

**Monthly Revenue Requirements per fixture**

|  |         |          |                  | Current Rates   |          |          | Adjusted without Base Cost of Fuel |          |          | Base Fuel E8760 |         |
|--|---------|----------|------------------|-----------------|----------|----------|------------------------------------|----------|----------|-----------------|---------|
|  |         |          |                  | Option 1        | Option 2 | Option 3 | Option 1                           | Option 2 | Option 3 | 0.02141         | 0.89601 |
| <b>Outdoor and Area Lighting Service - 76, 77</b>    |         |          |                  |                 |          |          |                                    |          |          |                 |         |
| <u>Mercury Vapor Lamps</u>                           |         |          |                  |                 |          |          |                                    |          |          |                 |         |
| Lumens   | Watts   | Old Code | Lamp Code        |                 |          |          |                                    |          |          |                 |         |
| 7,000  | 175 K   |          | MV175W           | Reddy (Area)    | \$12.99  | \$9.45   |                                    | 11.88    | 9.63     |                 |         |
| 20,000   | 400 M/P |          | MV400W / MV400W2 | Flood           | \$21.39  | \$15.72  |                                    | 18.65    | 12.87    |                 |         |
| 55,000   | 1,000 Q |          | MV1000W          | Flood           | \$41.63  | \$31.82  |                                    | 34.89    | 24.90    |                 |         |
| <u>Sodium Vapor Lamps</u>                            |         |          |                  |                 |          |          |                                    |          |          |                 |         |
| Lumens   | Watts   |          |                  |                 |          |          |                                    |          |          |                 |         |
| 8,500  | 100 I   |          | SV100W           | Reddy (Area)    | \$10.98  | \$6.65   | \$6.65                             | 12.05    | 6.97     | 6.97            |         |
| 14,000   | 150 X   |          | SV150W           | Reddy (Area)    | \$12.92  | \$8.63   |                                    | 13.91    | 8.89     |                 |         |
| 23,000   | 250 J/G |          | SV250W2 / SV250W | Flood           | \$18.57  | \$11.81  | \$11.88                            | 16.93    | 11.84    | 11.75           |         |
| 45,000   | 400 Z   |          | SV400W           | Flood           | \$25.38  | \$16.39  | \$13.75                            | 22.58    | 15.93    | 11.53           |         |
| <u>Metal Halide Lamps</u>                            |         |          |                  |                 |          |          |                                    |          |          |                 |         |
| Lumens   | Watts   |          |                  |                 |          |          |                                    |          |          |                 |         |
| 17,000   | 250 R   |          | MH250W           | Flood           | \$18.42  |          |                                    | 19.53    |          |                 |         |
| 28,800   | 400 S   |          | MH400W           | Flood           | \$23.15  | \$14.87  |                                    | 20.78    |          | 12.11           |         |
| 88,000   | 1,000 U |          | MH1000W          | Flood           | \$40.31  | \$29.34  |                                    | 33.88    |          | 22.70           |         |
| <u>Light Emitting Diode</u>                          |         |          |                  |                 |          |          |                                    |          |          |                 |         |
| Lumens   | Watts   |          |                  |                 |          |          |                                    |          |          |                 |         |
| 5,000  | ≤ 48 -  |          | LED48W           | Reddy (Area)    | \$9.49   |          |                                    | 10.79    |          |                 |         |
| 10,000   | ≤ 71    |          | LED71W           | Reddy (Area)    | \$0.00   |          |                                    | 13.06    |          |                 |         |
| <u>Light Emitting Diode</u>                          |         |          |                  |                 |          |          |                                    |          |          |                 |         |
| Lumens   | Watts   |          |                  |                 |          |          |                                    |          |          |                 |         |
| 24,000   | ≤184    |          | LED184W          | Flood (Outdoor) |          |          |                                    | 19.73    |          |                 |         |
| 43,500   | ≤316    |          | LED316W          | Flood (Outdoor) |          |          |                                    | 28.36    |          |                 |         |
| <b>Street and Highway Lighting Service - 80, 83,</b> |         |          |                  |                 |          |          |                                    |          |          |                 |         |
| <u>Mercury Vapor Lamps</u>                           |         |          |                  |                 |          |          |                                    |          |          |                 |         |
| Lumens   | Watts   |          |                  |                 |          |          |                                    |          |          |                 |         |
| 7,000  | 175 K   |          | MV175W           | Roadway         | \$17.33  | \$9.72   | \$9.45                             | 16.21    | 9.95     | 9.63            |         |
| 10,000   | 250 L   |          | MV250W           | Roadway         |          |          | \$12.10                            |          |          | 10.94           |         |
| 20,000   | 400 M   |          | MV400W           | Roadway         | \$24.36  | \$17.26  | \$16.79                            | 21.67    | 14.44    | 13.96           |         |
| 55,000   | 1,000 O |          | MV1000W2         | Roadway         |          |          | \$32.47                            |          |          | 25.56           |         |
| <u>Sodium Vapor Lamps</u>                            |         |          |                  |                 |          |          |                                    |          |          |                 |         |
| Lumens   | Watts   |          |                  |                 |          |          |                                    |          |          |                 |         |
| 8,500  | 100 I   |          | SV100W           | Roadway         | \$14.41  | \$7.62   | \$7.27                             | 16.07    | 8.11     | 7.69            |         |
| 14,000   | 150 X   |          | SV150W           | Roadway         | \$16.92  | \$9.78   | \$9.52                             | 18.60    | 10.23    | 9.93            |         |
| 14,000   | 150 A   |          | SV150W-P         | Roadway         |          |          | \$9.06                             |          |          | 9.21            |         |
| 20,500   | 200 F   |          | SV200W           | Roadway         | \$20.11  | \$11.87  | \$11.74                            | 19.65    | 12.06    | 11.90           |         |
| 23,000   | 250 G   |          | SV250W           | Roadway         | \$21.69  | \$12.97  | \$12.67                            | 20.11    | 13.21    | 12.78           |         |
| 45,000   | 400 Z   |          | SV400W           | Roadway         | \$27.38  | \$18.11  | \$17.25                            | 24.62    | 17.70    | 14.30           |         |
| <u>Metal Halide Lamps</u>                            |         |          |                  |                 |          |          |                                    |          |          |                 |         |
| Lumens   | Watts   |          |                  |                 |          |          |                                    |          |          |                 |         |
| 28,800   | 400 S   |          | MH400W           | Roadway         |          | \$16.14  |                                    | -        | 15.76    | -               |         |
| <u>Light Emitting Diode</u>                          |         |          |                  |                 |          |          |                                    |          |          |                 |         |
| Lumens   | Watts   |          |                  |                 |          |          |                                    |          |          |                 |         |
| 4,000  | ≤ 54 W  |          | LED54W           | Roadway         | \$13.10  |          |                                    | 14.98    |          |                 |         |
| 8,800  | ≤ 118 Y |          | LED118W          | Roadway         | \$17.39  |          |                                    | 19.56    |          |                 |         |
| 23,000   | ≤ 219 - |          | LED219W          | Roadway         | \$22.55  |          |                                    | 24.14    |          |                 |         |
| 30,000   | ≤278    |          | LED278W          | Roadway         | \$0.00   |          |                                    | 24.43    |          |                 |         |

**Option 4**

|                       |           |           |
|-----------------------|-----------|-----------|
| Customer Charge       |           | \$3.34    |
| Energy Charge (¢/kWh) | \$0.07142 | \$0.06020 |
| <b>Pole Costs</b>     |           |           |
| Pole Charge           | \$6.64    | \$11.00   |

The amounts identified by grey shading are not applicable to Minnesota Power's customers.

| kWh Calculations  |         | Old Code         | Lamp Code   | Daily Est | Total kWh | January | February | March | April | May | June | July | August | September | October | November | December | 31 |
|---|---------|------------------|-------------|-----------|-----------|---------|----------|-------|-------|-----|------|------|--------|-----------|---------|----------|----------|----|
|   |         |                  |             |           | 4,200     | 462     | 379      | 367   | 302   | 264 | 233  | 252  | 294    | 336       | 401     | 435      | 475      |    |
| <b>Burning Hours</b>                                    |         |                  |             |           |           |         |          |       |       |     |      |      |        |           |         |          |          |    |
| <b>Outdoor and Area Lighting Service - 76, 77</b>       |         |                  |             |           |           |         |          |       |       |     |      |      |        |           |         |          |          |    |
| <b>Mercury Vapor Lamps</b>                              |         |                  |             |           |           |         |          |       |       |     |      |      |        |           |         |          |          |    |
| Lumens  | Watts   |                  |             |           |           |         |          |       |       |     |      |      |        |           |         |          |          |    |
| 7,000   | 175 K   | MV175W           | 2.432876712 | 888       | 98        | 80      | 78       | 64    | 56    | 49  | 53   | 62   | 71     | 85        | 92      | 100      |          |    |
| 20,000  | 400 M/P | MV400W / MV400W2 | 5.293150685 | 1,932     | 213       | 174     | 169      | 139   | 121   | 107 | 116  | 135  | 155    | 184       | 200     | 218      |          |    |
| 55,000  | 1,000 Q | MV1000W          | 12.65753425 | 4,620     | 508       | 417     | 404      | 332   | 290   | 256 | 277  | 323  | 370    | 441       | 478     | 522      |          |    |
| <b>Sodium Vapor Lamps</b>                               |         |                  |             |           |           |         |          |       |       |     |      |      |        |           |         |          |          |    |
| Lumens  | Watts   |                  |             |           |           |         |          |       |       |     |      |      |        |           |         |          |          |    |
| 8,500   | 100 I   | SV100W           | 1.380821918 | 504       | 55        | 45      | 44       | 36    | 32    | 28  | 30   | 35   | 40     | 48        | 52      | 57       |          |    |
| 14,000  | 150 X   | SV150W           | 2.071232877 | 756       | 83        | 68      | 66       | 54    | 48    | 42  | 45   | 53   | 60     | 72        | 78      | 85       |          |    |
| 23,000  | 250 J/G | SV250W2 / SV250W | 3.353424658 | 1,224     | 135       | 110     | 107      | 88    | 77    | 68  | 73   | 86   | 98     | 117       | 127     | 138      |          |    |
| 45,000  | 400 Z   | SV400W           | 5.523287671 | 2,016     | 222       | 182     | 176      | 145   | 127   | 112 | 121  | 141  | 161    | 192       | 209     | 228      |          |    |
| <b>Metal Halide Lamps</b>                               |         |                  |             |           |           |         |          |       |       |     |      |      |        |           |         |          |          |    |
| Lumens  | Watts   |                  |             |           |           |         |          |       |       |     |      |      |        |           |         |          |          |    |
| 17,000  | 250 R   | MH250W           | 3.452054795 | 1,260     | 139       | 114     | 110      | 91    | 79    | 70  | 76   | 88   | 101    | 120       | 130     | 142      |          |    |
| 28,800  | 400 S   | MH400W           | 5.293150685 | 1,932     | 213       | 174     | 169      | 139   | 121   | 107 | 116  | 135  | 155    | 184       | 200     | 218      |          |    |
| 88,000  | 1,000 U | MH1000W          | 12.08219178 | 4,410     | 485       | 398     | 385      | 317   | 277   | 245 | 265  | 309  | 353    | 421       | 457     | 499      |          |    |
| <b>Light Emitting Diode</b>                             |         |                  |             |           |           |         |          |       |       |     |      |      |        |           |         |          |          |    |
| Lumens  | Watts   |                  |             |           |           |         |          |       |       |     |      |      |        |           |         |          |          |    |
| 5,000   | ≤ 48 -  | LED48W           | 0.56717808  | 207       | 23        | 19      | 18       | 15    | 13    | 11  | 12   | 14   | 17     | 20        | 21      | 23       |          |    |
| 10,000  | ≤ 71    | LED71W           | 0.81698635  | 298       | 33        | 27      | 26       | 21    | 19    | 17  | 18   | 21   | 24     | 28        | 31      | 34       |          |    |
| <b>Light Emitting Diode</b>                             |         |                  |             |           |           |         |          |       |       |     |      |      |        |           |         |          |          |    |
| Lumens  | Watts   |                  |             |           |           |         |          |       |       |     |      |      |        |           |         |          |          |    |
| 24,000  | ≤184    | LED184W          | 2.11726040  | 773       | 85        | 70      | 68       | 56    | 49    | 43  | 46   | 54   | 62     | 74        | 80      | 87       |          |    |
| 43,500  | ≤316    | LED316W          | 3.63616460  | 1,327     | 146       | 120     | 116      | 95    | 83    | 74  | 80   | 93   | 106    | 127       | 137     | 150      |          |    |
| <b>Street and Highway Lighting Service - 80, 83, 84</b> |         |                  |             |           |           |         |          |       |       |     |      |      |        |           |         |          |          |    |
| <b>Mercury Vapor Lamps</b>                              |         |                  |             |           |           |         |          |       |       |     |      |      |        |           |         |          |          |    |
| Lumens  | Watts   |                  |             |           |           |         |          |       |       |     |      |      |        |           |         |          |          |    |
| 7,000   | 175 K   | MV175W           | 2.432876712 | 888       | 98        | 80      | 78       | 64    | 56    | 49  | 53   | 62   | 71     | 85        | 92      | 100      |          |    |
| 10,000  | 250 L   | MV250W           | 3.353424658 | 1,224     | 135       | 110     | 107      | 88    | 77    | 68  | 73   | 86   | 98     | 117       | 127     | 138      |          |    |
| 20,000  | 400 M   | MV400W           | 5.293150685 | 1,932     | 213       | 174     | 169      | 139   | 121   | 107 | 116  | 135  | 155    | 184       | 200     | 218      |          |    |
| 55,000  | 1,000 O | MV1000W2         | 12.65753425 | 4,620     | 508       | 417     | 404      | 332   | 290   | 256 | 277  | 323  | 370    | 441       | 478     | 522      |          |    |
| <b>Sodium Vapor Lamps</b>                               |         |                  |             |           |           |         |          |       |       |     |      |      |        |           |         |          |          |    |
| Lumens  | Watts   |                  |             |           |           |         |          |       |       |     |      |      |        |           |         |          |          |    |
| 8,500   | 100 I   | SV100W           | 1.380821918 | 504       | 55        | 45      | 44       | 36    | 32    | 28  | 30   | 35   | 40     | 48        | 52      | 57       |          |    |
| 14,000  | 150 X   | SV150W           | 2.071232877 | 756       | 83        | 68      | 66       | 54    | 48    | 42  | 45   | 53   | 60     | 72        | 78      | 85       |          |    |
| 14,000  | 150 A   | SV150W-P         | 1.282191781 | 468       | 51        | 42      | 41       | 34    | 29    | 26  | 28   | 33   | 37     | 45        | 48      | 53       |          |    |
| 20,500  | 200 F   | SV200W           | 3.123287671 | 1,140     | 125       | 103     | 100      | 82    | 72    | 63  | 68   | 80   | 91     | 109       | 118     | 129      |          |    |
| 23,000  | 250 G   | SV250W           | 3.353424658 | 1,224     | 135       | 110     | 107      | 88    | 77    | 68  | 73   | 86   | 98     | 117       | 127     | 138      |          |    |
| 45,000  | 400 Z   | SV400W           | 5.523287671 | 2,016     | 222       | 182     | 176      | 145   | 127   | 112 | 121  | 141  | 161    | 192       | 209     | 228      |          |    |
| <b>Metal Halide Lamps</b>                               |         |                  |             |           |           |         |          |       |       |     |      |      |        |           |         |          |          |    |
| Lumens  | Watts   |                  |             |           |           |         |          |       |       |     |      |      |        |           |         |          |          |    |
| 28,800  | 400 S   | MH400W           | 5.293150685 | 1,932     | 213       | 174     | 169      | 139   | 121   | 107 | 116  | 135  | 155    | 184       | 200     | 218      |          |    |
| <b>Light Emitting Diode</b>                             |         |                  |             |           |           |         |          |       |       |     |      |      |        |           |         |          |          |    |
| Lumens  | Watts   |                  |             |           |           |         |          |       |       |     |      |      |        |           |         |          |          |    |
| 4,000   | ≤ 54 W  | LED54W           | 0.62136990  | 227       | 25        | 20      | 20       | 16    | 14    | 13  | 14   | 16   | 18     | 22        | 23      | 26       |          |    |
| 8,800   | ≤ 118 Y | LED118W          | 1.35780830  | 496       | 55        | 45      | 43       | 36    | 31    | 27  | 30   | 35   | 40     | 47        | 51      | 56       |          |    |
| 23,000  | ≤ 219 - | LED219W          | 2.52000015  | 920       | 101       | 83      | 80       | 66    | 58    | 51  | 55   | 64   | 74     | 88        | 95      | 104      |          |    |
| 30,000  | ≤278    | LED278W          | 3.19890430  | 1,168     | 128       | 105     | 102      | 84    | 73    | 65  | 70   | 82   | 93     | 111       | 121     | 132      |          |    |

Option 4

All Metered Lighting 4,920,674

**Flood Fixtures - Outdoor Lighting Service**  
**Rate Code 76**

| Bulb Type  | Light Emitting Diode<br>LED184W |                 |                 | Light Emitting Diode<br>LED316W |                   |                   | Mercury Vapor<br>MV400W / MV400W2 |                 |                 |
|--|---------------------------------|-----------------|-----------------|---------------------------------|-------------------|-------------------|-----------------------------------|-----------------|-----------------|
|  | Option 1                        | Option 2        | Option 3        | Option 1                        | Option 2          | Option 3          | Option 1                          | Option 2        | Option 3        |
| Lumens   | 30,000                          |                 |                 | 0                               |                   |                   | 20,000                            | 20,000          |                 |
| Watt   | ≤278                            |                 |                 | 0                               |                   |                   | 400                               | 400             |                 |
| Number of fixtures   | 0                               | 0               | 0               | 0                               | 0                 | 0                 | 105                               | 5               | 0               |
| Annual kWh per fixture   | 701                             | 701             | 701             | 1,327                           | 1,327             | 1,327             | 1,932                             | 1,932           | 1,932           |
| <b><u>Investment</u></b>   |                                 |                 |                 |                                 |                   |                   |                                   |                 |                 |
| Conductor  | 49.50                           | 49.50           | 49.50           | 49.50                           | 49.50             | 49.50             | \$49.50                           | \$49.50         | \$49.50         |
| Fixture - includes mast arm, ballast (non-LED), and lamp (LED)           | \$436.67                        | \$436.67        | \$436.67        | \$809.45                        | \$809.45          | \$809.45          | \$0.00                            | \$0.00          | \$0.00          |
| Lamp - non-LED   |                                 |                 |                 |                                 |                   |                   | \$8.21                            | \$8.21          | \$8.21          |
| Light Installation   | \$336.65                        | \$336.65        | \$336.65        | \$336.65                        | \$336.65          | \$336.65          | \$336.65                          | \$336.65        | \$336.65        |
| Photo Eye  | \$14.20                         | \$14.20         | \$14.20         | \$14.20                         | \$14.20           | \$14.20           | \$4.85                            | \$4.85          | \$4.85          |
| <i>Subtotal</i>  | <i>\$837.02</i>                 | <i>\$837.02</i> | <i>\$837.02</i> | <i>\$1,209.80</i>               | <i>\$1,209.80</i> | <i>\$1,209.80</i> | <i>\$399.21</i>                   | <i>\$399.21</i> | <i>\$399.21</i> |
| A&G Expense  | \$100.44                        | \$100.44        | \$100.44        | \$145.18                        | \$145.18          | \$145.18          | \$47.91                           | \$47.91         | \$47.91         |
| Material Handling Expense  | \$83.70                         | \$83.70         | \$83.70         | \$120.98                        | \$120.98          | \$120.98          | \$39.92                           | \$39.92         | \$39.92         |
| Sales Tax  | \$57.55                         | \$57.55         | \$57.55         | \$83.17                         | \$83.17           | \$83.17           | \$27.45                           | \$27.45         | \$27.45         |
| Total Investment   | \$1,078.71                      | \$1,078.71      | \$1,078.71      | \$1,559.13                      | \$1,559.13        | \$1,559.13        | \$514.48                          | \$514.48        | \$514.48        |
| <b><u>Annual Costs per fixture</u></b>                                   |                                 |                 |                 |                                 |                   |                   |                                   |                 |                 |
| Fixed Charges  | \$114.34                        | \$114.34        | \$114.34        | \$165.27                        | \$165.27          | \$165.27          | \$54.54                           | \$54.54         | \$54.54         |
| Maintenance  | \$61.49                         | \$61.49         | \$61.49         | \$88.87                         | \$88.87           | \$155.91          | \$29.33                           | \$29.33         |                 |
| Replacement - Fixture  | \$21.83                         | \$21.83         | \$21.83         | \$40.47                         | \$40.47           | \$40.47           | \$0.00                            |                 |                 |
| Replacement - Materials - Photo Eye, Driver (LED), and lamp (non-LED)    | \$2.12                          | \$2.12          | \$2.12          | \$2.12                          | \$2.12            | \$2.12            | \$1.95                            | \$1.95          | \$1.95          |
| Replacement - Labor Costs  | \$14.43                         | \$14.43         | \$14.43         | \$14.43                         | \$14.43           | \$14.43           | \$43.07                           | \$43.07         | \$43.07         |
| Billing and Collections  | \$2.00                          | \$2.00          | \$2.00          | \$2.00                          | \$2.00            | \$2.00            | \$2.00                            | \$2.00          | \$2.00          |
| <i>Subtotal</i>  | <i>\$216.21</i>                 | <i>\$216.21</i> | <i>\$216.21</i> | <i>\$313.16</i>                 | <i>\$313.16</i>   | <i>\$380.21</i>   | <i>\$130.88</i>                   | <i>\$130.88</i> | <i>\$101.56</i> |
| A&G Expense  | \$25.95                         | \$25.95         | \$25.95         | \$37.58                         | \$37.58           | \$45.62           | \$15.71                           | \$15.71         | \$12.19         |
| Total Annual Costs per fixture   | \$242.16                        | \$242.16        | \$242.16        | \$350.74                        | \$350.74          | \$425.83          | \$146.59                          | \$146.59        | \$113.74        |
| <b><u>Annual Energy Revenue per fixture</u></b>                          |                                 |                 |                 |                                 |                   |                   |                                   |                 |                 |
|  | \$5.77                          | \$5.77          | \$5.77          | \$10.92                         | \$10.92           | \$10.92           | \$15.90                           | \$15.90         | \$15.90         |
| <b><u>Annual Revenue Requirement per fixture</u></b>                     |                                 |                 |                 |                                 |                   |                   |                                   |                 |                 |
|  | \$247.93                        | \$247.93        | \$247.93        | \$361.66                        | \$361.66          | \$436.75          | \$162.48                          | \$162.48        | \$129.64        |
| <b><u>Total Annual Revenue</u></b>                                       |                                 |                 |                 |                                 |                   |                   |                                   |                 |                 |
|  | \$0.00                          | \$0.00          | \$0.00          | \$0.00                          | \$0.00            | \$0.00            | \$17,060.86                       | \$812.42        | \$0.00          |
| <b><u>Annual Base Rate Fuel per fixture</u></b>                          |                                 |                 |                 |                                 |                   |                   |                                   |                 |                 |
|  | \$2.24                          | \$2.24          | \$2.24          | \$4.25                          | \$4.25            | \$4.25            | \$6.18                            | \$6.18          | \$6.18          |
| <b><u>Annual Revenue Requirement plus Base Rate Fuel per fixture</u></b> |                                 |                 |                 |                                 |                   |                   |                                   |                 |                 |
|  | \$250.17                        | \$250.17        | \$250.17        | \$365.91                        | \$365.91          | \$440.99          | \$168.67                          | \$168.67        | \$135.82        |
| <b><u>Total Annual Revenue plus Base Rate Fuel</u></b>                   |                                 |                 |                 |                                 |                   |                   |                                   |                 |                 |
|  | \$0.00                          | \$0.00          | \$0.00          | \$0.00                          | \$0.00            | \$0.00            | \$17,710.01                       | \$843.33        | \$0.00          |
| <b><u>Adjusted Annual Revenue per fixture</u></b>                        |                                 |                 |                 |                                 |                   |                   |                                   |                 |                 |
|  | \$250.17                        | \$0.00          | \$0.00          | \$365.91                        | \$0.00            | \$0.00            | \$256.68                          | \$188.64        | \$0.00          |
| <b><u>Adjusted Total Annual Revenue</u></b>                              |                                 |                 |                 |                                 |                   |                   |                                   |                 |                 |
|  | \$0.00                          | \$0.00          | \$0.00          | \$0.00                          | \$0.00            | \$0.00            | \$26,951.40                       | \$943.20        | \$0.00          |

**Flood Fixtures - Outdoor Lighting Service**  
**Rate Code 76**

| Bulb Type   | Mercury Vapor<br>MV1000W |                 |                 | Metal Halide<br>MH250W |                 |                 | Metal Halide<br>MH400W |                 |                 |
|---|--------------------------|-----------------|-----------------|------------------------|-----------------|-----------------|------------------------|-----------------|-----------------|
|   | Option 1                 | Option 2        | Option 3        | Option 1               | Option 2        | Option 3        | Option 1               | Option 2        | Option 3        |
| Lumens  | 55,000                   | 55,000          |                 | 17,000                 |                 |                 | 28,800                 |                 | 28,800          |
| Watt  | 1,000                    | 1,000           |                 | 250                    |                 |                 | 400                    |                 | 400             |
| Number of fixtures  | 1                        | 1               | 0               | 159                    | 0               | 0               | 233                    | 0               | 0               |
| Annual kWh per fixture  | 4,620                    | 4,620           | 4,620           | 1,260                  | 1,260           | 1,260           | 1,932                  | 1,932           | 1,932           |
| <b>Investment</b>   |                          |                 |                 |                        |                 |                 |                        |                 |                 |
| Conductor   | \$49.50                  | \$49.50         | \$49.50         | \$49.50                | \$49.50         | \$49.50         | \$49.50                | \$49.50         | \$49.50         |
| Fixture - includes mast arm, ballast (non-LED), and lamp (LED)        | \$0.00                   | \$0.00          | \$0.00          | \$275.95               | \$275.95        | \$275.95        | \$275.95               | \$275.95        | \$275.95        |
| Lamp - non-LED  | \$32.71                  | \$32.71         | \$32.71         | \$13.32                | \$13.32         | \$13.32         | \$13.11                | \$13.11         | \$13.11         |
| Light Installation  | \$336.65                 | \$336.65        | \$336.65        | \$336.65               | \$336.65        | \$336.65        | \$336.65               | \$336.65        | \$336.65        |
| Photo Eye   | \$4.85                   | \$4.85          | \$4.85          | \$4.85                 | \$4.85          | \$4.85          | \$4.85                 | \$4.85          | \$4.85          |
| <i>Subtotal</i>   | <i>\$423.71</i>          | <i>\$423.71</i> | <i>\$423.71</i> | <i>\$680.27</i>        | <i>\$680.27</i> | <i>\$680.27</i> | <i>\$680.06</i>        | <i>\$680.06</i> | <i>\$680.06</i> |
| A&G Expense   | \$50.85                  | \$50.85         | \$50.85         | \$81.63                | \$81.63         | \$81.63         | \$81.61                | \$81.61         | \$81.61         |
| Material Handling Expense   | \$42.37                  | \$42.37         | \$42.37         | \$68.03                | \$68.03         | \$68.03         | \$68.01                | \$68.01         | \$68.01         |
| Sales Tax   | \$29.13                  | \$29.13         | \$29.13         | \$46.77                | \$46.77         | \$46.77         | \$46.75                | \$46.75         | \$46.75         |
| Total Investment  | \$546.06                 | \$546.06        | \$546.06        | \$876.70               | \$876.70        | \$876.70        | \$876.43               | \$876.43        | \$876.43        |
| <b>Annual Costs per fixture</b>                                       |                          |                 |                 |                        |                 |                 |                        |                 |                 |
| Fixed Charges   | \$57.88                  | \$57.88         | \$57.88         | \$92.93                | \$92.93         | \$92.93         | \$92.90                | \$92.90         | \$92.90         |
| Maintenance   | \$31.13                  | \$31.13         |                 | \$49.97                | \$49.97         |                 | \$49.96                | \$49.96         |                 |
| Replacement - Fixture   | \$0.00                   |                 |                 | \$41.19                |                 |                 | \$41.19                |                 |                 |
| Replacement - Materials - Photo Eye, Driver (LED), and lamp (non-LED) | \$5.61                   | \$5.61          | \$5.61          | \$2.71                 | \$2.71          | \$2.71          | \$2.68                 | \$2.68          | \$2.68          |
| Replacement - Labor Costs   | \$43.07                  | \$43.07         | \$43.07         | \$43.07                | \$43.07         | \$43.07         | \$43.07                | \$43.07         | \$43.07         |
| Billing and Collections   | \$2.00                   | \$2.00          | \$2.00          | \$2.00                 | \$2.00          | \$2.00          | \$2.00                 | \$2.00          | \$2.00          |
| <i>Subtotal</i>   | <i>\$139.69</i>          | <i>\$139.69</i> | <i>\$108.56</i> | <i>\$231.87</i>        | <i>\$190.69</i> | <i>\$140.71</i> | <i>\$231.80</i>        | <i>\$190.61</i> | <i>\$140.65</i> |
| A&G Expense   | \$16.76                  | \$16.76         | \$13.03         | \$27.82                | \$22.88         | \$16.89         | \$27.82                | \$22.87         | \$16.88         |
| Total Annual Costs per fixture  | \$156.45                 | \$156.45        | \$121.59        | \$259.70               | \$213.57        | \$157.60        | \$259.61               | \$213.48        | \$157.53        |
| <b>Annual Energy Revenue per fixture</b>                              |                          |                 |                 |                        |                 |                 |                        |                 |                 |
|   | \$38.01                  | \$38.01         | \$38.01         | \$10.37                | \$10.37         | \$10.37         | \$15.90                | \$15.90         | \$15.90         |
| <b>Annual Revenue Requirement per fixture</b>                         |                          |                 |                 |                        |                 |                 |                        |                 |                 |
|   | \$194.46                 | \$194.46        | \$159.60        | \$270.06               | \$223.94        | \$167.97        | \$275.51               | \$229.38        | \$173.43        |
| <b>Total Annual Revenue</b>   |                          |                 |                 |                        |                 |                 |                        |                 |                 |
|   | \$194.46                 | \$194.46        | \$0.00          | \$42,940.29            | \$0.00          | \$0.00          | \$64,193.65            | \$0.00          | \$0.00          |
| <b>Annual Base Rate Fuel per fixture</b>                              |                          |                 |                 |                        |                 |                 |                        |                 |                 |
|   | \$14.78                  | \$14.78         | \$14.78         | \$4.03                 | \$4.03          | \$4.03          | \$6.18                 | \$6.18          | \$6.18          |
| <b>Annual Revenue Requirement plus Base Rate Fuel per fixture</b>     |                          |                 |                 |                        |                 |                 |                        |                 |                 |
|   | \$209.24                 | \$209.24        | \$174.38        | \$274.10               | \$227.97        | \$172.00        | \$281.69               | \$235.56        | \$179.61        |
| <b>Total Annual Revenue plus Base Rate Fuel</b>                       |                          |                 |                 |                        |                 |                 |                        |                 |                 |
|   | \$209.24                 | \$209.24        | \$0.00          | \$43,581.38            | \$0.00          | \$0.00          | \$65,634.14            | \$0.00          | \$0.00          |
| <b>Adjusted Annual Revenue per fixture</b>                            |                          |                 |                 |                        |                 |                 |                        |                 |                 |
|   | \$499.56                 | \$381.84        | \$0.00          | \$254.20               | \$0.00          | \$0.00          | \$281.69               | \$0.00          | \$179.61        |
| <b>Adjusted Total Annual Revenue</b>                                  |                          |                 |                 |                        |                 |                 |                        |                 |                 |
|   | \$499.56                 | \$381.84        | \$0.00          | \$40,417.16            | \$0.00          | \$0.00          | \$65,634.14            | \$0.00          | \$0.00          |

**Flood Fixtures - Outdoor Lighting Service**  
**Rate Code 76**

| Bulb Type  | Metal Halide<br>MH1000W |                 |                 | Sodium Vapor<br>SV250W2 / SV250W |                 |                 | Sodium Vapor<br>SV400W |                 |                 |
|--|-------------------------|-----------------|-----------------|----------------------------------|-----------------|-----------------|------------------------|-----------------|-----------------|
|  | Option 1                | Option 2        | Option 3        | Option 1                         | Option 2        | Option 3        | Option 1               | Option 2        | Option 3        |
| Lumens   | 88,000                  |                 | 88,000          | 23,000                           | 23,000          | 23,000          | 45,000                 | 45,000          | 45,000          |
| Watt   | 1,000                   |                 | 1,000           | 250                              | 250             | 250             | 400                    | 400             | 400             |
| Number of fixtures   | 63                      | 0               | 0               | 898                              | 20              | 0               | 652                    | 12              | 0               |
| Annual kWh per fixture   | 4,410                   | 4,410           | 4,410           | 1,224                            | 1,224           | 1,224           | 2,016                  | 2,016           | 2,016           |
| <b><u>Investment</u></b>   |                         |                 |                 |                                  |                 |                 |                        |                 |                 |
| Conductor  | \$49.50                 | \$49.50         | \$49.50         | \$49.50                          | \$49.50         | \$49.50         | \$49.50                | \$49.50         | \$49.50         |
| Fixture - includes mast arm, ballast (non-LED), and lamp (LED)           | \$329.61                | \$329.61        | \$329.61        | \$125.18                         | \$125.18        | \$125.18        | \$252.79               | \$252.79        | \$252.79        |
| Lamp - non-LED   | \$26.34                 | \$26.34         | \$26.34         | \$10.02                          | \$10.02         | \$10.02         | \$13.23                | \$13.23         | \$13.23         |
| Light Installation   | \$336.65                | \$336.65        | \$336.65        | \$336.65                         | \$336.65        | \$336.65        | \$336.65               | \$336.65        | \$336.65        |
| Photo Eye  | \$4.85                  | \$4.85          | \$4.85          | \$4.85                           | \$4.85          | \$4.85          | \$4.85                 | \$4.85          | \$4.85          |
| <i>Subtotal</i>  | <i>\$746.95</i>         | <i>\$746.95</i> | <i>\$746.95</i> | <i>\$526.20</i>                  | <i>\$526.20</i> | <i>\$526.20</i> | <i>\$657.02</i>        | <i>\$657.02</i> | <i>\$657.02</i> |
| A&G Expense  | \$89.63                 | \$89.63         | \$89.63         | \$63.14                          | \$63.14         | \$63.14         | \$78.84                | \$78.84         | \$78.84         |
| Material Handling Expense  | \$74.69                 | \$74.69         | \$74.69         | \$52.62                          | \$52.62         | \$52.62         | \$65.70                | \$65.70         | \$65.70         |
| Sales Tax  | \$51.35                 | \$51.35         | \$51.35         | \$36.18                          | \$36.18         | \$36.18         | \$45.17                | \$45.17         | \$45.17         |
| Total Investment   | \$962.63                | \$962.63        | \$962.63        | \$678.14                         | \$678.14        | \$678.14        | \$846.73               | \$846.73        | \$846.73        |
| <b><u>Annual Costs per fixture</u></b>                                   |                         |                 |                 |                                  |                 |                 |                        |                 |                 |
| Fixed Charges  | \$102.04                | \$102.04        | \$102.04        | \$71.88                          | \$71.88         | \$71.88         | \$89.75                | \$89.75         | \$89.75         |
| Maintenance  | \$54.87                 | \$54.87         |                 | \$38.65                          | \$38.65         |                 | \$48.26                | \$48.26         |                 |
| Replacement - Fixture  | \$49.20                 |                 |                 | \$18.68                          |                 |                 | \$37.73                |                 |                 |
| Replacement - Materials - Photo Eye, Driver (LED), and lamp (non-LED)    | \$4.66                  | \$4.66          | \$4.66          | \$2.22                           | \$2.22          | \$2.22          | \$2.70                 | \$2.70          | \$2.70          |
| Replacement - Labor Costs  | \$43.07                 | \$43.07         | \$43.07         | \$43.07                          | \$43.07         | \$43.07         | \$43.07                | \$43.07         | \$43.07         |
| Billing and Collections  | \$2.00                  | \$2.00          | \$2.00          | \$2.00                           | \$2.00          | \$2.00          | \$2.00                 | \$2.00          | \$2.00          |
| <i>Subtotal</i>  | <i>\$255.83</i>         | <i>\$206.64</i> | <i>\$151.77</i> | <i>\$176.51</i>                  | <i>\$157.83</i> | <i>\$119.18</i> | <i>\$223.52</i>        | <i>\$185.79</i> | <i>\$137.53</i> |
| A&G Expense  | \$30.70                 | \$24.80         | \$18.21         | \$21.18                          | \$18.94         | \$14.30         | \$26.82                | \$22.29         | \$16.50         |
| Total Annual Costs per fixture   | \$286.53                | \$231.43        | \$169.98        | \$197.69                         | \$176.77        | \$133.48        | \$250.34               | \$208.08        | \$154.03        |
| <b><u>Annual Energy Revenue per fixture</u></b>                          |                         |                 |                 |                                  |                 |                 |                        |                 |                 |
|  | \$36.28                 | \$36.28         | \$36.28         | \$10.07                          | \$10.07         | \$10.07         | \$16.59                | \$16.59         | \$16.59         |
| <b><u>Annual Revenue Requirement per fixture</u></b>                     |                         |                 |                 |                                  |                 |                 |                        |                 |                 |
|  | \$322.82                | \$267.72        | \$206.26        | \$207.76                         | \$186.84        | \$143.55        | \$266.93               | \$224.67        | \$170.62        |
| <b><u>Total Annual Revenue</u></b>                                       |                         |                 |                 |                                  |                 |                 |                        |                 |                 |
|  | \$20,337.44             | \$0.00          | \$0.00          | \$186,572.81                     | \$3,736.78      | \$0.00          | \$174,037.16           | \$2,696.05      | \$0.00          |
| <b><u>Annual Base Rate Fuel per fixture</u></b>                          |                         |                 |                 |                                  |                 |                 |                        |                 |                 |
|  | \$14.11                 | \$14.11         | \$14.11         | \$3.92                           | \$3.92          | \$3.92          | \$6.45                 | \$6.45          | \$6.45          |
| <b><u>Annual Revenue Requirement plus Base Rate Fuel per fixture</u></b> |                         |                 |                 |                                  |                 |                 |                        |                 |                 |
|  | \$336.93                | \$281.83        | \$220.38        | \$211.68                         | \$190.76        | \$147.46        | \$273.38               | \$231.12        | \$177.07        |
| <b><u>Total Annual Revenue plus Base Rate Fuel</u></b>                   |                         |                 |                 |                                  |                 |                 |                        |                 |                 |
|  | \$21,226.50             | \$0.00          | \$0.00          | \$190,090.10                     | \$3,815.12      | \$0.00          | \$178,243.34           | \$2,773.46      | \$0.00          |
| <b><u>Adjusted Annual Revenue per fixture</u></b>                        |                         |                 |                 |                                  |                 |                 |                        |                 |                 |
|  | \$483.72                | \$0.00          | \$352.08        | \$222.84                         | \$162.98        | \$147.46        | \$304.56               | \$226.18        | \$177.07        |
| <b><u>Adjusted Total Annual Revenue</u></b>                              |                         |                 |                 |                                  |                 |                 |                        |                 |                 |
|  | \$30,474.36             | \$0.00          | \$0.00          | \$200,110.32                     | \$3,259.56      | \$0.00          | \$198,573.12           | \$2,714.18      | \$0.00          |

The amounts identified by grey shading are not applicable to Minnesota Power's customers.

**Reddy (Area) Fixtures - Area Lighting Service**  
**Rate Code 77**

| Bulb Type  | Light Emitting Diode<br>LED48W |                 |                 | Light Emitting Diode<br>LED71W |                 |                 | Mercury Vapor<br>MV175W |                 |                 |
|--|--------------------------------|-----------------|-----------------|--------------------------------|-----------------|-----------------|-------------------------|-----------------|-----------------|
|  | Option 1                       | Option 2        | Option 3        | Option 1                       | Option 2        | Option 3        | Option 1                | Option 2        | Option 3        |
| Lumens   | 4,674                          |                 |                 | 9,479                          |                 |                 | 7,000                   | 7,000           |                 |
| Watt   | ≤ 48                           |                 |                 | ≤ 71                           |                 |                 | 175                     | 175             |                 |
| Number of fixtures   | 0                              | 0               | 0               | 0                              | 0               | 0               | 977                     | 107             | 0               |
| Annual kWh per fixture   | 207                            | 207             | 207             | 298                            | 298             | 298             | 888                     | 888             | 888             |
| <b><u>Investment</u></b>   |                                |                 |                 |                                |                 |                 |                         |                 |                 |
| Conductor  | \$49.50                        | \$49.50         | \$49.50         | \$49.50                        | \$49.50         | \$49.50         | \$49.50                 | \$49.50         | \$49.50         |
| Fixture - includes mast arm, ballast (non-LED), and lamp (LED)           | \$156.69                       | \$156.69        | \$156.69        | \$146.74                       | \$146.74        | \$146.74        | \$0.00                  | \$0.00          | \$0.00          |
| Lamp - non-LED   |                                |                 |                 |                                |                 |                 | \$8.83                  | \$8.83          | \$8.83          |
| Light Installation   | \$336.65                       | \$336.65        | \$336.65        | \$336.65                       | \$336.65        | \$336.65        | \$336.65                | \$336.65        | \$336.65        |
| Photo Eye  | \$14.20                        | \$14.20         | \$14.20         | \$14.20                        | \$14.20         | \$14.20         | \$4.85                  | \$4.85          | \$4.85          |
| <i>Subtotal</i>  | <i>\$557.04</i>                | <i>\$557.04</i> | <i>\$557.04</i> | <i>\$547.09</i>                | <i>\$547.09</i> | <i>\$547.09</i> | <i>\$399.83</i>         | <i>\$399.83</i> | <i>\$399.83</i> |
| A&G Expense  | \$66.84                        | \$66.84         | \$66.84         | \$65.65                        | \$65.65         | \$65.65         | \$47.98                 | \$47.98         | \$47.98         |
| Material Handling Expense  | \$55.70                        | \$55.70         | \$55.70         | \$54.71                        | \$54.71         | \$54.71         | \$39.98                 | \$39.98         | \$39.98         |
| Sales Tax  | \$38.30                        | \$38.30         | \$38.30         | \$37.61                        | \$37.61         | \$37.61         | \$27.49                 | \$27.49         | \$27.49         |
| Total Investment   | \$717.88                       | \$717.88        | \$717.88        | \$705.06                       | \$705.06        | \$705.06        | \$515.28                | \$515.28        | \$515.28        |
| <b><u>Annual Costs per fixture</u></b>                                   |                                |                 |                 |                                |                 |                 |                         |                 |                 |
| Fixed Charges  | \$76.10                        | \$76.10         | \$76.10         | \$74.74                        | \$74.74         | \$74.74         | \$54.62                 | \$54.62         | \$54.62         |
| Maintenance  | \$40.92                        | \$40.92         |                 | \$40.19                        | \$40.19         | \$40.19         | \$29.37                 | \$29.37         |                 |
| Replacement - Fixture  | \$7.83                         |                 |                 | \$7.34                         | \$7.34          | \$7.34          | \$0.00                  |                 |                 |
| Replacement - Materials - Photo Eye, Driver (LED), and lamp (non-LED)    | \$0.71                         | \$0.71          | \$0.71          | \$0.71                         | \$0.71          | \$0.71          | \$2.04                  | \$2.04          | \$2.04          |
| Replacement - Labor Costs  | \$14.43                        | \$14.43         | \$14.43         | \$14.43                        | \$14.43         | \$14.43         | \$43.07                 | \$43.07         | \$43.07         |
| Billing and Collections  | \$2.00                         | \$2.00          | \$2.00          | \$2.00                         | \$2.00          | \$2.00          | \$2.00                  | \$2.00          | \$2.00          |
| <i>Subtotal</i>  | <i>\$141.99</i>                | <i>\$134.16</i> | <i>\$93.24</i>  | <i>\$139.40</i>                | <i>\$139.40</i> | <i>\$139.40</i> | <i>\$131.11</i>         | <i>\$131.11</i> | <i>\$101.73</i> |
| A&G Expense  | \$17.04                        | \$16.10         | \$11.19         | \$16.73                        | \$16.73         | \$16.73         | \$15.73                 | \$15.73         | \$12.21         |
| Total Annual Costs per fixture   | \$159.03                       | \$150.26        | \$104.43        | \$156.13                       | \$156.13        | \$156.13        | \$146.84                | \$146.84        | \$113.94        |
| <b><u>Annual Energy Revenue per fixture</u></b>                          |                                |                 |                 |                                |                 |                 |                         |                 |                 |
|  | \$1.70                         | \$1.70          | \$1.70          | \$2.45                         | \$2.45          | \$2.45          | \$7.31                  | \$7.31          | \$7.31          |
| <b><u>Annual Revenue Requirement per fixture</u></b>                     |                                |                 |                 |                                |                 |                 |                         |                 |                 |
|  | \$160.73                       | \$151.96        | \$106.13        | \$158.58                       | \$158.58        | \$158.58        | \$154.14                | \$154.14        | \$121.25        |
| <b><u>Total Annual Revenue</u></b>                                       |                                |                 |                 |                                |                 |                 |                         |                 |                 |
|  | \$0.00                         | \$0.00          | \$0.00          | \$0.00                         | \$0.00          | \$0.00          | \$150,598.86            | \$16,493.43     | \$0.00          |
| <b><u>Annual Base Rate Fuel per fixture</u></b>                          |                                |                 |                 |                                |                 |                 |                         |                 |                 |
|  | \$0.66                         | \$0.66          | \$0.66          | \$0.95                         | \$0.95          | \$0.95          | \$2.84                  | \$2.84          | \$2.84          |
| <b><u>Annual Revenue Requirement plus Base Rate Fuel per fixture</u></b> |                                |                 |                 |                                |                 |                 |                         |                 |                 |
|  | \$161.40                       | \$152.62        | \$106.79        | \$159.54                       | \$159.54        | \$159.54        | \$156.99                | \$156.99        | \$124.09        |
| <b><u>Total Annual Revenue plus Base Rate Fuel</u></b>                   |                                |                 |                 |                                |                 |                 |                         |                 |                 |
|  | \$0.00                         | \$0.00          | \$0.00          | \$0.00                         | \$0.00          | \$0.00          | \$153,375.11            | \$16,797.48     | \$0.00          |
| <b><u>Adjusted Annual Revenue Requirement per fixture</u></b>            |                                |                 |                 |                                |                 |                 |                         |                 |                 |
|  | \$130.96                       | \$0.00          | \$0.00          | \$159.54                       | \$0.00          | \$0.00          | \$156.99                | \$130.41        | \$0.00          |
| <b><u>Adjusted Total Annual Revenue</u></b>                              |                                |                 |                 |                                |                 |                 |                         |                 |                 |
|  | \$0.00                         | \$0.00          | \$0.00          | \$0.00                         | \$0.00          | \$0.00          | \$153,375.11            | \$13,953.87     | \$0.00          |

**Reddy (Area) Fixtures - Area Lighting Service**  
**Rate Code 77**

| Bulb Type  | Sodium Vapor<br>SV100W |                 |                 | Sodium Vapor<br>SV150W |                 |                 |
|--|------------------------|-----------------|-----------------|------------------------|-----------------|-----------------|
|  | Option 1               | Option 2        | Option 3        | Option 1               | Option 2        | Option 3        |
| Lumens   | 8,500                  | 8,500           | 8,500           | 14,000                 | 14,000          |                 |
| Watt   | 100                    | 100             | 100             | 150                    | 150             |                 |
| Number of fixtures   | 2,522                  | 40              | 1               | 336                    | 2               | 0               |
| Annual kWh per fixture   | 504                    | 504             | 504             | 756                    | 756             | 756             |
| <b><u>Investment</u></b>   |                        |                 |                 |                        |                 |                 |
| Conductor  | \$49.50                | \$49.50         | \$49.50         | \$49.50                | \$49.50         | \$49.50         |
| Fixture - includes mast arm, ballast (non-LED), and lamp (LED)           | \$90.74                | \$90.74         | \$90.74         | \$95.10                | \$95.10         | \$95.10         |
| Lamp - non-LED   | \$10.17                | \$10.17         | \$10.17         | \$10.03                | \$10.03         | \$10.03         |
| Light Installation   | \$336.65               | \$336.65        | \$336.65        | \$336.65               | \$336.65        | \$336.65        |
| Photo Eye  | \$4.85                 | \$4.85          | \$4.85          | \$4.85                 | \$4.85          | \$4.85          |
| <i>Subtotal</i>  | <i>\$491.91</i>        | <i>\$491.91</i> | <i>\$491.91</i> | <i>\$496.13</i>        | <i>\$496.13</i> | <i>\$496.13</i> |
| A&G Expense  | \$59.03                | \$59.03         | \$59.03         | \$59.54                | \$59.54         | \$59.54         |
| Material Handling Expense  | \$49.19                | \$49.19         | \$49.19         | \$49.61                | \$49.61         | \$49.61         |
| Sales Tax  | \$33.82                | \$33.82         | \$33.82         | \$34.11                | \$34.11         | \$34.11         |
| Total Investment   | \$633.95               | \$633.95        | \$633.95        | \$639.39               | \$639.39        | \$639.39        |
| <b><u>Annual Costs per fixture</u></b>                                   |                        |                 |                 |                        |                 |                 |
| Fixed Charges  | \$67.20                | \$67.20         | \$67.20         | \$67.78                | \$67.78         | \$67.78         |
| Maintenance  | \$36.14                | \$36.14         |                 | \$36.45                | \$36.45         |                 |
| Replacement - Fixture  | \$13.54                |                 |                 | \$14.19                |                 |                 |
| Replacement - Materials - Photo Eye, Driver (LED), and lamp (non-LED)    | \$2.24                 | \$2.24          | \$2.24          | \$2.22                 | \$2.22          | \$2.22          |
| Replacement - Labor Costs  | \$43.07                | \$43.07         | \$43.07         | \$43.07                | \$43.07         | \$43.07         |
| Billing and Collections  | \$2.00                 | \$2.00          | \$2.00          | \$2.00                 | \$2.00          | \$2.00          |
| <i>Subtotal</i>  | <i>\$164.19</i>        | <i>\$150.65</i> | <i>\$114.51</i> | <i>\$165.71</i>        | <i>\$151.51</i> | <i>\$115.07</i> |
| A&G Expense  | \$19.70                | \$18.08         | \$13.74         | \$19.88                | \$18.18         | \$13.81         |
| Total Annual Costs per fixture   | \$183.89               | \$168.73        | \$128.25        | \$185.59               | \$169.70        | \$128.88        |
| <b><u>Annual Energy Revenue per fixture</u></b>                          |                        |                 |                 |                        |                 |                 |
|  | \$4.15                 | \$4.15          | \$4.15          | \$6.22                 | \$6.22          | \$6.22          |
| <b><u>Annual Revenue Requirement per fixture</u></b>                     |                        |                 |                 |                        |                 |                 |
|  | \$188.04               | \$172.87        | \$132.40        | \$191.81               | \$175.92        | \$135.10        |
| <b><u>Total Annual Revenue</u></b>                                       |                        |                 |                 |                        |                 |                 |
|  | \$474,240.07           | \$6,914.91      | \$132.40        | \$64,449.15            | \$351.83        | \$0.00          |
| <b><u>Annual Base Rate Fuel per fixture</u></b>                          |                        |                 |                 |                        |                 |                 |
|  | \$1.61                 | \$1.61          | \$1.61          | \$2.42                 | \$2.42          | \$2.42          |
| <b><u>Annual Revenue Requirement plus Base Rate Fuel per fixture</u></b> |                        |                 |                 |                        |                 |                 |
|  | \$189.65               | \$174.49        | \$134.01        | \$194.23               | \$178.33        | \$137.52        |
| <b><u>Total Annual Revenue plus Base Rate Fuel</u></b>                   |                        |                 |                 |                        |                 |                 |
|  | \$478,307.55           | \$6,979.42      | \$134.01        | \$65,262.00            | \$356.67        | \$0.00          |
| <b><u>Adjusted Annual Revenue Requirement per fixture</u></b>            |                        |                 |                 |                        |                 |                 |
|  | \$151.52               | \$91.77         | \$91.77         | \$178.30               | \$119.09        | \$0.00          |
| <b><u>Adjusted Total Annual Revenue</u></b>                              |                        |                 |                 |                        |                 |                 |
|  | \$382,143.53           | \$3,670.80      | \$91.77         | \$59,907.46            | \$238.19        | \$0.00          |

**Roadway Fixtures -Street and Highway Lighting Service**  
**Rate Codes 80, 83, 84**

| Bulb Type  | Light Emitting Diode<br>LED54W |                 |                 | Light Emitting Diode<br>LED118W |                 |                 | Light Emitting Diode<br>LED219W |                   |                   |
|--|--------------------------------|-----------------|-----------------|---------------------------------|-----------------|-----------------|---------------------------------|-------------------|-------------------|
|  | Option 1                       | Option 2        | Option 3        | Option 1                        | Option 2        | Option 3        | Option 1                        | Option 2          | Option 3          |
| Lumens   | 4,000                          |                 |                 | 8,800                           |                 |                 | 23,000                          |                   |                   |
| Watt   | ≤ 54                           |                 |                 | ≤ 118                           |                 |                 | ≤ 219                           |                   |                   |
| Number of fixtures   | 119                            | 0               | 0               | 516                             | 0               | 0               | 0                               | 0                 | 0                 |
| Annual kWh per fixture   | 227                            | 227             | 227             | 496                             | 496             | 496             | 920                             | 920               | 920               |
| <b><u>Investment</u></b>   |                                |                 |                 |                                 |                 |                 |                                 |                   |                   |
| Conductor  | \$49.50                        | \$49.50         | \$49.50         | \$49.50                         | \$49.50         | \$49.50         | \$49.50                         | \$49.50           | \$49.50           |
| Fixture - includes ballast (non-LED), and lamp (LED)                     | \$192.69                       | \$192.69        | \$192.69        | \$305.40                        | \$305.40        | \$305.40        | \$502.95                        | \$502.95          | \$502.95          |
| Lamp - non-LED   |                                |                 |                 |                                 |                 |                 |                                 |                   |                   |
| Light Installation   | \$336.65                       | \$336.65        | \$336.65        | \$336.65                        | \$336.65        | \$336.65        | \$336.65                        | \$336.65          | \$336.65          |
| Mast Arm   | \$159.42                       | \$159.42        | \$159.42        | \$159.42                        | \$159.42        | \$159.42        | \$159.42                        | \$159.42          | \$159.42          |
| Photo Eye  | \$14.20                        | \$14.20         | \$14.20         | \$14.20                         | \$14.20         | \$14.20         | \$14.20                         | \$14.20           | \$14.20           |
| <i>Subtotal</i>  | <i>\$752.46</i>                | <i>\$752.46</i> | <i>\$752.46</i> | <i>\$865.17</i>                 | <i>\$865.17</i> | <i>\$865.17</i> | <i>\$1,062.72</i>               | <i>\$1,062.72</i> | <i>\$1,062.72</i> |
| A&G Expense  | \$90.30                        | \$90.30         | \$90.30         | \$103.82                        | \$103.82        | \$103.82        | \$127.53                        | \$127.53          | \$127.53          |
| Material Handling Expense  | \$75.25                        | \$75.25         | \$75.25         | \$86.52                         | \$86.52         | \$86.52         | \$106.27                        | \$106.27          | \$106.27          |
| Sales Tax  | \$51.73                        | \$51.73         | \$51.73         | \$59.48                         | \$59.48         | \$59.48         | \$73.06                         | \$73.06           | \$73.06           |
| Total Investment   | \$969.73                       | \$969.73        | \$969.73        | \$1,114.99                      | \$1,114.99      | \$1,114.99      | \$1,369.58                      | \$1,369.58        | \$1,369.58        |
| <b><u>Annual Costs per fixture</u></b>                                   |                                |                 |                 |                                 |                 |                 |                                 |                   |                   |
| Fixed Charges  | \$102.79                       | \$102.79        | \$102.79        | \$118.19                        | \$118.19        | \$118.19        | \$145.18                        | \$145.18          | \$145.18          |
| Maintenance  | \$55.27                        | \$55.27         |                 | \$63.55                         | \$63.55         |                 | \$78.07                         | \$78.07           |                   |
| Replacement - Fixture  | \$9.63                         |                 |                 | \$15.27                         |                 |                 | \$25.15                         |                   |                   |
| Replacement - Materials - Photo Eye, Driver (LED), and lamp (non-LED)    | \$0.71                         | \$0.71          | \$0.71          | \$0.71                          | \$0.71          | \$0.71          | \$0.71                          | \$0.71            | \$0.71            |
| Replacement - Labor Costs  | \$14.43                        | \$14.43         | \$14.43         | \$14.43                         | \$14.43         | \$14.43         | \$14.43                         | \$14.43           | \$14.43           |
| Billing and Collections  | \$2.00                         | \$2.00          | \$2.00          | \$2.00                          | \$2.00          | \$2.00          | \$2.00                          | \$2.00            | \$2.00            |
| <i>Subtotal</i>  | <i>\$184.84</i>                | <i>\$175.21</i> | <i>\$119.93</i> | <i>\$214.16</i>                 | <i>\$198.89</i> | <i>\$135.33</i> | <i>\$265.53</i>                 | <i>\$240.38</i>   | <i>\$162.32</i>   |
| A&G Expense  | \$22.18                        | \$21.03         | \$14.39         | \$25.70                         | \$23.87         | \$16.24         | \$31.86                         | \$28.85           | \$19.48           |
| Total Annual Costs per fixture   | \$207.02                       | \$196.23        | \$134.33        | \$239.85                        | \$222.75        | \$151.57        | \$297.40                        | \$269.23          | \$181.80          |
| <b><u>Annual Energy Revenue per fixture</u></b>                          | \$1.87                         | \$1.87          | \$1.87          | \$4.08                          | \$4.08          | \$4.08          | \$7.57                          | \$7.57            | \$7.57            |
| <b><u>Annual Revenue Requirement per fixture</u></b>                     | \$208.89                       | \$198.10        | \$136.19        | \$243.93                        | \$226.83        | \$155.65        | \$304.96                        | \$276.80          | \$189.36          |
| <b><u>Total Annual Revenue</u></b>                                       | \$24,857.98                    | \$0.00          | \$0.00          | \$125,868.78                    | \$0.00          | \$0.00          | \$0.00                          | \$0.00            | \$0.00            |
| <b><u>Annual Base Rate Fuel per fixture</u></b>                          | \$0.73                         | \$0.73          | \$0.73          | \$1.59                          | \$1.59          | \$1.59          | \$2.94                          | \$2.94            | \$2.94            |
| <b><u>Annual Revenue Requirement plus Base Rate Fuel per fixture</u></b> | \$209.62                       | \$198.83        | \$136.92        | \$245.52                        | \$228.42        | \$157.23        | \$307.91                        | \$279.74          | \$192.31          |
| <b><u>Total Annual Revenue plus Base Rate Fuel</u></b>                   | \$24,944.35                    | \$0.00          | \$0.00          | \$126,687.11                    | \$0.00          | \$0.00          | \$0.00                          | \$0.00            | \$0.00            |
| <b><u>Adjusted Annual Revenue Requirement per fixture</u></b>            | \$180.78                       | \$0.00          | \$0.00          | \$239.98                        | \$0.00          | \$0.00          | \$307.91                        | \$0.00            | \$0.00            |
| <b><u>Adjusted Total Annual Revenue</u></b>                              | \$21,512.82                    | \$0.00          | \$0.00          | \$123,830.71                    | \$0.00          | \$0.00          | \$0.00                          | \$0.00            | \$0.00            |



**Roadway Fixtures -Street and Highway Lighting Service**  
**Rate Codes 80, 83, 84**

| Bulb Type  | Light Emitting Diode<br>LED278W |                   |                   | Mercury Vapor<br>MV175W |                 |                 | Mercury Vapor<br>MV250W |                 |                 |
|--|---------------------------------|-------------------|-------------------|-------------------------|-----------------|-----------------|-------------------------|-----------------|-----------------|
|  | Option 1                        | Option 2          | Option 3          | Option 1                | Option 2        | Option 3        | Option 1                | Option 2        | Option 3        |
| Lumens   |                                 |                   |                   | 7,000                   | 7,000           | 7,000           |                         |                 | 10,000          |
| Watt   | ≤278                            |                   |                   | 175                     | 175             | 175             |                         |                 | 250             |
| Number of fixtures   | 0                               | 0                 | 0                 | 972                     | 1,375           | 7               | 0                       | 0               | 8               |
| Annual kWh per fixture   | 1,327                           | 1,327             | 1,327             | 888                     | 888             | 888             | 1,224                   | 1,224           | 1,224           |
| <b><u>Investment</u></b>   |                                 |                   |                   |                         |                 |                 |                         |                 |                 |
| Conductor  | \$49.50                         | \$49.50           | \$49.50           | \$49.50                 | \$49.50         | \$49.50         | \$49.50                 | \$49.50         | \$49.50         |
| Fixture - includes ballast (non-LED), and lamp (LED)                     | \$524.25                        | \$524.25          | \$524.25          | \$0.00                  | \$0.00          | \$0.00          | \$0.00                  | \$0.00          | \$0.00          |
| Lamp - non-LED   |                                 |                   |                   | \$8.83                  | \$8.83          | \$8.83          | \$8.83                  | \$8.83          | \$8.83          |
| Light Installation   | \$336.65                        | \$336.65          | \$336.65          | \$336.65                | \$336.65        | \$336.65        | \$336.65                | \$336.65        | \$336.65        |
| Mast Arm   | \$159.42                        | \$159.42          | \$159.42          | \$159.42                | \$159.42        | \$159.42        | \$159.42                | \$159.42        | \$159.42        |
| Photo Eye  | \$14.20                         | \$14.20           | \$14.20           | \$4.85                  | \$4.85          | \$4.85          | \$4.85                  | \$4.85          | \$4.85          |
| <i>Subtotal</i>  | <i>\$1,084.02</i>               | <i>\$1,084.02</i> | <i>\$1,084.02</i> | <i>\$559.25</i>         | <i>\$559.25</i> | <i>\$559.25</i> | <i>\$559.25</i>         | <i>\$559.25</i> | <i>\$559.25</i> |
| A&G Expense  | \$130.08                        | \$130.08          | \$130.08          | \$67.11                 | \$67.11         | \$67.11         | \$67.11                 | \$67.11         | \$67.11         |
| Material Handling Expense  | \$108.40                        | \$108.40          | \$108.40          | \$55.92                 | \$55.92         | \$55.92         | \$55.92                 | \$55.92         | \$55.92         |
| Sales Tax  | \$74.53                         | \$74.53           | \$74.53           | \$38.45                 | \$38.45         | \$38.45         | \$38.45                 | \$38.45         | \$38.45         |
| Total Investment   | \$1,397.03                      | \$1,397.03        | \$1,397.03        | \$720.73                | \$720.73        | \$720.73        | \$720.73                | \$720.73        | \$720.73        |
| <b><u>Annual Costs per fixture</u></b>                                   |                                 |                   |                   |                         |                 |                 |                         |                 |                 |
| Fixed Charges  | \$148.09                        | \$148.09          | \$148.09          | \$76.40                 | \$76.40         | \$76.40         | \$76.40                 | \$76.40         | \$76.40         |
| Maintenance  | \$79.63                         |                   |                   | \$41.08                 | \$41.08         |                 | \$41.08                 | \$41.08         |                 |
| Replacement - Fixture  | \$26.21                         |                   |                   | \$0.00                  |                 |                 | \$0.00                  |                 |                 |
| Replacement - Materials - Photo Eye, Driver (LED), and lamp (non-LED)    | \$0.71                          | \$0.71            | \$0.71            | \$2.04                  | \$2.04          | \$2.04          | \$2.04                  | \$2.04          | \$2.04          |
| Replacement - Labor Costs  | \$14.43                         | \$14.43           | \$14.43           | \$43.07                 | \$43.07         | \$43.07         | \$43.07                 | \$43.07         | \$43.07         |
| Billing and Collections  | \$2.00                          | \$2.00            | \$2.00            | \$2.00                  | \$2.00          | \$2.00          | \$2.00                  | \$2.00          | \$2.00          |
| <i>Subtotal</i>  | <i>\$271.07</i>                 | <i>\$165.23</i>   | <i>\$165.23</i>   | <i>\$164.59</i>         | <i>\$164.59</i> | <i>\$123.51</i> | <i>\$164.59</i>         | <i>\$164.59</i> | <i>\$123.51</i> |
| A&G Expense  | \$32.53                         | \$19.83           | \$19.83           | \$19.75                 | \$19.75         | \$14.82         | \$19.75                 | \$19.75         | \$14.82         |
| Total Annual Costs per fixture   | \$303.60                        | \$185.06          | \$185.06          | \$184.35                | \$184.35        | \$138.33        | \$184.35                | \$184.35        | \$138.33        |
| <b><u>Annual Energy Revenue per fixture</u></b>                          |                                 |                   |                   |                         |                 |                 |                         |                 |                 |
|  | \$10.92                         | \$10.92           | \$10.92           | \$7.31                  | \$7.31          | \$7.31          | \$10.07                 | \$10.07         | \$10.07         |
| <b><u>Annual Revenue Requirement per fixture</u></b>                     |                                 |                   |                   |                         |                 |                 |                         |                 |                 |
|  | \$314.52                        | \$195.97          | \$195.97          | \$191.65                | \$191.65        | \$145.64        | \$194.42                | \$194.42        | \$148.40        |
| <b><u>Total Annual Revenue</u></b>                                       |                                 |                   |                   |                         |                 |                 |                         |                 |                 |
|  | \$0.00                          | \$0.00            | \$0.00            | \$186,285.35            | \$263,520.94    | \$1,019.48      | \$0.00                  | \$0.00          | \$1,187.24      |
| <b><u>Annual Base Rate Fuel per fixture</u></b>                          |                                 |                   |                   |                         |                 |                 |                         |                 |                 |
|  | \$4.25                          | \$4.25            | \$4.25            | \$2.84                  | \$2.84          | \$2.84          | \$3.92                  | \$3.92          | \$3.92          |
| <b><u>Annual Revenue Requirement plus Base Rate Fuel per fixture</u></b> |                                 |                   |                   |                         |                 |                 |                         |                 |                 |
|  | \$318.76                        | \$200.22          | \$200.22          | \$194.49                | \$194.49        | \$148.48        | \$198.33                | \$198.33        | \$152.32        |
| <b><u>Total Annual Revenue plus Base Rate Fuel</u></b>                   |                                 |                   |                   |                         |                 |                 |                         |                 |                 |
|  | \$0.00                          | \$0.00            | \$0.00            | \$189,047.38            | \$267,428.14    | \$1,039.37      | \$0.00                  | \$0.00          | \$1,218.57      |
| <b><u>Adjusted Annual Revenue Requirement per fixture</u></b>            |                                 |                   |                   |                         |                 |                 |                         |                 |                 |
|  | \$318.76                        | \$0.00            | \$0.00            | \$207.96                | \$134.14        | \$130.41        | \$0.00                  | \$0.00          | \$152.32        |
| <b><u>Adjusted Total Annual Revenue</u></b>                              |                                 |                   |                   |                         |                 |                 |                         |                 |                 |
|  | \$0.00                          | \$0.00            | \$0.00            | \$202,137.12            | \$184,437.00    | \$912.87        | \$0.00                  | \$0.00          | \$1,218.57      |

**Roadway Fixtures -Street and Highway Lighting Service**  
**Rate Codes 80, 83, 84**

| Bulb Type  | Mercury Vapor<br>MV400W |                 |                 | Mercury Vapor<br>MV1000W2 |                 |                 | Metal Halide<br>MH400W |                 |                 |
|--|-------------------------|-----------------|-----------------|---------------------------|-----------------|-----------------|------------------------|-----------------|-----------------|
|  | Option 1                | Option 2        | Option 3        | Option 1                  | Option 2        | Option 3        | Option 1               | Option 2        | Option 3        |
| Lumens   | 20,000                  | 20,000          | 20,000          |                           |                 | 55,000          |                        | 28,800          |                 |
| Watt   | 400                     | 400             | 400             |                           |                 | 1,000           |                        | 400             |                 |
| Number of fixtures   | 27                      | 47              | 26              | 0                         | 0               | 0               | 0                      | 0               | 0               |
| Annual kWh per fixture   | 1,932                   | 1,932           | 1,932           | 4,620                     | 4,620           | 4,620           | 1,932                  | 1,932           | 1,932           |
| <b><u>Investment</u></b>   |                         |                 |                 |                           |                 |                 |                        |                 |                 |
| Conductor  | \$49.50                 | \$49.50         | \$49.50         | \$49.50                   | \$49.50         | \$49.50         | \$49.50                | \$49.50         | \$49.50         |
| Fixture - includes ballast (non-LED), and lamp (LED)                     | \$0.00                  | \$0.00          | \$0.00          | \$0.00                    | \$0.00          | \$0.00          |                        | \$161.43        |                 |
| Lamp - non-LED   | \$8.21                  | \$8.21          | \$8.21          | \$32.71                   | \$32.71         | \$32.71         | \$13.11                | \$13.11         | \$13.11         |
| Light Installation   | \$336.65                | \$336.65        | \$336.65        | \$336.65                  | \$336.65        | \$336.65        | \$336.65               | \$336.65        | \$336.65        |
| Mast Arm   | \$159.42                | \$159.42        | \$159.42        | \$159.42                  | \$159.42        | \$159.42        | \$159.42               | \$159.42        | \$159.42        |
| Photo Eye  | \$4.85                  | \$4.85          | \$4.85          | \$4.85                    | \$4.85          | \$4.85          | \$4.85                 | \$4.85          | \$4.85          |
| <i>Subtotal</i>  | <i>\$558.63</i>         | <i>\$558.63</i> | <i>\$558.63</i> | <i>\$583.13</i>           | <i>\$583.13</i> | <i>\$583.13</i> | <i>\$563.53</i>        | <i>\$724.96</i> | <i>\$563.53</i> |
| A&G Expense  | \$67.04                 | \$67.04         | \$67.04         | \$69.98                   | \$69.98         | \$69.98         | \$67.62                | \$87.00         | \$67.62         |
| Material Handling Expense  | \$55.86                 | \$55.86         | \$55.86         | \$58.31                   | \$58.31         | \$58.31         | \$56.35                | \$72.50         | \$56.35         |
| Sales Tax  | \$38.41                 | \$38.41         | \$38.41         | \$40.09                   | \$40.09         | \$40.09         | \$38.74                | \$49.84         | \$38.74         |
| Total Investment   | \$719.93                | \$719.93        | \$719.93        | \$751.51                  | \$751.51        | \$751.51        | \$726.25               | \$934.29        | \$726.25        |
| <b><u>Annual Costs per fixture</u></b>                                   |                         |                 |                 |                           |                 |                 |                        |                 |                 |
| Fixed Charges  | \$76.31                 | \$76.31         | \$76.31         | \$79.66                   | \$79.66         | \$79.66         | \$76.98                | \$99.03         | \$76.98         |
| Maintenance  | \$41.04                 | \$41.04         |                 | \$42.84                   | \$42.84         |                 | \$41.40                | \$53.25         |                 |
| Replacement - Fixture  | \$0.00                  |                 |                 | \$0.00                    |                 |                 | \$0.00                 |                 |                 |
| Replacement - Materials - Photo Eye, Driver (LED), and lamp (non-LED)    | \$1.95                  | \$1.95          | \$1.95          | \$5.61                    | \$5.61          | \$5.61          | \$2.68                 | \$2.68          | \$2.68          |
| Replacement - Labor Costs  | \$43.07                 | \$43.07         | \$43.07         | \$43.07                   | \$43.07         | \$43.07         | \$43.07                | \$43.07         | \$43.07         |
| Billing and Collections  | \$2.00                  | \$2.00          | \$2.00          | \$2.00                    | \$2.00          | \$2.00          | \$2.00                 | \$2.00          | \$2.00          |
| <i>Subtotal</i>  | <i>\$164.37</i>         | <i>\$164.37</i> | <i>\$123.34</i> | <i>\$173.17</i>           | <i>\$173.17</i> | <i>\$130.34</i> | <i>\$166.13</i>        | <i>\$200.04</i> | <i>\$124.74</i> |
| A&G Expense  | \$19.72                 | \$19.72         | \$14.80         | \$20.78                   | \$20.78         | \$15.64         | \$19.94                | \$24.01         | \$14.97         |
| Total Annual Costs per fixture   | \$184.10                | \$184.10        | \$138.14        | \$193.96                  | \$193.96        | \$145.98        | \$186.07               | \$224.05        | \$139.70        |
| <b><u>Annual Energy Revenue per fixture</u></b>                          |                         |                 |                 |                           |                 |                 |                        |                 |                 |
|  | \$15.90                 | \$15.90         | \$15.90         | \$38.01                   | \$38.01         | \$38.01         | \$15.90                | \$15.90         | \$15.90         |
| <b><u>Annual Revenue Requirement per fixture</u></b>                     |                         |                 |                 |                           |                 |                 |                        |                 |                 |
|  | \$199.99                | \$199.99        | \$154.03        | \$231.97                  | \$231.97        | \$183.99        | \$201.96               | \$239.94        | \$155.60        |
| <b><u>Total Annual Revenue</u></b>                                       |                         |                 |                 |                           |                 |                 |                        |                 |                 |
|  | \$5,399.78              | \$9,399.61      | \$4,004.81      | \$0.00                    | \$0.00          | \$0.00          | \$0.00                 | \$0.00          | \$0.00          |
| <b><u>Annual Base Rate Fuel per fixture</u></b>                          |                         |                 |                 |                           |                 |                 |                        |                 |                 |
|  | \$6.18                  | \$6.18          | \$6.18          | \$14.78                   | \$14.78         | \$14.78         | \$6.18                 | \$6.18          | \$6.18          |
| <b><u>Annual Revenue Requirement plus Base Rate Fuel per fixture</u></b> |                         |                 |                 |                           |                 |                 |                        |                 |                 |
|  | \$206.17                | \$206.17        | \$160.21        | \$246.75                  | \$246.75        | \$198.78        | \$208.15               | \$246.13        | \$161.78        |
| <b><u>Total Annual Revenue plus Base Rate Fuel</u></b>                   |                         |                 |                 |                           |                 |                 |                        |                 |                 |
|  | \$5,566.70              | \$9,690.19      | \$4,165.55      | \$0.00                    | \$0.00          | \$0.00          | \$0.00                 | \$0.00          | \$0.00          |
| <b><u>Adjusted Annual Revenue Requirement per fixture</u></b>            |                         |                 |                 |                           |                 |                 |                        |                 |                 |
|  | \$292.32                | \$207.12        | \$201.48        | \$0.00                    | \$0.00          | \$389.64        | \$0.00                 | \$222.73        | \$0.00          |
| <b><u>Adjusted Total Annual Revenue</u></b>                              |                         |                 |                 |                           |                 |                 |                        |                 |                 |
|  | \$7,892.64              | \$9,734.64      | \$5,238.48      | \$0.00                    | \$0.00          | \$0.00          | \$0.00                 | \$0.00          | \$0.00          |

**Roadway Fixtures -Street and Highway Lighting Service**  
**Rate Codes 80, 83, 84**

| Bulb Type  | Sodium Vapor<br>SV100W |                 |                 | Sodium Vapor<br>SV150W |                 |                 | Sodium Vapor<br>SV150W-P |                 |                 |
|--|------------------------|-----------------|-----------------|------------------------|-----------------|-----------------|--------------------------|-----------------|-----------------|
|  | Option 1               | Option 2        | Option 3        | Option 1               | Option 2        | Option 3        | Option 1                 | Option 2        | Option 3        |
| Lumens   | 8,500                  | 8,500           | 8,500           | 14,000                 | 14,000          | 14,000          |                          |                 | 14,000          |
| Watt   | 100                    | 100             | 100             | 150                    | 150             | 150             |                          |                 | 150             |
| Number of fixtures   | 1,158                  | 3,101           | 47              | 1,188                  | 1,188           | 102             | 0                        | 0               | 0               |
| Annual kWh per fixture   | 504                    | 504             | 504             | 756                    | 756             | 756             | 468                      | 468             | 468             |
| <b><u>Investment</u></b>   |                        |                 |                 |                        |                 |                 |                          |                 |                 |
| Conductor  | \$49.50                | \$49.50         | \$49.50         | \$49.50                | \$49.50         | \$49.50         | \$49.50                  | \$49.50         | \$49.50         |
| Fixture - includes ballast (non-LED), and lamp (LED)                     | \$111.19               | \$111.19        | \$111.19        | \$111.19               | \$111.19        | \$111.19        |                          |                 | \$111.19        |
| Lamp - non-LED   | \$10.17                | \$10.17         | \$10.17         | \$10.03                | \$10.03         | \$10.03         |                          |                 |                 |
| Light Installation   | \$336.65               | \$336.65        | \$336.65        | \$336.65               | \$336.65        | \$336.65        | \$336.65                 | \$336.65        | \$336.65        |
| Mast Arm   | \$159.42               | \$159.42        | \$159.42        | \$159.42               | \$159.42        | \$159.42        | \$159.42                 | \$159.42        | \$159.42        |
| Photo Eye  | \$4.85                 | \$4.85          | \$4.85          | \$4.85                 | \$4.85          | \$4.85          | \$4.85                   | \$4.85          | \$4.85          |
| <i>Subtotal</i>  | <i>\$671.78</i>        | <i>\$671.78</i> | <i>\$671.78</i> | <i>\$671.64</i>        | <i>\$671.64</i> | <i>\$671.64</i> | <i>\$550.42</i>          | <i>\$550.42</i> | <i>\$661.61</i> |
| A&G Expense  | \$80.61                | \$80.61         | \$80.61         | \$80.60                | \$80.60         | \$80.60         | \$66.05                  | \$66.05         | \$79.39         |
| Material Handling Expense  | \$67.18                | \$67.18         | \$67.18         | \$67.16                | \$67.16         | \$67.16         | \$55.04                  | \$55.04         | \$66.16         |
| Sales Tax  | \$46.18                | \$46.18         | \$46.18         | \$46.18                | \$46.18         | \$46.18         | \$37.84                  | \$37.84         | \$45.49         |
| Total Investment   | \$865.76               | \$865.76        | \$865.76        | \$865.58               | \$865.58        | \$865.58        | \$709.35                 | \$709.35        | \$852.65        |
| <b><u>Annual Costs per fixture</u></b>                                   |                        |                 |                 |                        |                 |                 |                          |                 |                 |
| Fixed Charges  | \$91.77                | \$91.77         | \$91.77         | \$91.75                | \$91.75         | \$91.75         | \$75.19                  | \$75.19         | \$90.38         |
| Maintenance  | \$49.35                | \$49.35         |                 | \$49.34                | \$49.34         |                 | \$40.43                  | \$40.43         |                 |
| Replacement - Fixture  | \$16.60                |                 |                 | \$16.60                |                 |                 | \$0.00                   |                 |                 |
| Replacement - Materials - Photo Eye, Driver (LED), and lamp (non-LED)    | \$2.24                 | \$2.24          | \$2.24          | \$2.22                 | \$2.22          | \$2.22          | \$0.72                   | \$0.72          | \$0.72          |
| Replacement - Labor Costs  | \$43.07                | \$43.07         | \$43.07         | \$43.07                | \$43.07         | \$43.07         | \$43.07                  | \$43.07         | \$43.07         |
| Billing and Collections  | \$2.00                 | \$2.00          | \$2.00          | \$2.00                 | \$2.00          | \$2.00          | \$2.00                   | \$2.00          | \$2.00          |
| <i>Subtotal</i>  | <i>\$205.03</i>        | <i>\$188.43</i> | <i>\$139.08</i> | <i>\$204.98</i>        | <i>\$188.38</i> | <i>\$139.04</i> | <i>\$161.42</i>          | <i>\$161.42</i> | <i>\$136.18</i> |
| A&G Expense  | \$24.60                | \$22.61         | \$16.69         | \$24.60                | \$22.61         | \$16.69         | \$19.37                  | \$19.37         | \$16.34         |
| Total Annual Costs per fixture   | \$229.63               | \$211.04        | \$155.77        | \$229.58               | \$210.99        | \$155.73        | \$180.79                 | \$180.79        | \$152.52        |
| <b><u>Annual Energy Revenue per fixture</u></b>                          | \$4.15                 | \$4.15          | \$4.15          | \$6.22                 | \$6.22          | \$6.22          | \$3.85                   | \$3.85          | \$3.85          |
| <b><u>Annual Revenue Requirement per fixture</u></b>                     | \$233.78               | \$215.19        | \$159.92        | \$235.80               | \$217.21        | \$161.95        | \$184.64                 | \$184.64        | \$156.37        |
| <b><u>Total Annual Revenue</u></b>                                       | \$270,715.55           | \$667,309.02    | \$7,516.32      | \$280,125.15           | \$258,043.82    | \$16,518.93     | \$0.00                   | \$0.00          | \$0.00          |
| <b><u>Annual Base Rate Fuel per fixture</u></b>                          | \$1.61                 | \$1.61          | \$1.61          | \$2.42                 | \$2.42          | \$2.42          | \$1.50                   | \$1.50          | \$1.50          |
| <b><u>Annual Revenue Requirement plus Base Rate Fuel per fixture</u></b> | \$235.39               | \$216.80        | \$161.53        | \$238.21               | \$219.63        | \$164.37        | \$186.14                 | \$186.14        | \$157.87        |
| <b><u>Total Annual Revenue plus Base Rate Fuel</u></b>                   | \$272,583.18           | \$672,310.32    | \$7,592.12      | \$282,999.16           | \$260,917.82    | \$16,765.68     | \$0.00                   | \$0.00          | \$0.00          |
| <b><u>Adjusted Annual Revenue Requirement per fixture</u></b>            | \$198.86               | \$105.16        | \$100.33        | \$233.50               | \$134.96        | \$131.38        | \$0.00                   | \$0.00          | \$125.03        |
| <b><u>Adjusted Total Annual Revenue</u></b>                              | \$230,277.56           | \$326,088.76    | \$4,715.32      | \$277,393.25           | \$160,337.23    | \$13,400.35     | \$0.00                   | \$0.00          | \$0.00          |

**Roadway Fixtures -Street and Highway Lighting Service**  
**Rate Codes 80, 83, 84**

| Bulb Type  | Sodium Vapor<br>SV200W |                 |                 | Sodium Vapor<br>SV250W |                 |                 | Sodium Vapor<br>SV400W |                 |                 |
|--|------------------------|-----------------|-----------------|------------------------|-----------------|-----------------|------------------------|-----------------|-----------------|
|  | Option 1               | Option 2        | Option 3        | Option 1               | Option 2        | Option 3        | Option 1               | Option 2        | Option 3        |
| Lumens   | 20,500                 | 20,500          | 20,500          | 23,000                 | 23,000          | 23,000          | 45,000                 | 45,000          | 45,000          |
| Watt   | 200                    | 200             | 200             | 250                    | 250             | 250             | 400                    | 400             | 400             |
| Number of fixtures   | 1                      | 4               | 63              | 501                    | 987             | 210             | 24                     | 34              | 107             |
| Annual kWh per fixture   | 1,140                  | 1,140           | 1,140           | 1,224                  | 1,224           | 1,224           | 2,016                  | 2,016           | 2,016           |
| <b><u>Investment</u></b>   |                        |                 |                 |                        |                 |                 |                        |                 |                 |
| Conductor  | \$49.50                | \$49.50         | \$49.50         | \$49.50                | \$49.50         | \$49.50         | \$49.50                | \$49.50         | \$49.50         |
| Fixture - includes ballast (non-LED), and lamp (LED)                     | \$138.62               | \$138.62        | \$138.62        | \$138.62               | \$138.62        | \$138.62        | \$161.43               | \$161.43        | \$161.43        |
| Lamp - non-LED   | \$8.95                 | \$8.95          | \$8.95          | \$10.02                | \$10.02         | \$10.02         | \$13.23                | \$13.23         | \$13.23         |
| Light Installation   | \$336.65               | \$336.65        | \$336.65        | \$336.65               | \$336.65        | \$336.65        | \$336.65               | \$336.65        | \$336.65        |
| Mast Arm   | \$159.42               | \$159.42        | \$159.42        | \$159.42               | \$159.42        | \$159.42        | \$159.42               | \$159.42        | \$159.42        |
| Photo Eye  | \$4.85                 | \$4.85          | \$4.85          | \$4.85                 | \$4.85          | \$4.85          | \$4.85                 | \$4.85          | \$4.85          |
| <i>Subtotal</i>  | <i>\$697.99</i>        | <i>\$697.99</i> | <i>\$697.99</i> | <i>\$699.06</i>        | <i>\$699.06</i> | <i>\$699.06</i> | <i>\$725.08</i>        | <i>\$725.08</i> | <i>\$725.08</i> |
| A&G Expense  | \$83.76                | \$83.76         | \$83.76         | \$83.89                | \$83.89         | \$83.89         | \$87.01                | \$87.01         | \$87.01         |
| Material Handling Expense  | \$69.80                | \$69.80         | \$69.80         | \$69.91                | \$69.91         | \$69.91         | \$72.51                | \$72.51         | \$72.51         |
| Sales Tax  | \$47.99                | \$47.99         | \$47.99         | \$48.06                | \$48.06         | \$48.06         | \$49.85                | \$49.85         | \$49.85         |
| Total Investment   | \$899.53               | \$899.53        | \$899.53        | \$900.91               | \$900.91        | \$900.91        | \$934.45               | \$934.45        | \$934.45        |
| <b><u>Annual Costs per fixture</u></b>                                   |                        |                 |                 |                        |                 |                 |                        |                 |                 |
| Fixed Charges  | \$95.35                | \$95.35         | \$95.35         | \$95.50                | \$95.50         | \$95.50         | \$99.05                | \$99.05         | \$99.05         |
| Maintenance  | \$51.27                | \$51.27         |                 | \$51.35                | \$51.35         |                 | \$53.26                | \$53.26         |                 |
| Replacement - Fixture  | \$20.69                |                 |                 | \$20.69                |                 |                 | \$24.09                |                 |                 |
| Replacement - Materials - Photo Eye, Driver (LED), and lamp (non-LED)    | \$2.06                 | \$2.06          | \$2.06          | \$2.22                 | \$2.22          | \$2.22          | \$2.70                 | \$2.70          | \$2.70          |
| Replacement - Labor Costs  | \$43.07                | \$43.07         | \$43.07         | \$43.07                | \$43.07         | \$43.07         | \$43.07                | \$43.07         | \$43.07         |
| Billing and Collections  | \$2.00                 | \$2.00          | \$2.00          | \$2.00                 | \$2.00          | \$2.00          | \$2.00                 | \$2.00          | \$2.00          |
| <i>Subtotal</i>  | <i>\$214.45</i>        | <i>\$193.76</i> | <i>\$142.48</i> | <i>\$214.83</i>        | <i>\$194.14</i> | <i>\$142.79</i> | <i>\$224.18</i>        | <i>\$200.09</i> | <i>\$146.82</i> |
| A&G Expense  | \$25.73                | \$23.25         | \$17.10         | \$25.78                | \$23.30         | \$17.13         | \$26.90                | \$24.01         | \$17.62         |
| Total Annual Costs per fixture   | \$240.18               | \$217.01        | \$159.58        | \$240.61               | \$217.44        | \$159.92        | \$251.08               | \$224.10        | \$164.44        |
| <b><u>Annual Energy Revenue per fixture</u></b>                          | \$9.38                 | \$9.38          | \$9.38          | \$10.07                | \$10.07         | \$10.07         | \$16.59                | \$16.59         | \$16.59         |
| <b><u>Annual Revenue Requirement per fixture</u></b>                     | \$249.56               | \$226.39        | \$168.96        | \$250.68               | \$227.51        | \$169.99        | \$267.67               | \$240.68        | \$181.03        |
| <b><u>Total Annual Revenue</u></b>                                       | \$249.56               | \$905.55        | \$10,644.53     | \$125,591.19           | \$224,551.10    | \$35,698.83     | \$6,424.05             | \$8,183.24      | \$19,370.04     |
| <b><u>Annual Base Rate Fuel per fixture</u></b>                          | \$3.65                 | \$3.65          | \$3.65          | \$3.92                 | \$3.92          | \$3.92          | \$6.45                 | \$6.45          | \$6.45          |
| <b><u>Annual Revenue Requirement plus Base Rate Fuel per fixture</u></b> | \$253.21               | \$230.03        | \$172.61        | \$254.60               | \$231.43        | \$173.91        | \$274.12               | \$247.13        | \$187.48        |
| <b><u>Total Annual Revenue plus Base Rate Fuel</u></b>                   | \$253.21               | \$920.14        | \$10,874.35     | \$127,553.50           | \$228,416.98    | \$36,521.36     | \$6,578.88             | \$8,402.58      | \$20,060.32     |
| <b><u>Adjusted Annual Revenue Requirement per fixture</u></b>            | \$253.21               | \$163.81        | \$162.01        | \$260.28               | \$178.99        | \$173.91        | \$328.56               | \$247.13        | \$207.00        |
| <b><u>Adjusted Total Annual Revenue</u></b>                              | \$253.21               | \$655.22        | \$10,206.76     | \$130,400.28           | \$176,659.18    | \$36,521.36     | \$7,885.44             | \$8,402.58      | \$22,149.00     |

**Street and Highway Lighting Service and Outdoor and Area Lighting Service**  
**Rate Codes 76, 77, 80, 83, 84**

|   |                |
|---|----------------|
|   | Option 4       |
| Number of Customers                                       | 301            |
| Annual kWh per customer                                   | 16,348         |
| <b><u>Investment</u></b>                                  |                |
| Meter Costs   | \$90.00        |
| <i>Subtotal</i>   | <u>\$90.00</u> |
| A&G Expense   | \$10.80        |
| Material Handling Expense                                 | \$9.00         |
| Sales Tax   | \$6.19         |
| Pre Cap Fee   | <u>\$80.00</u> |
| Total Investment per customer                             | \$195.99       |
| <b><u>Annual Costs per customer</u></b>                   |                |
| Fixed Charges   | \$20.77        |
| Billing and Collections                                   | <u>\$2.00</u>  |
| Total Annual Costs per customer                           | \$22.78        |
| <b><u>Annual Energy Revenue per customer</u></b>          | \$134.50       |
| <b><u>Total Annual Revenue</u></b>                        | \$47,342.43    |
| <b><u>Annual Base Rate Fuel per customer</u></b>          | \$1,342.64     |
| <b><u>Total Annual Revenue plus Base Rate Fuel</u></b>    | \$410,991.54   |
| <b><u>Adjusted Annual Energy Revenue per customer</u></b> | \$1,342.69     |
| <b><u>Adjusted Total Annual Revenue</u></b>               | \$411,006.30   |

**Street and Highway Lighting Service and Outdoor and Area Lighting Service**  
**Rate Codes 76, 77, 80, 83, 84**

|   |                 |
|---|-----------------|
|   | Pole Costs      |
| Number of MP-owned lighting-only poles            | 1,566           |
| <b><u>Investment</u></b>                          |                 |
| Pole Cost   | \$350.00        |
| <i>Subtotal</i>                                   | <u>\$350.00</u> |
| A&G Expense                                       | \$42.00         |
| Installation Labor                                | \$283.52        |
| Local Tax   | \$7.00          |
| Material Handling Expense                         | \$35.00         |
| Sales Tax   | \$24.06         |
| Vehicle Expense                                   | <u>\$60.00</u>  |
| Total Investment                                  | \$741.58        |
| <b><u>Annual Costs per pole</u></b>               |                 |
| Fixed Charges                                     | \$76.90         |
| Maintenance Expense                               | <u>\$42.27</u>  |
| <i>Subtotal</i>                                   | <u>\$119.17</u> |
| A&G Expense                                       | <u>\$14.30</u>  |
| Total Annual Costs per pole                       | \$133.47        |
| <b><u>Annual Revenue Requirement per pole</u></b> | \$133.47        |
| <b><u>Total Annual Revenue</u></b>                | \$209,018.69    |
| <b><u>Adjusted Annual Revenue per pole</u></b>    | \$132.00        |
| <b><u>Adjusted Total Annual Revenue</u></b>       | \$206,712.00    |

**Inputs and Cost Allocations**

|  |             |
|--|-------------|
| A&G expense  | 12.000%     |
| Area lighting only poles (MP owned)                        | 1,566       |
| Customer accounts revenue requirements per COS             | \$40,851    |
| Conductor (feet)   | 150         |
| Conductor (\$ per foot)                                    | \$0.33      |
| Distribution pole cost                                     | \$350.00    |
| Energy charge rate (\$/kWh)                                | \$0.008228  |
| Fixed charge rate - fixtures                               | 10.60%      |
| Fixed charge rate - distribution poles                     | 10.37%      |
| Hourly labor   | \$70.88     |
| Local Tax  | 2.000%      |
| Maintenance expense  | 5.70%       |
| Mast arm (Street Light)                                    | \$159.42    |
| Mart arm (Area Light)                                      | \$25.21     |
| Material handling expense                                  | 10.00%      |
| Meter cost   | \$90.00     |
| Number of customers (Service Agreements) on Option 4       | 301         |
| Number of hours to install light (LED and non-LED)         | 3.5         |
| Number of hours to install pole                            | 4.0         |
| Number of hours for replacement                            | 3.0         |
| Photo eye for all LED                                      | \$14.20     |
| Photo eye for all non-LED                                  | \$4.85      |
| Pre Cap Fee  | \$80.00     |
| Replacement - LED  | 20.0        |
| Replacement - non-LED                                      | 6.7         |
| Revenue requirements - Lighting                            | \$4,035,709 |
| Sales tax  | 6.875%      |
| Street lighting only poles (MP owned)                      | 3,715       |
| Total distribution poles (MP owned)                        | 134,918     |
| Total number of fixtures                                   | 20,378      |
| Vehicle expense  | \$15.00     |
| Average customer accounts Revenue Requirements per fixture | \$2.00      |
| Conductor costs  | \$49.50     |

**Light Installation - LED & non-LED**

|                          |                 |
|--------------------------|-----------------|
| Vehicle Expense          | \$52.50         |
| Labor Cost               | \$248.08        |
| <i>Subtotal</i>          | <i>\$300.58</i> |
| A&G Expense              | \$36.07         |
| Total Light Installation | \$336.65        |

**Replacement - Labor Costs**

|                                   |                 |
|-----------------------------------|-----------------|
| Vehicle Expense                   | \$45.00         |
| Labor                             | \$212.64        |
| <i>Subtotal</i>                   | <i>\$257.64</i> |
| A&G Expense                       | \$30.92         |
| Total Replacement - LED & non-LED | \$288.56        |

**Voltage Discount Cost Support  
2020 Test Year**

|  |                           | Secondary<br>(1) | Primary<br>(2) | Dist. Bulk<br>Delivery<br>(3) | Transmission<br>(4) |
|--|---------------------------|------------------|----------------|-------------------------------|---------------------|
| Revenue Requirements: Demand & Customer 1/ |                           |                  |                |                               |                     |
| A  | General Service           | 5,105,641        | 9,235,284      | 2,118,627                     | 6,198,644           |
| B  | Large Light & Power       | 1,751,785        | 9,476,717      | 3,033,083                     | 13,338,638          |
| C  | Municipal Pumping         | 159,414          | 349,031        | 103,645                       | 121,284             |
| D  | Revenue Requirements Sum. | 7,016,840        | 19,061,032     | 5,255,355                     | 19,658,566          |

Billing Units (MWh) 2/

|   |                       |           |           |           |           |
|---|-----------------------|-----------|-----------|-----------|-----------|
| E | General Service       | 688,706   | 730,189   | 745,313   | 751,201   |
| F | Large Light & Power   | 583,725   | 919,852   | 1,030,448 | 1,371,031 |
| G | Total Billing Demands | 1,272,431 | 1,650,041 | 1,775,760 | 2,122,232 |

Billing Units (kW) 3/

|   |                       |           |           |           |           |
|---|-----------------------|-----------|-----------|-----------|-----------|
| H | General Service       | 2,182,947 | 2,314,433 | 2,362,370 | 2,381,033 |
| I | Large Light & Power   | 1,374,804 | 2,166,458 | 2,426,934 | 3,229,085 |
| J | Total Billing Demands | 3,557,751 | 4,480,891 | 4,789,305 | 5,610,118 |

|   |  |      |       |      |      |
|---|--|------|-------|------|------|
| K | Revenue Req. (\$/MWh)<br>(Line D / Line H) | 5.51 | 11.55 | 2.96 | 9.26 |
|---|--|------|-------|------|------|

|   |   |      |      |      |      |
|---|---|------|------|------|------|
| L | Revenue Req. (\$/kW)<br>(Line D / Line L) | 1.97 | 4.25 | 1.10 | 3.50 |
|---|---|------|------|------|------|

|   |  |      |   |  |  |
|---|--|------|---|--|--|
| M | Avoided Cost for Customers at Primary<br>Voltage or Higher (\$/kW) | 1.97 | equivalent to = \$5.51/MWh or .00551 \$/kWh |  |  |
|---|--|------|---|--|--|

|   |   |       |  |  |  |
|---|---|-------|--|--|--|
| N | Additional Avoided Cost for Customers at<br>Transmission Voltage or Higher (\$/MWh) | 14.51 | equivalent to .01451 \$/kWh or \$5.35/kW |  |  |
|---|---|-------|--|--|--|

|   |  |                                  |  |                                    |  |
|---|--|----------------------------------|--|------------------------------------|--|
| O |  | <b>Proposed Primary Discount</b> |  | <b>\$2.00/kW or 0.00559 \$/kWh</b> |  |
|---|--|----------------------------------|--|------------------------------------|--|

|   |  |                                       |  |                      |  |
|---|--|---------------------------------------|--|----------------------|--|
| P |  | <b>Proposed Transmission Discount</b> |  | <b>\$0.00450/kWh</b> |  |
|---|--|---------------------------------------|--|----------------------|--|

NOTES:

1/ Revenue Requirements per Compliance Cost of Service Study in Docket E015/GR-16-664. Note Municipal Pumping included in revenue requirements only because customers were moved to General Service rate.

2/ Billing Units (MWh) per BD - Allocation Energy - 2020.xlsx, energy with losses

3/ Transmission level set equal to Sum NCP from 2020TY\_D01-D15.xlsx (multiplied by 12). Lower voltage demands determined based on the energy ratio by class at the corresponding voltage level.

The company's standard rates for General Service (GS) and Large Light & Power (LLP) classes are designed based on costs for service at secondary voltage. Since service at higher voltage generally requires fewer facilities and experiences less line and transformer losses, a discount is applicable.

To determine an appropriate discount, the demand and customer-related revenue requirement of the Distribution, Distribution Bulk Delivery and Transmission systems utilized by the GS, LLP and MP classes in MP's last rate case were segregated by voltage level as shown above

Row K shows that on average these three customer classes are charged \$29.29/MWh for Transmission and Distribution (equal to 10.83/kW, shown in Row L).

Row M shows that the avoided secondary distribution costs for customers taking service at Primary Voltage or higher is \$1.97/kW.

Row N shows that the additional avoided costs for customers taking service at Transmission voltage (and already receiving the discount for the avoided secondary distribution costs) is \$14.51/MWh = \$5.35/kW.

Row O shows the current primary discount is in line with demonstrated costs from Minnesota Power's last rate case, so no change to the \$2.00 discount is being proposed.

Row P shows the proposed transmission discount which is based on the current rate .00350 increased by approximately 30%, to avoid making a large change to the discount, while moving in the correct direction.



**Dual Fuel Electric Service  
Determination of Energy Costs**

| Line No. | Description  | Generation and<br>Purchase Energy<br>(MWh) | Generation and<br>Purchase Energy (\$) |          |
|----------|--|--|--|----------|
| 1        | <b>Energy Portion</b>  |  |  |          |
| 2        | System Energy Supply Cost 1/   | 13,487,433                                 | \$299,271,000                          | \$0.0222 |
| 3        | Average Loss Factor to Primary 2/  |  |  | 1.0274   |
| 4        | Average Energy Cost @ Primary  |  |  | \$0.0228 |
| 5        | Average Loss Factor to Secondary 2/  |  |  | 1.0643   |
| 6        | Average Energy Cost @ Secondary  |  |  | \$0.0236 |
| 7        |  |  |  |          |
| 8        |  |  |  |          |
| 9        | <b>Generation Capacity Portion</b>   |  |  |          |
| 10       | MP system average capacity cost  |  | \$204.96                               | 8,760    |
| 11       | Average Loss Factor to Primary 2/  |  |  | \$0.0230 |
| 12       | Net Capacity Cost @ Primary  |  |  | 1.0350   |
| 13       | Average Loss Factor to Secondary 2/  |  |  | 0.0238   |
| 14       | Net Capacity Cost @ Secondary  |  |  | 1.0721   |
| 15       |  |  |  | 0.0247   |
| 16       | <b>Transmission and Distribution Portion</b>                                   |  |  |          |
| 17       | T&D Average Costs @ Primary 3/   |  |  | \$0.0212 |
| 18       | T&D Average Costs @ Secondary 3/   |  |  | \$0.0273 |
| 19       |  |  |  |          |
| 20       | <b>Total Costs</b>   |  |  |          |
| 21       | @ Primary (Rate in \$/kWh)   | (Line 4 + Line 12 + Line 17)               |  | \$0.0678 |
| 22       | @ Primary (Rate in cents/kWh)  |  |  | 6.78     |
| 23       | @ Secondary (Rate in \$/kWh)   | (Line 6 + Line 14 + Line 18)               |  | \$0.0756 |
| 24       | @ Secondary (Rate in cents/kWh)  |  |  | 7.56     |
| 25       |  |  |  |          |
| 26       | <b>Average Cost of FPE 4/</b>  |  |  |          |
| 27       | Small Service (proxy Residential class)  |  |  | 2.15082  |
| 28       | Large Service (proxy General Service)  |  |  | 2.19562  |
| 29       |  |  |  |          |
| 30       | <b>Calculated Energy Charge - Energy and Capacity Costs Excluding FPE Cost</b> |  |  |          |
| 31       | Small Service (Rate in cents/kWh)  | (Line 22 - Line 27)                        |  | 4.6250   |
| 32       | Large Service (Rate in cents/kWh)  | (Line 24 - Line 28)                        |  | 5.3668   |

**NOTES:**

Energy Portion includes Fuel and Purchased Energy Cost

1/ 2019 Large Power Surcharge Calculation, 2019 budget and 2017 FERC Form 1

2/ Loss Factors, Docket No. E015/GR-16-664, Workpapers, SD-AF-1, page 35 of 37, Cumulative Loss Factors

3/ Off-Peak costs based on historical Day Ahead and Real Time LMP prices at MP.MP

4/See Podratz Direct Schedule 8, page 2 of 2, lines 2, 3.

**Dual Fuel Electric Service**  
**Determination of Customer Related Costs**

| Line No. | Description                    | OIC           |               | Annual Cost 1/ |               | Monthly Cost  |               |
|----------|--------------------------------|---------------|---------------|----------------|---------------|---------------|---------------|
|          |                                | Small Service | Large Service | Small Service  | Large Service | Small Service | Large Service |
| 1        | Characteristics                | < 75 kW       | > 75 kW       |                |               |               |               |
| 2        |                                |               |               |                |               |               |               |
| 3        | Incremental Distribution Costs |               |               |                |               |               |               |
| 4        | Average Meter Cost             | \$157.00      | \$220.83      |                |               |               |               |
| 5        | Transformer Capacity - kVA     | 16            | 156           |                |               |               |               |
| 6        | Transformer Capacity - Cost    | 2/ \$1,411.56 | \$18,742.24   |                |               |               |               |
| 7        | Service Drop Upgrade Cost      | \$304.00      | \$304.00      |                |               |               |               |
| 8        | Subtotal                       | \$1,872.56    | \$19,267.07   | \$266.65       | \$2,743.63    |               |               |
| 9        |                                |               |               |                |               |               |               |
| 10       |                                |               |               |                |               |               |               |
| 11       | Billing Expense                |               |               | 47.18          | 47.18         |               |               |
| 12       | O & M Expense (3% of OIC)      |               |               | \$56.18        | \$578.01      |               |               |
| 13       | Total Customer Related Costs   |               |               | \$370.01       | \$3,368.82    | \$30.83       | \$280.73      |
| 14       |                                |               |               |                |               |               |               |
| 15       | Proposed Customer Rate         |               |               |                |               | \$5.00        | \$15.00       |
| 16       |                                |               |               |                |               |               |               |

2/ Transformer Capacity Cost is obtained by multiplying line 5 by line 14, page 4

Fixed Charge Rates for determining annual cost 1/

| Line No. | Description  | Rates  |
|----------|--------------|--------|
| 1        | Distribution | 14.24% |

**Dual Fuel/Controlled Access Electric Service  
Transmission and Distribution Revenue Requirement <sup>1/</sup>**

| Line No. | Description     | Transmission | Dist. Bulk | Prim Dist. | Sec Dist. | Tot @ Primary            | Tot @ Secondary            | kWh <sup>2/</sup> |
|----------|-----------------|--------------|------------|------------|-----------|--------------------------|----------------------------|-------------------|
| 1        | Residential     | 6,744,119    | 2,804,892  | 9,055,238  | 6,819,293 | 18,604,249               | 25,423,542                 | 948,850,000       |
| 2        | General Service | 6,198,644    | 2,118,627  | 7,515,374  | 3,217,601 | 15,832,645               | 19,050,246                 | 678,755,000       |
|          |                 |              |            |            |           | 34,436,894               | 44,473,788                 | 1,627,605,000     |
|          |                 |              |            |            |           | Primary Rate<br>(\$/kWh) | Secondary Rate<br>(\$/kWh) |                   |
|          |                 |              |            |            |           | 0.0212                   | 0.0273                     |                   |

<sup>1/</sup> Revenue Requirements per Compliance Cost of Service Study in Docket E015/GR-16-664

<sup>2/</sup> Test Year 2020 usage

**Dual Fuel Electric Service**  
**Determination of Transformer Capacity Cost**

| Line No. | Subtype Description                      | Sum of KVA | Small Service | Large Service |
|----------|--|------------|---------------|---------------|
| 1        | Single Phase Overhead                    | 530,322    | 530,322       |               |
| 2        | Single Phase Underground                 | 256,615    | 256,615       |               |
| 3        | Two Phase Overhead                       | 62,825     | 62,825        |               |
| 4        | Two Phase Underground                    | 5,494      | 5,494         |               |
| 5        | Three Phase Overhead                     | 206,323    |               | 206,323       |
| 6        | Three Phase Underground                  | 14,366     |               | 14,366        |
| 7        | Three Phase Underground - Single Unit    | 402,665    |               | 402,665       |
| 8        | Total kVA                                | 1,478,608  | 855,255       | 623,353       |
| 9        |  |            |               |               |
| 10       | Transformer Cost per Property Accounting |            |               | 74,891,228    |
| 11       |  |            |               |               |
| 12       | Average KVA Unit Cost                    | \$50.65    | \$87.57       | \$120.14      |
| 13       |  |            |               |               |
| 14       | Average Unit Cost per Service Size       |            | \$29.30       | \$21.35       |
| 15       |  |            |               |               |

1/ Source- GIS

Minnesota Power  
Docket No. E015/GR-19-442  
Dual Fuel Electric Service  
Transformers - Year 2018

| Line No. | Plant Account | External Retire Unit | Retirement Unit Long Description             | Activity Quantity | End Balance          | Average Unit Price |
|----------|---------------|----------------------|--|-------------------|----------------------|--------------------|
| 1        | 3680          | 000000 7502          | Transformer Pole - 5Kv To 50Kv               | 33,108            | 28,245,372.76        | 853.13             |
| 2        | 3680          | 000000 7508          | Transformer Pole - 51Kv To 250Kv             | 1,552             | 3,948,432.82         | 2,544.09           |
| 3        | 3680          | 000000 7512          | Transformer Pole - 251Kv To 1000Kv           | 89                | 381,737.34           | 4,289.18           |
| 4        | 3680          | 000000 7516          | Transformer Pole - 1001Kv And Larger         | 5                 | 50,745.22            | 10,149.04          |
| 5        | 3680          | 000000 7522          | Transformer Network- 1000Kv And Smaller      | 9                 | 280,828.98           | 31,203.22          |
| 6        | 3680          | 000000 7528          | Transformer Network- 1500Kv                  | 4                 | (86,179.82)          | (21,544.96)        |
| 7        | 3680          | 000000 7530          | Transformer - Mobile Line 100Kva             | 2                 | 41,799.34            | 20,899.67          |
| 8        | 3680          | 000000 7602          | Transformer Padmount - 10Kv To 50Kv          | 12,287            | 19,318,007.67        | 1,572.23           |
| 9        | 3680          | 000000 7606          | Transformer Padmount - 51Kv To 167Kv         | 639               | 3,133,334.06         | 4,903.50           |
| 10       | 3680          | 000000 7608          | Transformer Padmount 10Kv To 750Kv 3Phs      | 1,634             | 14,455,515.44        | 8,846.70           |
| 11       | 3680          | 000000 7612          | Transformer Padmount - 751Kv And Larger 3Phs | 155               | 5,079,305.21         | 32,769.71          |
| 12       | 3680          | 000000 7650          | Transclosurer Housing                        | 18                | 42,328.56            | 2,351.59           |
| 13       | <b>Total</b>  | <b>Total</b>         | <b>Total</b>                                 | <b>49,502</b>     | <b>74,891,227.58</b> | <b>1,512.89</b>    |

1/ Do not use the amount in account 368 per FERC Form 1, it includes other materials not just transformers

Minnesota Power  
Docket No. E015/GR-19-442

RD-04, Calculation of Controlled Access Rates

Page 1 of 4

**Controlled Access Electric Service  
Determination of Customer Related Costs**

| Line No. | Description                              | OIC           |               | Annual Cost 1/ |               | Monthly Cost  |               |
|----------|--|---------------|---------------|----------------|---------------|---------------|---------------|
|          |  | Small Service | Large Service | Small Service  | Large Service | Small Service | Large Service |
| 1        | Characteristics                          | < 75 kW       | > 75 kW       |                |               |               |               |
| 2        |  |               |               |                |               |               |               |
| 3        | Incremental Distribution Costs           |               |               |                |               |               |               |
| 4        | Average Meter Cost                       | \$157.00      | \$220.83      |                |               |               |               |
| 5        | Transformer Capacity - kVA               | 16            | 156           |                |               |               |               |
| 6        | Transformer Capacity - Cost              | 2/ \$1,411.56 | \$18,742.24   |                |               |               |               |
| 7        | Service Drop Upgrade Cost                | \$304.00      | \$304.00      |                |               |               |               |
| 8        | Subtotal                                 | \$1,872.56    | \$19,267.07   | \$266.65       | \$2,743.63    |               |               |
| 9        |  |               |               |                |               |               |               |
| 10       |  |               |               |                |               |               |               |
| 11       | Customer Accounting Expenses             |               |               | 47.18          | 47.18         |               |               |
| 12       | O & M Expense (3% of OIC)                |               |               | \$56.18        | \$578.01      |               |               |
| 13       | Total Customer Related Costs             |               |               | \$370.01       | \$3,368.82    | \$30.83       | \$280.73      |
| 14       |  |               |               |                |               |               |               |
| 15       | Proposed Customer Monthly Service Charge |               |               |                |               | \$5.00        | \$15.00       |

Fixed Charge Rates for determining annual cost 1/

| Line No. | Description  | Rate   |
|----------|--------------|--------|
| 1        | Distribution | 14.24% |

2/ Transformer Capacity Cost is obtained by multiplying line 5 by line 14, page 4

**Controlled Access/Controlled Access Electric Service  
Transmission and Distribution Revenue Requirement 1/**

| Line No. | Description     | Transmission | Dist Bulk | Prim Dist | Sec Dist  | Tot @ Primary | Tot @ Secondary | kWh 2/        |
|----------|-----------------|--------------|-----------|-----------|-----------|---------------|-----------------|---------------|
| 1        | Residential     | 6,744,119    | 2,804,892 | 9,055,238 | 6,819,293 | 18,604,249    | 25,423,542      | 948,850,000   |
| 2        | General Service | 6,198,644    | 2,118,627 | 7,515,374 | 3,217,601 | 15,832,645    | 19,050,246      | 678,755,000   |
| 3        |                 |              |           |           |           | 34,436,894    | 44,473,788      | 1,627,605,000 |
| 4        |                 |              |           |           |           |               |                 |               |
| 5        |                 |              |           |           |           | Primary Rate  | Secondary Rate  |               |
| 6        |                 |              |           |           |           | (\$/kWh)      | (\$/kWh)        |               |
| 7        |                 |              |           |           |           | 0.0212        | 0.0273          |               |

1/ Revenue Requirements per Compliance Cost of Service Study in Docket E015/GR-16-664

2/ Test Year 2020 usage

**Controlled Access Service  
Determination of Transformer Capacity Cost**

| Line No. | Sub Type Description                     | Sum of KVA   | Small Service | Large Service |
|----------|--|--------------|---------------|---------------|
| 1        | Single Phase Overhead                    | 530,322      | 530,322       |               |
| 2        | Single Phase Underground                 | 256,615      | 256,615       |               |
| 3        | Two Phase Overhead                       | 62,825       | 62,825        |               |
| 4        | Two Phase Underground                    | 5,494        | 5,494         |               |
| 5        | Three Phase Overhead                     | 206,323      |               | 206,323       |
| 6        | Three Phase Underground                  | 14,366       |               | 14,366        |
| 7        | Three Phase Underground - Single Unit    | 402,665      |               | 402,665       |
| 8        | Total kVA                                | 1,478,608    | 855,255       | 623,353       |
| 9        |  |              |               |               |
| 10       | Transformer Cost per Property Accounting | \$74,891,228 |               |               |
| 11       |  |              |               |               |
| 12       | Average Cost                             |              | \$87.57       | \$120.14      |
| 13       |  |              |               |               |
| 14       | Average Unit Cost per Service Size       |              | \$29.30       | \$21.35       |

1/ Source- GIS



**Controlled Access Service  
Transformers - Year 2018**

| Line No. | Plant Account | External Retire Unit | Retirement Unit Long Description             | Activity Quantity | End Balance          | Average Unit Price |
|----------|---------------|----------------------|--|-------------------|----------------------|--------------------|
| 1        | 3680          | 000000 7502          | Transformer Pole - 5Kv To 50Kv               | 33,108            | 28,245,372.76        | 853.13             |
| 2        | 3680          | 000000 7508          | Transformer Pole - 51Kv To 250Kv             | 1,552             | 3,948,432.82         | 2,544.09           |
| 3        | 3680          | 000000 7512          | Transformer Pole - 251Kv To 1000Kv           | 89                | 381,737.34           | 4,289.18           |
| 4        | 3680          | 000000 7516          | Transformer Pole - 1001Kv And Larger         | 5                 | 50,745.22            | 10,149.04          |
| 5        | 3680          | 000000 7522          | Transformer Network- 1000Kv And Smaller      | 9                 | 280,828.98           | 31,203.22          |
| 6        | 3680          | 000000 7528          | Transformer Network- 1500Kv                  | 4                 | (86,179.82)          | (21,544.96)        |
| 7        | 3680          | 000000 7530          | Transformer - Mobile Line 100Kva             | 2                 | 41,799.34            | 20,899.67          |
| 8        | 3680          | 000000 7602          | Transformer Padmount - 10Kv To 50Kv          | 12,287            | 19,318,007.67        | 1,572.23           |
| 9        | 3680          | 000000 7606          | Transformer Padmount - 51Kv To 167Kv         | 639               | 3,133,334.06         | 4,903.50           |
| 10       | 3680          | 000000 7608          | Transformer Padmount 10Kv To 750Kv 3Phs      | 1,634             | 14,455,515.44        | 8,846.70           |
| 11       | 3680          | 000000 7612          | Transformer Padmount - 751Kv And Larger 3Phs | 155               | 5,079,305.21         | 32,769.71          |
| 12       | 3680          | 000000 7650          | Transclosurer Housing                        | 18                | 42,328.56            | 2,351.59           |
| 13       | <b>Total</b>  | <b>Total</b>         | <b>Total</b>                                 | <b>49,502</b>     | <b>74,891,227.58</b> | <b>1,512.89</b>    |

1/ Do not use the amount in account 368 per Ferc Form 1, it includes other materials not just transformers

MINNESOTA POWER  
TEST YEAR 2020  
IR-1

The following 45 pages make up the Workpapers IR-1. The first page is a summary sheet for Total Revenue. After that, each Rate Class has a summary tab for total revenue excluding adjustments for riders that will remain outside of base rates and a summary tab for total revenue (including rider adjustments). After each rate class summary tab are the detailed rate sheets for each rate within that class. For the Large Power class, each customer has its own detailed rate sheet.

MINNESOTA POWER  
COMPARISON OF OPERATING REVENUES  
PRESENT VS. INTERIM RATES  
TEST YEAR 2020

| Rate Classes  | Customers | MWh       | Operating Revenues |           | Interim       | Increase     |       |
|---|-----------|-----------|--------------------|-----------|---------------|--------------|-------|
|   |           |           | Present            | MWh       |               | (\$)         | (%)   |
| 1 Residential                                       | 112,654   | 948,850   | \$103,025,631      | 948,850   | \$110,958,604 | \$7,932,974  | 7.70% |
| 2 General Service                                   | 20,894    | 678,755   | \$72,516,553       | 678,755   | \$78,100,328  | \$5,583,775  | 7.70% |
| 3 Large Light & Power                               | 446       | 1,324,161 | \$107,097,891      | 1,324,161 | \$115,344,428 | \$8,246,537  | 7.70% |
| 4 Large Power                                       | 9         | 5,288,437 | \$325,538,419      | 5,288,437 | \$350,604,877 | \$25,066,458 | 7.70% |
| 5 Municipal Pumping                                 | -         | -         | -                  | -         | -             | \$0          | 0.00% |
| 6 Lighting  | 5,045     | 20,418    | \$3,509,312        | 20,418    | \$3,779,522   | \$270,210    | 7.70% |
| 7 Subtotal (By Rate Class)                          | 139,048   | 8,260,621 | \$611,687,805      | 8,260,621 | \$658,787,759 | \$47,099,954 | 7.70% |
| Dual Fuel (Interruptible)                           |           |           |                    |           |               |              |       |
| 8 Residential                                       | 7,676     | 97,889    | \$8,201,260        | 97,889    | \$8,832,757   | \$631,497    | 7.70% |
| 9 Commercial/Industrial                             | 543       | 27,733    | \$2,214,100        | 27,733    | \$2,384,586   | \$170,486    | 7.70% |
| 10 Subtotal Dual Fuel                               | 8,219     | 125,622   | \$10,415,360       | 125,622   | \$11,217,343  | \$801,983    | 7.70% |
| 11 TOTAL (Sales of Electricity Including Dual Fuel) |           | 8,386,243 | \$622,103,165      | 8,386,243 | \$670,005,102 | \$47,901,936 | 7.70% |
| 12 Large Power (Other) 1/                           |           | 848,471   | \$35,557,558       | 848,471   | \$35,557,558  | \$0          | 0.00% |
| 13 TOTAL  | 147,267   | 9,234,714 | \$657,660,724      | 9,234,714 | \$705,562,660 | \$47,901,936 | 7.28% |
| <u>Adjustments to Revenue</u>                       |           |           |                    |           |               |              |       |
| 14 Boswell 4 Environmental Adjustment               |           |           | \$0                |           | \$0           | \$0          | 0.00% |
| 15 Renewable Resource Adjustment                    |           |           | \$0                |           | \$0           | \$0          | 0.00% |
| 16 Transmission Adjustment                          |           |           | \$0                |           | \$0           | \$0          | 0.00% |
| 18 Solar Energy Adjustment                          |           |           | -\$463,731         |           | -\$463,731    | \$0          | 0.00% |
| 19 Community Solar Garden                           |           | 1,553     | \$132,583          |           | \$132,583     | \$0          | 0.00% |
| 20 Conservation Program Adjustment                  |           |           | \$86,687           |           | \$86,687      | \$0          | 0.00% |
| 21 CCRC Credit for CIP-exempt                       |           |           | -\$1,262,387       |           | -\$1,262,387  | \$0          | 0.00% |
| 23 CARE Surcharge                                   |           |           | \$1,885,875        |           | \$1,885,875   | \$0          | 0.00% |
| 24 Subtotal Revenue Adjustments                     |           | 1,553     | \$379,027          |           | \$379,027     | \$0          | 0.00% |
| 25 Total E Schedule Revenue                         |           | 9,236,266 | \$658,039,751      |           | \$705,941,687 | \$47,901,936 | 7.28% |

Notes:

1/ Large Power (Other) includes IPS for Present and General Rates.

MINNESOTA POWER  
COMPARISON OF OPERATING REVENUES  
PRESENT VS. INTERIM RATES  
TEST YEAR 2020  
RESIDENTIAL

**\*\*Excluding Riders that will remain outside of Base Rates\*\***

| Residential                     | Operating Revenues |               | Increase    |       |
|---------------------------------|--------------------|---------------|-------------|-------|
|                                 | Present            | Interim       | (\$)        | (%)   |
| 1 Residential                   | \$101,187,814      | \$108,979,276 | \$7,791,462 | 7.70% |
| 2 Residential Seasonal          | \$1,493,290        | \$1,608,274   | \$114,983   | 7.70% |
| 3 Residential Controlled Access | \$343,594          | \$370,050     | \$26,457    | 7.70% |
| 4 Residential Electric Vehicle  | \$933              | \$1,004       | \$72        | 7.70% |
| 5 TOTAL RESIDENTIAL CLASS       | \$103,025,631      | \$110,958,604 | \$7,932,974 | 7.70% |

MINNESOTA POWER  
COMPARISON OF OPERATING REVENUES  
PRESENT VS. INTERIM RATES  
TEST YEAR 2020  
RESIDENTIAL

**\*\*Including Riders\*\***

| Residential                     | Operating Revenues |               | Increase    |       |
|---------------------------------|--------------------|---------------|-------------|-------|
|                                 | Present            | Interim       | (\$)        | (%)   |
| 1 Residential                   | \$102,521,899      | \$110,313,360 | \$7,791,462 | 7.60% |
| 2 Residential Seasonal          | \$1,530,899        | \$1,645,882   | \$114,983   | 7.51% |
| 3 Residential Controlled Access | \$343,149          | \$369,605     | \$26,457    | 7.71% |
| 4 Residential Electric Vehicle  | \$931              | \$1,003       | \$72        | 7.71% |
| 5 TOTAL RESIDENTIAL CLASS       | \$104,396,877      | \$112,329,851 | \$7,932,974 | 7.60% |

MINNESOTA POWER  
COMPARISON OF OPERATING REVENUES  
PRESENT VS. INTERIM RATES  
TEST YEAR 2020  
RESIDENTIAL

| Type of Charge                                       | Basis or Unit<br>Upon Which Rates<br>Are Applied | Total Billing Units |             | Unit Charge  |              | Operating Revenues |               | Increase    |       |
|--|--|---------------------|-------------|--------------|--------------|--------------------|---------------|-------------|-------|
|  |  | Present             | Interim     | Present      | Interim      | Present            | Interim       | (\$)        | (%)   |
| 1 Minimum charge                                     | # of Bills                                       | 1,310,363           | 1,310,363   | \$8.00       | \$8.00       | \$10,482,904       | \$10,482,904  | \$0         | 0.00% |
| Energy Blocks  |  |                     |             |              |              |                    |               |             |       |
| 2 0 kWh to 400 kWh                                   | kWh  | 449,905,000         | 449,905,000 | \$0.07423    | \$0.05272    | \$33,396,448       | \$23,719,796  |             |       |
| 3 401 kWh to 800 kWh                                 | kWh  | 255,062,665         | 255,062,665 | \$0.09767    | \$0.07616    | \$24,911,970       | \$19,426,028  |             |       |
| 4 801 kWh to 1200 kWh                                | kWh  | 110,607,000         | 110,607,000 | \$0.12113    | \$0.09962    | \$13,397,826       | \$11,018,867  |             |       |
| 5 Over 1200 kWh                                      | kWh  | 118,575,000         | 118,575,000 | \$0.14653    | \$0.12502    | \$17,374,795       | \$14,824,458  |             |       |
| 6 Base Cost of Fuel                                  | kWh  | 934,149,665         | 934,149,665 | \$0.00000    | \$0.02151    | \$0                | \$20,091,890  |             |       |
| 7 Total Base Revenue                                 |  |                     |             |              |              | \$99,563,943       | \$99,563,943  | \$0         | 0.00% |
| 8 Fuel Adjustment                                    |  | 934,149,665         | 934,149,665 | \$0.00336    | \$0.00336    | \$3,143,117        | \$3,143,117   | \$0         |       |
| <u>Adjustments for Riders Included in Base Rates</u> |  |                     |             |              |              |                    |               |             |       |
| 9 Boswell 4 Environmental Adjustment                 | kWh  | 934,149,665         | 934,149,665 | \$0.00000000 | \$0.00000000 | \$0                | \$0           | \$0         |       |
| 10 Renewable Resource Adjustment                     | kWh  | 934,149,665         | 934,149,665 | \$0.00000000 | \$0.00000000 | \$0                | \$0           | \$0         |       |
| 11 Transmission Adjustment (\$)                      | kWh  | 934,149,665         | 934,149,665 | \$0.00000000 | \$0.00000000 | \$0                | \$0           | \$0         |       |
| 12 Fuel Adjustment Clause                            | kWh  | 934,149,665         | 934,149,665 | \$0.00000000 | \$0.00000000 | \$0                | \$0           | \$0         |       |
| 13 Conservation Program Adjustment                   | kWh  | 934,149,665         | 934,149,665 | \$0.00000000 | \$0.00000000 | \$0                | \$0           | \$0         |       |
| 14 Excess ADIT Credit                                | %  |                     |             | -0.015259    | -0.015259    | (\$1,519,246)      | (\$1,519,246) | \$0         |       |
| 15 Subtotal Revenue                                  |  |                     |             |              |              | \$101,187,814      | \$101,187,814 | \$0         | 0.00% |
| Interim Rate Increase (%)                            |  |                     |             | 0%           | 7.70%        | \$0                | \$7,791,462   | \$7,791,462 |       |
| Subtotal Revenue                                     |  |                     |             |              |              | \$101,187,814      | \$108,979,276 | \$7,791,462 | 7.70% |
| 16 Boswell 4 Environmental Adjustment                | kWh  | 934,149,665         | 934,149,665 | \$0.00000000 | \$0.00000000 | \$0                | \$0           | \$0         |       |
| 17 Renewable Resource Adjustment                     | kWh  | 934,149,665         | 934,149,665 | \$0.00000000 | \$0.00000000 | \$0                | \$0           | \$0         |       |
| 18 Transmission Adjustment (\$)                      | kWh  | 934,149,665         | 934,149,665 | \$0.00000000 | \$0.00000000 | \$0                | \$0           | \$0         |       |
| 19 Solar Energy Adjustment                           | kWh  | 934,149,665         | 934,149,665 | -\$0.00015   | -\$0.00015   | -\$140,050         | -\$140,050    | \$0         |       |
| 20 Community Solar Garden - Customer Charge          | Blocks   | 5,313               | 5,313       | \$15.44      | \$15.44      | \$82,058           | \$82,058      | \$0         |       |
| 21 Community Solar Garden - Energy                   | kWh  | 55,239              | 55,239      | \$0.1115     | \$0.1115     | \$6,159            | \$6,159       | \$0         |       |
| 22 Conservation Program Adjustment                   | kWh  | 934,149,665         | 934,149,665 | \$0.00003880 | \$0.00003880 | \$36,244           | \$36,244      | \$0         |       |
| 23 CARE Surcharge                                    | # of Bills                                       | 1,310,363           | 1,310,363   | \$1.03000000 | \$1.03000000 | \$1,349,674        | \$1,349,674   | \$0         |       |
| 24 TOTAL REVENUE                                     |  |                     |             |              |              | \$102,521,899      | \$110,313,360 | \$7,791,462 | 7.60% |

MINNESOTA POWER  
COMPARISON OF OPERATING REVENUES  
PRESENT VS. INTERIM RATES  
TEST YEAR 2020  
RESIDENTIAL

Rate Schedules 23  
Seasonal Residential

| Type of Charge                                       | Basis or Unit<br>Upon Which Rates<br>Are Applied | Total Billing Units |            | Unit Charge  |              | Operating Revenues |             | Increase   |         |
|--|--|---------------------|------------|--------------|--------------|--------------------|-------------|------------|---------|
|  |  | Present             | Interim    | Present      | Interim      | Present            | Interim     | (\$)       | (%)     |
| 1 Minimum Charge                                     | # of Bills                                       | 37,636              | 37,636     | \$10.00      | \$10.00      | \$376,360          | \$376,360   | \$0        | 0.00%   |
| 2 Energy - All                                       | kWh  | 10,131,000          | 10,131,000 | \$0.10853    | \$0.08702    | \$1,099,517        | \$881,618   | -\$217,900 | -19.82% |
| 3 Base Cost of fuel                                  | kWh  | 10,131,000          | 10,131,000 | \$0.00000    | \$0.02151    | \$0                | \$217,900   |            |         |
| 4 Total Base Revenue                                 |  |                     |            |              |              | \$1,475,877        | \$1,475,877 | \$0        | 0.00%   |
| 5 Fuel Adjustment                                    |  | 10,131,000          | 10,131,000 | \$0.0039417  | \$0.0039417  | \$39,933           | \$39,933    | \$0        |         |
| <u>Adjustments for Riders Included in Base Rates</u> |  |                     |            |              |              |                    |             |            |         |
| 6 Boswell 4 Environmental Adjustment                 | kWh  | 10,131,000          | 10,131,000 | \$0.00000000 | \$0.00000000 | \$0                | \$0         | \$0        |         |
| 7 Renewable Resource Adjustment                      | kWh  | 10,131,000          | 10,131,000 | \$0.00000000 | \$0.00000000 | \$0                | \$0         | \$0        |         |
| 8 Transmission Adjustment (\$)                       | kWh  | 10,131,000          | 10,131,000 | \$0.00000000 | \$0.00000000 | \$0                | \$0         | \$0        |         |
| 9 Conservation Program Adjustment                    | kWh  | 10,131,000          | 10,131,000 | \$0.00000000 | \$0.00000000 | \$0                | \$0         | \$0        |         |
| 10 Excess ADIT Credit                                | %  |                     |            | -\$0.015259  | -\$0.015259  | (\$22,520)         | (\$22,520)  | \$0        |         |
| 11 Subtotal Revenue                                  |  |                     |            |              |              | \$1,493,290        | \$1,493,290 | \$0        | 0.00%   |
| Interim Rate Increase (%)                            |  |                     |            | 0%           | 7.70%        | \$0                | \$114,983   | \$114,983  |         |
| Subtotal Revenue                                     |  |                     |            |              |              | \$1,493,290        | \$1,608,274 | \$114,983  | 7.70%   |
| 12 Boswell 4 Environmental Adjustment                | kWh  | 10,131,000          | 10,131,000 | \$0.00000000 | \$0.00000000 | \$0                | \$0         | \$0        |         |
| 13 Renewable Resource Adjustment                     | kWh  | 10,131,000          | 10,131,000 | \$0.00000000 | \$0.00000000 | \$0                | \$0         | \$0        |         |
| 14 Transmission Adjustment (\$)                      | kWh  | 10,131,000          | 10,131,000 | \$0.00000000 | \$0.00000000 | \$0                | \$0         | \$0        |         |
| 15 Solar Energy Adjustment                           | kWh  | 10,131,000          | 10,131,000 | -\$0.0001633 | -\$0.0001633 | (\$1,655)          | -\$1,655    | \$0        |         |
| 16 Conservation Program Adjustment                   | kWh  | 10,131,000          | 10,131,000 | \$0.00004920 | \$0.00004920 | \$498              | \$498       | \$0        |         |
| 17 CARE Surcharge                                    | # of Bills                                       | 37,636              | 37,636     | \$1.03       | \$1.03       | \$38,765           | \$38,765    | \$0        |         |
| 18 TOTAL REVENUE                                     |  |                     |            |              |              | \$1,530,899        | \$1,645,882 | \$114,983  | 7.51%   |

MINNESOTA POWER  
COMPARISON OF OPERATING REVENUES  
PRESENT VS. INTERIM RATES  
TEST YEAR 2020  
RESIDENTIAL

Rate Schedule 24  
Residential Controlled Access

| Type of Charge                                       | Basis or Unit<br>Upon Which Rates<br>Are Applied | Total Billing Units |           | Unit Charge  |              | Operating Revenues |           | Increase  |         |
|--|--|---------------------|-----------|--------------|--------------|--------------------|-----------|-----------|---------|
|  |  | Present             | Interim   | Present      | Interim      | Present            | Interim   | (\$)      | (%)     |
| 1 Minimum Charge                                     | # of Bills                                       | 3,818               | 3,818     | \$8.00       | \$8.00       | \$30,544           | \$30,544  | \$0       | 0.00%   |
| 2 Energy - All                                       | kWh  | 4,554,000           | 4,554,000 | \$0.06769    | \$0.04618    | \$308,260          | \$210,312 | -\$97,948 | -31.77% |
| 3 Base Cost of Fuel                                  | kWh  | 4,554,000           | 4,554,000 | \$0.00000    | \$0.02151    | \$0                | \$97,948  |           |         |
| 4 Total Base Revenue                                 |  |                     |           |              |              | \$338,804          | \$338,804 | \$0       | 0.00%   |
| 5 Fuel Adjustment                                    |  | 4,554,000           | 4,554,000 | \$0.0021869  | \$0.0021869  | \$9,959            | \$9,959   | \$0       |         |
| <u>Adjustments for Riders Included in Base Rates</u> |  |                     |           |              |              |                    |           |           |         |
| 6 Boswell 4 Environmental Adjustment                 | kWh  | 4,554,000           | 4,554,000 | \$0.00000000 | \$0.00000000 | \$0                | \$0       | \$0       |         |
| 7 Renewable Resource Adjustment                      | kWh  | 4,554,000           | 4,554,000 | \$0.00000000 | \$0.00000000 | \$0                | \$0       | \$0       |         |
| 8 Transmission Adjustment (\$)                       | kWh  | 4,554,000           | 4,554,000 | \$0.00000000 | \$0.00000000 | \$0                | \$0       | \$0       |         |
| 9 Conservation Program Adjustment                    | kWh  | 4,554,000           | 4,554,000 | \$0.00000000 | \$0.00000000 | \$0                | \$0       | \$0       |         |
| 10 Excess ADIT Credit                                | %  |                     |           | -0.015259    | -0.015259    | (\$5,170)          | (\$5,170) | \$0       |         |
| 11 Subtotal Revenue                                  |  |                     |           |              |              | \$343,594          | \$343,594 | \$0       | 0.00%   |
| Interim Rate Increase (%)                            |  |                     |           | 0%           | 7.70%        | \$0                | \$26,457  | \$26,457  |         |
| Subtotal Revenue                                     |  |                     |           |              |              | \$343,594          | \$370,050 | \$26,457  | 7.70%   |
| 12 Boswell 4 Environmental Adjustment                | kWh  | 4,554,000           | 4,554,000 | \$0.00000000 | \$0.00000000 | \$0                | \$0       | \$0       |         |
| 13 Renewable Resource Adjustment                     | kWh  | 4,554,000           | 4,554,000 | \$0.00000000 | \$0.00000000 | \$0                | \$0       | \$0       |         |
| 14 Transmission Adjustment (\$)                      | kWh  | 4,554,000           | 4,554,000 | \$0.00000000 | \$0.00000000 | \$0                | \$0       | \$0       |         |
| 15 Solar Energy Adjustment                           | kWh  | 4,554,000           | 4,554,000 | -\$0.0001167 | -\$0.0001167 | -\$532             | -\$532    | \$0       |         |
| 16 Conservation Program Adjustment                   | kWh  | 4,554,000           | 4,554,000 | \$0.00001903 | \$0.00001903 | \$87               | \$87      | \$0       |         |
| 17 TOTAL REVENUE                                     |  |                     |           |              |              | \$343,149          | \$369,605 | \$26,457  | 7.71%   |



MINNESOTA POWER  
COMPARISON OF OPERATING REVENUES  
PRESENT VS. INTERIM RATES  
TEST YEAR 2020  
RESIDENTIAL ELECTRIC VEHICLE

Rate Schedules 28  
Residential Electric Vehicle

| Type of Charge                                       | Basis or Unit<br>Upon Which Rates<br>Are Applied | Total Billing Units |         | Unit Charge  |              | Operating Revenues |         | Increase |         |
|--|--|---------------------|---------|--------------|--------------|--------------------|---------|----------|---------|
|  |  | Present             | Interim | Present      | Interim      | Present            | Interim | (\$)     | (%)     |
| 1 Minimum charge                                     | # of Bills                                       | 36                  | 36      | \$4.25       | \$4.25       | \$153              | \$153   | \$0      | 0.00%   |
| Energy   |  |                     |         |              |              |                    |         |          |         |
| 2 On - Peak Energy                                   | kWh  | 2,000               | 2,000   | \$0.11763    | \$0.09612    | \$235              | \$192   | -\$43    | -18.28% |
| 3 Off - Peak Energy                                  | kWh  | 13,000              | 13,000  | \$0.03903    | \$0.01752    | \$507              | \$228   | -\$280   | -55.11% |
| 4 Base Cost of Fuel                                  | kWh  | 15,000              | 15,000  | \$0.00000    | \$0.02151    | \$0                | \$323   |          |         |
| 5 Total Base Revenue                                 |  |                     |         |              |              | \$896              | \$896   | \$0      | 0.00%   |
| 6 Fuel Adjustment                                    |  | 15,000              | 15,000  | \$0.0033761  | \$0.00337614 | \$51               | \$51    | \$0      |         |
| <u>Adjustments for Riders Included in Base Rates</u> |  |                     |         |              |              |                    |         |          |         |
| 7 Boswell 4 Environmental Adjustment                 | kWh  | 15,000              | 15,000  | \$0.00000000 | \$0.00000000 | \$0                | \$0     | \$0      |         |
| 8 Renewable Resource Adjustment                      | kWh  | 15,000              | 15,000  | \$0.00000000 | \$0.00000000 | \$0                | \$0     | \$0      |         |
| 9 Transmission Adjustment (\$)                       | kWh  | 15,000              | 15,000  | \$0.00000000 | \$0.00000000 | \$0                | \$0     | \$0      |         |
| 10 Conservation Program Adjustment                   | kWh  | 15,000              | 15,000  | \$0.00000000 | \$0.00000000 | \$0                | \$0     | \$0      |         |
| 11 Excess ADIT Credit                                | %  |                     |         | -0.015259    | -0.015259    | (\$14)             | -\$14   | \$0      |         |
| 12 Subtotal Revenue                                  |  |                     |         |              |              | \$933              | \$933   | \$0      | 0.00%   |
| Interim Rate Increase (%)                            |  |                     |         | 0%           | 7.70%        | \$0                | \$72    | \$72     |         |
| Subtotal Revenue                                     |  |                     |         |              |              | \$933              | \$1,004 | \$72     | 7.70%   |
| 13 Boswell 4 Environmental Adjustment                | kWh  | 15,000              | 15,000  | \$0.00000000 | \$0.00000000 | \$0                | \$0     | \$0      |         |
| 14 Renewable Resource Adjustment                     | kWh  | 15,000              | 15,000  | \$0.00000000 | \$0.00000000 | \$0                | \$0     | \$0      |         |
| 15 Transmission Adjustment (\$)                      | kWh  | 15,000              | 15,000  | \$0.00000000 | \$0.00000000 | \$0                | \$0     | \$0      |         |
| 16 Solar Energy Adjustment                           | kWh  | 15,000              | 15,000  | -\$0.0001487 | -\$0.0001487 | -\$2               | -\$2    | \$0      |         |
| 17 Conservation Program Adjustment                   | kWh  | 15,000              | 15,000  | \$0.00003267 | \$0.00003267 | \$0                | \$0     | \$0      |         |
| 18 TOTAL REVENUE                                     |  |                     |         |              |              | \$931              | \$1,003 | \$72     | 7.71%   |

MINNESOTA POWER  
COMPARISON OF OPERATING REVENUES  
PRESENT VS. INTERIM RATES  
TEST YEAR 2020  
GENERAL SERVICE

**\*\*Excluding Riders that will remain outside of Base Rates\*\***

| General Service                | Operating Revenues |              | Increase    |       |
|--------------------------------|--------------------|--------------|-------------|-------|
|                                | Present            | Interim      | (\$)        | (%)   |
| 1 General Service              | \$72,454,214       | \$78,033,188 | \$5,578,974 | 7.70% |
| 2 Commercial Controlled Access | \$62,339           | \$67,139     | \$4,800     | 7.70% |
| 3 TOTAL GENERAL SERVICE CLASS  | \$72,516,553       | \$78,100,328 | \$5,583,775 | 7.70% |

MINNESOTA POWER  
COMPARISON OF OPERATING REVENUES  
PRESENT VS. INTERIM RATES  
TEST YEAR 2020  
GENERAL SERVICE

**\*\*Including Riders\*\***

| General Service                | Operating Revenues |              | Increase    |       |
|--------------------------------|--------------------|--------------|-------------|-------|
|                                | Present            | Interim      | (\$)        | (%)   |
| 1 General Service              | \$72,797,873       | \$78,376,847 | \$5,578,974 | 7.66% |
| 2 Commercial Controlled Access | \$62,250           | \$67,050     | \$4,800     | 7.71% |
| 3 TOTAL GENERAL SERVICE CLASS  | \$72,860,123       | \$78,443,897 | \$5,583,775 | 7.66% |

MINNESOTA POWER  
COMPARISON OF OPERATING REVENUES  
PRESENT VS. INTERIM RATES  
TEST YEAR 2020  
GENERAL SERVICE

Rate Schedule 25  
General Service

| Type of Charge                                       | Basis or Unit<br>Upon Which Rates<br>Are Applied | Total Billing Units |             | Unit Charge   |               | Operating Revenues |               | Increase      |         |
|--|--|---------------------|-------------|---------------|---------------|--------------------|---------------|---------------|---------|
|  |  | Present             | Interim     | Present       | Interim       | Present            | Interim       | (\$)          | (%)     |
| 1 Service Charge                                     | # of Bills                                       | 250,036             | 250,036     | \$12.00       | \$12.00       | \$3,000,432        | \$3,000,432   | \$0           | 0.00%   |
| 2 No Demand Meter<br>Energy - All                    | kWh  | 61,669,169          | 61,669,169  | \$0.10204     | \$0.08008     | \$6,292,722        | \$4,938,703   | -\$1,354,019  | -21.52% |
| 3 Community Solar Garden Adjustment                  | kWh  | 62,704              | 62,704      | -\$0.08912    | -\$0.08912    | -\$5,588           | -\$5,588      |               |         |
| 4 Demand Meter<br>Demand - All                       | kW   | 2,340,677           | 2,340,677   | \$6.50        | \$6.50        | \$15,214,401       | \$15,214,401  | \$0           | 0.00%   |
| 5 Energy - All                                       | kWh  | 617,075,256         | 617,075,256 | \$0.07619     | \$0.05423     | \$47,014,964       | \$33,466,356  | -\$13,548,608 | -28.82% |
| 6 Community Solar Garden Adjustment                  | kWh  | 713,631             | 713,631     | -\$0.08912    | -\$0.08912    | -\$63,599          | -\$63,599     |               |         |
| 7 Service Voltage Adjustment<br>High Voltage Service | kW   | 103,346             | 103,346     | \$ (2.00)     | \$ (2.00)     | (\$206,692)        | (\$206,692)   | \$0           | 0.00%   |
| 8 Transmission Voltage Service                       | kWh  | 0                   | 0           | (\$0.00350)   | (\$0.00350)   | \$0                | \$0           | \$0           |         |
| 9 Base Cost of Fuel                                  | kWh  | 678,744,425         | 678,744,425 | \$0.00000     | \$0.02196     | \$0                | \$14,902,626  |               |         |
| 10 Total Base Revenue                                |  |                     |             |               |               | \$71,246,639       | \$71,246,639  | \$0           | 0.00%   |
| 11 Fuel Adjustment                                   | kWh  | 677,968,090         | 677,968,090 | \$0.0033847   | \$0.0033847   | \$2,294,727        | \$2,294,727   | \$0           |         |
| <u>Adjustments for Riders Included in Base Rates</u> |  |                     |             |               |               |                    |               |               |         |
| 12 Boswell 4 Environmental Adjustment                | kWh  | 677,968,090         | 677,968,090 | \$0.00000000  | \$0.00000000  | \$0                | \$0           | \$0           |         |
| 13 Renewable Resource Adjustment                     | kWh  | 677,968,090         | 677,968,090 | \$0.00000000  | \$0.00000000  | \$0                | \$0           | \$0           |         |
| 14 Transmission Adjustment (\$)                      | kWh  | 677,968,090         | 677,968,090 | \$0.00000000  | \$0.00000000  | \$0                | \$0           | \$0           |         |
| 15 Conservation Program Adjustment                   | kWh  | 677,968,090         | 677,968,090 | \$0.00000000  | \$0.00000000  | \$0                | \$0           | \$0           |         |
| 16 Excess ADIT Credit                                | %  |                     |             | -0.014783     | -0.015259     | (\$1,087,152)      | (\$1,087,152) | \$0           |         |
| 17 Subtotal Revenue                                  |  |                     |             |               |               | \$72,454,214       | \$72,454,214  | \$0           | 0.00%   |
| Interim Rate Increase (%)                            |  |                     |             | 0%            | 7.70%         | \$0                | \$5,578,974   | \$5,578,974   |         |
| Subtotal Revenue                                     |  |                     |             |               |               | \$72,454,214       | \$78,033,188  | \$5,578,974   | 7.70%   |
| 18 Boswell 4 Environmental Adjustment                | kWh  | 677,968,090         | 677,968,090 | \$0.00000000  | \$0.00000000  | \$0                | \$0           | \$0           |         |
| 19 Renewable Resource Adjustment                     | kWh  | 677,968,090         | 677,968,090 | \$0.00000000  | \$0.00000000  | \$0                | \$0           | \$0           |         |
| 20 Transmission Adjustment (\$)                      | kWh  | 677,968,090         | 677,968,090 | \$0.00000000  | \$0.00000000  | \$0                | \$0           | \$0           |         |
| 21 Solar Energy Adjustment                           | kWh  | 676,168,090         | 676,168,090 | -\$0.00015183 | -\$0.00015183 | (\$102,660)        | (\$102,660)   | \$0           |         |
| 22 Community Solar Garden - Customer Charge          | Blocks   | 6,240               | 6,240       | \$7.11000000  | \$7.11000000  | \$44,366           | \$44,366      | \$0           |         |
| 23 Conservation Program Adjustment                   | kWh  | 677,968,090         | 677,968,090 | \$0.00002999  | \$0.00002999  | \$20,335           | \$20,335      | \$0           |         |
| 24 CCRC Credit for CIP-exempt                        | kWh  | 1,800,000           | 1,800,000   | -\$0.00329910 | -\$0.00329910 | -\$5,938           | (\$5,938)     | \$0           |         |
| 25 Care Surcharge                                    | # of Bills                                       | 250,036             | 250,036     | \$1.55000000  | \$1.55000000  | \$387,556          | \$387,556     | \$0           |         |
| 26 TOTAL REVENUE                                     |  |                     |             |               |               | \$72,797,873       | \$78,376,847  | \$5,578,974   | 7.66%   |

MINNESOTA POWER  
COMPARISON OF OPERATING REVENUES  
PRESENT VS. INTERIM RATES  
TEST YEAR 2020  
GENERAL SERVICE

Rate Schedule 27  
Commercial Controlled Access

| Type of Charge                                       | Basis or Unit<br>Upon Which Rates<br>Are Applied | Total Billing Units |         | Unit Charge  |              | Operating Revenues |          | Increase  |         |
|--|--|---------------------|---------|--------------|--------------|--------------------|----------|-----------|---------|
|  |  | Present             | Interim | Present      | Interim      | Present            | Interim  | (\$)      | (%)     |
| 1 Minimum Charge                                     | # of Bills                                       | 692                 | 692     | \$12.00      | \$12.00      | \$8,304            | \$8,304  | \$0       | 0.00%   |
| 2 Energy - All                                       | kWh  | 787,000             | 787,000 | \$0.06769    | \$0.04573    | \$53,272           | \$35,993 | -\$17,280 | -32.44% |
| 3 Base Cost of Fuel                                  | kWh  | 787,000             | 787,000 | \$0.00000    | \$0.02196    | \$0                | \$17,280 |           |         |
| 4 Total Base Revenue                                 |  |                     |         |              |              | \$61,576           | \$61,576 | \$0       | 0.00%   |
| 5 Fuel Adjustment                                    |  | 787,000             | 787,000 | \$0.0015631  | \$0.0015631  | \$1,703            | \$1,703  | \$0       |         |
| <u>Adjustments for Riders Included in Base Rates</u> |  |                     |         |              |              |                    |          |           |         |
| 6 Boswell 4 Environmental Adjustment                 | kWh  | 787,000             | 787,000 | \$0.00000000 | \$0.00000000 | \$0                | \$0      | \$0       |         |
| 7 Renewable Resource Adjustment                      | kWh  | 787,000             | 787,000 | \$0.00000000 | \$0.00000000 | \$0                | \$0      | \$0       |         |
| 8 Transmission Adjustment (\$)                       | kWh  | 787,000             | 787,000 | \$0.00000000 | \$0.00000000 | \$0                | \$0      | \$0       |         |
| 9 Conservation Program Adjustment                    | kWh  | 787,000             | 787,000 | \$0.00000000 | \$0.00000000 | \$0                | \$0      | \$0       |         |
| 10 Excess ADIT Credit                                |  |                     |         | -0.015259    | -0.015259    | (\$940)            | (\$940)  | \$0       |         |
| 11 Subtotal Revenue                                  |  |                     |         |              |              | \$62,339           | \$62,339 | \$0       | 0.00%   |
| Interim Rate Increase (%)                            |  |                     |         | 0%           | 7.70%        | \$0                | \$4,800  | \$4,800   |         |
| Subtotal Revenue                                     |  |                     |         |              |              | \$62,339           | \$67,139 | \$4,800   | 7.70%   |
| 12 Boswell 4 Environmental Adjustment                | kWh  | 787,000             | 787,000 | \$0.00000000 | \$0.00000000 | \$0                | \$0      | \$0       |         |
| 13 Renewable Resource Adjustment                     | kWh  | 787,000             | 787,000 | \$0.00000000 | \$0.00000000 | \$0                | \$0      | \$0       |         |
| 14 Transmission Adjustment (\$)                      | kWh  | 787,000             | 787,000 | \$0.00000000 | \$0.00000000 | \$0                | \$0      | \$0       |         |
| 15 Solar Energy Adjustment                           | kWh  | 787,000             | 787,000 | -\$0.0001150 | -\$0.0001150 | -\$90              | -\$90    | \$0       |         |
| 16 Conservation Program Adjustment                   | kWh  | 787,000             | 787,000 | \$0.00000205 | \$0.00000205 | \$2                | \$2      | \$0       |         |
| 17 TOTAL REVENUE                                     |  |                     |         |              |              | \$62,250           | \$67,050 | \$4,800   | 7.71%   |

MINNESOTA POWER  
COMPARISON OF OPERATING REVENUES  
PRESENT VS. INTERIM RATES  
TEST YEAR 2020  
LARGE LIGHT & POWER

**\*\*Excluding Riders that will remain outside of Base Rates\*\***

| Large Light and Power               | Operating Revenues |               | Increase    |       |
|-------------------------------------|--------------------|---------------|-------------|-------|
|                                     | Present            | Interim       | (\$)        | (%)   |
| 1 Standard Rate                     | \$103,187,045      | \$111,132,447 | \$7,945,402 | 7.70% |
| 2 Rider for Schools                 | \$3,910,846        | \$4,211,981   | \$301,135   | 7.70% |
| 3 TOTAL LARGE LIGHT AND POWER CLASS | \$107,097,891      | \$115,344,428 | \$8,246,537 | 7.70% |

MINNESOTA POWER  
COMPARISON OF OPERATING REVENUES  
PRESENT VS. INTERIM RATES  
TEST YEAR 2020  
LARGE LIGHT & POWER

**\*\*Including Riders\*\***

| <u>Large Light and Power</u>        | <u>Operating Revenues</u> |                | <u>Increase</u> |            |
|-------------------------------------|---------------------------|----------------|-----------------|------------|
|                                     | <u>Present</u>            | <u>Interim</u> | <u>(\$)</u>     | <u>(%)</u> |
| 1 Standard Rate                     | \$101,858,497             | \$109,803,899  | \$7,945,402     | 7.80%      |
| 2 Rider for Schools                 | \$3,916,096               | \$4,217,231    | \$301,135       | 7.69%      |
| 3 TOTAL LARGE LIGHT AND POWER CLASS | \$105,774,593             | \$114,021,130  | \$8,246,537     | 7.80%      |

**PUBLIC DOCUMENT**  
**TRADE SECRET DATA EXCISED**

MINNESOTA POWER  
COMPARISON OF OPERATING REVENUES  
PRESENT VS. INTERIM RATES  
TEST YEAR 2020  
LARGE LIGHT & POWER

**Non-Public Document- All Highlighted Data is Trade Secret Customer Data**

Rate Schedules 75  
Standard Rate

| Type of Charge                                | Basis or Unit<br>Upon Which Rates<br>Are Applied | Total Billing Units |               | Unit Charge   |               | Operating Revenues |               | Increase               |         |
|---|--|---------------------|---------------|---------------|---------------|--------------------|---------------|------------------------|---------|
|   |  | Present             | Interim       | Present       | Interim       | Present            | Interim       | (\$)                   | (%)     |
| 1 Service Charge                              | # of Bills                                       | 4,820               | 4,820         | \$1,200.00    | \$1,200.00    | \$5,784,000        | \$5,784,000   | \$0                    | 0.00%   |
| Demand Blocks                                 |  |                     |               |               |               |                    |               |                        |         |
| 2 First 100 kW or less                        | kW   | 454,474             | 454,474       | \$0.00        | \$0.00        | \$0                | \$0           | \$0                    |         |
| 3 Over 100 kW                                 | kW   | 1,799,243           | 1,799,243     | \$10.50       | \$10.50       | \$18,892,055       | \$18,892,055  | \$0                    | 0.00%   |
| 4 Energy - All                                | kWh  | 914,395,000         | 914,395,000   | \$0.05811     | \$0.03669     | \$53,135,493       | \$33,550,723  | (\$19,584,770)         | -36.86% |
| Service Voltage Adjustment                    |  |                     |               |               |               |                    |               |                        |         |
| 5 High Voltage Service                        | kW   | 952,819             | 952,819       | \$ (2.00)     | \$ (2.00)     | (\$1,905,638)      | (\$1,905,638) | \$0                    | 0.00%   |
| 6 Foundry Discount                            | kW   | 230,800             | 230,800       | \$ (2.50)     | \$ (2.50)     | (\$577,000)        | (\$577,000)   | \$0                    | 0.00%   |
| 7 Transmission Voltage Service                | kWh  | 18,468,000          | 18,468,000    | (\$0.00350)   | (\$0.00350)   | (\$64,638)         | (\$64,638)    | \$0                    | 0.00%   |
| 8 Business Incentive Discount                 | kW   | 381,600             | 381,600       | -50%          | -50%          | (\$190,800)        | (\$190,800)   | \$0                    | 0.00%   |
| 9 Base Cost Of Fuel                           | kWh  | 914,395,000         | 914,395,000   | \$0.00000     | \$0.02142     | \$0                | \$19,584,769  |                        |         |
| 10 Total Base Revenue                         |  |                     |               |               |               | \$75,073,472       | \$75,073,471  | -\$1                   | 0.00%   |
| 11 Gerdau Base Revenue 1/                     | TRADE SECRET DATA BEGINS                         |                     |               |               |               |                    |               | TRADE SECRET DATA ENDS |         |
| 12 Pipelines Base Revenue 2/                  | TRADE SECRET DATA BEGINS                         |                     |               |               |               |                    |               | TRADE SECRET DATA ENDS |         |
| 13 Fuel Adjustment                            |  | 1,283,474,000       | 1,283,474,000 | \$0.0032476   | \$0.0032476   | \$4,168,239        | \$4,168,239   | \$0                    |         |
| Adjustments for Riders Included in Base Rates |  |                     |               |               |               |                    |               |                        |         |
| 14 Boswell 4 Environmental Adjustment         | kWh  | 1,283,474,000       | 1,283,474,000 | \$0.00000000  | \$0.00000000  | \$0                | \$0           | \$0                    |         |
| 15 Renewable Resource Adjustment              | kWh  | 1,283,474,000       | 1,283,474,000 | \$0.00000000  | \$0.00000000  | \$0                | \$0           | \$0                    |         |
| 16 Transmission Adjustment (\$)               | kWh  | 1,283,474,000       | 1,283,474,000 | \$0.00000000  | \$0.00000000  | \$0                | \$0           | \$0                    |         |
| 17 Conservation Program Adjustment            | kWh  | 1,283,474,000       | 1,283,474,000 | \$0.00000000  | \$0.00000000  | \$0                | \$0           | \$0                    |         |
| 18 Excess ADIT Credit                         | %  |                     |               | -0.015259     | -0.015259     | (\$1,534,340)      | (\$1,534,340) | \$0                    |         |
| 19 Subtotal Revenue                           |  |                     |               |               |               | \$103,187,045      | \$103,187,045 | (\$1)                  | 0.00%   |
| Interim Rate Increase (%)                     |  |                     |               | 0%            | 7.70%         | \$0                | \$7,945,402   | \$7,945,402            |         |
| Subtotal Revenue                              |  |                     |               |               |               | \$103,187,045      | \$111,132,447 | \$7,945,402            | 7.70%   |
| 20 Boswell 4 Environmental Adjustment         | kWh  | 1,283,474,000       | 1,283,474,000 | \$0.00000000  | \$0.00000000  | \$0                | \$0           | \$0                    |         |
| 21 Renewable Resource Adjustment              | kWh  | 1,283,474,000       | 1,283,474,000 | \$0.00000000  | \$0.00000000  | \$0                | \$0           | \$0                    |         |
| 22 Transmission Adjustment (\$)               | kWh  | 1,283,474,000       | 1,283,474,000 | \$0.00000000  | \$0.00000000  | \$0                | \$0           | \$0                    |         |
| 23 Fuel Adjustment Clause                     | kWh  | 1,283,474,000       | 1,283,474,000 | \$0.00000000  | \$0.00000000  | \$0                | \$0           | \$0                    |         |
| 24 Solar Energy Adjustment                    | kWh  | 1,267,706,000       | 1,267,706,000 | -\$0.0001536  | -\$0.0001536  | -\$194,760         | -\$194,760    | \$0                    |         |
| 25 Conservation Program Adjustment            | kWh  | 902,628,000         | 902,628,000   | \$0.00003179  | \$0.00003179  | \$28,697           | \$28,697      | \$0                    |         |
| 26 CCRC Credit for CIP-exempt                 | kWh  | 380,846,000         | 380,846,000   | -\$0.00329910 | -\$0.00329910 | (\$1,256,449)      | (\$1,256,449) | \$0                    |         |
| 27 CARE Surcharge                             | # of Bills                                       | 4,856               | 4,856         | \$19.35       | \$19.35       | \$93,964           | \$93,964      | \$0                    |         |
| 28 Total Revenue                              |  |                     |               |               |               | \$101,858,497      | \$109,803,899 | \$7,945,402            | 7.80%   |

Notes:

1/ Line 10 - Gerdau, - revenues are calculated on the following tab; Sales - Test Year Gerdau, Sales - Therefore, their revenue is excluded from Lines 1-8.  
Lines 12-27 include Fuel Adjustment, CIP and Rider revenue for Gerdau and Pipelines.

2\ Pipeline customers' revenue are excluded from Lines 1-8.



MINNESOTA POWER  
COMPARISON OF OPERATING REVENUES  
PRESENT VS. INTERIM RATES  
TEST YEAR 2020  
LARGE LIGHT & POWER

Rate Schedule 75 - Schools  
Rider for Schools

| Type of Charge                                       | Basis or Unit<br>Upon Which Rates<br>Are Applied | Total Billing Units |            | Unit Charge  |               | Operating Revenues |             | Increase    |         |
|--|--|---------------------|------------|--------------|---------------|--------------------|-------------|-------------|---------|
|  |  | Present             | Interim    | Present      | Interim       | Present            | Interim     | (\$)        | (%)     |
| 1 Service Charge                                     | # of Bills                                       | 510                 | 510        | \$600.00     | \$600.00      | \$306,000          | \$306,000   | \$0         | 0.00%   |
| Demand Blocks  |  |                     |            |              |               |                    |             |             |         |
| 2 Block 1  | kW   | 25,611              | 25,611     | \$0.00       | \$0.00        | \$0                | \$0         | \$0         |         |
| 3 Block 2  | kW   | 23,866              | 23,866     | \$12.00      | \$12.00       | \$286,392          | \$286,392   | \$0         | 0.00%   |
| 4 Block 3  | kW   | 84,789              | 84,789     | \$10.50      | \$10.50       | \$890,285          | \$890,285   | \$0         | 0.00%   |
| 5 Energy - All                                       | kWh  | 40,687,000          | 40,687,000 | \$0.05811    | \$0.03669     | \$2,364,322        | \$1,492,876 | (\$871,446) | -36.86% |
| Service Voltage Adjustment                           |  |                     |            |              |               |                    |             |             |         |
| 6 High Voltage Service                               | kW   | 4,949               | 4,949      | (\$2.00)     | (\$2.00)      | (\$9,898)          | (\$9,898)   | \$0         | 0.00%   |
| 7 Transmission Voltage Service                       | kWh  | 0                   | 0          | \$0          | \$0           | \$0                | \$0         | \$0         |         |
| 8 Base Cost of Fuel                                  | kWh  | 40,687,000          | 40,687,000 | \$0.00000    | \$0.02142     | \$0                | \$871,446   |             |         |
| 9 Total Base Revenue                                 |  |                     |            |              |               | \$3,837,100        | \$3,837,100 | \$0         | 0.00%   |
| 10 Fuel Adjustment                                   |  | 40,687,000          | 40,687,000 | \$0.0032516  | \$0.0032516   | \$132,296          | \$132,296   | \$0         |         |
| <u>Adjustments for Riders Included in Base Rates</u> |  |                     |            |              |               |                    |             |             |         |
| 11 Boswell 4 Environmental Adjustment                | kWh  | 40,687,000          | 40,687,000 | \$0.00000000 | \$0.00000000  | \$0                | \$0         | \$0         |         |
| 12 Renewable Resource Adjustment                     | kWh  | 40,687,000          | 40,687,000 | \$0.00000000 | \$0.00000000  | \$0                | \$0         | \$0         |         |
| 13 Transmission Adjustment (\$)                      | kWh  | 40,687,000          | 40,687,000 | \$0.00000000 | \$0.00000000  | \$0                | \$0         | \$0         |         |
| 14 Conservation Program Adjustment                   | kWh  | 40,687,000          | 40,687,000 | \$0.00000000 | \$0.00000000  | \$0                | \$0         | \$0         |         |
| 15 Excess ADIT Credit                                | %  |                     |            | -0.015259    | -0.015259     | (\$58,550)         | -\$58,550   | \$0         |         |
| 16 Subtotal Revenue                                  |  |                     |            |              |               | \$3,910,846        | \$3,910,846 | \$0         | 0.00%   |
| Interim Rate Increase (%)                            |  |                     |            | 0%           | 7.70%         | \$0                | \$301,135   | \$301,135   |         |
| Subtotal Revenue                                     |  |                     |            |              |               | \$3,910,846        | \$4,211,981 | \$301,135   | 7.70%   |
| 17 Boswell 4 Environmental Adjustment                | kWh  | 40,687,000          | 40,687,000 | \$0.00000000 | \$0.00000000  | \$0                | \$0         | \$0         |         |
| 18 Renewable Resource Adjustment                     | kWh  | 40,687,000          | 40,687,000 | \$0.00000000 | \$0.00000000  | \$0                | \$0         | \$0         |         |
| 19 Transmission Adjustment (\$)                      | kWh  | 40,687,000          | 40,687,000 | \$0.00000000 | \$0.00000000  | \$0                | \$0         | \$0         |         |
| 20 Solar Energy Adjustment                           | kWh  | 40,687,000          | 40,687,000 | -\$0.0001527 | -\$0.0001527  | -\$6,214           | -\$6,214    | \$0         |         |
| 21 Conservation Program Adjustment                   | kWh  | 40,687,000          | 40,687,000 | \$0.00003922 | \$0.00003922  | \$1,596            | \$1,596     | \$0         |         |
| 22 Care Surcharge                                    | # of Bills                                       | 510                 | 510        | \$19.350000  | \$19.35000000 | \$9,869            | \$9,869     | \$0         |         |
| 23 TOTAL REVENUE                                     |  |                     |            |              |               | \$3,916,096        | \$4,217,231 | \$301,135   | 7.69%   |

MINNESOTA POWER  
COMPARISON OF OPERATING REVENUES  
PRESENT VS. INTERIM RATES  
TEST YEAR 2020  
RESIDENTIAL DUAL FUEL

Rate Schedule 21  
Residential Dual Fuel Interruptible

| Type of Charge                                       | Basis or Unit<br>Upon Which Rates<br>Are Applied | Total Billing Units |            | Unit Charge   |               | Operating Revenues |             | Increase      |         |
|--|--|---------------------|------------|---------------|---------------|--------------------|-------------|---------------|---------|
|  |  | Present             | Interim    | Present       | Interim       | Present            | Interim     | (\$)          | (%)     |
| Dual Fuel Rate                                       |  |                     |            |               |               |                    |             |               |         |
| 1 Minimum Charge                                     | # of Bills                                       | 92,109              | 92,109     | \$8.00        | \$8.00        | \$736,872          | \$736,872   | \$0           | 0.00%   |
| 2 Energy   | kWh  | 97,889,000          | 97,889,000 | \$0.07563     | \$0.05412     | \$7,403,345        | \$5,297,928 | (\$2,105,417) | -28.44% |
| 3 Base Cost of Fuel                                  | kWh  | 97,889,000          | 97,889,000 | \$0.00000     | \$0.02151     | \$0                | \$2,105,417 |               |         |
| 4 Total Base Revenue                                 |  |                     |            |               |               | \$8,140,217        | \$8,140,217 | \$0           | 0.00%   |
| 5 Fuel Adjustment                                    |  | 97,889,000          | 97,889,000 | \$0.00189250  | \$0.00189250  | \$185,254          | \$185,254   | \$0           |         |
| <u>Adjustments for Riders Included in Base Rates</u> |  |                     |            |               |               |                    |             |               |         |
| 6 Boswell 4 Environmental Adjustment                 | kWh  | 97,889,000          | 97,889,000 | \$0.00000000  | \$0.00000000  | \$0                | \$0         | \$0           |         |
| 7 Renewable Resource Adjustment                      | kWh  | 97,889,000          | 97,889,000 | \$0.00000000  | \$0.00000000  | \$0                | \$0         | \$0           |         |
| 8 Transmission Adjustment (\$)                       | kWh  | 97,889,000          | 97,889,000 | \$0.00000000  | \$0.00000000  | \$0                | \$0         | \$0           |         |
| 10 Conservation Program Adjustment                   | kWh  | 97,889,000          | 97,889,000 | \$0.00000000  | \$0.00000000  | \$0                | \$0         | \$0           |         |
| 11 Excess ADIT Credit                                | %  |                     |            | -0.015259     | -0.015259     | (\$124,212)        | (\$124,212) | \$0           |         |
| 12 Subtotal Revenue                                  |  |                     |            |               |               | \$8,201,260        | \$8,201,260 | \$0           | 0.00%   |
| Interim Rate Increase (%)                            |  |                     |            | 0%            | 7.70%         | \$0                | \$631,497   | \$631,497     |         |
| Subtotal Revenue                                     |  |                     |            |               |               | \$8,201,260        | \$8,832,757 | \$631,497     | 7.70%   |
| 13 Boswell 4 Environmental Adjustment                | kWh  | 97,889,000          | 97,889,000 | \$0.00000000  | \$0.00000000  | \$0                | \$0         | \$0           |         |
| 14 Renewable Resource Adjustment                     | kWh  | 97,889,000          | 97,889,000 | \$0.00000000  | \$0.00000000  | \$0                | \$0         | \$0           |         |
| 12 Transmission Adjustment (\$)                      | kWh  | 97,889,000          | 97,889,000 | \$0.00000000  | \$0.00000000  | \$0                | \$0         | \$0           |         |
| 16 Solar Energy Adjustment                           | kWh  | 97,889,000          | 97,889,000 | -\$0.00011086 | -\$0.00011086 | -\$10,852          | -\$10,852   | \$0           |         |
| 17 Conservation Program Adjustment                   | kWh  | 97,889,000          | 97,889,000 | -\$0.00002365 | -\$0.00002365 | (\$2,315)          | (\$2,315)   | \$0           |         |
| 18 TOTAL REVENUE                                     |  |                     |            |               |               | \$8,188,093        | \$8,819,590 | \$631,497     | 7.71%   |

MINNESOTA POWER  
COMPARISON OF OPERATING REVENUES  
PRESENT VS. INTERIM RATES  
TEST YEAR 2020  
COMMERCIAL/INDUSTRIAL DUAL FUEL

Rate Schedule 26  
C/I Dual Fuel Interruptible

| Type of Charge                                       | Basis or Unit<br>Upon Which Rates<br>Are Applied | Total Billing Units |            | Unit Charge  |              | Operating Revenues |             | Increase    |         |
|--|--|---------------------|------------|--------------|--------------|--------------------|-------------|-------------|---------|
|  |  | Present             | Interim    | Present      | Interim      | Present            | Interim     | (\$)        | (%)     |
| 1 Service Charge                                     | # of Bills                                       | 6,517               | 6,517      | \$12.00      | \$12.00      | \$78,204           | \$78,204    | \$0         | 0.00%   |
| Energy Charge  |  |                     |            |              |              |                    |             |             |         |
| 2 Low Voltage Service                                | kWh  | 26,305,861          | 26,305,861 | \$0.07563    | \$0.05367    | \$1,989,512        | \$1,411,936 | (\$577,576) | -29.03% |
| 3 High Voltage Service                               | kWh  | 1,427,139           | 1,427,139  | \$0.06982    | \$0.04786    | \$99,643           | \$68,308    | (\$31,335)  | -31.45% |
| 4 Base Cost of Fuel                                  | kWh  | 27,733,000          | 27,733,000 | \$0.00000    | 0.021956168  | \$0                | \$608,910   |             |         |
| 5 Total Base Revenue                                 |  |                     |            |              |              | \$2,167,359        | \$2,167,359 | \$0         | 0.00%   |
| 6 Fuel Adjustment                                    |  | 27,733,000          | 27,733,000 | \$0.0028779  | \$0.0028779  | \$79,813           | \$79,813    | \$0         |         |
| <u>Adjustments for Riders Included in Base Rates</u> |  |                     |            |              |              |                    |             |             |         |
| 7 Boswell 4 Environmental Adjustment                 | kWh  | 27,733,000          | 27,733,000 | \$0.00000000 | \$0.00000000 | \$0                | \$0         | \$0         |         |
| 8 Renewable Resource Adjustment                      | kWh  | 27,733,000          | 27,733,000 | \$0.00000000 | \$0.00000000 | \$0                | \$0         | \$0         |         |
| 9 Transmission Adjustment (\$)                       | kWh  | 27,733,000          | 27,733,000 | \$0.00000000 | \$0.00000000 | \$0                | \$0         | \$0         |         |
| 10 Conservation Program Adjustment                   | kWh  | 27,733,000          | 27,733,000 | \$0.00000000 | \$0.00000000 | \$0                | \$0         | \$0         |         |
| 11 Excess ADIT Credit                                | %  |                     |            | -0.015259    | -0.015259    | (\$33,072)         | -\$33,072   | \$0         |         |
| 12 Subtotal Revenue                                  |  |                     |            |              |              | \$2,214,100        | \$2,214,100 | \$0         | 0.00%   |
| Interim Rate Increase (%)                            |  |                     |            | 0%           | 7.70%        | \$0                | \$170,486   | \$170,486   |         |
| Subtotal Revenue                                     |  |                     |            |              |              | \$2,214,100        | \$2,384,586 | \$170,486   | 7.70%   |
| 13 Boswell 4 Environmental Adjustment                | kWh  | 27,733,000          | 27,733,000 | \$0.00000000 | \$0.00000000 | \$0                | \$0         | \$0         |         |
| 14 Renewable Resource Adjustment                     | kWh  | 27,733,000          | 27,733,000 | \$0.00000000 | \$0.00000000 | \$0                | \$0         | \$0         |         |
| 15 Transmission Adjustment (\$)                      | kWh  | 27,733,000          | 27,733,000 | \$0.00000000 | \$0.00000000 | \$0                | \$0         | \$0         |         |
| 16 Solar Energy Adjustment                           | kWh  | 27,733,000          | 27,733,000 | -\$0.0001385 | -\$0.0001385 | -\$3,841           | -\$3,841    | \$0         |         |
| 17 Conservation Program Adjustment                   | kWh  | 27,733,000          | 27,733,000 | \$0.00001264 | \$0.00001264 | \$350              | \$350       | \$0         |         |
| 18 TOTAL REVENUE                                     |  |                     |            |              |              | \$2,210,610        | \$2,381,096 | \$170,486   | 7.71%   |

MINNESOTA POWER  
COMPARISON OF OPERATING REVENUES  
PRESENT VS. INTERIM RATES  
TEST YEAR 2020  
LIGHTING

**\*\*Excluding Riders that will remain outside of Base Rates\*\***

| Residential                            | Operating Revenues |             | Increase  |       |
|--|--------------------|-------------|-----------|-------|
|  | Present            | Interim     | (\$)      | (%)   |
| 1 Outdoor Lighting                     | \$25,148           | \$27,085    | \$1,937   | 7.70% |
| 2 Area Lighting                        | \$1,206,191        | \$1,299,061 | \$92,870  | 7.70% |
| 3 Ornamental Street & Highway Lighting | \$427,666          | \$460,596   | \$32,930  | 7.70% |
| 4 Overhead Street Lighting             | \$1,850,306        | \$1,992,779 | \$142,474 | 7.70% |
| 5 TOTAL LIGHTING CLASS                 | \$3,509,312        | \$3,779,522 | \$270,210 | 7.70% |

MINNESOTA POWER  
COMPARISON OF OPERATING REVENUES  
PRESENT VS. INTERIM RATES  
TEST YEAR 2020  
LIGHTING

**\*\*Including Riders\*\***

| Residential                            | Operating Revenues |                    | Increase         |              |
|--|--------------------|--------------------|------------------|--------------|
|  | Present            | Interim            | (\$)             | (%)          |
| 1 Outdoor Lighting                     | \$25,133           | \$27,070           | \$1,937          | 7.71%        |
| 2 Area Lighting                        | \$1,205,649        | \$1,298,519        | \$92,870         | 7.70%        |
| 3 Ornamental Street & Highway Lighting | \$427,137          | \$460,067          | \$32,930         | 7.71%        |
| 4 Overhead Street Lighting             | <u>\$1,849,512</u> | <u>\$1,991,985</u> | <u>\$142,474</u> | <u>7.70%</u> |
| 5 TOTAL LIGHTING CLASS                 | \$3,507,430        | \$3,777,640        | \$270,210        | 7.70%        |

MINNESOTA POWER  
COMPARISON OF OPERATING REVENUES  
PRESENT VS. INTERIM RATES  
TEST YEAR 2020  
LIGHTING

Rate Schedules 76  
Outdoor Lighting

| Type of Lamp   | Option | Basis or Unit<br>Upon Which Rates<br>Are Applied | Total Billing Units |         | Lamp kWh | Unit Charge  |              | Operating Revenues |          | Increase  |         |
|--|--------|--|---------------------|---------|----------|--------------|--------------|--------------------|----------|-----------|---------|
|  |        |  | Present             | Interim |          | Present      | Interim      | Present            | Interim  | (\$)      | (%)     |
| 1 Service Charge                                     | IV     | # of Bills                                       | 36                  | 36      |          | \$2.09       | \$2.09       | \$75.24            | \$75.24  | \$0.00    | 0.00%   |
| Mercury Vapor  |        |  |                     |         |          |              |              |                    |          |           |         |
| 2 7000 Lumen (175W)                                  | I      | per lamp   | 11                  | 11      | 74       | \$12.99      | \$11.69      | \$1,715            | \$1,544  | (\$171)   | -9.98%  |
| 3 7000 Lumen (175W)                                  | II     | per lamp   | 2                   | 2       | 74       | \$9.45       | \$8.15       | \$227              | \$196    | (\$31)    | -13.71% |
| 4 20,000 Lumen (400W)                                | I      | per lamp   | 4                   | 4       | 161      | \$21.39      | \$18.57      | \$1,027            | \$891    | (\$135)   | -13.18% |
| Sodium Vapor   |        |  |                     |         |          |              |              |                    |          |           |         |
| 5 8,500 Lumen (100W)                                 | I      | per lamp   | 27                  | 27      | 42       | \$10.98      | \$10.24      | \$3,558            | \$3,319  | (\$238)   | -6.70%  |
| 6 14,000 Lumen (150W)                                | I      | per lamp   | 2                   | 2       | 63       | \$12.92      | \$11.82      | \$310              | \$284    | (\$26)    | -8.54%  |
| 7 23,000 Lumen (250W)                                | I      | per lamp   | 12                  | 12      | 102      | \$18.57      | \$16.78      | \$2,674            | \$2,417  | (\$257)   | -9.62%  |
| 8 45,000 Lumen (400W)                                | I      | per lamp   | 6                   | 6       | 168      | \$25.38      | \$22.44      | \$1,827            | \$1,616  | (\$212)   | -11.59% |
| Metal Halide   |        |  |                     |         |          |              |              |                    |          |           |         |
| 9 17,000 Lumen (250W)                                | I      | per lamp   | 1                   | 1       | 1260     | \$18.42      | \$16.58      | \$221              | \$199    | (\$22)    | -9.98%  |
| 10 28,800 Lumen (400 W)                              | I      | per lamp   | 30                  | 30      | 1932     | \$23.15      | \$20.33      | \$8,334            | \$7,319  | (\$1,015) | -12.18% |
| 11 Pole Charge                                       |        | per pole   | 18                  | 18      |          | \$6.64       | \$6.64       | \$1,434            | \$1,434  | \$0       | 0.00%   |
| 12 Energy Charge                                     |        | kWh  | 51,437              | 51,437  |          | \$0.07142    | \$0.05391    | \$3,674            | \$2,773  | (\$901)   | -24.52% |
| 13 Base Cost of Fuel                                 |        | kWh  | 171,838             | 171,838 |          | \$0.00000    | \$0.01751    | \$0                | \$3,009  |           |         |
| 14 Total Base Revenue                                |        |  |                     |         |          |              |              | \$25,075           | \$25,075 | \$0       | 0.00%   |
| 15 Total Annual Energy Usage                         |        | kWh  |                     |         | 171,838  |              |              |                    |          |           |         |
| 16 Fuel Adjustment                                   |        |  |                     |         | 171,838  | \$0.0026512  | \$0.0026512  | \$456              | \$456    | \$0       |         |
| <u>Adjustments for Riders Included in Base Rates</u> |        |  |                     |         |          |              |              |                    |          |           |         |
| 17 Boswell 4 Environmental Adjustment                |        | kWh  |                     |         | 171,838  | \$0.00000000 | \$0.00000000 | \$0                | \$0      | \$0       |         |
| 18 Renewable Resource Adjustment                     |        | kWh  |                     |         | 171,838  | \$0.00000000 | \$0.00000000 | \$0                | \$0      | \$0       |         |
| 19 Transmission Adjustment (\$)                      |        | kWh  |                     |         | 171,838  | \$0.00000000 | \$0.00000000 | \$0                | \$0      | \$0       |         |
| 20 Excess ADIT Credit                                |        | %  |                     |         |          | -0.015259    | -0.015259    | (\$383)            | (\$383)  | \$0       |         |
| 21 Subtotal Revenue                                  |        |  |                     |         |          |              |              | \$25,148           | \$25,148 | \$0       | 0.00%   |
| Interim Rate Increase (%)                            |        |  |                     |         |          | 0%           | 7.70%        | \$0                | \$1,936  | \$1,936   |         |
| Subtotal Revenue                                     |        |  |                     |         |          |              |              | \$25,148           | \$27,085 | \$1,937   | 7.70%   |
| 23 Boswell 4 Environmental Adjustment                |        | kWh  |                     |         | 171,838  | \$0.00000000 | \$0.00000000 | \$0                | \$0      | \$0       |         |
| 23 Renewable Resource Adjustment                     |        | kWh  |                     |         | 171,838  | \$0.00000000 | \$0.00000000 | \$0                | \$0      | \$0       |         |
| 24 Transmission Adjustment (\$)                      |        | kWh  |                     |         | 171,838  | \$0.00000000 | \$0.00000000 | \$0                | \$0      | \$0       |         |
| 25 Solar Energy Adjustment                           |        | kWh  |                     |         | 171,838  | -\$0.0001517 | -\$0.0001517 | -\$26              | -\$26    | \$0       |         |
| 26 Conservation Program Adjustment                   |        | kWh  |                     |         | 171,838  | \$0.00006257 | \$0.00006257 | \$11               | \$11     | \$0       |         |
| 27 TOTAL REVENUE                                     |        |  |                     |         |          |              |              | \$25,133           | \$27,070 | \$1,937   | 7.71%   |

MINNESOTA POWER  
COMPARISON OF OPERATING REVENUES  
PRESENT VS. INTERIM RATES  
TEST YEAR 2020  
LIGHTING

Rate Schedules 77  
Area Lighting

| Type of Lamp   | Option | Basis or Unit<br>Upon Which Rates<br>Are Applied | Total Billing Units |           | Lamp kWh  | Unit Charge   |               | Operating Revenues |             | Increase   |         |
|--|--------|--|---------------------|-----------|-----------|---------------|---------------|--------------------|-------------|------------|---------|
|  |        |  | Present             | Interim   |           | Present       | Interim       | Present            | Interim     | (\$)       | (%)     |
| 1 Service Charge                                     | IV     | # of Bills                                       | 108                 | 108       |           | \$2.09        | \$2.09        | \$225.72           | \$225.72    | \$0.00     |         |
| Mercury Vapor  |        |  |                     |           |           |               |               |                    |             |            |         |
| 2 7,000 Lumen (175W)                                 | I      | per lamp   | 966                 | 966       | 74        | \$12.99       | \$11.69       | \$150,580          | \$135,557   | (\$15,023) | -9.98%  |
| 3 7,000 Lumen (175W)                                 | II     | per lamp   | 105                 | 105       | 74        | \$9.45        | \$8.15        | \$11,907           | \$10,274    | (\$1,633)  | -13.71% |
| 4 20,000 Lumen (400W)                                | I      | per lamp   | 101                 | 101       | 161       | \$21.39       | \$18.57       | \$25,925           | \$22,507    | (\$3,417)  | -13.18% |
| 5 20,000 Lumen (400W)                                | II     | per lamp   | 5                   | 5         | 161       | \$15.72       | \$12.90       | \$943              | \$774       | (\$169)    | -17.94% |
| 6 55,000 Lumen (1,000W)                              | I      | per lamp   | 1                   | 1         | 385       | \$41.63       | \$34.89       | \$500              | \$419       | (\$81)     | -16.20% |
| 7 55,000 Lumen (1,000W)                              | II     | per lamp   | 1                   | 1         | 385       | \$31.82       | \$25.08       | \$382              | \$301       | (\$81)     | -21.19% |
| Sodium Vapor   |        |  |                     |           |           |               |               |                    |             |            |         |
| 8 8,500 Lumen (100W)                                 | I      | per lamp   | 2,495               | 2,495     | 42        | \$10.98       | \$10.24       | \$328,741          | \$306,718   | (\$22,023) | -6.70%  |
| 9 8,500 Lumen (100W)                                 | II     | per lamp   | 40                  | 40        | 42        | \$6.65        | \$5.91        | \$3,192            | \$2,839     | (\$353)    | -11.06% |
| 10 8,500 Lumen (100W)                                | III    | per lamp   | 1                   | 1         | 42        | \$6.65        | \$5.91        | \$80               | \$71        | (\$9)      | -11.06% |
| 11 14,000 Lumen (150W)                               | I      | per lamp   | 334                 | 334       | 63        | \$12.92       | \$11.82       | \$51,783           | \$47,361    | (\$4,422)  | -8.54%  |
| 12 14,000 Lumen (150W)                               | II     | per lamp   | 2                   | 2         | 63        | \$8.63        | \$7.53        | \$207              | \$181       | (\$26)     | -12.79% |
| 13 23,000 Lumen (250W)                               | I      | per lamp   | 886                 | 886       | 102       | \$18.57       | \$16.78       | \$197,436          | \$178,443   | (\$18,993) | -9.62%  |
| 14 23,000 Lumen (250W)                               | II     | per lamp   | 20                  | 20        | 102       | \$11.81       | \$10.02       | \$2,834            | \$2,406     | (\$429)    | -15.13% |
| 15 23,000 Lumen (250W)                               | III    | per lamp   | 0                   | 0         | 102       | \$11.88       | \$10.09       | \$0                | \$0         | \$0        |         |
| 16 45,000 Lumen (400W)                               | I      | per lamp   | 646                 | 646       | 168       | \$25.38       | \$22.44       | \$196,746          | \$173,937   | (\$22,808) | -11.59% |
| 17 45,000 Lumen (400W)                               | II     | per lamp   | 12                  | 12        | 168       | \$16.39       | \$13.45       | \$2,360            | \$1,936     | (\$424)    | -17.95% |
| Metal Halide   |        |  |                     |           |           |               |               |                    |             |            |         |
| 18 17,000 Lumen (250W)                               | I      | per lamp   | 158                 | 158       | 105       | \$18.42       | \$16.58       | \$34,924           | \$31,438    | (\$3,487)  | -9.98%  |
| 19 17,000 Lumen (250W)                               | II     | per lamp   | 0                   | 0         | 105       | \$0.00        | \$0.00        | \$0                | \$0         | \$0        |         |
| 20 28,800 Lumen (400W)                               | I      | per lamp   | 203                 | 203       | 161       | \$23.15       | \$20.33       | \$56,393           | \$49,525    | (\$6,869)  | -12.18% |
| 21 28,800 Lumen (400W)                               | II     | per lamp   | 0                   | 0         | 161       | \$14.87       | \$12.05       | \$0                | \$0         | \$0        |         |
| 22 28,800 Lumen (400W)                               | III    | per lamp   | 0                   | 0         | 161       | \$0.00        | \$0.00        | \$0                | \$0         | \$0        |         |
| 23 88,000 Lumen (1,000W)                             | I      | per lamp   | 63                  | 63        | 368       | \$40.31       | \$33.87       | \$30,474           | \$25,602    | (\$4,872)  | -15.99% |
| 24 88,000 Lumen (1,000W)                             | II     | per lamp   | 0                   | 0         | 368       | \$29.34       | \$22.90       | \$0                | \$0         | \$0        |         |
| 25 88,000 Lumen (1,000W)                             | III    | per lamp   | 0                   | 0         | 368       | \$0.00        | \$0.00        | \$0                | \$0         | \$0        |         |
| 26 Pole Charge                                       |        | per pole   | 1,342               | 1,342     |           | \$6.64        | \$6.640000    | \$106,931          | \$106,931   | \$0        | 0.00%   |
| 27 Energy Charge                                     |        | kWh  | 83,261              | 83,261    |           | \$0.07142     | \$0.05391     | \$5,947            | \$4,488     | (\$1,458)  | -24.52% |
| 28 Base Cost of Fuel                                 |        | kWh  | 6,085,086           | 6,085,086 |           | \$0.00000     | \$0.01751     | \$0                | \$106,571   |            |         |
| 29 Total Base Revenue                                |        |  |                     |           |           |               |               | \$1,208,511        | \$1,208,505 | (\$6)      | 0.00%   |
| 30 Fuel Adjustment                                   |        |  |                     |           | 6,085,086 | \$0.0026492   | \$0.0026492   | \$16,121           | \$16,121    | \$0        |         |
| <u>Adjustments for Riders Included in Base Rates</u> |        |  |                     |           |           |               |               |                    |             |            |         |
| 31 Boswell 4 Environmental Adjustment                |        | kWh  |                     |           | 6,085,086 | \$0.00000000  | \$0.00000000  | \$0                | \$0         | \$0        |         |
| 32 Renewable Resource Adjustment                     |        | kWh  |                     |           | 6,085,086 | \$0.00000000  | \$0.00000000  | \$0                | \$0         | \$0        |         |
| 33 Transmission Adjustment (\$)                      |        | kWh  |                     |           | 6,085,086 | \$0.00000000  | \$0.00000000  | \$0                | \$0         | \$0        |         |
| 34 Conservation Program Adjustment                   |        | kWh  |                     |           | 6,085,086 | \$0.00000000  | \$0.00000000  | \$0                | \$0         | \$0        |         |
| 35 Excess ADIT Credit                                |        | %  |                     |           |           | -0.015259     | -0.015259     | (\$18,441)         | (\$18,441)  | \$0        |         |
| 36 Subtotal Revenue                                  |        |  |                     |           |           |               |               | \$1,206,191        | \$1,206,185 | (\$6)      | 0.00%   |
| Interim Rate Increase (%)                            |        |  |                     |           |           | 0%            | 7.70%         | \$0                | \$92,876    | \$92,876   |         |
| Subtotal Revenue                                     |        |  |                     |           |           |               |               | \$1,206,191        | \$1,299,061 | \$92,870   | 7.70%   |
| 37 Boswell 4 Environmental Adjustment                |        | kWh  |                     |           | 6,085,086 | \$0.00000000  | \$0.00000000  | \$0                | \$0         | \$0        |         |
| 38 Renewable Resource Adjustment                     |        | kWh  |                     |           | 6,085,086 | \$0.00000000  | \$0.00000000  | \$0                | \$0         | \$0        |         |
| 39 Transmission Adjustment (\$)                      |        | kWh  |                     |           | 6,085,086 | \$0.00000000  | \$0.00000000  | \$0                | \$0         | \$0        |         |
| 40 Solar Energy Adjustment                           |        | kWh  |                     |           | 6,085,086 | -\$0.00015161 | -\$0.00015161 | (\$923)            | (\$923)     | \$0        |         |
| 41 Conservation Program Adjustment                   |        | kWh  |                     |           | 6,085,086 | \$0.00006243  | \$0.00006243  | \$380              | \$380       | \$0        |         |
| 42 TOTAL REVENUE                                     |        |  |                     |           |           |               |               | \$1,205,649        | \$1,298,519 | \$92,870   | 7.70%   |

MINNESOTA POWER  
COMPARISON OF OPERATING REVENUES  
PRESENT VS. INTERIM RATES  
TEST YEAR 2020  
LIGHTING

Rate Schedules 80 & 84  
Highway and Ornamental Street Lighting

| Type of Lamp   | Option | Basis or Unit<br>Upon Which Rates<br>Are Applied | Total Billing Units |           | Lamp kWh  | Unit Charge  |              | Operating Revenues |            | Increase   |         |
|--|--------|--|---------------------|-----------|-----------|--------------|--------------|--------------------|------------|------------|---------|
|  |        |  | Present             | Interim   |           | Present      | Interim      | Present            | Interim    | (\$)       | (%)     |
| 1 Service Charge                                     | IV     | # of Bills                                       | 3,060               | 3,060     |           | \$2.09       | \$2.09       | \$6,395.40         | \$6,395.40 | \$0.00     | 0.00%   |
| Mercury Vapor  |        |  |                     |           |           |              |              |                    |            |            |         |
| 2 7,000 Lumen (175W)                                 | III    | per lamp   | 7                   | 7         | 74        | \$9.45       | \$8.15       | \$794              | \$685      | (\$109)    | -13.71% |
| 3 10,000 Lumen (250W)                                | III    | per lamp   | 8                   | 8         | 102       | \$12.10      | \$10.31      | \$1,162            | \$990      | (\$171)    | -14.76% |
| 4 20,000 Lumen (400W)                                | III    | per lamp   | 26                  | 26        | 161       | \$16.79      | \$13.97      | \$5,238            | \$4,359    | (\$880)    | -16.79% |
| 5 55,000 Lumen (1,000W)                              | III    | per lamp   | 0                   | 0         | 385       | \$32.47      | \$25.73      | \$0                | \$0        | \$0        |         |
| Sodium Vapor   |        |  |                     |           |           |              |              |                    |            |            |         |
| 6 8,500 Lumen (100W)                                 | III    | per lamp   | 47                  | 47        | 42        | \$7.27       | \$6.53       | \$4,100            | \$3,685    | (\$415)    | -10.12% |
| 7 14,000 Lumen (150W)                                | I      | per lamp   | 4                   | 4         | 63        | \$16.92      | \$15.82      | \$812              | \$759      | (\$53)     | -6.52%  |
| 8 14,000 Lumen (150W)                                | III    | per lamp   | 0                   | 0         | 63        | \$9.78       | \$8.68       | \$0                | \$0        | \$0        |         |
| 9 14,000 Lumen (150W)                                | IIIA   | per lamp   | 102                 | 102       | 39        | \$9.52       | \$8.42       | \$11,652           | \$10,302   | (\$1,351)  | -11.59% |
| 10 20,500 Lumen (200W)                               | III    | per lamp   | 77                  | 77        | 95        | \$11.74      | \$10.08      | \$10,848           | \$9,310    | (\$1,537)  | -14.17% |
| 11 23,000 Lumen (250W)                               | I      | per lamp   | 1                   | 1         | 102       | \$21.69      | \$19.90      | \$260              | \$239      | (\$21)     | -8.24%  |
| 12 23,000 Lumen (250W)                               | III    | per lamp   | 211                 | 211       | 102       | \$12.67      | \$10.88      | \$32,080           | \$27,557   | (\$4,523)  | -14.10% |
| 13 45,000 Lumen (400W)                               | I      | per lamp   | 0                   | 0         | 168       | \$27.38      | \$24.44      | \$0                | \$0        | \$0        |         |
| 14 45,000 Lumen (400W)                               | III    | per lamp   | 107                 | 107       | 168       | \$17.25      | \$14.31      | \$22,149           | \$18,371   | (\$3,778)  | -17.06% |
| Light Emitting Diode (LED)                           |        |  |                     |           |           |              |              |                    |            |            |         |
| 15 4,000 Lumens (54 W or Less)                       | I      | per lamp   | 2                   | 2         | 19        | \$13.10      | \$12.77      | \$314              | \$306      | (\$8)      | 0.00%   |
| 16 Energy Charge                                     |        |  |                     |           | 4,552,062 | \$0.07142    | \$0.05391    | \$325,108          | \$245,386  | (\$79,723) | -24.52% |
| 17 Base Cost of Fuel                                 |        | kWh  | 5,285,559           | 5,285,559 |           | \$0.000000   | \$0.01751    | \$0                | \$92,569   |            |         |
| 18 Total Base Revenue                                |        |  |                     |           |           |              |              | \$420,914          | \$420,914  | \$0        | 0.00%   |
| 19 Total Annual Energy Usage                         |        | kWh  |                     |           | 5,285,559 |              |              |                    |            |            |         |
| 20 Fuel Adjustment                                   |        |  |                     |           | 5,285,559 | \$0.0024925  | \$0.0024925  | \$13,174           | \$13,174   | \$0        |         |
| <u>Adjustments for Riders Included in Base Rates</u> |        |  |                     |           |           |              |              |                    |            |            |         |
| 21 Boswell 4 Environmental Adjustment                |        | kWh  |                     |           | 5,285,559 | \$0.00000000 | \$0.00000000 | \$0                | \$0        | \$0        |         |
| 22 Renewable Resource Adjustment                     |        | kWh  |                     |           | 5,285,559 | \$0.00000000 | \$0.00000000 | \$0                | \$0        | \$0        |         |
| 23 Transmission Adjustment (\$)                      |        | kWh  |                     |           | 5,285,559 | \$0.00000000 | \$0.00000000 | \$0                | \$0        | \$0        |         |
| 25 Conservation Program Adjustment                   |        | kWh  |                     |           | 5,285,559 | \$0.00000000 | \$0.00000000 | \$0                | \$0        | \$0        |         |
| 26 Excess ADIT Credit                                |        | %  |                     |           |           | -0.015259    | -0.015259    | (\$6,423)          | (\$6,423)  | (\$0)      |         |
| 27 Subtotal Revenue                                  |        |  |                     |           |           |              |              | \$427,666          | \$427,666  | \$0        | 0.00%   |
| Interim Rate Increase (%)                            |        |  |                     |           |           | 0.00%        | 7.70%        | \$0                | \$32,930   | \$32,930   |         |
| Subtotal Revenue                                     |        |  |                     |           |           |              |              | \$427,666          | \$460,596  | \$32,930   | 7.70%   |
| 28 Boswell 4 Environmental Adjustment                |        | kWh  |                     |           | 5,285,559 | \$0.00000000 | \$0.00000000 | \$0                | \$0        | \$0        |         |
| 29 Renewable Resource Adjustment                     |        | kWh  |                     |           | 5,285,559 | \$0.00000000 | \$0.00000000 | \$0                | \$0        | \$0        |         |
| 30 Transmission Adjustment (\$)                      |        | kWh  |                     |           | 5,285,559 | \$0.00000000 | \$0.00000000 | \$0                | \$0        | \$0        |         |
| 32 Solar Energy Adjustment                           |        | kWh  |                     |           | 5,285,559 | -\$0.0001478 | -\$0.0001478 | -\$781             | -\$781     |            |         |
| 33 Conservation Program Adjustment                   |        | kWh  |                     |           | 5,285,559 | \$0.00004766 | \$0.00004766 | \$252              | \$252      | \$0        |         |
| 34 TOTAL REVENUE                                     |        |  |                     |           |           |              |              | \$427,137          | \$460,067  | \$32,930   | 7.71%   |



MINNESOTA POWER  
COMPARISON OF OPERATING REVENUES  
PRESENT VS. INTERIM RATES  
TEST YEAR 2020  
LIGHTING

Rate Schedules 83  
Overhead Street Lighting

| Type of Lamp   | Option | Basis or Unit<br>Upon Which Rates<br>Are Applied | Total Billing Units |           | Lamp kWh  | Unit Charge   |               | Operating Revenues |             | Increase   |         |
|--|--------|--|---------------------|-----------|-----------|---------------|---------------|--------------------|-------------|------------|---------|
|  |        |  | Present             | Interim   |           | Present       | Interim       | Present            | Interim     | (\$)       | (%)     |
| 1 Service Charge                                     | IV     | # of Bills                                       | 432                 | 432       |           | \$2.09        | \$2.09        | \$902.88           | \$902.88    | \$0        | 0.00%   |
| Mercury Vapor  |        |  |                     |           |           |               |               |                    |             |            |         |
| 2 7,000 Lumen (175W)                                 | I      | per lamp   | 972                 | 972       | 74        | \$17.33       | \$16.03       | \$202,137          | \$187,021   | (\$15,117) | -7.48%  |
| 3 7,000 Lumen (175W)                                 | II     | per lamp   | 1,375               | 1,375     | 74        | \$9.72        | \$8.42        | \$160,380          | \$138,996   | (\$21,384) | -13.33% |
| 4 20,000 Lumen (400W)                                | I      | per lamp   | 27                  | 27        | 161       | \$24.36       | \$21.54       | \$7,893            | \$6,979     | (\$914)    | -11.58% |
| 5 20,000 Lumen (400W)                                | II     | per lamp   | 47                  | 47        | 161       | \$17.26       | \$14.44       | \$9,735            | \$8,144     | (\$1,590)  | -16.34% |
| 6 8,500 Lumen (100W)                                 | I      | per lamp   | 1,158               | 1,158     | 42        | \$14.41       | \$13.67       | \$200,241          | \$190,020   | (\$10,221) | -5.10%  |
| 7 8,500 Lumen (100W)                                 | II     | per lamp   | 3,101               | 3,101     | 42        | \$7.62        | \$6.88        | \$283,555          | \$256,183   | (\$27,372) | -9.65%  |
| 8 14,000 Lumen (150W)                                | I      | per lamp   | 1,188               | 1,188     | 63        | \$16.92       | \$15.82       | \$241,212          | \$225,482   | (\$15,729) | -6.52%  |
| 9 14,000 Lumen (150W)                                | II     | per lamp   | 1,188               | 1,188     | 63        | \$9.78        | \$8.68        | \$139,424          | \$123,694   | (\$15,729) | -11.28% |
| 10 14,000 Lumen (150W)                               | III    | per lamp   | 0                   | 0         | 63        | \$9.52        | \$8.42        | \$0                | \$0         | \$0        |         |
| 11 20,500 Lumen (200W)                               | I      | per lamp   | 1                   | 1         | 95        | \$20.11       | \$18.45       | \$241              | \$221       | (\$20)     | -8.27%  |
| 12 20,500 Lumen (200W)                               | II     | per lamp   | 4                   | 4         | 95        | \$11.87       | \$10.21       | \$570              | \$490       | (\$80)     | -14.02% |
| 13 23,000 Lumen (250W)                               | I      | per lamp   | 501                 | 501       | 102       | \$21.69       | \$19.90       | \$130,400          | \$119,661   | (\$10,740) | -8.24%  |
| 14 23,000 Lumen (250W)                               | II     | per lamp   | 987                 | 987       | 102       | \$12.97       | \$11.18       | \$153,617          | \$132,459   | (\$21,158) | -13.77% |
| 15 23,000 Lumen (250W)                               | III    | per lamp   | 1                   | 1         | 102       | \$12.67       | \$10.88       | \$152              | \$131       | (\$21)     |         |
| 16 45,000 Lumen (400W)                               | I      | per lamp   | 24                  | 24        | 168       | \$27.38       | \$24.44       | \$7,885            | \$7,038     | (\$847)    | -10.75% |
| 17 45,000 Lumen (400W)                               | II     | per lamp   | 34                  | 34        | 168       | \$18.11       | \$15.17       | \$7,389            | \$6,188     | (\$1,200)  | -16.25% |
| Metal Halide   |        |  |                     |           |           |               |               |                    |             |            |         |
| 18 28,800 Lumen (400W)                               | II     | per lamp   | 0                   | 0         | 161       | \$16.14       | \$13.32       | \$0                | \$0         | \$0        | 0.00%   |
| Light Emitting Diode (LED)                           |        |  |                     |           |           |               |               |                    |             |            |         |
| 19 4,000 Lumen (54 W or Less)                        | I      | per lamp   | 1,177               | 1,177     | 19        | \$13.10       | \$12.77       | \$185,024          | \$180,366   | (\$4,659)  | -2.52%  |
| 20 8,800 Lumen (118 W or Less but > 54W)             | I      | per lamp   | 516                 | 516       | 43        | \$17.39       | \$16.65       | \$107,679          | \$103,115   | (\$4,564)  | -4.24%  |
| 21 Pole Charge                                       |        | per pole   | 0                   | 0         |           | \$0.00        | \$0.00        | \$0                | \$0         | \$0        |         |
| 22 Energy Charge                                     |        | kWh  | 233,914             | 233,914   |           | \$0.07142     | \$0.05391     | \$16,706           | \$12,609    | (\$4,097)  | -24.52% |
| 23 Base Cost of Fuel                                 |        | kWh  | 8,875,556           | 8,875,556 |           | \$0.00000     | \$0.01751     | \$0                | \$155,442   |            |         |
| 24 Total Base Revenue                                |        |  |                     |           |           |               |               | \$1,855,143        | \$1,855,143 | \$0        | 0.00%   |
| 25 Total Annual Energy Usage                         |        | kWh  |                     |           | 8,875,556 |               |               |                    |             |            |         |
| 26 Fuel Adjustment                                   |        | kWh  |                     |           | 8,875,556 | \$0.00264438  | \$0.00264438  | \$23,470           | \$23,470    | \$0        |         |
| <u>Adjustments for Riders Included in Base Rates</u> |        |  |                     |           |           |               |               |                    |             |            |         |
| 27 Boswell 4 Environmental Adjustment                |        | kWh  |                     |           | 8,875,556 | \$0.00000000  | \$0.00000000  | \$0                | \$0         | \$0        |         |
| 28 Renewable Resource Adjustment                     |        | kWh  |                     |           | 8,875,556 | \$0.00000000  | \$0.00000000  | \$0                | \$0         | \$0        |         |
| 29 Transmission Adjustment (\$)                      |        | kWh  |                     |           | 8,875,556 | \$0.00000000  | \$0.00000000  | \$0                | \$0         | \$0        |         |
| 30 Conservation Program Adjustment                   |        | kWh  |                     |           | 8,875,556 | \$0.00000000  | \$0.00000000  | \$0                | \$0         | \$0        |         |
| 31 Excess ADIT Credit                                |        | %  |                     |           |           | -0.015259     | -0.015259     | (\$28,308)         | (\$28,308)  | \$0        |         |
| 32 Subtotal Revenue                                  |        |  |                     |           |           |               |               | \$1,850,306        | \$1,850,306 | \$0        | 0.00%   |
| Interim Rate Increase (%)                            |        |  |                     |           |           | 0%            | 7.70%         | \$0                | \$142,474   | \$142,474  |         |
| Subtotal Revenue                                     |        |  |                     |           |           |               |               | \$1,850,306        | \$1,992,779 | \$142,474  | 7.70%   |
| 33 Boswell 4 Environmental Adjustment                |        | kWh  |                     |           | 8,875,556 | \$0.00000000  | \$0.00000000  | \$0                | \$0         | \$0        |         |
| 34 Renewable Resource Adjustment                     |        | kWh  |                     |           | 8,875,556 | \$0.00000000  | \$0.00000000  | \$0                | \$0         | \$0        |         |
| 35 Transmission Adjustment (\$)                      |        | kWh  |                     |           | 8,875,556 | \$0.00000000  | \$0.00000000  | \$0                | \$0         | \$0        |         |
| 36 Solar Energy Adjustment                           |        | kWh  |                     |           | 8,875,556 | -\$0.00015147 | -\$0.00015147 | (\$1,344)          | (\$1,344)   | \$0        |         |
| 37 Conservation Program Adjustment                   |        | kWh  |                     |           | 8,875,556 | \$0.00006199  | \$0.00006199  | \$550              | \$550       | \$0        |         |
| 38 TOTAL REVENUE                                     |        |  |                     |           |           |               |               | \$1,849,512        | \$1,991,985 | \$142,474  | 7.70%   |

MINNESOTA POWER  
COMPARISON OF OPERATING REVENUES  
PRESENT VS. INTERIM RATES  
TEST YEAR 2020  
MUNICIPAL PUMPING

Rate Schedule 87  
Municipal Pumping

| Type of Charge                                       | Basis or Unit<br>Upon Which Rate<br>Are Applied | Total Billing Units |         | Unit Charge  |              | Operating Revenues |         | Increase |     |
|--|---|---------------------|---------|--------------|--------------|--------------------|---------|----------|-----|
|  |   | Present             | Interim | Present      | Interim      | Present            | Interim | (\$)     | (%) |
| 1 Service Charge                                     | # of Bills                                      | 0                   | 0       | \$12.00      | \$12.00      | \$0                | \$0     | \$0      |     |
| No Demand Meter                                      |   |                     |         |              |              |                    |         |          |     |
| 2 Energy - All                                       | kWh   | 0                   | 0       | \$0.10204    | \$0.10204    | \$0                | \$0     | \$0      |     |
| Demand Meter   |   |                     |         |              |              |                    |         |          |     |
| 3 Demand - All                                       | kW  | 0                   | 0       | \$6.50       | \$6.50       | \$0                | \$0     | \$0      |     |
| 4 Energy - All                                       | kWh   | 0                   | 0       | \$0.07619    | \$0.07619    | \$0                | \$0     | \$0      |     |
| Service Voltage Adjustment                           |   |                     |         |              |              |                    |         |          |     |
| 5 High Voltage Service                               | kW  | 0                   | 0       | (\$2.00)     | (\$2.00)     | \$0                | \$0     | \$0      |     |
| 6 Transmission Voltage Service                       | kWh   | 0                   | 0       | (\$0.00350)  | (\$0.00350)  | \$0                | \$0     | \$0      |     |
| 8 Total Base Revenue                                 |   |                     |         |              |              | \$0                | \$0     | \$0      |     |
| 9 Fuel Adjustment                                    |   | 0                   | 0       | \$0.0000000  | \$0.0000000  | \$0                | \$0     | \$0      |     |
| 10 Subtotal Revenue                                  |   |                     |         |              |              | \$0                | \$0     | \$0      |     |
| <u>Adjustments for Riders Included in Base Rates</u> |   |                     |         |              |              |                    |         |          |     |
| 11 Boswell 4 Environmental Adjustment                | kWh   | -                   | -       | \$0.00000000 | \$0.00000000 | \$0                | \$0     | \$0      |     |
| 12 Renewable Resource Adjustment                     | kWh   | -                   | -       | \$0.00000000 | \$0.00000000 | \$0                | \$0     | \$0      |     |
| 13 Transmission Adjustment (\$)                      | kWh   | -                   | -       | \$0.00000000 | \$0.00000000 | \$0                | \$0     | \$0      |     |
| 14 Conservation Program Adjustment                   | kWh   | -                   | -       | \$0.00000000 | \$0.00000000 | \$0                | \$0     | \$0      |     |
| 15 Excess ADIT Credit                                | %   |                     |         | 0.000000     | 0.000000     | \$0                | \$0     | \$0      |     |
| 16 Subtotal Revenue                                  |   |                     |         |              |              | \$0                | \$0     | \$0      |     |
| Interim Rate Increase (%)                            |   |                     |         | 0%           | \$0          | \$0                | \$0     | \$0      |     |
| 17 Boswell 4 Environmental Adjustment                | kWh   | -                   | -       | \$0.00000000 | \$0.00000000 | \$0                | \$0     | \$0      |     |
| 18 Renewable Resource Adjustment                     | kWh   | -                   | -       | \$0.00000000 | \$0.00000000 | \$0                | \$0     | \$0      |     |
| 19 Transmission Adjustment (\$)                      | kWh   | -                   | -       | \$0.00000000 | \$0.00000000 | \$0                | \$0     | \$0      |     |
| 20 Solar Energy Adjustment                           | kWh   |                     |         | \$0.00       | \$0.00       | \$0                | \$0     | \$0      |     |
| 21 Conservation Program Adjustment                   | kWh   | -                   | -       | \$0.00000000 | \$0.00000000 | \$0                | \$0     | \$0      |     |
| 22 Care Surcharge                                    | # of Bills                                      | -                   | -       | \$0.00000000 | \$0.00000000 | \$0                | \$0     | \$0      |     |
| 23 TOTAL REVENUE                                     |   |                     |         |              |              | \$0                | \$0     | \$0      |     |

MINNESOTA POWER  
SUMMARY OF LARGE POWER OPERATING REVENUES  
PRESENT VS. INTERIM RATES  
TEST YEAR 2020

|   | Revenue       |               | Increase     |       |
|---|---------------|---------------|--------------|-------|
|   | Present       | Interim       | (\$)         | (%)   |
| Firm Service                            | \$333,940,841 | \$359,654,286 | \$25,713,445 | 7.70% |
| Interruptible Service                   | (\$3,358,800) | (\$3,617,428) | (\$258,628)  | 7.70% |
| Riders/CPA in Base                      | -\$5,043,623  | (\$5,431,982) | (\$388,359)  | 7.70% |
| Subtotal Firm Service                   | \$325,538,419 | \$350,604,877 | \$25,066,458 | 7.70% |
| IPS Service                             | \$2,958,751   | \$2,958,751   | \$0          | 0.00% |
| Other Service                           | \$32,598,807  | \$32,598,807  | \$0          | 0.00% |
| Total                                   | \$361,095,977 | \$386,162,435 | \$25,066,458 | 6.94% |
| <u>Adjustments for Remaining Riders</u> |               |               |              |       |
| Boswell 4 Environmental Adjustment      | \$0           | \$0           | \$0          | 0.00% |
| Transmission Adjustment                 | \$0           | \$0           | \$0          | 0.00% |
| Renewable Resource Adjustment           | \$0           | \$0           | \$0          | 0.00% |
| Care Surcharge                          | \$6,048       | \$6,048       | \$0          | 0.00% |
| Total Adjustments                       | \$6,048       | \$6,048       | \$0          | 0.00% |
| Grand Total Large Power                 | \$361,102,025 | \$386,168,483 | \$25,066,458 | 6.94% |

**PUBLIC DOCUMENT**  
**TRADE SECRET DATA EXCISED**

MINNESOTA POWER  
SUMMARY OF LARGE POWER OPERATING REVENUES  
PRESENT VS. INTERIM RATES  
TEST YEAR 2020

**Non-Public Document All Highlighted Data is Trade Secret Customer Data**

**Large Power - Present Rates**

|                        | <u>Nominated<br/>Demand (kW)</u> | <u>Total Energy<br/>(MWh)</u> | <u>Firm Energy<br/>(MWh)</u> | <u>Firm<br/>Billing Demand<br/>(Bkw)</u> | <u>Base Rate<br/>Revenue 1/</u> | <u>Interruptible<br/>Demand<br/>Discount</u> | <u>Base Rate<br/>Rider Revenue</u> | <u>Subtotal<br/>Firm Revenue</u> | <u>IPS<br/>Revenue</u> | <u>Other<br/>Revenue 2/</u> | <u>Total Large<br/>Power Revenue</u> |
|------------------------|----------------------------------|-------------------------------|------------------------------|--|---------------------------------|--|------------------------------------|----------------------------------|------------------------|-----------------------------|--------------------------------------|
| Blandin Paper Company  | <b>TRADE SECRET DATA BEGINS</b>  |                               |                              |  |                                 |  |                                    |                                  |                        |                             |                                      |
| Boise Cascade          |                                  |                               |                              |  |                                 |  |                                    |                                  |                        |                             |                                      |
| Verso                  |                                  |                               |                              |  |                                 |  |                                    |                                  |                        |                             |                                      |
| Sappi - Cloquet        |                                  |                               |                              |  |                                 |  |                                    |                                  |                        |                             |                                      |
| Hibbing Taconite       |                                  |                               |                              |  |                                 |  |                                    |                                  |                        |                             |                                      |
| Mittal Steel - Minorca |                                  |                               |                              |  |                                 |  |                                    |                                  |                        |                             |                                      |
| United Taconite        |                                  |                               |                              |  |                                 |  |                                    |                                  |                        |                             |                                      |
| US Steel - Combined    |                                  |                               |                              |  |                                 |  |                                    |                                  |                        |                             |                                      |
| Silver Bay Power Corp. |                                  |                               |                              |  |                                 |  |                                    |                                  |                        |                             |                                      |
|                        | <b>TRADE SECRET DATA ENDS</b>    |                               |                              |  |                                 |  |                                    |                                  |                        |                             |                                      |
| Total                  | 7,784,000                        | 6,136,908                     | 5,288,437                    | 7,566,248                                | \$333,940,841                   | (\$3,358,800)                                | -\$5,043,623                       | \$325,538,419                    | \$2,958,751            | \$32,598,807                | \$361,095,977                        |

**Large Power - Interim Rates**

|                        | <u>Nominated<br/>Demand (kW)</u> | <u>Total Energy</u> | <u>Firm Energy<br/>(MWh)</u> | <u>Firm Billing<br/>Demand<br/>(Bkw)</u> | <u>Base Rate<br/>Revenue 1/</u> | <u>Interruptible<br/>Demand<br/>Discount</u> | <u>Base Rate<br/>Rider Revenue</u> | <u>IPS<br/>Revenue</u> | <u>Subtotal<br/>Firm Revenue</u> | <u>Other<br/>Revenue 2/</u> | <u>Total Large<br/>Power Revenue</u> | <u>Dollar<br/>Amount</u> | <u>Interim<br/>Increase</u> |
|------------------------|----------------------------------|---------------------|------------------------------|--|---------------------------------|--|------------------------------------|------------------------|----------------------------------|-----------------------------|--------------------------------------|--------------------------|-----------------------------|
|                        | TRADE SECRET DATA BEGINS         |                     |                              |  |                                 |  |                                    |                        |                                  |                             |                                      |                          |                             |
| Blandin Paper Company  |                                  |                     |                              |  |                                 |  |                                    |                        |                                  |                             |                                      |                          |                             |
| Boise Cascade          |                                  |                     |                              |  |                                 |  |                                    |                        |                                  |                             |                                      |                          |                             |
| Verso                  |                                  |                     |                              |  |                                 |  |                                    |                        |                                  |                             |                                      |                          |                             |
| Sappi - Cloquet        |                                  |                     |                              |  |                                 |  |                                    |                        |                                  |                             |                                      |                          |                             |
| Hibbing Taconite       |                                  |                     |                              |  |                                 |  |                                    |                        |                                  |                             |                                      |                          |                             |
| Mittal Steel - Minorca |                                  |                     |                              |  |                                 |  |                                    |                        |                                  |                             |                                      |                          |                             |
| United Taconite        |                                  |                     |                              |  |                                 |  |                                    |                        |                                  |                             |                                      |                          |                             |
| US Steel - Combined    |                                  |                     |                              |  |                                 |  |                                    |                        |                                  |                             |                                      |                          |                             |
| Silver Bay Power Corp. |                                  |                     |                              |  |                                 |  |                                    |                        |                                  |                             |                                      |                          |                             |
|                        |                                  |                     |                              |  |                                 |  |                                    |                        |                                  |                             |                                      |                          |                             |
|                        |                                  |                     |                              |  |                                 |  |                                    |                        |                                  |                             |                                      |                          |                             |
|                        |                                  |                     |                              |  |                                 |  |                                    |                        |                                  |                             |                                      |                          |                             |
|                        |                                  |                     |                              |  |                                 |  |                                    |                        |                                  |                             |                                      |                          |                             |
|                        |                                  |                     |                              |  |                                 |  |                                    |                        |                                  |                             |                                      |                          |                             |
|                        |                                  |                     |                              |  |                                 |  |                                    |                        |                                  |                             |                                      |                          |                             |
|                        |                                  |                     |                              |  |                                 |  |                                    |                        |                                  |                             |                                      |                          |                             |
|                        |                                  |                     |                              |  |                                 |  |                                    |                        |                                  |                             |                                      |                          |                             |
|                        |                                  |                     |                              |  |                                 |  |                                    |                        |                                  |                             |                                      |                          |                             |
|                        |                                  |                     |                              |  |                                 |  |                                    |                        |                                  |                             |                                      |                          |                             |
|                        |                                  |                     |                              |  |                                 |  |                                    |                        |                                  |                             |                                      |                          |                             |
|                        |                                  |                     |                              |  |                                 |  |                                    |                        |                                  |                             |                                      |                          |                             |
|                        |                                  |                     |                              |  |                                 |  |                                    |                        |                                  |                             |                                      |                          |                             |
|                        |                                  |                     |                              |  |                                 |  |                                    |                        |                                  |                             |                                      |                          |                             |
|                        |                                  |                     |                              |  |                                 |  |                                    |                        |                                  |                             |                                      |                          |                             |
|                        |                                  |                     |                              |  |                                 |  |                                    |                        |                                  |                             |                                      |                          |                             |
|                        |                                  |                     |                              |  |                                 |  |                                    |                        |                                  |                             |                                      |                          |                             |
|                        |                                  |                     |                              |  |                                 |  |                                    |                        |                                  |                             |                                      |                          |                             |
|                        |                                  |                     |                              |  |                                 |  |                                    |                        |                                  |                             |                                      |                          |                             |
|                        |                                  |                     |                              |  |                                 |  |                                    |                        |                                  |                             |                                      |                          |                             |
|                        |                                  |                     |                              |  |                                 |  |                                    |                        |                                  |                             |                                      |                          |                             |
|                        |                                  |                     |                              |  |                                 |  |                                    |                        |                                  |                             |                                      |                          |                             |
|                        |                                  |                     |                              |  |                                 |  |                                    |                        |                                  |                             |                                      |                          |                             |
|                        |                                  |                     |                              |  |                                 |  |                                    |                        |                                  |                             |                                      |                          |                             |
|                        |                                  |                     |                              |  |                                 |  |                                    |                        |                                  |                             |                                      |                          |                             |
|                        |                                  |                     |                              |  |                                 |  |                                    |                        |                                  |                             |                                      |                          |                             |
|                        |                                  |                     |                              |  |                                 |  |                                    |                        |                                  |                             |                                      |                          |                             |
|                        |                                  |                     |                              |  |                                 |  |                                    |                        |                                  |                             |                                      |                          |                             |
|                        |                                  |                     |                              |  |                                 |  |                                    |                        |                                  |                             |                                      |                          |                             |
|                        |                                  |                     |                              |  |                                 |  |                                    |                        |                                  |                             |                                      |                          |                             |
|                        |                                  |                     |                              |  |                                 |  |                                    |                        |                                  |                             |                                      |                          |                             |
|                        |                                  |                     |                              |  |                                 |  |                                    |                        |                                  |                             |                                      |                          |                             |
|                        |                                  |                     |                              |  |                                 |  |                                    |                        |                                  |                             |                                      |                          |                             |
|                        |                                  |                     |                              |  |                                 |  |                                    |                        |                                  |                             |                                      |                          |                             |
|                        |                                  |                     |                              |  |                                 |  |                                    |                        |                                  |                             |                                      |                          |                             |
|                        |                                  |                     |                              |  |                                 |  |                                    |                        |                                  |                             |                                      |                          |                             |
|                        |                                  |                     |                              |  |                                 |  |                                    |                        |                                  |                             |                                      |                          |                             |
|                        |                                  |                     |                              |  |                                 |  |                                    |                        |                                  |                             |                                      |                          |                             |
|                        |                                  |                     |                              |  |                                 |  |                                    |                        |                                  |                             |                                      |                          |                             |
|                        |                                  |                     |                              |  |                                 |  |                                    |                        |                                  |                             |                                      |                          |                             |
|                        |                                  |                     |                              |  |                                 |  |                                    |                        |                                  |                             |                                      |                          |                             |
|                        |                                  |                     |                              |  |                                 |  |                                    |                        |                                  |                             |                                      |                          |                             |
|                        |                                  |                     |                              |  |                                 |  |                                    |                        |                                  |                             |                                      |                          |                             |
|                        |                                  |                     |                              |  |                                 |  |                                    |                        |                                  |                             |                                      |                          |                             |
|                        |                                  |                     |                              |  |                                 |  |                                    |                        |                                  |                             |                                      |                          |                             |
|                        |                                  |                     |                              |  |                                 |  |                                    |                        |                                  |                             |                                      |                          |                             |
|                        |                                  |                     |                              |  |                                 |  |                                    |                        |                                  |                             |                                      |                          |                             |
|                        |                                  |                     |                              |  |                                 |  |                                    |                        |                                  |                             |                                      |                          |                             |
|                        |                                  |                     |                              |  |                                 |  |                                    |                        |                                  |                             |                                      |                          |                             |
|                        |                                  |                     |                              |  |                                 |  |                                    |                        |                                  |                             |                                      |                          |                             |
|                        |                                  |                     |                              |  |                                 |  |                                    |                        |                                  |                             |                                      |                          |                             |
|                        |                                  |                     |                              |  |                                 |  |                                    |                        |                                  |                             |                                      |                          |                             |
|                        |                                  |                     |                              |  |                                 |  |                                    |                        |                                  |                             |                                      |                          |                             |
|                        |                                  |                     |                              |  |                                 |  |                                    |                        |                                  |                             |                                      |                          |                             |
|                        |                                  |                     |                              |  |                                 |  |                                    |                        |                                  |                             |                                      |                          |                             |
|                        |                                  |                     |                              |  |                                 |  |                                    |                        |                                  |                             |                                      |                          |                             |
|                        |                                  |                     |                              |  |                                 |  |                                    |                        |                                  |                             |                                      |                          |                             |
|                        |                                  |                     |                              |  |                                 |  |                                    |                        |                                  |                             |                                      |                          |                             |
|                        |                                  |                     |                              |  |                                 |  |                                    |                        |                                  |                             |                                      |                          |                             |
|                        |                                  |                     |                              |  |                                 |  |                                    |                        |                                  |                             |                                      |                          |                             |
|                        |                                  |                     |                              |  |                                 |  |                                    |                        |                                  |                             |                                      |                          |                             |
|                        |                                  |                     |                              |  |                                 |  |                                    |                        |                                  |                             |                                      |                          |                             |
|                        |                                  |                     |                              |  |                                 |  |                                    |                        |                                  |                             |                                      |                          |                             |
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1/ Includes customer charge, demand charge, energy charge

2/ Other Revenue includes: Non-Firm, RFPS, Pool within Pool Service Fee, and Economy

**Present Rates - Firm Power**

**Demand Charge**

\$250.087 for the first 10,000 Billing kW  
\$24.96 per kw for all Firm Bkw  
\$1.75 low Voltage adder per Bkw

**Energy Charge**

2.778¢ /kWh for all kWh

**Fuel Adjustment**

0.150¢ /kWh

**General Rates - Firm Power**

**Demand Charge**

\$250.087 for the first 10,000 Billing kW  
\$24.96 per kw for all additional Bkw  
\$1.75 low Voltage adder per Bkw

**Energy Charge**

0.678¢ /kWh for all kWh

**Fuel Adjustment**

0.150¢ /kWh

MINNESOTA POWER  
SUMMARY OF LARGE POWER OPERATING REVENUES  
PRESENT VS. INTERIM RATES  
TEST YEAR 2020

Non-Public Document All Highlighted Data is Trade Secret Customer Data

**Present**

Blandin Paper Company  
Boise Cascade  
Verso - Duluth  
Sappi - Cloquet  
Hibbing Taconite  
Mittal Steel - Minorca  
United Taconite  
US Steel - Combined  
Silver Bay Power Corp.

| IPS<br>Energy<br>(MWh)   | IPS<br>Revenue<br>(\$) | Economy<br>& Non-Firm<br>Energy<br>(MWh) | Economy<br>& Non-Firm<br>Revenue<br>(\$) | RFPS<br>Energy<br>(MWh) | RFPS<br>Revenue<br>(\$) | Fixed-Price<br>Contract<br>Energy<br>(MWh) | Fixed-Price<br>Contract<br>Revenue<br>(\$) |
|--------------------------|------------------------|--|--|-------------------------|-------------------------|--|--|
| TRADE SECRET DATA BEGINS |                        |  |  |                         |                         |  |  |
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**General**

Blandin Paper Company  
Boise Cascade  
Verso - Duluth  
Sappi - Cloquet  
Hibbing Taconite  
Mittal Steel - Minorca  
United Taconite  
US Steel - Combined  
Silver Bay Power Corp.

| IPS<br>Energy<br>(MWh)   | IPS<br>Revenue | Economy<br>& Non-Firm<br>Energy<br>(MWh) | Economy<br>& Non-Firm<br>Revenue<br>(\$) | RFPS<br>Energy<br>(MWh) | RFPS<br>Revenue<br>(\$) | Fixed-Price<br>Contract<br>Energy<br>(MWh) | Fixed-Price<br>Contract<br>Revenue<br>(\$) |
|--------------------------|----------------|--|--|-------------------------|-------------------------|--|--|
| TRADE SECRET DATA BEGINS |                |  |  |                         |                         |  |  |
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MINNESOTA POWER  
COMPARISON OF OPERATING REVENUES  
PRESENT VS. INTERIM RATES  
TEST YEAR 2020

**Non-Public Document- All Highlighted Data is Trade Secret Customer Data**

Silver Bay Power Company

| Type of Charge                                       | Basis or Unit<br>Upon Which Rates<br>Are Applied | Total Billing Units      |         | Unit Charge |         | Operating Revenues     |              | Increase |       |
|--|--|--------------------------|---------|-------------|---------|------------------------|--------------|----------|-------|
|  |  | Present                  | Interim | Present     | Interim | Present                | Interim      | (\$)     | (%)   |
|  |  | TRADE SECRET DATA BEGINS |         |             |         |                        |              |          |       |
| 1 Service Charge                                     | # of Bills                                       |                          |         |             |         |                        |              |          |       |
| 2 Demand   | kW   |                          |         |             |         |                        |              |          |       |
| 3 Energy - All (Economy)                             | kWh  |                          |         |             |         |                        |              |          |       |
| 4 Amortization                                       | # of Bills                                       |                          |         |             |         |                        |              |          |       |
| 5 Total Base Revenue                                 |  |                          |         |             |         |                        |              |          |       |
| 6 Fuel Adjustment                                    |  |                          |         |             |         |                        |              |          |       |
| <u>Adjustments for Riders Included in Base Rates</u> |  |                          |         |             |         |                        |              |          |       |
| 7 Boswell 4 Environmental Adjustment                 | kWh  |                          |         |             |         |                        |              |          |       |
| 8 Renewable Resource Adjustment                      | kWh  |                          |         |             |         |                        |              |          |       |
| 9 Transmission Adjustment (\$)                       | kWh  |                          |         |             |         |                        |              |          |       |
| 10 Conservation Program Adjustment                   | kWh  |                          |         |             |         |                        |              |          |       |
| 11 Subtotal Revenue                                  |  |                          |         |             |         |                        |              |          |       |
| 12 Boswell 4 Environmental Adjustment                | kWh  |                          |         |             |         |                        |              |          |       |
| 13 Renewable Resource Adjustment                     | kWh  |                          |         |             |         |                        |              |          |       |
| 14 Transmission Adjustment (\$)                      | kWh  |                          |         |             |         |                        |              |          |       |
| 15 Conservation Program Adjustment                   | kWh  |                          |         |             |         |                        |              |          |       |
|  |  |                          |         |             |         | TRADE SECRET DATA ENDS |              |          |       |
| 16 TOTAL REVENUE                                     |  |                          |         |             |         | \$28,324,291           | \$28,324,291 | \$0      | 0.00% |

MINNESOTA POWER  
COMPARISON OF LARGE POWER OPERATING REVENUES  
PRESENT VS. INTERIM RATES  
TEST YEAR 2020

Non-Public Document- All Highlighted Data is Trade Secret Customer Data  
Blandin Paper Company

|  | January                         | February | March | April | May | June | July | August | September | October | November | December | Total |
|--|---------------------------------|----------|-------|-------|-----|------|------|--------|-----------|---------|----------|----------|-------|
| <b>Blandin Paper Company</b>                         | <b>TRADE SECRET DATA BEGINS</b> |          |       |       |     |      |      |        |           |         |          |          |       |
| Nominated Demand (kW)                                |                                 |          |       |       |     |      |      |        |           |         |          |          |       |
| Firm Demand (kW)                                     |                                 |          |       |       |     |      |      |        |           |         |          |          |       |
| Expected Peak Load Per ESA (kW)                      |                                 |          |       |       |     |      |      |        |           |         |          |          |       |
| Firm Energy (MWh)                                    |                                 |          |       |       |     |      |      |        |           |         |          |          |       |
| Excess Energy (MWh)                                  |                                 |          |       |       |     |      |      |        |           |         |          |          |       |
| Nonfirm Energy (MWh)                                 |                                 |          |       |       |     |      |      |        |           |         |          |          |       |
| RFPS (MWh)   |                                 |          |       |       |     |      |      |        |           |         |          |          |       |
| Incremental Production Service (MWh)                 |                                 |          |       |       |     |      |      |        |           |         |          |          |       |
| Total Energy (MWh)                                   |                                 |          |       |       |     |      |      |        |           |         |          |          |       |
| <b>Present Rates</b>                                 |                                 |          |       |       |     |      |      |        |           |         |          |          |       |
| Firm Demand (\$)                                     |                                 |          |       |       |     |      |      |        |           |         |          |          |       |
| Firm Energy (\$)                                     |                                 |          |       |       |     |      |      |        |           |         |          |          |       |
| Firm FAC   |                                 |          |       |       |     |      |      |        |           |         |          |          |       |
| Customer Chg (\$)                                    |                                 |          |       |       |     |      |      |        |           |         |          |          |       |
| EITE Energy Charge Credit (\$)                       |                                 |          |       |       |     |      |      |        |           |         |          |          |       |
| Firm Energy (\$)                                     |                                 |          |       |       |     |      |      |        |           |         |          |          |       |
| RFPS Energy (\$)                                     |                                 |          |       |       |     |      |      |        |           |         |          |          |       |
| IPS Energy (\$)                                      |                                 |          |       |       |     |      |      |        |           |         |          |          |       |
| Subtotal Revenue                                     |                                 |          |       |       |     |      |      |        |           |         |          |          |       |
| <b>Adjustments for Riders Included in Base Rates</b> |                                 |          |       |       |     |      |      |        |           |         |          |          |       |
| Boswell 4 Adj (Demand)                               |                                 |          |       |       |     |      |      |        |           |         |          |          |       |
| Boswell 4 Adj (Energy)                               |                                 |          |       |       |     |      |      |        |           |         |          |          |       |
| Boswell 4 Environmental Adjustment (\$)              |                                 |          |       |       |     |      |      |        |           |         |          |          |       |
| Transmission Adj (Demand)                            |                                 |          |       |       |     |      |      |        |           |         |          |          |       |
| Transmission Adj (Energy)                            |                                 |          |       |       |     |      |      |        |           |         |          |          |       |
| Transmission Adjustment (\$)                         |                                 |          |       |       |     |      |      |        |           |         |          |          |       |
| Renewable Resource Adj (Demand)                      |                                 |          |       |       |     |      |      |        |           |         |          |          |       |
| Renewable Resource Adj (Energy)                      |                                 |          |       |       |     |      |      |        |           |         |          |          |       |
| Renewable Resource Adjustment (\$)                   |                                 |          |       |       |     |      |      |        |           |         |          |          |       |
| Excess ADIT Credit                                   |                                 |          |       |       |     |      |      |        |           |         |          |          |       |
| Total Adjustments                                    |                                 |          |       |       |     |      |      |        |           |         |          |          |       |
| <b>Adjustments for Remaining Riders</b>              |                                 |          |       |       |     |      |      |        |           |         |          |          |       |
| Boswell 4 Adj (Demand)                               |                                 |          |       |       |     |      |      |        |           |         |          |          |       |
| Boswell 4 Adj (Energy)                               |                                 |          |       |       |     |      |      |        |           |         |          |          |       |
| Boswell 4 Environmental Adjustment (\$)              |                                 |          |       |       |     |      |      |        |           |         |          |          |       |
| Transmission Adj (Demand)                            |                                 |          |       |       |     |      |      |        |           |         |          |          |       |
| Transmission Adj (Energy)                            |                                 |          |       |       |     |      |      |        |           |         |          |          |       |
| Transmission Adjustment (\$)                         |                                 |          |       |       |     |      |      |        |           |         |          |          |       |
| Renewable Resource Adj (Demand)                      |                                 |          |       |       |     |      |      |        |           |         |          |          |       |
| Renewable Resource Adj (Energy)                      |                                 |          |       |       |     |      |      |        |           |         |          |          |       |
| Renewable Resource Adjustment (\$)                   |                                 |          |       |       |     |      |      |        |           |         |          |          |       |
| Care Surcharge                                       |                                 |          |       |       |     |      |      |        |           |         |          |          |       |
| Non-Firm Energy (\$)                                 |                                 |          |       |       |     |      |      |        |           |         |          |          |       |
| Pool within Pool Service Fee (\$)                    |                                 |          |       |       |     |      |      |        |           |         |          |          |       |
| Total Revenues (\$)                                  |                                 |          |       |       |     |      |      |        |           |         |          |          |       |

TRADE SECRET DATA ENDS

MINNESOTA POWER  
COMPARISON OF LARGE POWER OPERATING REVENUES  
PRESENT VS. INTERIM RATES  
TEST YEAR 2020

Non-Public Document- All Highlighted Data is Trade Secret Customer Data  
Blandin Paper Company

|  | January                  | February | March | April | May | June | July | August | September | October | November | December | Total |
|--|--------------------------|----------|-------|-------|-----|------|------|--------|-----------|---------|----------|----------|-------|
| <b>General Rates</b>                                 | TRADE SECRET DATA BEGINS |          |       |       |     |      |      |        |           |         |          |          |       |
| Firm Demand (\$)                                     |                          |          |       |       |     |      |      |        |           |         |          |          |       |
| Total Firm Energy (\$)                               |                          |          |       |       |     |      |      |        |           |         |          |          |       |
| Base Cost of Fuel                                    |                          |          |       |       |     |      |      |        |           |         |          |          |       |
| Firm FAC   |                          |          |       |       |     |      |      |        |           |         |          |          |       |
| Customer Chg (\$)                                    |                          |          |       |       |     |      |      |        |           |         |          |          |       |
| EITE Energy Charge Credit (\$)                       |                          |          |       |       |     |      |      |        |           |         |          |          |       |
| Firm Energy (\$)                                     |                          |          |       |       |     |      |      |        |           |         |          |          |       |
| RFPS Energy (\$)                                     |                          |          |       |       |     |      |      |        |           |         |          |          |       |
| IPS Energy (\$)                                      |                          |          |       |       |     |      |      |        |           |         |          |          |       |
| Subtotal Revenue                                     |                          |          |       |       |     |      |      |        |           |         |          |          |       |
| <u>Adjustments for Riders Included in Base Rates</u> |                          |          |       |       |     |      |      |        |           |         |          |          |       |
| Boswell 4 Adj (Demand)                               |                          |          |       |       |     |      |      |        |           |         |          |          |       |
| Boswell 4 Adj (Energy)                               |                          |          |       |       |     |      |      |        |           |         |          |          |       |
| Boswell 4 Environmental Adjust (\$)                  |                          |          |       |       |     |      |      |        |           |         |          |          |       |
| Transmission Adj (Demand)                            |                          |          |       |       |     |      |      |        |           |         |          |          |       |
| Transmission Adj (Energy)                            |                          |          |       |       |     |      |      |        |           |         |          |          |       |
| Transmission Adjustment (\$)                         |                          |          |       |       |     |      |      |        |           |         |          |          |       |
| Renewable Resource Adj (Demand)                      |                          |          |       |       |     |      |      |        |           |         |          |          |       |
| Renewable Resource Adj (Energy)                      |                          |          |       |       |     |      |      |        |           |         |          |          |       |
| Personal Property Tax Adjustment (\$)                |                          |          |       |       |     |      |      |        |           |         |          |          |       |
| Excess ADIT Credit                                   |                          |          |       |       |     |      |      |        |           |         |          |          |       |
| Total Adjustments                                    |                          |          |       |       |     |      |      |        |           |         |          |          |       |
| <u>Adjustments for Remaining Riders</u>              |                          |          |       |       |     |      |      |        |           |         |          |          |       |
| Boswell 4 Adj (Demand)                               |                          |          |       |       |     |      |      |        |           |         |          |          |       |
| Boswell 4 Adj (Energy)                               |                          |          |       |       |     |      |      |        |           |         |          |          |       |
| Boswell 4 Environmental Adjustment (\$)              |                          |          |       |       |     |      |      |        |           |         |          |          |       |
| Transmission Adj (Demand)                            |                          |          |       |       |     |      |      |        |           |         |          |          |       |
| Transmission Adj (Energy)                            |                          |          |       |       |     |      |      |        |           |         |          |          |       |
| Transmission Adjustment (\$)                         |                          |          |       |       |     |      |      |        |           |         |          |          |       |
| Renewable Resource Adj (Demand)                      |                          |          |       |       |     |      |      |        |           |         |          |          |       |
| Renewable Resource Adj (Energy)                      |                          |          |       |       |     |      |      |        |           |         |          |          |       |
| Renewable Resource Adjustment (\$)                   |                          |          |       |       |     |      |      |        |           |         |          |          |       |
| Care Surcharge                                       |                          |          |       |       |     |      |      |        |           |         |          |          |       |
| Non-Firm Energy (\$)                                 |                          |          |       |       |     |      |      |        |           |         |          |          |       |
| Pool within Pool Service Fee (\$)                    |                          |          |       |       |     |      |      |        |           |         |          |          |       |
| Total Revenues (\$)                                  |                          |          |       |       |     |      |      |        |           |         |          |          |       |
| Interim Rate Adjust-Firm (\$)                        |                          |          |       |       |     |      |      |        |           |         |          |          |       |
| Interim Rate Adjust-Inter. (\$)                      |                          |          |       |       |     |      |      |        |           |         |          |          |       |
| Interim Rate Adjust-Riders (\$)                      |                          |          |       |       |     |      |      |        |           |         |          |          |       |

TRADE SECRET DATA ENDS



MINNESOTA POWER  
COMPARISON OF LARGE POWER OPERATING REVENUES  
PRESENT VS. INTERIM RATES  
TEST YEAR 2020

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Blandin Paper Company

|                  | January | February | March | April | May | June | July | August | September | October | November | December | Total |
|------------------|---------|----------|-------|-------|-----|------|------|--------|-----------|---------|----------|----------|-------|
| Fuel Costs Calc: |         |          |       |       |     |      |      |        |           |         |          |          |       |
| Fuel Cost Rate   |         |          |       |       |     |      |      |        |           |         |          |          |       |
| Firm             |         |          |       |       |     |      |      |        |           |         |          |          |       |
| Excess           |         |          |       |       |     |      |      |        |           |         |          |          |       |
| Economy          |         |          |       |       |     |      |      |        |           |         |          |          |       |
| RFPS             |         |          |       |       |     |      |      |        |           |         |          |          |       |
| IPS              |         |          |       |       |     |      |      |        |           |         |          |          |       |
| Fuel Cost        |         |          |       |       |     |      |      |        |           |         |          |          |       |
| Firm             |         |          |       |       |     |      |      |        |           |         |          |          |       |
| Excess           |         |          |       |       |     |      |      |        |           |         |          |          |       |
| Economy          |         |          |       |       |     |      |      |        |           |         |          |          |       |
| RFPS             |         |          |       |       |     |      |      |        |           |         |          |          |       |
| IPS              |         |          |       |       |     |      |      |        |           |         |          |          |       |

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MINNESOTA POWER  
COMPARISON OF LARGE POWER OPERATING REVENUES  
PRESENT VS. INTERIM RATES  
TEST YEAR 2020

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Boise Cascade

|  | January | February | March | April | May | June | July | August | September | October | November | December | Total |
|--|---------|----------|-------|-------|-----|------|------|--------|-----------|---------|----------|----------|-------|
| <b>Boise Cascade</b>                                 |         |          |       |       |     |      |      |        |           |         |          |          |       |
| Nominated Demand (kW)                                |         |          |       |       |     |      |      |        |           |         |          |          |       |
| Firm Demand (kW)                                     |         |          |       |       |     |      |      |        |           |         |          |          |       |
| Expected Peak Load Per ESA (kW)                      |         |          |       |       |     |      |      |        |           |         |          |          |       |
| Firm Energy (MWh)                                    |         |          |       |       |     |      |      |        |           |         |          |          |       |
| Economy Energy (MWh)                                 |         |          |       |       |     |      |      |        |           |         |          |          |       |
| RFPS (MWh)   |         |          |       |       |     |      |      |        |           |         |          |          |       |
| Incremental Production Service (MWh)                 |         |          |       |       |     |      |      |        |           |         |          |          |       |
| Total Energy (MWh)                                   |         |          |       |       |     |      |      |        |           |         |          |          |       |
| <b>Present Rates</b>                                 |         |          |       |       |     |      |      |        |           |         |          |          |       |
| Firm Demand (\$)                                     |         |          |       |       |     |      |      |        |           |         |          |          |       |
| Firm Energy (\$)                                     |         |          |       |       |     |      |      |        |           |         |          |          |       |
| Firm FAC   |         |          |       |       |     |      |      |        |           |         |          |          |       |
| Customer Chg (\$)                                    |         |          |       |       |     |      |      |        |           |         |          |          |       |
| EITE Energy Charge Credit (\$)                       |         |          |       |       |     |      |      |        |           |         |          |          |       |
| Firm Energy (\$)                                     |         |          |       |       |     |      |      |        |           |         |          |          |       |
| RFPS Energy (\$)                                     |         |          |       |       |     |      |      |        |           |         |          |          |       |
| IPS Energy (\$)                                      |         |          |       |       |     |      |      |        |           |         |          |          |       |
| Subtotal Revenue                                     |         |          |       |       |     |      |      |        |           |         |          |          |       |
| <b>Adjustments for Riders Included in Base Rates</b> |         |          |       |       |     |      |      |        |           |         |          |          |       |
| Boswell 4 Adj (Demand)                               |         |          |       |       |     |      |      |        |           |         |          |          |       |
| Boswell 4 Adj (Energy)                               |         |          |       |       |     |      |      |        |           |         |          |          |       |
| Boswell 4 Environmental Adjustment (\$)              |         |          |       |       |     |      |      |        |           |         |          |          |       |
| Transmission Adj (Demand)                            |         |          |       |       |     |      |      |        |           |         |          |          |       |
| Transmission Adj (Energy)                            |         |          |       |       |     |      |      |        |           |         |          |          |       |
| Transmission Adjustment (\$)                         |         |          |       |       |     |      |      |        |           |         |          |          |       |
| Renewable Resource Adj (Demand)                      |         |          |       |       |     |      |      |        |           |         |          |          |       |
| Renewable Resource Adj (Energy)                      |         |          |       |       |     |      |      |        |           |         |          |          |       |
| Renewable Resource Adjustment (\$)                   |         |          |       |       |     |      |      |        |           |         |          |          |       |
| Excess ADIT Credit                                   |         |          |       |       |     |      |      |        |           |         |          |          |       |
| Total Adjustments                                    |         |          |       |       |     |      |      |        |           |         |          |          |       |
| <b>Adjustments for Remaining Riders</b>              |         |          |       |       |     |      |      |        |           |         |          |          |       |
| Boswell 4 Adj (Demand)                               |         |          |       |       |     |      |      |        |           |         |          |          |       |
| Boswell 4 Adj (Energy)                               |         |          |       |       |     |      |      |        |           |         |          |          |       |
| Boswell 4 Environmental Adjustment (\$)              |         |          |       |       |     |      |      |        |           |         |          |          |       |
| Transmission Adj (Demand)                            |         |          |       |       |     |      |      |        |           |         |          |          |       |
| Transmission Adj (Energy)                            |         |          |       |       |     |      |      |        |           |         |          |          |       |
| Transmission Adjustment (\$)                         |         |          |       |       |     |      |      |        |           |         |          |          |       |
| Renewable Resource Adj (Demand)                      |         |          |       |       |     |      |      |        |           |         |          |          |       |
| Renewable Resource Adj (Energy)                      |         |          |       |       |     |      |      |        |           |         |          |          |       |
| Renewable Resource Adjustment (\$)                   |         |          |       |       |     |      |      |        |           |         |          |          |       |
| Care Surcharge                                       |         |          |       |       |     |      |      |        |           |         |          |          |       |
| Fuel Adjustment Clause                               |         |          |       |       |     |      |      |        |           |         |          |          |       |
| Pool within Pool Service Fee (\$)                    |         |          |       |       |     |      |      |        |           |         |          |          |       |
| Economy Energy (\$)                                  |         |          |       |       |     |      |      |        |           |         |          |          |       |
| Total Revenues (\$)                                  |         |          |       |       |     |      |      |        |           |         |          |          |       |

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MINNESOTA POWER  
COMPARISON OF LARGE POWER OPERATING REVENUES  
PRESENT VS. INTERIM RATES  
TEST YEAR 2020

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Boise Cascade

General Rates

Firm Demand (\$)  
Total Firm Energy (\$)  
Base Cost of Fuel  
Firm FAC  
Customer Chg (\$)  
EITE Energy Charge Credit (\$)  
Firm Energy (\$)  
RFPS Energy (\$)  
IPS Energy (\$)

Subtotal Revenue

Adjustments for Riders Included in Base Rates

Boswell 4 Adj (Demand)  
Boswell 4 Adj (Energy)  
Boswell 4 Environmental Adjustment (\$)  
Transmission Adj (Demand)  
Transmission Adj (Energy)  
Transmission Adjustment (\$)  
Renewable Resource Adj (Demand)  
Renewable Resource Adj (Energy)  
Renewable Resource Adjustment (\$)  
Excess ADIT Credit  
Total Adjustments

Adjustments for Remaining Riders

Boswell 4 Adj (Demand)  
Boswell 4 Adj (Energy)  
Boswell 4 Environmental Adjustment (\$)  
Transmission Adj (Demand)  
Transmission Adj (Energy)  
Transmission Adjustment (\$)  
Renewable Resource Adj (Demand)  
Renewable Resource Adj (Energy)  
Renewable Resource Adjustment (\$)  
Care Surcharge  
Pool within Pool Service Fee (\$)  
Economy Energy (\$)  
Total Revenues (\$)

Interim Rate Adjust-Firm (\$)  
Interim Rate Adjust-Inter. (\$)  
Interim Rate Adjust-Riders (\$)

Fuel Costs Calc:

Fuel Cost Rate

Firm  
Excess  
Economy  
RFPS  
IPS

Fuel Cost

Firm  
Excess  
Economy  
RFPS  
IPS

January February March April May June July August September October November December Total

TRADE SECRET DATA BEGINS

TRADE SECRET DATA ENDS

January February March April May June July August September October November December TOTAL

TRADE SECRET DATA BEGINS

TRADE SECRET DATA ENDS





MINNESOTA POWER  
COMPARISON OF LARGE POWER OPERATING REVENUES  
PRESENT VS. INTERIM RATES  
TEST YEAR 2020

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Sappi - Cloquet

|  | January                  | February | March | April | May | June | July | August | September | October | November | December | Total |
|--|--------------------------|----------|-------|-------|-----|------|------|--------|-----------|---------|----------|----------|-------|
| <b>Sappi - Cloquet</b>                               | TRADE SECRET DATA BEGINS |          |       |       |     |      |      |        |           |         |          |          |       |
| Nominated Demand (kW)                                |                          |          |       |       |     |      |      |        |           |         |          |          |       |
| Firm Demand (kW)                                     |                          |          |       |       |     |      |      |        |           |         |          |          |       |
| Firm Energy (MWh)                                    |                          |          |       |       |     |      |      |        |           |         |          |          |       |
| Economy Energy (MWh)                                 |                          |          |       |       |     |      |      |        |           |         |          |          |       |
| Incremental Production Service (MWh)                 |                          |          |       |       |     |      |      |        |           |         |          |          |       |
| Total Energy (MWh)                                   |                          |          |       |       |     |      |      |        |           |         |          |          |       |
| <b>Present Rates</b>                                 |                          |          |       |       |     |      |      |        |           |         |          |          |       |
| Firm Demand (\$)                                     |                          |          |       |       |     |      |      |        |           |         |          |          |       |
| Firm Energy (\$)                                     |                          |          |       |       |     |      |      |        |           |         |          |          |       |
| Firm FAC   |                          |          |       |       |     |      |      |        |           |         |          |          |       |
| Customer Chg (\$)                                    |                          |          |       |       |     |      |      |        |           |         |          |          |       |
| Firm Energy (\$)                                     |                          |          |       |       |     |      |      |        |           |         |          |          |       |
| IPS Energy (\$)                                      |                          |          |       |       |     |      |      |        |           |         |          |          |       |
| Subtotal Revenue                                     |                          |          |       |       |     |      |      |        |           |         |          |          |       |
| <b>Adjustments for Riders Included in Base Rates</b> |                          |          |       |       |     |      |      |        |           |         |          |          |       |
| Boswell 4 Adj (Demand)                               |                          |          |       |       |     |      |      |        |           |         |          |          |       |
| Boswell 4 Adj (Energy)                               |                          |          |       |       |     |      |      |        |           |         |          |          |       |
| Boswell 4 Environmental Adjustment (\$)              |                          |          |       |       |     |      |      |        |           |         |          |          |       |
| Transmission Adj (Demand)                            |                          |          |       |       |     |      |      |        |           |         |          |          |       |
| Transmission Adj (Energy)                            |                          |          |       |       |     |      |      |        |           |         |          |          |       |
| Transmission Adjustment (\$)                         |                          |          |       |       |     |      |      |        |           |         |          |          |       |
| Renewable Resource Adj (Demand)                      |                          |          |       |       |     |      |      |        |           |         |          |          |       |
| Renewable Resource Adj (Energy)                      |                          |          |       |       |     |      |      |        |           |         |          |          |       |
| Renewable Resource Adjustment (\$)                   |                          |          |       |       |     |      |      |        |           |         |          |          |       |
| Excess ADIT Credit                                   |                          |          |       |       |     |      |      |        |           |         |          |          |       |
| Total Adjustments                                    |                          |          |       |       |     |      |      |        |           |         |          |          |       |
| <b>Adjustments for Remaining Riders</b>              |                          |          |       |       |     |      |      |        |           |         |          |          |       |
| Boswell 4 Adj (Demand)                               |                          |          |       |       |     |      |      |        |           |         |          |          |       |
| Boswell 4 Adj (Energy)                               |                          |          |       |       |     |      |      |        |           |         |          |          |       |
| Boswell 4 Environmental Adjustment (\$)              |                          |          |       |       |     |      |      |        |           |         |          |          |       |
| Transmission Adj (Demand)                            |                          |          |       |       |     |      |      |        |           |         |          |          |       |
| Transmission Adj (Energy)                            |                          |          |       |       |     |      |      |        |           |         |          |          |       |
| Transmission Adjustment (\$)                         |                          |          |       |       |     |      |      |        |           |         |          |          |       |
| Renewable Resource Adj (Demand)                      |                          |          |       |       |     |      |      |        |           |         |          |          |       |
| Renewable Resource Adj (Energy)                      |                          |          |       |       |     |      |      |        |           |         |          |          |       |
| Renewable Resource Adjustment (\$)                   |                          |          |       |       |     |      |      |        |           |         |          |          |       |
| CARE Surcharge                                       |                          |          |       |       |     |      |      |        |           |         |          |          |       |
| Economy Energy (\$)                                  |                          |          |       |       |     |      |      |        |           |         |          |          |       |
| Pool within Pool Service Fee (\$)                    |                          |          |       |       |     |      |      |        |           |         |          |          |       |
| Total Revenues (\$)                                  |                          |          |       |       |     |      |      |        |           |         |          |          |       |

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MINNESOTA POWER  
COMPARISON OF LARGE POWER OPERATING REVENUES  
PRESENT VS. INTERIM RATES  
TEST YEAR 2020

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Hibbing Taconite

|  | January | February | March | April | May | June | July | August | September | October | November | December | Total |
|--|---------|----------|-------|-------|-----|------|------|--------|-----------|---------|----------|----------|-------|
| <b>Hibbing Taconite</b>                              |         |          |       |       |     |      |      |        |           |         |          |          |       |
| Nominated Demand (kW)                                |         |          |       |       |     |      |      |        |           |         |          |          |       |
| Firm Contract Demand (kW)                            |         |          |       |       |     |      |      |        |           |         |          |          |       |
| Expected Peak Load Per ESA (kW)                      |         |          |       |       |     |      |      |        |           |         |          |          |       |
| RIS Discount (kW)                                    |         |          |       |       |     |      |      |        |           |         |          |          |       |
| Firm Energy (MWh)                                    |         |          |       |       |     |      |      |        |           |         |          |          |       |
| Incremental Production Service (MWh)                 |         |          |       |       |     |      |      |        |           |         |          |          |       |
| Total Energy (MWh)                                   |         |          |       |       |     |      |      |        |           |         |          |          |       |
| <b>Present Rates</b>                                 |         |          |       |       |     |      |      |        |           |         |          |          |       |
| Firm Demand (\$)                                     |         |          |       |       |     |      |      |        |           |         |          |          |       |
| Firm Energy (\$)                                     |         |          |       |       |     |      |      |        |           |         |          |          |       |
| Firm FAC   |         |          |       |       |     |      |      |        |           |         |          |          |       |
| Customer Chg (\$)                                    |         |          |       |       |     |      |      |        |           |         |          |          |       |
| EITE Energy Charge Credit (\$)                       |         |          |       |       |     |      |      |        |           |         |          |          |       |
| Firm Energy (\$)                                     |         |          |       |       |     |      |      |        |           |         |          |          |       |
| Replace & Fixed Price Int Discount (\$)              |         |          |       |       |     |      |      |        |           |         |          |          |       |
| IPS Energy (\$)                                      |         |          |       |       |     |      |      |        |           |         |          |          |       |
| Subtotal Revenue                                     |         |          |       |       |     |      |      |        |           |         |          |          |       |
| <b>Adjustments for Riders Included in Base Rates</b> |         |          |       |       |     |      |      |        |           |         |          |          |       |
| Boswell 4 Adj (Demand)                               |         |          |       |       |     |      |      |        |           |         |          |          |       |
| Boswell 4 Adj (Energy)                               |         |          |       |       |     |      |      |        |           |         |          |          |       |
| Boswell 4 Environmental Adjustment (\$)              |         |          |       |       |     |      |      |        |           |         |          |          |       |
| Transmission Adj (Demand)                            |         |          |       |       |     |      |      |        |           |         |          |          |       |
| Transmission Adj (Energy)                            |         |          |       |       |     |      |      |        |           |         |          |          |       |
| Transmission Adjustment (\$)                         |         |          |       |       |     |      |      |        |           |         |          |          |       |
| Renewable Resource Adj (Demand)                      |         |          |       |       |     |      |      |        |           |         |          |          |       |
| Renewable Resource Adj (Energy)                      |         |          |       |       |     |      |      |        |           |         |          |          |       |
| Renewable Resource Adjustment (\$)                   |         |          |       |       |     |      |      |        |           |         |          |          |       |
| Excess ADIT Credit                                   |         |          |       |       |     |      |      |        |           |         |          |          |       |
| Total Adjustments                                    |         |          |       |       |     |      |      |        |           |         |          |          |       |
| <b>Adjustments for Remaining Riders</b>              |         |          |       |       |     |      |      |        |           |         |          |          |       |
| Boswell 4 Adj (Demand)                               |         |          |       |       |     |      |      |        |           |         |          |          |       |
| Boswell 4 Adj (Energy)                               |         |          |       |       |     |      |      |        |           |         |          |          |       |
| Boswell 4 Environmental Adjustment (\$)              |         |          |       |       |     |      |      |        |           |         |          |          |       |
| Transmission Adj (Demand)                            |         |          |       |       |     |      |      |        |           |         |          |          |       |
| Transmission Adj (Energy)                            |         |          |       |       |     |      |      |        |           |         |          |          |       |
| Transmission Adjustment (\$)                         |         |          |       |       |     |      |      |        |           |         |          |          |       |
| Renewable Resource Adj (Demand)                      |         |          |       |       |     |      |      |        |           |         |          |          |       |
| Renewable Resource Adj (Energy)                      |         |          |       |       |     |      |      |        |           |         |          |          |       |
| Renewable Resource Adjustment (\$)                   |         |          |       |       |     |      |      |        |           |         |          |          |       |
| CARE Surcharge                                       |         |          |       |       |     |      |      |        |           |         |          |          |       |
| Total Revenues (\$)                                  |         |          |       |       |     |      |      |        |           |         |          |          |       |

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**Hibbing Taconite**

### General Rates

Firm Demand (\$)  
Firm Energy (\$)  
Base Cost of Fuel  
Firm FAC  
Customer Chg (\$)  
EITE Energy Charge Credit (\$)  
Firm Energy (\$)  
Replace & Fixed Price Int Discount (\$)  
IPS Energy (\$)

Subtotal Revenue

### Adjustments for Riders Included in Base Rates

|   |
|---|
| Boswell 4 Adj (Demand)                  |
| Boswell 4 Adj (Energy)                  |
| Boswell 4 Environmental Adjustment (\$) |
| Transmission Adj (Demand)               |
| Transmission Adj (Energy)               |
| Transmission Adjustment (\$)            |
| Renewable Resource Adj (Demand)         |
| Renewable Resource Adj (Energy)         |
| Renewable Resource Adjustment (\$)      |
| Excess ADIT Credit                      |
| Total Adjustments                       |

### Adjustments for Remaining Riders

|   |
|---|
| Boswell 4 Adj (Demand)                  |
| Boswell 4 Adj (Energy)                  |
| Boswell 4 Environmental Adjustment (\$) |
| Transmission Adj (Demand)               |
| Transmission Adj (Energy)               |
| Transmission Adjustment (\$)            |
| Renewable Resource Adj (Demand)         |
| Renewable Resource Adj (Energy)         |
| Renewable Resource Adjustment (\$)      |
| Care Surcharge                          |
| Total Revenues (\$)                     |

Interim Rate Adjust-Firm (\$)  
Interim Rate Adjust-Inter. (\$)  
Interim Rate Adjust-Riders (\$)

**Fuel Costs Calc:**

## Fuel Cost Rate

Firm  
Excess  
Economy  
RFPS  
IPS

### Fuel Cost

Firm  
Excess  
Economy  
RFPS  
IPS

| January | February | March | April | May | June | July | August | September | October | November | December | Total |
|---------|----------|-------|-------|-----|------|------|--------|-----------|---------|----------|----------|-------|
|---------|----------|-------|-------|-----|------|------|--------|-----------|---------|----------|----------|-------|

**TRADE SECRET DATA BEGINS**

TRADE SECRET DATA ENDS

| January | February | March | April | May | June | July | August | September | October | November | December | TOTAL |
|---------|----------|-------|-------|-----|------|------|--------|-----------|---------|----------|----------|-------|
|---------|----------|-------|-------|-----|------|------|--------|-----------|---------|----------|----------|-------|

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MINNESOTA POWER  
COMPARISON OF LARGE POWER OPERATING REVENUES  
PRESENT VS. INTERIM RATES  
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Arcelor Mittal Steel

|  | January                         | February | March | April | May | June | July | August | September | October | November | December | Total |
|--|---------------------------------|----------|-------|-------|-----|------|------|--------|-----------|---------|----------|----------|-------|
| <b>Arcelor Mittal Steel</b>                          | <b>TRADE SECRET DATA BEGINS</b> |          |       |       |     |      |      |        |           |         |          |          |       |
| Nominated Demand (kW)                                |                                 |          |       |       |     |      |      |        |           |         |          |          |       |
| Billing Demand (kW)                                  |                                 |          |       |       |     |      |      |        |           |         |          |          |       |
| Expected Peak Load Per ESA (kW)                      |                                 |          |       |       |     |      |      |        |           |         |          |          |       |
| RIS Discount   |                                 |          |       |       |     |      |      |        |           |         |          |          |       |
| Firm Energy (MWh)                                    |                                 |          |       |       |     |      |      |        |           |         |          |          |       |
| Incremental Production Service (MWh)                 |                                 |          |       |       |     |      |      |        |           |         |          |          |       |
| Total Energy (MWh)                                   |                                 |          |       |       |     |      |      |        |           |         |          |          |       |
| <b>Present Rates</b>                                 |                                 |          |       |       |     |      |      |        |           |         |          |          |       |
| Firm Demand (\$)                                     |                                 |          |       |       |     |      |      |        |           |         |          |          |       |
| Firm Energy (\$)                                     |                                 |          |       |       |     |      |      |        |           |         |          |          |       |
| Firm FAC   |                                 |          |       |       |     |      |      |        |           |         |          |          |       |
| Customer Chg (\$)                                    |                                 |          |       |       |     |      |      |        |           |         |          |          |       |
| EITE Energy Charge Credit (\$)                       |                                 |          |       |       |     |      |      |        |           |         |          |          |       |
| Firm Energy (\$)                                     |                                 |          |       |       |     |      |      |        |           |         |          |          |       |
| Fixed Price Interruptible Discount Demand (\$)       |                                 |          |       |       |     |      |      |        |           |         |          |          |       |
| IPS Energy (\$)                                      |                                 |          |       |       |     |      |      |        |           |         |          |          |       |
| Subtotal Revenue                                     |                                 |          |       |       |     |      |      |        |           |         |          |          |       |
| <b>Adjustments for Riders Included in Base Rates</b> |                                 |          |       |       |     |      |      |        |           |         |          |          |       |
| Boswell 4 Adj (Demand)                               |                                 |          |       |       |     |      |      |        |           |         |          |          |       |
| Boswell 4 Adj (Energy)                               |                                 |          |       |       |     |      |      |        |           |         |          |          |       |
| Boswell 4 Environmental Adjustment (\$)              |                                 |          |       |       |     |      |      |        |           |         |          |          |       |
| Transmission Adj (Demand)                            |                                 |          |       |       |     |      |      |        |           |         |          |          |       |
| Transmission Adj (Energy)                            |                                 |          |       |       |     |      |      |        |           |         |          |          |       |
| Transmission Adjustment (\$)                         |                                 |          |       |       |     |      |      |        |           |         |          |          |       |
| Renewable Resource Adj (Demand)                      |                                 |          |       |       |     |      |      |        |           |         |          |          |       |
| Renewable Resource Adj (Energy)                      |                                 |          |       |       |     |      |      |        |           |         |          |          |       |
| Renewable Resource Adjustment (\$)                   |                                 |          |       |       |     |      |      |        |           |         |          |          |       |
| Excess ADIT Credit                                   |                                 |          |       |       |     |      |      |        |           |         |          |          |       |
| Total Adjustments                                    |                                 |          |       |       |     |      |      |        |           |         |          |          |       |
| <b>Adjustments for Remaining Riders</b>              |                                 |          |       |       |     |      |      |        |           |         |          |          |       |
| Boswell 4 Adj (Demand)                               |                                 |          |       |       |     |      |      |        |           |         |          |          |       |
| Boswell 4 Adj (Energy)                               |                                 |          |       |       |     |      |      |        |           |         |          |          |       |
| Boswell 4 Environmental Adjustment (\$)              |                                 |          |       |       |     |      |      |        |           |         |          |          |       |
| Transmission Adj (Demand)                            |                                 |          |       |       |     |      |      |        |           |         |          |          |       |
| Transmission Adj (Energy)                            |                                 |          |       |       |     |      |      |        |           |         |          |          |       |
| Transmission Adjustment (\$)                         |                                 |          |       |       |     |      |      |        |           |         |          |          |       |
| Renewable Resource Adj (Demand)                      |                                 |          |       |       |     |      |      |        |           |         |          |          |       |
| Renewable Resource Adj (Energy)                      |                                 |          |       |       |     |      |      |        |           |         |          |          |       |
| Renewable Resource Adjustment (\$)                   |                                 |          |       |       |     |      |      |        |           |         |          |          |       |
| CARE Surcharge                                       |                                 |          |       |       |     |      |      |        |           |         |          |          |       |
| Total Revenues (\$)                                  |                                 |          |       |       |     |      |      |        |           |         |          |          |       |
|  | <b>TRADE SECRET DATA ENDS</b>   |          |       |       |     |      |      |        |           |         |          |          |       |

MINNESOTA POWER  
COMPARISON OF LARGE POWER OPERATING REVENUES  
PRESENT VS. INTERIM RATES  
TEST YEAR 2020

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Arcelor Mittal Steel

|  | January                  | February | March | April | May | June | July | August | September | October | November | December | Total |
|--|--------------------------|----------|-------|-------|-----|------|------|--------|-----------|---------|----------|----------|-------|
| <b>General Rates</b>                                 | TRADE SECRET DATA BEGINS |          |       |       |     |      |      |        |           |         |          |          |       |
| Firm Demand (\$)                                     |                          |          |       |       |     |      |      |        |           |         |          |          |       |
| Total Firm Energy (\$)                               |                          |          |       |       |     |      |      |        |           |         |          |          |       |
| Base Cost of Fuel                                    |                          |          |       |       |     |      |      |        |           |         |          |          |       |
| Firm FAC   |                          |          |       |       |     |      |      |        |           |         |          |          |       |
| Customer Chg (\$)                                    |                          |          |       |       |     |      |      |        |           |         |          |          |       |
| EITE Energy Charge Credit (\$)                       |                          |          |       |       |     |      |      |        |           |         |          |          |       |
| Firm Energy (\$)                                     |                          |          |       |       |     |      |      |        |           |         |          |          |       |
| Fixed Price Interruptible Discount Demand (\$)       |                          |          |       |       |     |      |      |        |           |         |          |          |       |
| IPS Energy (\$)                                      |                          |          |       |       |     |      |      |        |           |         |          |          |       |
| Subtotal Revenue                                     |                          |          |       |       |     |      |      |        |           |         |          |          |       |
| <b>Adjustments for Riders Included in Base Rates</b> |                          |          |       |       |     |      |      |        |           |         |          |          |       |
| Boswell 4 Adj (Demand)                               |                          |          |       |       |     |      |      |        |           |         |          |          |       |
| Boswell 4 Adj (Energy)                               |                          |          |       |       |     |      |      |        |           |         |          |          |       |
| Boswell 4 Environmental Adjustment (\$)              |                          |          |       |       |     |      |      |        |           |         |          |          |       |
| Transmission Adj (Demand)                            |                          |          |       |       |     |      |      |        |           |         |          |          |       |
| Transmission Adj (Energy)                            |                          |          |       |       |     |      |      |        |           |         |          |          |       |
| Transmission Adjustment (\$)                         |                          |          |       |       |     |      |      |        |           |         |          |          |       |
| Renewable Resource Adj (Demand)                      |                          |          |       |       |     |      |      |        |           |         |          |          |       |
| Renewable Resource Adj (Energy)                      |                          |          |       |       |     |      |      |        |           |         |          |          |       |
| Renewable Resource Adjustment (\$)                   |                          |          |       |       |     |      |      |        |           |         |          |          |       |
| Excess ADIT Credit                                   |                          |          |       |       |     |      |      |        |           |         |          |          |       |
| Total Adjustments                                    |                          |          |       |       |     |      |      |        |           |         |          |          |       |
| <b>Adjustments for Remaining Riders</b>              |                          |          |       |       |     |      |      |        |           |         |          |          |       |
| Boswell 4 Adj (Demand)                               |                          |          |       |       |     |      |      |        |           |         |          |          |       |
| Boswell 4 Adj (Energy)                               |                          |          |       |       |     |      |      |        |           |         |          |          |       |
| Boswell 4 Environmental Adjustment (\$)              |                          |          |       |       |     |      |      |        |           |         |          |          |       |
| Transmission Adj (Demand)                            |                          |          |       |       |     |      |      |        |           |         |          |          |       |
| Transmission Adj (Energy)                            |                          |          |       |       |     |      |      |        |           |         |          |          |       |
| Transmission Adjustment (\$)                         |                          |          |       |       |     |      |      |        |           |         |          |          |       |
| Renewable Resource Adj (Demand)                      |                          |          |       |       |     |      |      |        |           |         |          |          |       |
| Renewable Resource Adj (Energy)                      |                          |          |       |       |     |      |      |        |           |         |          |          |       |
| Renewable Resource Adjustment (\$)                   |                          |          |       |       |     |      |      |        |           |         |          |          |       |
| Care Surcharge                                       |                          |          |       |       |     |      |      |        |           |         |          |          |       |
| Total Revenues (\$)                                  |                          |          |       |       |     |      |      |        |           |         |          |          |       |
| Interim Rate Adjust-Firm (\$)                        |                          |          |       |       |     |      |      |        |           |         |          |          |       |
| Interim Rate Adjust-Inter. (\$)                      |                          |          |       |       |     |      |      |        |           |         |          |          |       |
| Interim Rate Adjust-Riders (\$)                      |                          |          |       |       |     |      |      |        |           |         |          |          |       |
|  | TRADE SECRET DATA ENDS   |          |       |       |     |      |      |        |           |         |          |          |       |

|                         |                        |          |       |       |     |      |      |        |           |         |          |          |       |
|-------------------------|------------------------|----------|-------|-------|-----|------|------|--------|-----------|---------|----------|----------|-------|
| <b>Fuel Costs Calc:</b> | January                | February | March | April | May | June | July | August | September | October | November | December | TOTAL |
| <b>Fuel Cost Rate</b>   |                        |          |       |       |     |      |      |        |           |         |          |          |       |
| Firm                    |                        |          |       |       |     |      |      |        |           |         |          |          |       |
| Excess                  |                        |          |       |       |     |      |      |        |           |         |          |          |       |
| Economy                 |                        |          |       |       |     |      |      |        |           |         |          |          |       |
| RFPS                    |                        |          |       |       |     |      |      |        |           |         |          |          |       |
| IPS                     |                        |          |       |       |     |      |      |        |           |         |          |          |       |
| <b>Fuel Cost</b>        |                        |          |       |       |     |      |      |        |           |         |          |          |       |
| Firm                    |                        |          |       |       |     |      |      |        |           |         |          |          |       |
| Excess                  |                        |          |       |       |     |      |      |        |           |         |          |          |       |
| Economy                 |                        |          |       |       |     |      |      |        |           |         |          |          |       |
| RFPS                    |                        |          |       |       |     |      |      |        |           |         |          |          |       |
| IPS                     |                        |          |       |       |     |      |      |        |           |         |          |          |       |
|                         | TRADE SECRET DATA ENDS |          |       |       |     |      |      |        |           |         |          |          |       |

MINNESOTA POWER  
COMPARISON OF LARGE POWER OPERATING REVENUES  
PRESENT VS. INTERIM RATES  
TEST YEAR 2020

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United Taconite LLC (Cliffs)

|  | January                  | February | March | April | May | June | July | August | September | October | November | December | Total |
|--|--------------------------|----------|-------|-------|-----|------|------|--------|-----------|---------|----------|----------|-------|
| <u>United Taconite LLC</u>                           | TRADE SECRET DATA BEGINS |          |       |       |     |      |      |        |           |         |          |          |       |
| Nominated Demand (kW)                                |                          |          |       |       |     |      |      |        |           |         |          |          |       |
| Firm Contract Demand (kW)                            |                          |          |       |       |     |      |      |        |           |         |          |          |       |
| RIS Discount (kW)                                    |                          |          |       |       |     |      |      |        |           |         |          |          |       |
| Expected Peak Load Per ESA (kW)                      |                          |          |       |       |     |      |      |        |           |         |          |          |       |
| Firm Energy (MWh)                                    |                          |          |       |       |     |      |      |        |           |         |          |          |       |
| Total Excess Energy (MWh)                            |                          |          |       |       |     |      |      |        |           |         |          |          |       |
| Incremental Production Service (MWh)                 |                          |          |       |       |     |      |      |        |           |         |          |          |       |
| Total Energy (MWh)                                   |                          |          |       |       |     |      |      |        |           |         |          |          |       |
| <u>Present Rates</u>                                 |                          |          |       |       |     |      |      |        |           |         |          |          |       |
| Firm Demand (\$)                                     |                          |          |       |       |     |      |      |        |           |         |          |          |       |
| Firm Energy (\$)                                     |                          |          |       |       |     |      |      |        |           |         |          |          |       |
| Firm FAC   |                          |          |       |       |     |      |      |        |           |         |          |          |       |
| Customer Chg (\$)                                    |                          |          |       |       |     |      |      |        |           |         |          |          |       |
| EITE Energy Charge Credit (\$)                       |                          |          |       |       |     |      |      |        |           |         |          |          |       |
| Firm Energy (\$)                                     |                          |          |       |       |     |      |      |        |           |         |          |          |       |
| Curtailable Credit                                   |                          |          |       |       |     |      |      |        |           |         |          |          |       |
| Excess Energy (\$)                                   |                          |          |       |       |     |      |      |        |           |         |          |          |       |
| IPS Energy (\$)                                      |                          |          |       |       |     |      |      |        |           |         |          |          |       |
| Subtotal Revenue                                     |                          |          |       |       |     |      |      |        |           |         |          |          |       |
| <u>Adjustments for Riders Included in Base Rates</u> |                          |          |       |       |     |      |      |        |           |         |          |          |       |
| Boswell 4 Adj (Demand)                               |                          |          |       |       |     |      |      |        |           |         |          |          |       |
| Boswell 4 Adj (Energy)                               |                          |          |       |       |     |      |      |        |           |         |          |          |       |
| Boswell 4 Environmental Adjustment (\$)              |                          |          |       |       |     |      |      |        |           |         |          |          |       |
| Transmission Adj (Demand)                            |                          |          |       |       |     |      |      |        |           |         |          |          |       |
| Transmission Adj (Energy)                            |                          |          |       |       |     |      |      |        |           |         |          |          |       |
| Transmission Adjustment (\$)                         |                          |          |       |       |     |      |      |        |           |         |          |          |       |
| Renewable Resource Adj (Demand)                      |                          |          |       |       |     |      |      |        |           |         |          |          |       |
| Renewable Resource Adj (Energy)                      |                          |          |       |       |     |      |      |        |           |         |          |          |       |
| Renewable Resource Adjustment (\$)                   |                          |          |       |       |     |      |      |        |           |         |          |          |       |
| Excess ADIT Credit                                   |                          |          |       |       |     |      |      |        |           |         |          |          |       |
| Total Adjustments                                    |                          |          |       |       |     |      |      |        |           |         |          |          |       |
| <u>Adjustments for Remaining Riders</u>              |                          |          |       |       |     |      |      |        |           |         |          |          |       |
| Boswell 4 Adj (Demand)                               |                          |          |       |       |     |      |      |        |           |         |          |          |       |
| Boswell 4 Adj (Energy)                               |                          |          |       |       |     |      |      |        |           |         |          |          |       |
| Boswell 4 Environmental Adjustment (\$)              |                          |          |       |       |     |      |      |        |           |         |          |          |       |
| Transmission Adj (Demand)                            |                          |          |       |       |     |      |      |        |           |         |          |          |       |
| Transmission Adj (Energy)                            |                          |          |       |       |     |      |      |        |           |         |          |          |       |
| Transmission Adjustment (\$)                         |                          |          |       |       |     |      |      |        |           |         |          |          |       |
| Renewable Resource Adj (Demand)                      |                          |          |       |       |     |      |      |        |           |         |          |          |       |
| Renewable Resource Adj (Energy)                      |                          |          |       |       |     |      |      |        |           |         |          |          |       |
| Renewable Resource Adjustment (\$)                   |                          |          |       |       |     |      |      |        |           |         |          |          |       |
| CARE Surcharge                                       |                          |          |       |       |     |      |      |        |           |         |          |          |       |
| Total Revenues (\$)                                  |                          |          |       |       |     |      |      |        |           |         |          |          |       |
|  | TRADE SECRET DATA ENDS   |          |       |       |     |      |      |        |           |         |          |          |       |

PUBLIC DOCUMENT  
TRADE SECRET DATA EXCISED

Minnesota Power  
Docket No. E015/GR-19-442

MINNESOTA POWER  
COMPARISON OF LARGE POWER OPERATING REVENUES  
PRESENT VS. INTERIM RATES  
TEST YEAR 2020

Non-Public Document- All Highlighted Data is Trade Secret Customer Data  
United Taconite LLC (Cliffs)

|   | January                  | February | March | April | May | June | July | August | September | October | November | December | Total |
|---|--------------------------|----------|-------|-------|-----|------|------|--------|-----------|---------|----------|----------|-------|
| <b>General Rates</b>                          | TRADE SECRET DATA BEGINS |          |       |       |     |      |      |        |           |         |          |          |       |
| Firm Demand (\$)                              |                          |          |       |       |     |      |      |        |           |         |          |          |       |
| Total Firm Energy (\$)                        |                          |          |       |       |     |      |      |        |           |         |          |          |       |
| Base Cost of Fuel                             |                          |          |       |       |     |      |      |        |           |         |          |          |       |
| Firm FAC                                      |                          |          |       |       |     |      |      |        |           |         |          |          |       |
| Customer Chg (\$)                             |                          |          |       |       |     |      |      |        |           |         |          |          |       |
| EITE Energy Charge Credit (\$)                |                          |          |       |       |     |      |      |        |           |         |          |          |       |
| Firm Energy (\$)                              |                          |          |       |       |     |      |      |        |           |         |          |          |       |
| Replacement Interruptible Demand Discount(\$) |                          |          |       |       |     |      |      |        |           |         |          |          |       |
| Excess Energy (\$)                            |                          |          |       |       |     |      |      |        |           |         |          |          |       |
| IPS Energy (\$)                               |                          |          |       |       |     |      |      |        |           |         |          |          |       |
| Subtotal Revenue                              |                          |          |       |       |     |      |      |        |           |         |          |          |       |
| Adjustments for Riders Included in Base Rates |                          |          |       |       |     |      |      |        |           |         |          |          |       |
| Boswell 4 Adj (Demand)                        |                          |          |       |       |     |      |      |        |           |         |          |          |       |
| Boswell 4 Adj (Energy)                        |                          |          |       |       |     |      |      |        |           |         |          |          |       |
| Boswell 4 Environmental Adjustment (\$)       |                          |          |       |       |     |      |      |        |           |         |          |          |       |
| Transmission Adj (Demand)                     |                          |          |       |       |     |      |      |        |           |         |          |          |       |
| Transmission Adj (Energy)                     |                          |          |       |       |     |      |      |        |           |         |          |          |       |
| Transmission Adjustment (\$)                  |                          |          |       |       |     |      |      |        |           |         |          |          |       |
| Renewable Resource Adj (Demand)               |                          |          |       |       |     |      |      |        |           |         |          |          |       |
| Renewable Resource Adj (Energy)               |                          |          |       |       |     |      |      |        |           |         |          |          |       |
| Renewable Resource Adjustment (\$)            |                          |          |       |       |     |      |      |        |           |         |          |          |       |
| Excess ADIT Credit                            |                          |          |       |       |     |      |      |        |           |         |          |          |       |
| Total Adjustments                             |                          |          |       |       |     |      |      |        |           |         |          |          |       |
| Adjustments for Remaining Riders              |                          |          |       |       |     |      |      |        |           |         |          |          |       |
| Boswell 4 Adj (Demand)                        |                          |          |       |       |     |      |      |        |           |         |          |          |       |
| Boswell 4 Adj (Energy)                        |                          |          |       |       |     |      |      |        |           |         |          |          |       |
| Boswell 4 Environmental Adjustment (\$)       |                          |          |       |       |     |      |      |        |           |         |          |          |       |
| Transmission Adj (Demand)                     |                          |          |       |       |     |      |      |        |           |         |          |          |       |
| Transmission Adj (Energy)                     |                          |          |       |       |     |      |      |        |           |         |          |          |       |
| Transmission Adjustment (\$)                  |                          |          |       |       |     |      |      |        |           |         |          |          |       |
| Renewable Resource Adj (Demand)               |                          |          |       |       |     |      |      |        |           |         |          |          |       |
| Renewable Resource Adj (Energy)               |                          |          |       |       |     |      |      |        |           |         |          |          |       |
| Renewable Resource Adjustment (\$)            |                          |          |       |       |     |      |      |        |           |         |          |          |       |
| Care Surcharge                                |                          |          |       |       |     |      |      |        |           |         |          |          |       |
| Fuel Adjustment Clause                        |                          |          |       |       |     |      |      |        |           |         |          |          |       |
| Conservation Program Adjustment               |                          |          |       |       |     |      |      |        |           |         |          |          |       |
| Total Revenues (\$)                           |                          |          |       |       |     |      |      |        |           |         |          |          |       |
| Interim Rate Adjust-Firm (\$)                 |                          |          |       |       |     |      |      |        |           |         |          |          |       |
| Interim Rate Adjust-Inter. (\$)               |                          |          |       |       |     |      |      |        |           |         |          |          |       |
| Interim Rate Adjust-Riders (\$)               |                          |          |       |       |     |      |      |        |           |         |          |          |       |
|   | TRADE SECRET DATA ENDS   |          |       |       |     |      |      |        |           |         |          |          |       |

|                         |                        |          |       |       |     |      |      |        |           |         |          |          |       |
|-------------------------|------------------------|----------|-------|-------|-----|------|------|--------|-----------|---------|----------|----------|-------|
| <b>Fuel Costs Calc:</b> | January                | February | March | April | May | June | July | August | September | October | November | December | TOTAL |
| <b>Fuel Cost Rate</b>   |                        |          |       |       |     |      |      |        |           |         |          |          |       |
| Firm                    |                        |          |       |       |     |      |      |        |           |         |          |          |       |
| Excess                  |                        |          |       |       |     |      |      |        |           |         |          |          |       |
| Economy                 |                        |          |       |       |     |      |      |        |           |         |          |          |       |
| RFPS                    |                        |          |       |       |     |      |      |        |           |         |          |          |       |
| IPS                     |                        |          |       |       |     |      |      |        |           |         |          |          |       |
| <b>Fuel Cost</b>        |                        |          |       |       |     |      |      |        |           |         |          |          |       |
| Firm                    |                        |          |       |       |     |      |      |        |           |         |          |          |       |
| Excess                  |                        |          |       |       |     |      |      |        |           |         |          |          |       |
| Economy                 |                        |          |       |       |     |      |      |        |           |         |          |          |       |
| RFPS                    |                        |          |       |       |     |      |      |        |           |         |          |          |       |
| IPS                     |                        |          |       |       |     |      |      |        |           |         |          |          |       |
|                         | TRADE SECRET DATA ENDS |          |       |       |     |      |      |        |           |         |          |          |       |

MINNESOTA POWER  
COMPARISON OF LARGE POWER OPERATING REVENUES  
PRESENT VS. INTERIM RATES  
TEST YEAR 2020

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USS Keewatin & Minntac

|  | January                         | February | March | April | May | June | July | August | September | October | November | December | Total |
|--|---------------------------------|----------|-------|-------|-----|------|------|--------|-----------|---------|----------|----------|-------|
| <b>USS Keewatin &amp; Minntac</b>                    | <b>TRADE SECRET DATA BEGINS</b> |          |       |       |     |      |      |        |           |         |          |          |       |
| Nominated Demand (kW)                                |                                 |          |       |       |     |      |      |        |           |         |          |          |       |
| Firm Contract Demand (kW)                            |                                 |          |       |       |     |      |      |        |           |         |          |          |       |
| RIS Discount (kW)                                    |                                 |          |       |       |     |      |      |        |           |         |          |          |       |
| Expected Peak Load Per ESA (kW)                      |                                 |          |       |       |     |      |      |        |           |         |          |          |       |
| Firm Energy (MWh)                                    |                                 |          |       |       |     |      |      |        |           |         |          |          |       |
| Total Excess Energy (MWh)                            |                                 |          |       |       |     |      |      |        |           |         |          |          |       |
| Incremental Production Service (MWh)                 |                                 |          |       |       |     |      |      |        |           |         |          |          |       |
| Total Energy (MWh)                                   |                                 |          |       |       |     |      |      |        |           |         |          |          |       |
| <b>Present Rates</b>                                 |                                 |          |       |       |     |      |      |        |           |         |          |          |       |
| Firm Demand (\$)                                     |                                 |          |       |       |     |      |      |        |           |         |          |          |       |
| Firm Energy (\$)                                     |                                 |          |       |       |     |      |      |        |           |         |          |          |       |
| Firm FAC   |                                 |          |       |       |     |      |      |        |           |         |          |          |       |
| Customer Chg (\$)                                    |                                 |          |       |       |     |      |      |        |           |         |          |          |       |
| EITE Energy Charge Credit (\$)                       |                                 |          |       |       |     |      |      |        |           |         |          |          |       |
| Firm Energy (\$)                                     |                                 |          |       |       |     |      |      |        |           |         |          |          |       |
| Replace & Fixed Price Int Discount (\$)              |                                 |          |       |       |     |      |      |        |           |         |          |          |       |
| ESA Demand Charge Credit                             |                                 |          |       |       |     |      |      |        |           |         |          |          |       |
| Excess Energy (\$)                                   |                                 |          |       |       |     |      |      |        |           |         |          |          |       |
| IPS Energy (\$)                                      |                                 |          |       |       |     |      |      |        |           |         |          |          |       |
| Subtotal Revenue                                     |                                 |          |       |       |     |      |      |        |           |         |          |          |       |
| <b>Adjustments for Riders Included in Base Rates</b> |                                 |          |       |       |     |      |      |        |           |         |          |          |       |
| Boswell 4 Adj (Demand)                               |                                 |          |       |       |     |      |      |        |           |         |          |          |       |
| Boswell 4 Adj (Energy)                               |                                 |          |       |       |     |      |      |        |           |         |          |          |       |
| Boswell 4 Environmental Adjustment (\$)              |                                 |          |       |       |     |      |      |        |           |         |          |          |       |
| Transmission Adj (Demand)                            |                                 |          |       |       |     |      |      |        |           |         |          |          |       |
| Transmission Adj (Energy)                            |                                 |          |       |       |     |      |      |        |           |         |          |          |       |
| Transmission Adjustment (\$)                         |                                 |          |       |       |     |      |      |        |           |         |          |          |       |
| Renewable Resource Adj (Demand)                      |                                 |          |       |       |     |      |      |        |           |         |          |          |       |
| Renewable Resource Adj (Energy)                      |                                 |          |       |       |     |      |      |        |           |         |          |          |       |
| Renewable Resource Adjustment (\$)                   |                                 |          |       |       |     |      |      |        |           |         |          |          |       |
| Excess ADIT Credit                                   |                                 |          |       |       |     |      |      |        |           |         |          |          |       |
| Total Adjustments                                    |                                 |          |       |       |     |      |      |        |           |         |          |          |       |
| <b>Adjustments for Remaining Riders</b>              |                                 |          |       |       |     |      |      |        |           |         |          |          |       |
| Boswell 4 Adj (Demand)                               |                                 |          |       |       |     |      |      |        |           |         |          |          |       |
| Boswell 4 Adj (Energy)                               |                                 |          |       |       |     |      |      |        |           |         |          |          |       |
| Boswell 4 Environmental Adjustment (\$)              |                                 |          |       |       |     |      |      |        |           |         |          |          |       |
| Transmission Adj (Demand)                            |                                 |          |       |       |     |      |      |        |           |         |          |          |       |
| Transmission Adj (Energy)                            |                                 |          |       |       |     |      |      |        |           |         |          |          |       |
| Transmission Adjustment (\$)                         |                                 |          |       |       |     |      |      |        |           |         |          |          |       |
| Renewable Resource Adj (Demand)                      |                                 |          |       |       |     |      |      |        |           |         |          |          |       |
| Renewable Resource Adj (Energy)                      |                                 |          |       |       |     |      |      |        |           |         |          |          |       |
| Renewable Resource Adjustment (\$)                   |                                 |          |       |       |     |      |      |        |           |         |          |          |       |
| CARE Surcharge                                       |                                 |          |       |       |     |      |      |        |           |         |          |          |       |
| Total Revenues (\$)                                  |                                 |          |       |       |     |      |      |        |           |         |          |          |       |
|  | <b>TRADE SECRET DATA ENDS</b>   |          |       |       |     |      |      |        |           |         |          |          |       |

Non-Public Document- All Highlighted Data is Trade Secret Customer Data  
USS Keewatin & Minntac

|   | January                  | February | March | April | May | June | July | August | September | October | November | December | Total |
|---|--------------------------|----------|-------|-------|-----|------|------|--------|-----------|---------|----------|----------|-------|
| General Rates                                 | TRADE SECRET DATA BEGINS |          |       |       |     |      |      |        |           |         |          |          |       |
| Firm Demand (\$)                              |                          |          |       |       |     |      |      |        |           |         |          |          |       |
| Total Firm Energy (\$)                        |                          |          |       |       |     |      |      |        |           |         |          |          |       |
| Base Cost of Fuel                             |                          |          |       |       |     |      |      |        |           |         |          |          |       |
| Firm FAC                                      |                          |          |       |       |     |      |      |        |           |         |          |          |       |
| Customer Chg (\$)                             |                          |          |       |       |     |      |      |        |           |         |          |          |       |
| EITE Energy Charge Credit (\$)                |                          |          |       |       |     |      |      |        |           |         |          |          |       |
| Firm Energy (\$)                              |                          |          |       |       |     |      |      |        |           |         |          |          |       |
| Replace & Fixed Price Int Discount (\$)       |                          |          |       |       |     |      |      |        |           |         |          |          |       |
| ESA Demand Charge Credit                      |                          |          |       |       |     |      |      |        |           |         |          |          |       |
| Replace Capacity Premium (\$)                 |                          |          |       |       |     |      |      |        |           |         |          |          |       |
| Excess Energy (\$)                            |                          |          |       |       |     |      |      |        |           |         |          |          |       |
| IPS Energy (\$)                               |                          |          |       |       |     |      |      |        |           |         |          |          |       |
| Subtotal Revenue                              |                          |          |       |       |     |      |      |        |           |         |          |          |       |
| Adjustments for Riders Included in Base Rates |                          |          |       |       |     |      |      |        |           |         |          |          |       |
| Boswell 4 Adj (Demand)                        |                          |          |       |       |     |      |      |        |           |         |          |          |       |
| Boswell 4 Adj (Energy)                        |                          |          |       |       |     |      |      |        |           |         |          |          |       |
| Boswell 4 Environmental Adjustment (\$)       |                          |          |       |       |     |      |      |        |           |         |          |          |       |
| Transmission Adj (Demand)                     |                          |          |       |       |     |      |      |        |           |         |          |          |       |
| Transmission Adj (Energy)                     |                          |          |       |       |     |      |      |        |           |         |          |          |       |
| Transmission Adjustment (\$)                  |                          |          |       |       |     |      |      |        |           |         |          |          |       |
| Renewable Resource Adj (Demand)               |                          |          |       |       |     |      |      |        |           |         |          |          |       |
| Renewable Resource Adj (Energy)               |                          |          |       |       |     |      |      |        |           |         |          |          |       |
| Renewable Resource Adjustment (\$)            |                          |          |       |       |     |      |      |        |           |         |          |          |       |
| Excess ADIT Credit                            |                          |          |       |       |     |      |      |        |           |         |          |          |       |
| Total Adjustments                             |                          |          |       |       |     |      |      |        |           |         |          |          |       |
| Adjustments for Remaining Riders              |                          |          |       |       |     |      |      |        |           |         |          |          |       |
| Boswell 4 Adj (Demand)                        |                          |          |       |       |     |      |      |        |           |         |          |          |       |
| Boswell 4 Adj (Energy)                        |                          |          |       |       |     |      |      |        |           |         |          |          |       |
| Boswell 4 Environmental Adjustment (\$)       |                          |          |       |       |     |      |      |        |           |         |          |          |       |
| Transmission Adj (Demand)                     |                          |          |       |       |     |      |      |        |           |         |          |          |       |
| Transmission Adj (Energy)                     |                          |          |       |       |     |      |      |        |           |         |          |          |       |
| Transmission Adjustment (\$)                  |                          |          |       |       |     |      |      |        |           |         |          |          |       |
| Renewable Resource Adj (Demand)               |                          |          |       |       |     |      |      |        |           |         |          |          |       |
| Renewable Resource Adj (Energy)               |                          |          |       |       |     |      |      |        |           |         |          |          |       |
| Renewable Resource Adjustment (\$)            |                          |          |       |       |     |      |      |        |           |         |          |          |       |
| Care Surcharge                                |                          |          |       |       |     |      |      |        |           |         |          |          |       |
| Fuel Adjustment Clause                        |                          |          |       |       |     |      |      |        |           |         |          |          |       |
| Conservation Program Adjustment               |                          |          |       |       |     |      |      |        |           |         |          |          |       |
| Total Revenues (\$)                           |                          |          |       |       |     |      |      |        |           |         |          |          |       |
| Interim Rate Adjust-Firm (\$)                 |                          |          |       |       |     |      |      |        |           |         |          |          |       |
| Interim Rate Adjust-Inter. (\$)               |                          |          |       |       |     |      |      |        |           |         |          |          |       |
| Interim Rate Adjust-Riders (\$)               |                          |          |       |       |     |      |      |        |           |         |          |          |       |
|   | TRADE SECRET DATA ENDS   |          |       |       |     |      |      |        |           |         |          |          |       |

|                  |                          |          |       |       |     |      |      |        |           |         |          |          |       |
|------------------|--------------------------|----------|-------|-------|-----|------|------|--------|-----------|---------|----------|----------|-------|
| Fuel Costs Calc: | January                  | February | March | April | May | June | July | August | September | October | November | December | TOTAL |
| Fuel Cost Rate   | TRADE SECRET DATA BEGINS |          |       |       |     |      |      |        |           |         |          |          |       |
| Firm             |                          |          |       |       |     |      |      |        |           |         |          |          |       |
| Excess           |                          |          |       |       |     |      |      |        |           |         |          |          |       |
| Economy          |                          |          |       |       |     |      |      |        |           |         |          |          |       |
| RFPS             |                          |          |       |       |     |      |      |        |           |         |          |          |       |
| IPS              |                          |          |       |       |     |      |      |        |           |         |          |          |       |
| Fuel Cost        |                          |          |       |       |     |      |      |        |           |         |          |          |       |
| Firm             |                          |          |       |       |     |      |      |        |           |         |          |          |       |
| Excess           |                          |          |       |       |     |      |      |        |           |         |          |          |       |
| Economy          |                          |          |       |       |     |      |      |        |           |         |          |          |       |
| RFPS             |                          |          |       |       |     |      |      |        |           |         |          |          |       |
| IPS              |                          |          |       |       |     |      |      |        |           |         |          |          |       |
|                  | TRADE SECRET DATA ENDS   |          |       |       |     |      |      |        |           |         |          |          |       |

**PUBLIC DOCUMENT**  
**TRADE SECRET DATA EXCISED**

Minnesota Power  
Docket No. E015/19-442

Volume 4  
IR-02, Sales Forecast, Revenue, and Rate Design Data  
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Minnesota Power  
Test Year 2020  
Workpaper IR-2

The following pages contain the energy and customer count projections for the 2020 test year that were derived from the 2018 Annual Forecast Report (AFR). This information matches the sales forecast information that was pre-filed in this docket on September 27, 2019.

The Rate Class detail (Dual Fuel and Miscellaneous Industrial) are necessary for Minnesota Power Budgeting, and are produced in parallel with the AFR Revenue Class projections. These outlooks are produced using the same econometric process as all AFR forecasts.



**Minnesota Power**  
**TEST YEAR 2020**

**Budget Forecast Energy Sales and Customer Count by Class**

| <b>Energy Sales (MWh)</b> |              | <b>Residential</b> |                  | <b>Commercial</b> |                  | <b>Other Public</b> | <b>Street</b>   | <b>Miscellaneous</b> |
|---------------------------|--------------|--------------------|------------------|-------------------|------------------|---------------------|-----------------|----------------------|
| <b>Year</b>               | <b>Month</b> | <b>Residential</b> | <b>Dual Fuel</b> | <b>Commercial</b> | <b>Dual Fuel</b> | <b>Authorities</b>  | <b>Lighting</b> | <b>Industrial</b>    |
| 2020                      | Jan          | 125,695            | 18,427           | 110,831           | 3,502            | 3,930               | 1,705           | 5,754                |
| 2020                      | Feb          | 100,405            | 18,861           | 108,523           | 3,469            | 3,886               | 1,439           | 5,375                |
| 2020                      | Mar          | 100,917            | 15,032           | 110,750           | 3,182            | 4,086               | 1,318           | 5,746                |
| 2020                      | Apr          | 75,011             | 11,208           | 90,887            | 2,595            | 3,882               | 1,119           | 5,585                |
| 2020                      | May          | 66,872             | 6,093            | 95,921            | 1,619            | 3,683               | 969             | 5,763                |
| 2020                      | Jun          | 63,527             | 3,952            | 102,290           | 1,338            | 3,887               | 835             | 5,570                |
| 2020                      | Jul          | 84,555             | 1,533            | 110,741           | 1,791            | 4,286               | 887             | 5,750                |
| 2020                      | Aug          | 81,879             | 983              | 114,725           | 1,790            | 4,157               | 1,004           | 5,738                |
| 2020                      | Sep          | 69,203             | 957              | 106,663           | 1,880            | 3,896               | 1,209           | 5,544                |
| 2020                      | Oct          | 67,133             | 2,154            | 97,171            | 1,478            | 4,031               | 1,357           | 5,701                |
| 2020                      | Nov          | 92,554             | 6,053            | 97,697            | 2,095            | 3,672               | 1,479           | 5,533                |
| 2020                      | Dec          | 121,566            | 12,636           | 115,099           | 2,592            | 4,215               | 1,620           | 5,723                |
| <b>Annual Total</b>       |              | 1,049,317          | 97,889           | 1,261,298         | 27,331           | 47,611              | 14,941          | 67,782               |

| <b>Customer Count</b> |              | <b>Residential</b> |                  | <b>Commercial</b> |                  | <b>Other Public</b> | <b>Street</b>   | <b>Miscellaneous</b> |
|-----------------------|--------------|--------------------|------------------|-------------------|------------------|---------------------|-----------------|----------------------|
| <b>Year</b>           | <b>Month</b> | <b>Residential</b> | <b>Dual Fuel</b> | <b>Commercial</b> | <b>Dual Fuel</b> | <b>Authorities</b>  | <b>Lighting</b> | <b>Industrial</b>    |
| 2020                  | Jan          | 122,670            | 7,654            | 23,070            | 537              | 282                 | 705             | 296                  |
| 2020                  | Feb          | 122,684            | 7,652            | 23,085            | 537              | 283                 | 705             | 296                  |
| 2020                  | Mar          | 122,698            | 7,654            | 23,101            | 537              | 283                 | 705             | 295                  |
| 2020                  | Apr          | 122,715            | 7,666            | 23,115            | 538              | 283                 | 706             | 295                  |
| 2020                  | May          | 122,731            | 7,671            | 23,131            | 537              | 283                 | 706             | 294                  |
| 2020                  | Jun          | 122,745            | 7,675            | 23,146            | 537              | 283                 | 706             | 293                  |
| 2020                  | Jul          | 122,759            | 7,680            | 23,164            | 537              | 282                 | 707             | 293                  |
| 2020                  | Aug          | 122,773            | 7,683            | 23,180            | 537              | 282                 | 707             | 292                  |
| 2020                  | Sep          | 122,788            | 7,687            | 23,195            | 537              | 282                 | 707             | 292                  |
| 2020                  | Oct          | 122,801            | 7,692            | 23,209            | 537              | 282                 | 707             | 292                  |
| 2020                  | Nov          | 122,816            | 7,697            | 23,224            | 537              | 282                 | 708             | 291                  |
| 2020                  | Dec          | 122,831            | 7,698            | 23,238            | 537              | 282                 | 708             | 291                  |
| <b>Annual Total</b>   |              | 122,751            | 7,676            | 23,155            | 537              | 282                 | 706             | 293                  |

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MINNESOTA POWER  
TEST YEAR 2020  
Frequency Distribution

Frequency distribution percentages are derived from actual 2018 annual sales data from the Customer Information System (CIS) to convert the sales forecast from "Revenue Classes" to "Rate Classes" and to get the breakdown for the various components (energy blocks and demand blocks) of each rate.

## Minnesota Power

Minnesota Power Docket No. E015/GR-19-442

## Frequency Distribution Ratios

2020 Unadjusted Test Year (based on 2018 actual customer data)

|          |                          | Total      |         |         |             | Rate 25D | Rate 25N | Rate 75H | Rate 75L | Total<br>Other and Public<br>Authorities | Rate 25D | Rate 25N | Rate 27 | Rate 75F | Rate 75H | Rate 75L | Rate 75S | Total<br>Commercial | Rate 25D | Rate 25N | Rate 75H | Rate 75L | Rate 74 | Total<br>Industrial<br>Miscellaneous |
|----------|--------------------------|------------|---------|---------|-------------|----------|----------|----------|----------|--|----------|----------|---------|----------|----------|----------|----------|---------------------|----------|----------|----------|----------|---------|--------------------------------------|
|          |                          | Rate 20,22 | Rate 23 | Rate 24 | Residential |          |          |          |          |  |          |          |         |          |          |          |          |                     |          |          |          |          |         |                                      |
| January  | % of Customers           | 96.94%     | 2.78%   | 0.3%    | 100%        | 54.270%  | 41.640%  | 1.49%    | 2.60%    | 100.00%                                  | 36.55%   | 61.34%   | 0.28%   | 0.00%    | 0.13%    | 1.49%    | 0.21%    | 100%                | 54.75%   | 33.78%   | 2.62%    | 8.85%    | 0.00%   | 100%                                 |
|          | % of MWh                 | 98.32%     | 0.81%   | 0.9%    | 100%        | 29.030%  | 1.110%   | 55.88%   | 13.98%   | 100.00%                                  | 48.51%   | 5.98%    | 0.15%   | 0.00%    | 10.64%   | 31.37%   | 3.35%    | 100%                | 25.96%   | 0.82%    | 26.71%   | 46.51%   | 0.00%   | 100%                                 |
|          | % Energy Block 1         | 39.11%     |         |         |             |          |          |          |          |  |          |          |         |          |          |          |          |                     |          |          |          |          |         |                                      |
|          | % Energy Block 2         | 26.01%     |         |         |             |          |          |          |          |  |          |          |         |          |          |          |          |                     |          |          |          |          |         |                                      |
|          | % Energy Block 3         | 13.96%     |         |         |             |          |          |          |          |  |          |          |         |          |          |          |          |                     |          |          |          |          |         |                                      |
|          | % Energy Block 4         | 20.92%     |         |         |             |          |          |          |          |  |          |          |         |          |          |          |          |                     |          |          |          |          |         |                                      |
|          | % Energy Block 5         | 0.00%      |         |         |             |          |          |          |          |  |          |          |         |          |          |          |          |                     |          |          |          |          |         |                                      |
|          | Demand Meter Load Factor |            |         |         |             | 38.570%  | 0.000%   | 65.32%   | 57.69%   |  | 40.46%   | 0.00%    | 0.00%   | 0.00%    | 62.15%   | 63.05%   | 44.87%   |                     | 31.63%   | 0.00%    | 32.56%   | 49.20%   | 0.00%   |                                      |
|          | High Voltage kW          |            |         |         |             | 0.000%   | 0.000%   | 100.00%  | 14.63%   |  | 3.32%    | 0.00%    | 0.00%   | 0.00%    | 100.00%  | 0.00%    | 4.23%    |                     | 6.62%    | 0.00%    | 100.00%  | 0.00%    | 0.00%   |                                      |
|          | % Demand Block 1         |            |         |         |             |          |          | 7.55%    | 46.84%   | 100.00%                                  |          |          |         |          | 10.98%   | 40.31%   | 19.86%   |                     |          |          | 9.10%    | 29.68%   |         |                                      |
|          | % Demand Block 2         |            |         |         |             |          |          | 92.45%   | 53.36%   | 100.00%                                  |          |          |         |          | 89.02%   | 59.69%   | 18.71%   |                     |          |          | 90.90%   | 70.32%   |         |                                      |
|          | % Demand Block 3         |            |         |         |             |          |          | N/A      | N/A      |  |          |          |         |          | N/A      | N/A      | 61.43%   |                     |          |          | N/A      | N/A      |         |                                      |
| February | % of Customers           | 96.92%     | 2.80%   | 0.3%    | 100%        | 53.360%  | 42.540%  | 1.49%    | 2.61%    | 100.00%                                  | 35.76%   | 62.12%   | 0.29%   | 0.00%    | 0.13%    | 1.49%    | 0.21%    | 100%                | 53.20%   | 34.68%   | 2.69%    | 9.43%    | 0.00%   | 100%                                 |
|          | % of MWh                 | 98.29%     | 0.85%   | 0.9%    | 100%        | 29.520%  | 1.223%   | 54.63%   | 14.63%   | 100.00%                                  | 48.69%   | 6.02%    | 0.15%   | 0.00%    | 7.55%    | 34.20%   | 3.39%    | 100%                | 25.51%   | 0.84%    | 25.73%   | 47.92%   | 0.00%   | 100%                                 |
|          | % Energy Block 1         | 41.04%     |         |         |             |          |          |          |          |  |          |          |         |          |          |          |          |                     |          |          |          |          |         |                                      |
|          | % Energy Block 2         | 25.91%     |         |         |             |          |          |          |          |  |          |          |         |          |          |          |          |                     |          |          |          |          |         |                                      |
|          | % Energy Block 3         | 13.29%     |         |         |             |          |          |          |          |  |          |          |         |          |          |          |          |                     |          |          |          |          |         |                                      |
|          | % Energy Block 4         | 19.76%     |         |         |             |          |          |          |          |  |          |          |         |          |          |          |          |                     |          |          |          |          |         |                                      |
|          | % Energy Block 5         | 0.00%      |         |         |             |          |          |          |          |  |          |          |         |          |          |          |          |                     |          |          |          |          |         |                                      |
|          | Demand Meter Load Factor |            |         |         |             | 39.990%  | 0.000%   | 71.55%   | 59.23%   |  | 42.48%   | 0.00%    | 0.00%   | 0.00%    | 59.21%   | 66.44%   | 47.91%   |                     | 33.70%   | 0.00%    | 34.01%   | 53.19%   | 0.00%   |                                      |
|          | High Voltage kW          |            |         |         |             | 0.000%   | 0.000%   | 100.00%  | 0.00%    |  | 3.01%    | 0.00%    | 0.00%   | 0.00%    | 100.00%  | 0.00%    | 4.24%    |                     | 5.95%    | 0.00%    | 100.00%  | 0.00%    | 0.00%   |                                      |
|          | % Demand Block 1         |            |         |         |             |          |          | 8.62%    | 46.84%   | 100.00%                                  |          |          |         |          | 13.66%   | 37.46%   | 20.19%   |                     |          |          | 8.44%    | 30.45%   |         |                                      |
|          | % Demand Block 2         |            |         |         |             |          |          | 91.38%   | 53.36%   | 100.00%                                  |          |          |         |          | 86.34%   | 62.54%   | 18.98%   |                     |          |          | 91.56%   | 69.55%   |         |                                      |
|          | % Demand Block 3         |            |         |         |             |          |          | N/A      | N/A      |  |          |          |         |          | N/A      | N/A      | 60.83%   |                     |          |          | N/A      | N/A      |         |                                      |
| March    | % of Customers           | 96.94%     | 2.78%   | 0.3%    | 100%        | 52.380%  | 43.590%  | 1.47%    | 2.56%    | 100.00%                                  | 35.63%   | 62.27%   | 0.27%   | 0.00%    | 0.12%    | 1.51%    | 0.20%    | 100%                | 54.13%   | 33.99%   | 2.64%    | 9.24%    | 0.00%   | 100%                                 |
|          | % of MWh                 | 98.40%     | 0.83%   | 0.8%    | 100%        | 29.050%  | 1.170%   | 55.63%   | 14.15%   | 100.00%                                  | 48.45%   | 5.78%    | 0.10%   | 0.00%    | 7.73%    | 34.65%   | 3.29%    | 100%                | 26.04%   | 0.91%    | 19.62%   | 54.43%   | 0.00%   | 101%                                 |
|          | % Energy Block 1         | 46.13%     |         |         |             |          |          |          |          |  |          |          |         |          |          |          |          |                     |          |          |          |          |         |                                      |
|          | % Energy Block 2         | 26.17%     |         |         |             |          |          |          |          |  |          |          |         |          |          |          |          |                     |          |          |          |          |         |                                      |
|          | % Energy Block 3         | 12.05%     |         |         |             |          |          |          |          |  |          |          |         |          |          |          |          |                     |          |          |          |          |         |                                      |
|          | % Energy Block 4         | 15.65%     |         |         |             |          |          |          |          |  |          |          |         |          |          |          |          |                     |          |          |          |          |         |                                      |
|          | % Energy Block 5         |            |         |         |             |          |          |          |          |  |          |          |         |          |          |          |          |                     |          |          |          |          |         |                                      |
|          | Demand Meter Load Factor |            |         |         |             | 37.240%  | 0.000%   | 66.41%   | 56.34%   |  | 39.10%   | 0.00%    | 0.00%   | 0.00%    | 54.76%   | 60.68%   | 41.94%   |                     | 30.56%   | 0.00%    | 24.11%   | 51.93%   | 0.00%   |                                      |
|          | High Voltage kW          |            |         |         |             | 0.000%   | 0.000%   | 100.00%  | 0.00%    |  | 3.08%    | 0.00%    | 0.00%   | 0.00%    | 100.00%  | 0.00%    | 4.22%    |                     | 6.31%    | 0.00%    | 100.00%  | 0.00%    | 0.00%   |                                      |
|          | % Demand Block 1         |            |         |         |             |          |          | 7.90%    | 46.11%   | 100.00%                                  |          |          |         |          | 13.78%   | 38.26%   | 20.34%   |                     |          |          | 8.76%    | 30.32%   |         |                                      |
|          | % Demand Block 2         |            |         |         |             |          |          | 92.10%   | 53.89%   | 100.00%                                  |          |          |         |          | 86.22%   | 61.74%   | 18.62%   |                     |          |          | 91.24%   | 69.68%   |         |                                      |
|          | % Demand Block 3         |            |         |         |             |          |          | N/A      | N/A      |  |          |          |         |          | N/A      | N/A      | 61.04%   |                     |          |          | N/A      | N/A      |         |                                      |
| April    | % of Customers           | 96.93%     | 2.79%   | 0.3%    | 100%        | 52.000%  | 44.000%  | 1.45%    | 2.55%    | 100.00%                                  | 35.85%   | 62.02%   | 0.28%   | 0.00%    | 0.13%    | 1.51%    | 0.21%    | 100%                | 52.73%   | 34.69%   | 2.72%    | 9.86%    | 0.00%   | 100%                                 |
|          | % of MWh                 | 98.58%     | 0.76%   | 0.7%    | 100%        | 28.890%  | 1.230%   | 56.75%   | 13.13%   | 100.00%                                  | 47.72%   | 5.38%    | 0.09%   | 0.00%    | 7.48%    | 35.88%   | 3.45%    | 100%                | 26.31%   | 0.86%    | 16.35%   | 56.48%   | 0.00%   | 100%                                 |
|          | % Energy Block 1         | 47.80%     |         |         |             |          |          |          |          |  |          |          |         |          |          |          |          |                     |          |          |          |          |         |                                      |
|          | % Energy Block 2         | 26.91%     |         |         |             |          |          |          |          |  |          |          |         |          |          |          |          |                     |          |          |          |          |         |                                      |
|          | % Energy Block 3         | 11.90%     |         |         |             |          |          |          |          |  |          |          |         |          |          |          |          |                     |          |          |          |          |         |                                      |
|          | % Energy Block 4         | 13.36%     |         |         |             |          |          |          |          |  |          |          |         |          |          |          |          |                     |          |          |          |          |         |                                      |
|          | % Energy Block 5         |            |         |         |             |          |          |          |          |  |          |          |         |          |          |          |          |                     |          |          |          |          |         |                                      |
|          | Demand Meter Load Factor |            |         |         |             | 35.420%  | 0.000%   | 64.16%   | 52.84%   |  | 39.14%   | 0.00%    | 0.00%   | 0.00%    | 57.70%   | 62.91%   | 44.17%   |                     | 30.22%   | 0.00%    | 18.92%   | 50.77%   | 0.00%   |                                      |
|          | High Voltage kW          |            |         |         |             | 0.000%   | 0.000%   | 100.00%  | 0.00%    |  | 3.28%    | 0.00%    | 0.00%   | 0.00%    | 100.00%  | 0.00%    | 4.01%    |                     | 5.90%    | 0.00%    | 100.00%  | 0.00%    | 0.00%   |                                      |
|          | % Demand Block 1         |            |         |         |             |          |          | 7.88%    | 49.05%   | 100.00%                                  |          |          |         |          | 15.01%   | 37.81%   | 20.40%   |                     |          |          | 9.80%    | 30.68%   |         |                                      |
|          | % Demand Block 2         |            |         |         |             |          |          | 92.12%   | 50.95%   | 100.00%                                  |          |          |         |          | 84.99%   | 62.19%   | 19.41%   |                     |          |          | 90.20%   | 69.32%   |         |                                      |
|          | % Demand Block 3         |            |         |         |             |          |          | N/A      | N/A      |  |          |          |         |          | N/A      | N/A      | 60.19%   |                     |          |          | N/A      | N/A      |         |                                      |
| May      | % of Customers           | 96.94%     | 2.78%   | 0.3%    | 100%        | 51.810%  | 44.200%  | 1.45%    | 2.54%    | 100.00%                                  | 35.94%   | 61.93%   | 0.28%   | 0.00%    | 0.12%    | 1.53%    | 0.20%    | 100%                | 53.26%   | 35.40%   | 2.06%    | 9.28%    | 0.00%   | 100%                                 |
|          | % of MWh                 | 98.77%     | 0.77%   | 0.5%    | 100%        | 31.400%  | 1.320%   | 52.49%   | 14.79%   | 100.00%                                  | 47.24%   | 4.96%    | 0.40%   | 0.00%    | 7.52%    | 36.63%   | 3.61%    | 100%                | 27.59%   | 0.74%    | 11.36%   | 60.30%   | 0.00%   | 100%                                 |
|          | % Energy Block 1         | 54.61%     |         |         |             |          |          |          |          |  |          |          |         |          |          |          |          |                     |          |          |          |          |         |                                      |
|          | % Energy Block 2         | 26.88%     |         |         |             |          |          |          |          |  |          |          |         |          |          |          |          |                     |          |          |          |          |         |                                      |
|          | % Energy Block 3         | 9.92%      |         |         |             |          |          |          |          |  |          |          |         |          |          |          |          |                     |          |          |          |          |         |                                      |
|          | % Energy Block 4         | 8.59%      |         |         |             |          |          |          |          |  |          |          |         |          |          |          |          |                     |          |          |          |          |         |                                      |
|          | % Energy Block 5         |            |         |         |             |          |          |          |          |  |          |          |         |          |          |          |          |                     |          |          |          |          |         |                                      |
|          | Demand Meter Load Factor |            |         |         |             | 35.340%  | 0.000%   | 54.65%   | 56.80%   |  | 35.33%   | 0.00%    | 0.00%   | 0.00%    | 55.15%   | 59.81%   | 39.95%   |                     | 28.26%   | 0.00%    | 21.22%   | 49.08%   | 0.00%   |                                      |
|          | High Voltage kW          |            |         |         |             | 0.000%   | 0.000%   | 100.00%  | 0.00%    |  | 3.35%    | 0.00%    | 0.00%   | 0.00%    | 100.00%  | 0.00%    | 3.76%    |                     | 6.53%    | 0.00%    | 100.00%  | 0.00%    | 0.00%   |                                      |
|          | % Demand Block 1         |            |         |         |             |          |          | 7.90%    | 50.80%   | 100.00%                                  |          |          |         |          | 14.84%   | 37.84%   | 17.91%   |                     |          |          | 12.82%   | 29.65%   |         |                                      |
|          | % Demand Block 2         |            |         |         |             |          |          | 92.10%   | 49.20%   | 100.00%                                  |          |          |         |          | 85.16%   | 62.16%   | 16.12%   |                     |          |          | 87.18%   | 70.35%   |         |                                      |
|          | % Demand Block 3         |            |         |         |             |          |          | N/A      | N/A      |  |          |          |         |          | N/A      | N/A      | 65.97%   |                     |          |          | N/A      | N/A      |         |                                      |
| June     | % of Customers           | 96.94%     | 2.77%   | 0.3%    | 100%        | 52.790%  | 43.141%  | 1.49%    | 2.60%    | 100.02%                                  | 35.69%   | 62.17%   | 0.28%   | 0.00%    | 0.13%    | 1.52%    | 0.21%    | 100%                | 51.72%   | 36.21%   | 2.41%    | 9.66%    | 0.00%   | 100%                                 |
|          | % of MWh                 | 98.64%     | 1.23%   | 0.1%    | 100%        | 28.450%  | 1.240%   | 57.13%   | 13.18%   | 100.00%                                  | 46.78%   | 4.39%    | 0.02%   | 0.00%    | 7.06%    | 38.04%   | 3.71%    | 100%                | 24.83%   | 0.62%    | 12.43%   | 62.12%   | 0.00%   | 100%                                 |
|          | % Energy Block 1         | 54.96%     |         |         |             |          |          |          |          |  |          |          |         |          |          |          |          |                     |          |          |          |          |         |                                      |
|          | % Energy Block 2         | 27.73%     |         |         |             |          |          |          |          |  |          |          |         |          |          |          |          |                     |          |          |          |          |         |                                      |
|          | % Energy Block 3         | 9.89%      |         |         |             |          |          |          |          |  |          |          |         |          |          |          |          |                     |          |          |          |          |         |                                      |
|          | % Energy Block 4         | 7.42%      |         |         |             |          |          |          |          |  |          |          |         |          |          |          |          |                     |          |          |          |          |         |                                      |
|          | % Energy Block 5         |            |         |         |             |          |          |          |          |  |          |          |         |          |          |          |          |                     |          |          |          |          |         |                                      |
|          | Demand Meter Load Factor |            |         |         |             | 31.130%  | 0.000%   | 57.53%   | 53.92%   |  | 32.92%   | 0.00%    | 0.00%   | 0.00%    | 52.44%   | 59.11%   | 35.92%   |                     | 24.11%   | 0.00%    | 13.54%   | 47.83%   | 0.00%   |                                      |
|          | High Voltage kW          |            |         |         |             | 0.000%   | 0.000%   | 100.00%  | 0.00%    |  | 3.28%    | 0.00%    | 0.00%   | 0.00%    | 100.00%  | 0.00%    | 2.63%    |                     | 11.22%   | 0.00%    | 100.00%  | 0.00%    | 0.00%   |                                      |
|          | % Demand Block 1         |            |         |         |             |          |          | 7.20%    | 50.95%   | 100.00%                                  |          |          |         |          | 14.50%   | 34.98%   | 15.51%   |                     |          |          | 8.88%    | 28.99%   |         |                                      |
|          |                          |            |         |         |             |          |          |          |          |  |          |          |         |          |          |          |          |                     |          |          |          |          |         |                                      |

## Minnesota Power

Minnesota Power Docket No. E015/GR-19-442

## Frequency Distribution Ratios

2020 Unadjusted Test Year (based on 2018 actual customer data)

| Total       |  |  |  |  | Total      |  |  |  |  | Total      |  |  |  |  | Total      |  |  |  |  |            |  |  |  |  |           |  |  |  |  |           |  |  |  |  |            |  |  |  |  |          |  |  |  |  |               |  |  |  |  |           |  |  |  |  |           |  |  |  |  |           |  |  |  |  |           |  |  |  |  |           |  |  |  |  |           |  |  |  |  |           |  |  |  |  |           |  |  |  |  |           |  |  |  |  |           |  |  |  |  |           |  |  |  |  |           |  |  |  |  |           |  |  |  |  |           |  |  |  |  |           |  |  |  |  |           |  |  |  |  |           |  |  |  |  |           |  |  |  |  |           |  |  |  |  |           |  |  |  |  |           |  |  |  |  |           |  |  |  |  |           |  |  |  |  |           |  |  |  |  |           |  |  |  |  |           |  |  |  |  |           |  |  |  |  |           |  |  |  |  |           |  |  |  |  |           |  |  |  |  |           |  |  |  |  |      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 |  |  |           |  |  |  |  |           |  |  |  |  |           |  |  |  |  |           |  |  |  |  |           |  |  |  |  |           |  |  |  |  |           |  |  |  |  |           |  |  |  |  |           |  |  |  |  |           |  |  |  |  |           |  |  |  |  |           |  |  |  |  |           |  |  |  |  |           |  |  |  |  |           |  |  |  |  |           |  |  |  |  |           |  |  |  |  |           |  |  |  |  |           |  |  |  |  |           |  |  |  |  |           |  |  |  |  |           |  |  |  |  |           |  |  |  |  |           |  |  |  |  |           |  |  |  |  |           |  |  |  |  |           |  |  |  |  |           |  |  |  |  |           |  |  |  |  |           |  |  |  |  |           |  |  |  |  |           |  |  |  |  |           |  |  |  |  |           |  |  |  |  |           |  |  |  |  |           |  |  |  |  |           |  |  |  |  |           |  |  |  |  |           |  |  |  |  |           |  |  |  |  |           |  |  |  |  |         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 |  |           |  |  |  |  |           |  |  |  |  |           |  |  |  |  |           |  |  |  |  |           |  |  |  |  |           |  |  |  |  |           |  |  |  |  |           |  |  |  |  |           |  |  |  |  |           |  |  |  |  |           |  |  |  |  |           |  |  |  |  |           |  |  |  |  |           |  |  |  |  |           |  |  |  |  |           |  |  |  |  |           |  |  |  |  |           |  |  |  |  |           |  |  |  |  |           |  |  |  |  |           |  |  |  |  |           |  |  |  |  |           |  |  |  |  |           |  |  |  |  |           |  |  |  |  |           |  |  |  |  |           |  |  |  |  |           |  |  |  |  |           |  |  |  |  |           |  |  |  |  |           |  |  |  |  |           |  |  |  |  |           |  |  |  |  |           |  |  |  |  |           |  |  |  |  |           |  |  |  |  |           |  |  |  |  |           |  |  |  |  |           |  |  |  |  |           |  |  |  |  |           |  |  |  |  |           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| Rate 20,22  |  |  |  |  | Rate 25D   |  |  |  |  | Rate 25N   |  |  |  |  | Rate 25T   |  |  |  |  | Rate 25F   |  |  |  |  | Rate 25L  |  |  |  |  | Rate 25S  |  |  |  |  | Rate 25C   |  |  |  |  | Rate 25I |  |  |  |  | Rate 25M      |  |  |  |  | Rate 25J  |  |  |  |  | Rate 25K  |  |  |  |  | Rate 25N  |  |  |  |  | Rate 25O  |  |  |  |  | Rate 25P  |  |  |  |  | Rate 25Q  |  |  |  |  | Rate 25R  |  |  |  |  | Rate 25S  |  |  |  |  | Rate 25T  |  |  |  |  | Rate 25U  |  |  |  |  | Rate 25V  |  |  |  |  | Rate 25W  |  |  |  |  | Rate 25X  |  |  |  |  | Rate 25Y  |  |  |  |  | Rate 25Z  |  |  |  |  |           |  |  |  |  |           |  |  |  |  |           |  |  |  |  |           |  |  |  |  |           |  |  |  |  |           |  |  |  |  |           |  |  |  |  |           |  |  |  |  |           |  |  |  |  |           |  |  |  |  |           |  |  |  |  |           |  |  |  |  |           |  |  |  |  |           |  |  |  |  |           |  |  |  |  |           |  |  |  |  |      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|  |           |  |  |  |  |           |  |  |  |  |           |  |  |  |  |           |  |  |  |  |           |  |  |  |  |           |  |  |  |  |           |  |  |  |  |
| Residential |  |  |  |  | Commercial |  |  |  |  | Industrial |  |  |  |  | Government |  |  |  |  | Healthcare |  |  |  |  | Education |  |  |  |  | Religious |  |  |  |  | Non-Profit |  |  |  |  | Other    |  |  |  |  | Miscellaneous |  |  |  |  | Unlabeled |  |  |  |  | Unlabeled |  |  |  |  | Unlabeled |  |  |  |  | Unlabeled |  |  |  |  | Unlabeled |  |  |  |  | Unlabeled |  |  |  |  | Unlabeled |  |  |  |  | Unlabeled |  |  |  |  | Unlabeled |  |  |  |  | Unlabeled |  |  |  |  | Unlabeled |  |  |  |  | Unlabeled |  |  |  |  | Unlabeled |  |  |  |  | Unlabeled |  |  |  |  | Unlabeled |  |  |  |  | Unlabeled |  |  |  |  | Unlabeled |  |  |  |  | Unlabeled |  |  |  |  | Unlabeled |  |  |  |  | Unlabeled |  |  |  |  | Unlabeled |  |  |  |  | Unlabeled |  |  |  |  | Unlabeled |  |  |  |  | Unlabeled |  |  |  |  | Unlabeled |  |  |  |  | Unlabeled |  |  |  |  | Unlabeled |  |  |  |  | Unlabeled |  |  |  |  | Unlabeled |  |  |  |  | Unlabeled |  |  |  |  | Unlabeled |  |  |  |  | Unlabeled |  |  |  |  | Unlabeled |  |  |  |  | Unlabeled |  |  |  |  | Unlabeled |  |  |  |  | Unlabeled |  |  |  |  | Unlabeled |  |  |  |  | Unlabeled |  |  |  |  | Unlabeled |  |  |  |  | Unlabeled |  |  |  |  | Unlabeled |  |  |  |  | Unlabeled |  |  |  |  | Unlabeled |  |  |  |  | Unlabeled |  |  |  |  | Unlabeled |  |  |  |  | Unlabeled |  |  |  |  | Unlabeled |  |  |  |  | Unlabeled |  |  |  |  | Unlabeled |  |  |  |  | Unlabeled |  |  |  |  | Unlabeled |  |  |  |  | Unlabeled |  |  |  |  | Unlabeled |  |  |  |  | Unlabeled |  |  |  |  | Unlabeled |  |  |  |  | Unlabeled |  |  |  |  | Unlabeled |  |  |  |  | Unlabeled |  |  |  |  | Unlabeled |  |  |  |  | Unlabeled |  |  |  |  | Unlabeled |  |  |  |  | Unlabeled |  |  |  |  | Unlabeled |  |  |  |  | Unlabeled |  |  |  |  | Unlabeled |  |  |  |  | Unlabeled |  |  |  |  | Unlabeled |  |  |  |  | Unlabeled |  |  |  |  | Unlabeled |  |  |  |  | Unlabeled |  |  |  |  | Unlabeled |  |  |  |  | Unlabeled |  |  |  |  | Unlabeled |  |  |  |  | Unlabeled |  |  |  |  | Unlabeled |  |  |  |  | Unlabeled |  |  |  |  | Unlabeled |  |  |  |  | Unlabeled |  |  |  |  | Unlabeled |  |  |  |  | Unlabeled |  |  |  |  | Unlabeled |  |  |  |  | Unlabeled |  |  |  |  | Unlabeled |  |  |  |  | Unlabeled |  |  |  |  | Unlabeled |  |  |  |  | Unlabeled |  |  |  |  | Unlabeled |  |  |  |  | Unlabeled |  |  |  |  | Unlabeled |  |  |  |  | Unlabeled |  |  |  |  | Unlabeled |  |  |  |  | Unlabeled |  |  |  |  | Unlabeled |  |  |  |  | Unlabeled |  |  |  |  | Unlabeled |  |  |  |  | Unlabeled |  |  |  |  | Unlabeled |  |  |  |  | Unlabeled |  |  |  |  | Unlabeled |  |  |  |  | Unlabeled |  |  |  |  | Unlabeled |  |  |  |  | Unlabeled |  |  |  |  | Unlabeled |  |  |  |  | Unlabeled |  |  |  |  | Unlabeled |  |  |  |  | Unlabeled |  |  |  |  | Unlabeled |  |  |  |  | Unlabeled |  |  |  |  | Unlabeled |  |  |  |  | Unlabeled |  |  |  |  | Unlabeled |  |  |  |  | Unlabeled |  |  |  |  | Unlabeled |  |  |  |  | Unlabeled |  |  |  |  | Unlabeled |  |  |  |  | Unlabeled |  |  |  |  | Unlabeled |  |  |  |  | Unlabeled |  |  |  |  | Unlabeled |  |  |  |  | Unlabeled |  |  |  |  | Unlabeled |  |  |  |  | Unlabeled |  |  |  |  | Unlabeled |  |  |  |  | Unlabeled |  |  |  |  | Unlabeled |  |  |  |  | Unlabeled |  |  |  |  | Unlabeled |  |  |  |  | Unlabeled |  |  |  |  | Unlabeled |  |  |  |  | Unlabeled |  |  |  |  | Unlabeled |  |  |  |  | Unlabeled |  |  |  |  | Unlabeled |  |  |  |  | Unlabeled |  |  |  |  | Unlabeled |  |  |  |  | Unlabeled |  |  |  |  | Unlabeled |  |  |  |  | Unlabeled |  |  |  |  | Unlabeled |  |  |  |  | Unlabeled |  |  |  |  | Unlabeled |  |  |  |  | Unlabeled |  |  |  |  | Unlabeled |  |  |  |  | Unlabeled |  |  |  |  | Unlabeled |  |  |  |  | Unlabeled |  |  |  |  | Unlabeled |  |  |  |  | Unlabeled |  |  |  |  | Unlabeled |  |  |  |  | Unlabeled |  |  |  |  | Unlabeled |  |  |  |  | Unlabeled |  |  |  |  | Unlabeled |  |  |  |  | Unlabeled |  |  |  |  | Unlabeled |  |  |  |  | Unlabeled |  |  |  |  | Unlabeled |  |  |  |  | Unlabeled |  |  |  |  | Unlabeled |  |  |  |  | Unlabeled |  |  |  |  | Unlabeled |  |  |  |  | Unlabeled |  |  |  |  | Unlabeled |  |  |  |  | Unlabeled |  |  |  |  | Unlabeled |  |  |  |  | Unlabeled |  |  |  |  | Unlabeled |  |  |  |  | Unlabeled |  |  |  |  | Unlabeled |  |  |  |  | Unlabeled |  |  |  |  | Unlabeled |  |  |  |  | Unlabeled |  |  |  |  | Unlabeled |  |  |  |  | Unlabeled |  |  |  |  | Unlabeled |  |  |  |  | Unlabeled |  |  |  |  | Unlabeled |  |  |  |  | Unlabeled |  |  |  |  | Unlabeled |  |  |  |  | Unlabeled |  |  |  |  | Unlabeled |  |  |  |  | Unlabeled |  |  |  |  | Unlabeled |  |  |  |  | Unlabeled |  |  |  |  | Unlabeled |  |  |  |  | Unlabeled |  |  |  |  | Unlabeled |  |  |  |  | Unlabeled |  |  |  |  | Unlabeled |  |  |  |  | Unlabeled |  |  |  |  | Unlabeled |  |  |  |  | Unlabeled |  |  |  |  | Unlabeled |  |  |  |  | Unlabeled |  |  |  |  | Unlabeled |  |  |  |  | Unlabeled |  |  |  |  | Unlabeled |  |  |  |  | Unlabeled |  |  |  |  | Unlabeled |  |  |  |  | Unlabeled |  |  |  |  | Unlabeled |  |  |  |  | Unlabeled |  |  |  |  | Unlabeled |  |  |  |  | Unlabeled |  |  |  |  | Unlabeled |  |  |  |  | Unlabeled |  |  |  |  | Unlabeled |  |  |  |  | Unlabeled |  |  |  |  | Unlabeled |  |  |  |  | Unlabeled |  |  |  |  | Unlabeled |  |  |  |  | Unlabeled |  |  |  |  | Unlabeled |  |  |  |  | Unlabeled |  |  |  |  | Unlabeled |  |  |  |  | Unlabeled |  |  |  |  | Unlabeled |  |  |  |  | Unlabeled |  |  |  |  | Unlabeled |  |  |  |  | Unlabeled |  |  |  |  | Unlabeled |  |  |  |  | Unlabeled |  |  |  |  | Unlabeled |  |  |  |  | Unlabeled |  |  |  |  | Unlabeled |  |  |  |  | Unlabeled |  |  |  |  | Unlabeled |  |  |  |  | Unlabeled |  |  |  |  | Unlabeled |  |  |  |  | Unlabeled |  |  |  |  | Unlabeled |  |  |  |  | Unlabeled |  |  |  |  | Unlabeled |  |  |  |  | Unlabeled |  |  |  |  | Unlabeled |  |  |  |  | Unlabeled |  |  |  |  | Unlabeled |  |  |  |  | Unlabeled |  |  |  |  | Unlabeled |  |  |  |  | Unlabeled |  |  |  |  | Unlabeled |  |  |  |  | Unlabeled |  |  |  |  | Unlabeled |  |  |  |  | Unlabeled |  |  |  |  | Unlabeled |  |  |  |  | Unlabeled |  |  |  |  | Unlabeled |  |  |  |  | Unlabeled |  |  |  |  | Unlabeled |  |  |  |  | Unlabeled |  |  |  |  | Unlabeled |  |  |  |  | Unlabeled |  |  |  |  | Unlabeled |  |  |  |  | Unlabeled |  |  |  |  | Unlabeled |  |  |  |  | Unlabeled |  |  |  |  | Unlabeled |  |  |  |  | Unlabeled |  |  |  |  | Unlabeled |  |  |  |  | Unlabeled |  |  |  |  | Unlabeled |  |  |  |  | Unlabeled |  |  |  |  | Unlabeled |  |  |  |  | Unlabeled |  |  |  |  | Unlabeled |  |  |  |  | Unlabeled |  |  |  |  | Unlabeled |  |  |  |  | Unlabeled |  |  |  |  | Unlabeled |  |  |  |  | Unlabeled |  |  |  |  | Unlabeled |  |  |  |  | Unlabeled |  |  |  |  | Unlabeled |  |  |  |  | Unlabeled |  |  |  |  | Unlabeled |  |  |  |  | Unlabeled |  |  |  |  | Unlabeled |  |  |  |  | Unlabeled |  |  |  |  | Unlabeled |  |  |  |  | Unlabeled |  |  |  |  | Unlabeled |  |  |  |  | Unlabeled |  |  |  |  | Unlabeled |  |  |  |  | Unlabeled |  |  |  |  | Unlabeled |  |  |  |  | Unlabeled |  |  |  |  | Unlabeled |  |  |  |  | Unlabeled |  |  |  |  | Unlabeled |  |  |  |  | Unlabeled |  |  |  |  | Unlabeled |  |  |  |  | Unlabeled |  |  |  |  | Unlabeled |  |  |  |  | Unlabeled |  |  |  |  | Unlabeled |  |  |  |  | Unlabeled |  |  |  |  | Unlabeled |  |  |  |  | Unlabeled |  |  |  |  | Unlabeled |  |  |  |  | Unlabeled |  |  |  |  | Unlabeled |  |  |  |  | Unlabeled |  |  |  |  | Unlabeled |  |  |  |  | Unlabeled |  |  |  |  | Unlabeled |  |  |  |  | Unlabeled |  |  |  |  | Unlabeled |  |  |  |  | Unlabeled |  |  |  |  | Unlabeled |  |  |  |  | Unlabeled |  |  |  |  | Unlabeled |  |  |  |  | Unlabeled |  |  |  |  | Unlabeled |  |  |  |  | Unlabeled |  |  |  |  | Unlabeled |  |  |  |  | Unlabeled |  |  |  |  | Unlabeled |  |  |  |  | Unlabeled |  |  |  |  | Unlabeled |  |  |  |  | Unlabeled |  |  |  |  | Unlabeled |  |  |  |  | Unlabeled |  |  |  |  | Unlabeled |  |  |  |  | Unlabeled |  |  |  |  | Unlabeled |  |  |  |  | Unlabeled |  |  |  |  | Unlabeled |  |  |  |  | Unlabeled |  |  |  |  | Unlabeled |  |  |  |  | Unlabeled |  |  |  |  | Unlabeled |  |  |  |  | Unlabeled |  |  |  |  | Unlabeled |  |  |  |  | Unlabeled |  |  |  |  | Unlabeled |  |  |  |  | Unlabeled |  |  |  |  | Unlabeled |  |  |  |  | Unlabeled |  |  |  |  | Unlabeled |  |  |  |  | Unlabeled |  |  |  |  | Unlabeled |  |  |  |  | Unlabeled |  |  |  |  | Unlabeled |  |  |  |  | Unlabeled |  |  |  |  | Unlabeled |  |  |  |  | Unlabeled |  |  |  |  | Unlabeled |  |  |  |  | Unlabeled |  |  |  |  | Unlabeled |  |  |  |  | Unlabeled |  |  |  |  | Unlabeled |  |  |  |  | Unlabeled |  |  |  |  | Unlabeled |  |  |  |  | Unlabeled |  |  |  |  | Unlabeled |  |  |  |  | Unlabeled |  |  |  |  | Unlabeled |  |  |  |  | Unlabeled |  |  |  |  | Unlabeled |  |  |  |  | Unlabeled |  |  |  |  | Unlabeled |  |  |  |  | Unlabeled |  |  |  |  | Unlabeled |  |  |  |  | Unlabeled |  |  |  |  | Unlabeled |  |  |  |  | Unlabeled |  |  |  |  | Unlabeled |  |  |  |  | Unlabeled |  |  |  |  | Unlabeled |  |  |  |  | Unlabeled |  |  |  |  | Unlabeled |  |  |  |  | Unlabeled |  |  |  |  |

MINNESOTA POWER  
TEST YEAR 2020  
Sales Summaries

The two tabs under "Sales Summaries" summarize the energy and customer counts by rate class. This step is needed to get from the AFR sales forecast which is broken out by revenue class to the rate class data needed for proper rate application and revenue calculation.

**volumes** - On this tab, the Frequency Distribution percentages has been applied to the AFR in order to get from "Revenue Class" to "Rate Class".

**Monthly Sales - Non-LP Rates** - This tab is used primarily as a summary sheet for all Rate Class MWhs and Customer Counts. Many of the numbers are being pulled off of the "volumes" tab but some come from other tabs such as the "Sales Summary Rate 25" and "Sales Summary Rate 75" tabs, the "Sales 2020 - Ind. Budgeted" tab or the "Calculation of Lighting by mo" tab.

## Minnesota Power

Minnesota Power Docket No. E015/GR-19-442

Rate Class MWh and Customer Counts

TEST YEAR 2020

|                                     |         | January | February | March   | April   | May     | June    | July    | August  | September | October | November | December | Total     |
|-------------------------------------|---------|---------|----------|---------|---------|---------|---------|---------|---------|-----------|---------|----------|----------|-----------|
| <b>Residential</b>                  |         |         |          |         |         |         |         |         |         |           |         |          |          |           |
| Residential Dual Fuel MWh           |         | 18,427  | 18,861   | 15,032  | 11,208  | 6,093   | 3,952   | 1,533   | 983     | 957       | 2,154   | 6,053    | 12,636   | 97,889    |
| Residential Dual Fuel Customers     |         | 7,654   | 7,652    | 7,654   | 7,666   | 7,671   | 7,675   | 7,680   | 7,683   | 7,687     | 7,692   | 7,697    | 7,698    | 92,109    |
| Rate 20 - MWh                       |         | 105,268 | 79,988   | 84,354  | 62,769  | 59,918  | 58,664  | 81,636  | 79,485  | 67,066    | 63,814  | 84,924   | 107,040  | 934,926   |
| Rate 23 - MWh                       |         | 867     | 692      | 712     | 484     | 467     | 732     | 1,227   | 1,244   | 994       | 836     | 941      | 935      | 10,131    |
| Rate 24 - MWh                       |         | 932     | 700      | 660     | 420     | 279     | 77      | 50      | 40      | 41        | 156     | 449      | 750      | 4,554     |
| Rate 28 - MWh On - Peak             |         | 1       | -        | -       | -       | -       | -       | -       | -       | -         | -       | -        | 1        | 2         |
| Rate 28 - MWh Off - Peak            |         | 1       | 1        | 1       | 1       | 1       | 2       | 1       | 1       | 1         | 1       | 1        | 1        | 13        |
|                                     |         | 107,069 | 81,381   | 85,727  | 63,674  | 60,665  | 59,475  | 82,914  | 80,770  | 68,102    | 64,807  | 86,315   | 108,727  | 949,626   |
| Rate 20 - Customers                 |         | 109,152 | 109,145  | 109,178 | 109,161 | 109,176 | 109,188 | 109,183 | 109,214 | 109,205   | 109,244 | 109,246  | 109,271  | 1,310,363 |
| Rate 23 - Customers                 |         | 3,130   | 3,153    | 3,131   | 3,142   | 3,131   | 3,120   | 3,143   | 3,132   | 3,155     | 3,122   | 3,144    | 3,133    | 37,636    |
| Rate 24 - Customers                 |         | 315     | 315      | 315     | 315     | 315     | 327     | 327     | 315     | 315       | 327     | 316      | 316      | 3,818     |
| Rate 28 - Customer                  |         | 3       | 3        | 3       | 3       | 3       | 3       | 3       | 3       | 3         | 3       | 3        | 3        | 36        |
|                                     |         | 112,600 | 112,616  | 112,627 | 112,621 | 112,625 | 112,638 | 112,656 | 112,664 | 112,678   | 112,696 | 112,709  | 112,723  | 1,351,817 |
| Rate 20                             | Block 1 | 41,170  | 32,827   | 38,913  | 30,004  | 32,721  | 32,242  | 41,430  | 38,892  | 33,607    | 35,481  | 44,364   | 48,254   | 449,905   |
|                                     | Block 2 | 27,380  | 20,725   | 22,076  | 16,891  | 16,106  | 16,268  | 23,250  | 22,812  | 19,402    | 18,123  | 23,702   | 29,104   | 255,839   |
|                                     | Block 3 | 14,695  | 10,630   | 10,165  | 7,488   | 5,944   | 5,802   | 9,445   | 9,816   | 7,934     | 6,062   | 9,053    | 13,573   | 110,607   |
|                                     | Block 4 | 22,022  | 15,806   | 13,201  | 8,386   | 5,147   | 4,353   | 7,511   | 7,964   | 6,123     | 4,148   | 7,805    | 16,109   | 118,575   |
|                                     | Total   | 105,267 | 79,988   | 84,355  | 62,769  | 59,918  | 58,665  | 81,636  | 79,484  | 67,066    | 63,814  | 84,924   | 107,040  | 934,926   |
|                                     |         | 1       | -        | (1)     | -       | -       | (1)     | -       | 1       | -         | -       | -        | -        |           |
| <b>Other Public Authorities MWH</b> |         | 4,484   | 4,332    | 4,754   | 4,562   | 4,347   | 4,390   | 4,982   | 4,860   | 4,574     | 4,720   | 4,362    | 4,849    | 55,216    |
| Rate 25D - Customer                 |         | 150     | 148      | 145     | 144     | 144     | 146     | 149     | 147     | 146       | 148     | 148      | 148      | 1,763     |
| Rate 25N - Customer                 |         | 115     | 118      | 121     | 122     | 122     | 120     | 116     | 118     | 119       | 117     | 117      | 117      | 1,422     |
| Rate 87D - Customer                 |         | -       | -        | -       | -       | -       | -       | -       | -       | -         | -       | -        | -        | -         |
| Rate 87N - Customer                 |         | -       | -        | -       | -       | -       | -       | -       | -       | -         | -       | -        | -        | -         |
| Rate 75H - Customer                 |         | 4       | 4        | 4       | 4       | 4       | 4       | 4       | 4       | 4         | 4       | 4        | 4        | 48        |
| Rate 75L - Customer                 |         | 7       | 7        | 7       | 7       | 7       | 7       | 7       | 7       | 7         | 7       | 7        | 7        | 84        |
| Other Public Authority Customers    |         | 276     | 277      | 277     | 277     | 277     | 277     | 276     | 276     | 276       | 276     | 276      | 276      | 3,317     |
| Rate 25D - MWh                      |         | 1,141   | 1,147    | 1,187   | 1,121   | 1,156   | 1,106   | 1,194   | 1,072   | 1,014     | 1,155   | 1,110    | 1,222    | 13,625    |
| Rate 25N - MWh                      |         | 44      | 48       | 48      | 48      | 49      | 48      | 38      | 33      | 30        | 36      | 44       | 57       | 523       |
| Total MWh                           |         | 1,185   | 1,195    | 1,235   | 1,169   | 1,205   | 1,154   | 1,232   | 1,105   | 1,044     | 1,191   | 1,154    | 1,279    | 14,148    |
| Rate 75H - MWh                      |         | 2,196   | 2,122    | 2,273   | 2,202   | 1,933   | 2,221   | 2,469   | 2,525   | 2,281     | 2,233   | 1,989    | 2,311    | 26,755    |
| Rate 75L - MWh                      |         | 549     | 568      | 578     | 510     | 545     | 512     | 585     | 526     | 571       | 606     | 529      | 624      | 6,703     |
| Total MWh                           |         | 2,745   | 2,690    | 2,851   | 2,712   | 2,478   | 2,733   | 3,054   | 3,051   | 2,852     | 2,839   | 2,518    | 2,935    | 33,458    |
| Rate 87D - MWh                      |         | -       | -        | -       | -       | -       | -       | -       | -       | -         | -       | -        | -        | -         |
| Rate 87N - MWh                      |         | -       | -        | -       | -       | -       | -       | -       | -       | -         | -       | -        | -        | -         |
| Total MWh                           |         | -       | -        | -       | -       | -       | -       | -       | -       | -         | -       | -        | -        | -         |
| Rate 25D - kW                       |         | 4,052   | 3,929    | 4,366   | 4,336   | 4,483   | 4,866   | 5,676   | 4,894   | 4,528     | 5,793   | 4,969    | 5,021    | 56,913    |
| Rate 75H - kW                       |         | 4,606   | 4,063    | 4,689   | 4,702   | 4,846   | 5,288   | 5,393   | 4,940   | 4,837     | 5,612   | 4,974    | 5,094    | 59,044    |
| Rate 75L - kW                       |         | 1,304   | 1,315    | 1,406   | 1,321   | 1,318   | 1,302   | 1,431   | 1,281   | 1,268     | 1,463   | 1,368    | 1,457    | 16,234    |
| Rate 87D Demand - kW                |         | -       | -        | -       | -       | -       | -       | -       | -       | -         | -       | -        | -        | -         |
| Rate 87D - High Voltage kW          |         | -       | -        | -       | -       | -       | -       | -       | -       | -         | -       | -        | -        | -         |
| <b>Demand Blocks</b>                |         |         |          |         |         |         |         |         |         |           |         |          |          |           |
| Rate 75H                            | Block 1 | 348     | 350      | 370     | 371     | 383     | 381     | 411     | 376     | 371       | 428     | 391      | 403      | 4,583     |
|                                     | Block 2 | 4,258   | 3,713    | 4,319   | 4,331   | 4,463   | 4,907   | 4,982   | 4,564   | 4,466     | 5,184   | 4,583    | 4,691    | 54,461    |
| Rate 75L                            | Block 1 | 608     | 613      | 648     | 648     | 670     | 663     | 716     | 657     | 647       | 746     | 685      | 705      | 8,006     |
|                                     | Block 2 | 696     | 702      | 758     | 673     | 648     | 639     | 716     | 624     | 621       | 717     | 683      | 752      | 8,229     |

## Minnesota Power

Minnesota Power Docket No. E015/GR-19-442

Rate Class MWh and Customer Counts

TEST YEAR 2020

|                                | January | February | March   | April   | May     | June    | July    | August  | September | October | November | December | Total     |
|--------------------------------|---------|----------|---------|---------|---------|---------|---------|---------|-----------|---------|----------|----------|-----------|
| <b>Commercial</b>              |         |          |         |         |         |         |         |         |           |         |          |          |           |
| Commerical Dual Fuel MWh       | 3,502   | 3,469    | 3,182   | 2,595   | 1,619   | 1,338   | 1,791   | 1,790   | 1,880     | 1,478   | 2,095    | 2,592    | 27,331    |
| Commerical Dual Fuel Customers | 537     | 537      | 537     | 538     | 537     | 537     | 537     | 537     | 537       | 537     | 537      | 537      | 6,445     |
| Rate 25D - MWh                 | 50,880  | 50,109   | 50,981  | 41,055  | 43,495  | 46,251  | 50,580  | 53,605  | 47,120    | 42,093  | 45,245   | 55,161   | 576,575   |
| Rate 25N - MWh                 | 6,272   | 6,196    | 6,082   | 4,629   | 4,567   | 4,340   | 4,612   | 4,767   | 4,201     | 3,991   | 4,624    | 6,072    | 60,353    |
| Rate 27 - MWh                  | 157     | 154      | 105     | 77      | 37      | 20      | 11      | 11      | 10        | 28      | 66       | 111      | 787       |
| Rate 75F - MWh                 | -       | -        | -       | -       | -       | -       | -       | -       | -         | -       | -        | -        | -         |
| Rate 75H - MWh                 | 11,160  | 7,770    | 8,134   | 6,435   | 6,924   | 6,980   | 7,515   | 6,394   | 8,780     | 6,528   | 6,512    | 7,607    | 90,739    |
| Rate 75L - MWh                 | 32,903  | 35,197   | 36,460  | 30,869  | 33,726  | 37,610  | 40,791  | 42,908  | 38,933    | 38,329  | 34,618   | 38,268   | 440,612   |
| Rate 75S - MWh                 | 3,514   | 3,489    | 3,462   | 2,968   | 3,324   | 3,668   | 3,245   | 2,931   | 3,412     | 3,368   | 3,313    | 3,993    | 40,687    |
| Rate 25D - Customer            | 7,524   | 7,365    | 7,344   | 7,400   | 7,427   | 7,379   | 7,433   | 7,503   | 7,532     | 7,577   | 7,599    | 7,723    | 89,806    |
| Rate 25N - Customer            | 12,627  | 12,793   | 12,834  | 12,803  | 12,797  | 12,854  | 12,820  | 12,782  | 12,752    | 12,709  | 12,718   | 12,599   | 153,088   |
| Rate 27 - Customer             | 58      | 60       | 56      | 58      | 58      | 58      | 56      | 56      | 58        | 58      | 58       | 58       | 692       |
| Rate 75F - Customer            | -       | -        | -       | -       | -       | -       | -       | -       | -         | -       | -        | -        | -         |
| Rate 75H - Customer            | 27      | 27       | 25      | 27      | 25      | 27      | 25      | 23      | 27        | 25      | 25       | 25       | 308       |
| Rate 75L - Customer            | 307     | 307      | 311     | 312     | 316     | 314     | 317     | 313     | 309       | 330     | 309      | 316      | 3,761     |
| Rate 75S - Customer            | 43      | 43       | 41      | 43      | 41      | 44      | 43      | 39      | 43        | 43      | 42       | 45       | 510       |
|                                | 20,046  | 20,068   | 20,077  | 20,093  | 20,102  | 20,133  | 20,136  | 20,143  | 20,166    | 20,173  | 20,192   | 20,203   | 248,165   |
| <b>Demand</b>                  |         |          |         |         |         |         |         |         |           |         |          |          |           |
| Rate 25D - Demand kW           | 172,266 | 161,589  | 178,611 | 143,688 | 168,646 | 192,459 | 204,088 | 201,456 | 184,790   | 182,071 | 182,614  | 197,654  | 2,169,932 |
| Rate 25N - Demand kW           | -       | -        | -       | -       | -       | -       | -       | -       | -         | -       | -        | -        | -         |
| Rate 27 - Demand kW            | -       | -        | -       | -       | -       | -       | -       | -       | -         | -       | -        | -        | -         |
| Rate 75F - Demand kW           | -       | -        | -       | -       | -       | -       | -       | -       | -         | -       | -        | -        | -         |
| Rate 75H - Demand kW           | 24,598  | 17,977   | 20,347  | 15,278  | 17,198  | 18,234  | 18,325  | 14,880  | 22,070    | 17,224  | 16,044   | 17,807   | 219,982   |
| Rate 75L - Demand kW           | 71,487  | 72,569   | 82,309  | 67,216  | 77,245  | 87,160  | 92,421  | 92,549  | 84,361    | 90,030  | 78,048   | 83,528   | 978,923   |
| Rate 75S - Demand kW           | 10,727  | 9,975    | 11,307  | 9,205   | 11,397  | 13,989  | 12,257  | 9,360   | 11,956    | 12,115  | 10,100   | 11,874   | 134,262   |
|                                | 279,078 | 262,110  | 292,574 | 235,387 | 274,486 | 311,842 | 327,091 | 318,245 | 303,177   | 301,440 | 286,806  | 310,863  | 3,503,099 |
| <b>Hours in Test Year 8760</b> |         |          |         |         |         |         |         |         |           |         |          |          |           |
| High Voltage kW                | 5,719   | 4,864    | 5,501   | 4,713   | 5,650   | 6,313   | 5,959   | 6,850   | 5,303     | 6,227   | 5,369    | 6,404    | 68,872    |
| Rate 25N - Demand kW           | -       | -        | -       | -       | -       | -       | -       | -       | -         | -       | -        | -        | -         |
| Rate 27 - Demand kW            | -       | -        | -       | -       | -       | -       | -       | -       | -         | -       | -        | -        | -         |
| Rate 75F - Demand kW           | -       | -        | -       | -       | -       | -       | -       | -       | -         | -       | -        | -        | -         |
| Rate 75H - Demand kW           | 24,598  | 17,977   | 20,347  | 15,278  | 17,198  | 18,234  | 18,325  | 14,880  | 22,070    | 17,224  | 16,044   | 17,807   | 219,982   |
| Rate 75L - Demand kW           | -       | -        | -       | -       | -       | -       | -       | -       | -         | -       | -        | -        | -         |
| Rate 75S - Demand kW           | 454     | 423      | 477     | 369     | 429     | 368     | 496     | 316     | 238       | 422     | 378      | 579      | 4,949     |
|                                | 30,771  | 23,264   | 26,325  | 20,360  | 23,277  | 24,915  | 24,780  | 22,046  | 27,611    | 23,873  | 21,791   | 24,790   | 293,803   |
| <b>Demand Blocks</b>           |         |          |         |         |         |         |         |         |           |         |          |          |           |
| Rate 75H                       | Block 1 | 2,701    | 2,456   | 2,804   | 2,293   | 2,552   | 2,644   | 2,699   | 2,472     | 2,655   | 2,506    | 2,726    | 31,014    |
|                                | Block 2 | 21,897   | 15,521  | 17,543  | 12,985  | 14,646  | 15,590  | 15,626  | 12,408    | 19,415  | 14,718   | 13,538   | 188,968   |
|                                |         | 24,598   | 17,977  | 20,347  | 15,278  | 17,198  | 18,234  | 18,325  | 14,880    | 22,070  | 17,224   | 16,044   | 219,982   |
| Rate 75L                       | Block 1 | 28,816   | 27,184  | 31,491  | 25,414  | 29,230  | 30,489  | 31,571  | 30,911    | 27,831  | 30,187   | 28,932   | 353,513   |
|                                | Block 2 | 42,671   | 45,385  | 50,818  | 41,802  | 48,015  | 56,671  | 60,850  | 61,638    | 56,530  | 59,843   | 49,116   | 625,410   |
|                                | Block 3 | -        | -       | -       | -       | -       | -       | -       | -         | -       | -        | -        | -         |
|                                |         | 71,487   | 72,569  | 82,309  | 67,216  | 77,245  | 87,160  | 92,421  | 92,549    | 84,361  | 90,030   | 78,048   | 978,923   |
| Rate 75S                       | Block 1 | 2,130    | 2,014   | 2,300   | 1,878   | 2,041   | 2,170   | 2,279   | 2,038     | 2,114   | 2,109    | 2,087    | 25,611    |
|                                | Block 2 | 2,007    | 1,893   | 2,105   | 1,787   | 1,837   | 2,116   | 2,073   | 1,847     | 2,018   | 1,966    | 1,988    | 23,866    |
|                                | Block 3 | 6,590    | 6,068   | 6,902   | 5,541   | 7,519   | 9,703   | 7,906   | 5,476     | 7,824   | 8,040    | 6,026    | 84,789    |
|                                |         | 10,727   | 9,975   | 11,307  | 9,206   | 11,397  | 13,989  | 12,258  | 9,361     | 11,956  | 12,115   | 10,101   | 134,266   |



## Minnesota Power

Minnesota Power Docket No. E015/GR-19-442

Rate Class MWh and Customer Counts

TEST YEAR 2020

|  | January | February  | March     | April     | May       | June      | July      | August    | September | October   | November  | December  | Total      |
|--|---------|-----------|-----------|-----------|-----------|-----------|-----------|-----------|-----------|-----------|-----------|-----------|------------|
| <b>Industrial</b>                      |         |           |           |           |           |           |           |           |           |           |           |           |            |
| Rate 25D - MWh                         | 1,494   | 1,371     | 1,496     | 1,469     | 1,590     | 1,383     | 1,340     | 1,383     | 1,319     | 1,418     | 1,508     | 1,741     | 17,512     |
| Rate 25N - MWh                         | 47      | 45        | 52        | 48        | 43        | 35        | 31        | 33        | 29        | 31        | 35        | 50        | 479        |
| Rate 75H - MWh                         | 1,537   | 1,383     | 1,128     | 913       | 655       | 692       | 719       | 652       | 683       | 620       | 624       | 678       | 10,284     |
| Rate 75L - MWh                         | 2,676   | 2,576     | 3,070     | 3,155     | 3,475     | 3,460     | 3,660     | 3,670     | 3,513     | 3,632     | 3,366     | 3,254     | 39,507     |
|  | 5,754   | 5,375     | 5,746     | 5,585     | 5,763     | 5,570     | 5,750     | 5,738     | 5,544     | 5,701     | 5,533     | 5,723     | 67,782     |
| Rate 25D - Customers                   | 162     | 157       | 160       | 156       | 157       | 152       | 153       | 157       | 157       | 160       | 161       | 164       | 1,896      |
| Rate 25N - Customers                   | 100     | 103       | 100       | 102       | 104       | 106       | 106       | 101       | 101       | 97        | 96        | 93        | 1,209      |
| Rate 75H - Customers                   | 8       | 8         | 8         | 8         | 6         | 7         | 6         | 6         | 6         | 6         | 6         | 6         | 81         |
| Rate 75L - Customers                   | 26      | 28        | 27        | 29        | 27        | 28        | 28        | 28        | 28        | 29        | 28        | 28        | 334        |
|  | 296     | 296       | 295       | 295       | 294       | 293       | 293       | 292       | 292       | 292       | 291       | 291       | 3,520      |
| <b>Demand</b>                          |         |           |           |           |           |           |           |           |           |           |           |           |            |
| Rate 25D - Demand kW                   | 6,469   | 5,574     | 6,707     | 6,661     | 7,708     | 7,858     | 7,072     | 6,874     | 7,315     | 7,291     | 7,695     | 7,547     | 84,771     |
| Rate 25N - Demand kW                   | -       | -         | -         | -         | -         | -         | -         | -         | -         | -         | -         | -         | -          |
| Rate 75H - Demand kW                   | 6,466   | 5,570     | 6,406     | 6,611     | 4,226     | 7,005     | 4,025     | 3,769     | 3,674     | 3,773     | 3,623     | 3,809     | 58,957     |
| Rate 75L - Demand kW                   | 7,451   | 6,633     | 8,099     | 8,511     | 9,699     | 9,910     | 9,942     | 9,440     | 9,480     | 10,678    | 9,491     | 9,154     | 108,488    |
|  | 20,386  | 17,777    | 21,212    | 21,783    | 21,633    | 24,773    | 21,039    | 20,083    | 20,469    | 21,742    | 20,809    | 20,510    | 252,216    |
| <b>High Voltage kW</b>                 |         |           |           |           |           |           |           |           |           |           |           |           |            |
| Rate 25D - Demand kW                   | 428     | 332       | 423       | 393       | 503       | 882       | 485       | 452       | 885       | 435       | 891       | 540       | 6,649      |
| Rate 25N - Demand kW                   | -       | -         | -         | -         | -         | -         | -         | -         | -         | -         | -         | -         | -          |
| Rate 75H - Demand kW                   | 6,466   | 5,570     | 6,406     | 6,611     | 4,226     | 7,005     | 4,025     | 3,769     | 3,674     | 3,773     | 3,623     | 3,809     | 58,957     |
| Rate 75L - Demand kW                   | -       | -         | -         | -         | -         | -         | -         | -         | -         | -         | -         | -         | -          |
|  | 6,894   | 5,902     | 6,829     | 7,004     | 4,729     | 7,887     | 4,510     | 4,221     | 4,559     | 4,208     | 4,514     | 4,349     | 65,606     |
| <b>Demand Blocks</b>                   |         |           |           |           |           |           |           |           |           |           |           |           |            |
| Rate 75H                               | Block 1 | 588       | 470       | 561       | 648       | 542       | 622       | 502       | 471       | 473       | 515       | 508       | 6,425      |
|  | Block 2 | 5,878     | 5,100     | 5,845     | 5,963     | 3,684     | 6,383     | 3,523     | 3,298     | 3,201     | 3,258     | 3,115     | 52,532     |
|  |         | 6,466     | 5,570     | 6,406     | 6,611     | 4,226     | 7,005     | 4,025     | 3,769     | 3,674     | 3,773     | 3,623     | 58,957     |
| Rate 75L                               | Block 1 | 2,211     | 2,020     | 2,456     | 2,611     | 2,876     | 2,873     | 2,784     | 2,625     | 2,633     | 3,071     | 2,795     | 31,733     |
|  | Block 2 | 5,240     | 4,613     | 5,643     | 5,900     | 6,823     | 7,037     | 7,158     | 6,815     | 6,847     | 7,607     | 6,696     | 76,755     |
|  |         | 7,451     | 6,633     | 8,099     | 8,511     | 9,699     | 9,910     | 9,942     | 9,440     | 9,480     | 10,678    | 9,491     | 108,488    |
| <b>Lighting</b>                        |         |           |           |           |           |           |           |           |           |           |           |           |            |
| Rate 25D - Customers                   |         | 6         | 6         | 6         | 6         | 6         | 6         | 6         | 6         | 6         | 6         | 6         | 72         |
| Rate 25N - Customers                   |         | 63        | 63        | 63        | 63        | 63        | 63        | 63        | 63        | 63        | 63        | 63        | 756        |
| Rate 25D - Demand kW                   |         | 102       | 102       | 104       | 105       | 108       | 99        | 99        | 109       | 102       | 102       | 102       | 1236       |
| Rate 25D - MWh                         |         | 17        | 18        | 16        | 15        | 16        | 11        | 11        | 21        | 19        | 19        | 19        | 198.256    |
| Rate 25N - MWh                         |         | 31        | 33        | 31        | 27        | 27        | 22        | 21        | 22        | 22        | 23        | 26        | 314.169    |
| <b>Commercial/Industrial Dual Fuel</b> |         |           |           |           |           |           |           |           |           |           |           |           |            |
| Total kWh                              |         | 3,546,000 | 3,518,000 | 3,231,000 | 2,633,000 | 1,655,000 | 1,371,000 | 1,818,000 | 1,808,000 | 1,900,000 | 1,502,000 | 2,124,000 | 27,733,000 |
| Low Voltage kWh                        |         | 3,363,523 | 3,336,964 | 3,064,733 | 2,497,506 | 1,569,834 | 1,300,448 | 1,724,446 | 1,714,960 | 1,802,226 | 1,424,707 | 2,014,699 | 26,305,861 |
| High Voltage kWh                       |         | 182,477   | 181,036   | 166,267   | 135,494   | 85,166    | 70,552    | 93,554    | 93,040    | 97,774    | 77,293    | 109,301   | 1,427,139  |

PUBLIC DOCUMENT  
TRADE SECRET DATA EXCISED

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Minnesota Power

Docket No. E015/GR-19-442

Minnesota Power  
Budgeted Energy, Demand & Billing Units  
Test Year 2020 - By Month

| Rate                     | Description                                      | 31<br>January | 28<br>February | 31<br>March | 30<br>April | 31<br>May   | 30<br>June  | 31<br>July  | 31<br>August | 30<br>September | 31<br>October | 30<br>November | 31<br>December | 365<br>Total |               |
|--------------------------|--|---------------|----------------|-------------|-------------|-------------|-------------|-------------|--------------|-----------------|---------------|----------------|----------------|--------------|---------------|
| 20                       | Residential Standard (Incl. CARE)                | kWh           | 105,267,000    | 79,988,000  | 84,355,000  | 62,769,000  | 59,918,000  | 58,665,000  | 81,636,000   | 79,484,000      | 67,066,000    | 63,814,000     | 84,924,000     | 107,040,000  | 934,926,000   |
| 20                       | Block 1 Energy (0-400 kWh)                       | kWh           | 41,170,000     | 32,827,000  | 38,913,000  | 30,004,000  | 32,721,000  | 32,242,000  | 41,430,000   | 38,892,000      | 33,607,000    | 35,481,000     | 44,364,000     | 48,254,000   | 449,905,000   |
| 20                       | Block 2 Energy (401-800 kWh)                     | kWh           | 27,380,000     | 20,725,000  | 22,076,000  | 16,891,000  | 16,106,000  | 16,268,000  | 23,250,000   | 22,812,000      | 19,402,000    | 18,123,000     | 23,702,000     | 29,104,000   | 255,839,000   |
| 20                       | Block 3 Energy (801-1200 kWh)                    | kWh           | 14,695,000     | 10,630,000  | 10,165,000  | 7,488,000   | 5,944,000   | 5,802,000   | 9,445,000    | 9,816,000       | 7,934,000     | 6,062,000      | 9,053,000      | 13,573,000   | 110,607,000   |
| 20                       | Block 4 Energy (Over 12000 kWh)                  | kWh           | 22,022,000     | 18,806,000  | 13,201,000  | 8,386,000   | 5,147,000   | 4,353,000   | 7,511,000    | 7,964,000       | 6,123,000     | 4,148,000      | 7,805,000      | 16,109,000   | 118,575,000   |
|                          |  | kWh           | 0              | 0           | 0           | 0           | 0           | 0           | 0            | 0               | 0             | 0              | 0              | 0            | 0             |
|                          | Residential Standard (Excl. CARE)                | kWh           | 79,271,034     | 71,599,644  | 79,271,034  | 76,713,904  | 79,271,034  | 76,713,904  | 79,271,034   | 79,271,034      | 76,713,904    | 79,271,034     | 76,713,904     | 79,271,034   | 933,352,500   |
|                          | Block 1 Energy (0-400 kWh)                       | kWh           | 37,967,491     | 34,293,218  | 37,967,491  | 36,742,733  | 37,967,491  | 36,742,733  | 37,967,491   | 37,967,491      | 36,742,733    | 37,967,491     | 36,742,733     | 37,967,491   | 447,036,590   |
|                          | Block 2 Energy (401-800 kWh)                     | kWh           | 21,779,505     | 19,671,811  | 21,779,505  | 21,076,940  | 21,779,505  | 21,076,940  | 21,779,505   | 21,076,940      | 21,779,505    | 21,076,940     | 21,779,505     | 256,436,106  |               |
|                          | Block 3 Energy (801-1200 kWh)                    | kWh           | 9,503,160      | 8,583,500   | 9,503,160   | 9,196,607   | 9,503,160   | 9,196,607   | 9,503,160    | 9,196,607       | 9,503,160     | 9,196,607      | 9,503,160      | 111,892,051  |               |
|                          | Block 4 Energy (Over 12000 kWh)                  | kWh           | 10,020,878     | 9,051,115   | 10,020,878  | 9,697,624   | 10,020,878  | 9,697,624   | 10,020,878   | 9,697,624       | 10,020,878    | 9,697,624      | 10,020,878     | 117,987,753  |               |
| 20                       | Residential Standard (CARE)                      | kWh           | 4,266,466      | 3,241,909   | 3,418,904   | 2,544,024   | 2,428,473   | 2,377,689   | 3,308,703    | 3,221,482       | 2,718,181     | 2,586,378      | 3,441,965      | 4,338,325    | 37,892,500    |
| 20                       | Block 1 Energy (0-400 kWh)                       | kWh           | 1,668,616      | 1,330,475   | 1,577,140   | 1,216,059   | 1,326,179   | 1,306,765   | 1,679,153    | 1,576,288       | 1,362,088     | 1,438,041      | 1,798,068      | 1,955,731    | 18,234,600    |
| 20                       | Block 2 Energy (401-800 kWh)                     | kWh           | 1,109,706      | 839,980     | 894,736     | 684,589     | 652,773     | 659,339     | 942,318      | 924,565         | 786,359       | 734,521        | 960,637        | 1,179,577    | 10,369,100    |
| 20                       | Block 3 Energy (801-1200 kWh)                    | kWh           | 595,588        | 430,834     | 411,987     | 303,489     | 240,910     | 235,155     | 382,806      | 397,842         | 321,565       | 245,693        | 366,918        | 550,114      | 4,482,900     |
| 20                       | Block 4 Energy (Over 12000 kWh)                  | kWh           | 892,543        | 640,611     | 535,032     | 339,881     | 208,606     | 176,425     | 304,418      | 322,778         | 248,163       | 168,117        | 316,334        | 652,892      | 4,805,800     |
|                          | Residential Standard (CARE)                      | kWh           | 4,266,466      | 3,241,909   | 3,418,904   | 2,544,024   | 2,428,473   | 2,377,689   | 3,308,703    | 3,221,482       | 2,718,181     | 2,586,378      | 3,441,965      | 4,338,325    | 37,892,500    |
|                          | Block 1 Energy (0-400 kWh)                       | kWh           | 1,668,616      | 1,330,475   | 1,577,140   | 1,216,059   | 1,326,179   | 1,306,765   | 1,679,153    | 1,576,288       | 1,362,088     | 1,438,041      | 1,798,068      | 1,955,731    | 18,148,900    |
|                          | Block 2 Energy (401-800 kWh)                     | kWh           | 1,109,706      | 839,980     | 894,736     | 684,589     | 652,773     | 659,339     | 942,318      | 924,565         | 786,359       | 734,521        | 960,637        | 1,179,577    | 10,410,900    |
|                          | Block 3 Energy (801-1200 kWh)                    | kWh           | 595,588        | 430,834     | 411,987     | 303,489     | 240,910     | 235,155     | 382,806      | 397,842         | 321,565       | 245,693        | 366,918        | 550,114      | 4,542,600     |
|                          | Block 4 Energy (Over 12000 kWh)                  | kWh           | 892,543        | 640,611     | 535,032     | 339,881     | 208,606     | 176,425     | 304,418      | 322,778         | 248,163       | 168,117        | 316,334        | 652,892      | 4,790,100     |
| 21                       | Dual Fuel - Residential                          | kWh           | 18,427,000     | 18,861,000  | 15,032,000  | 11,208,000  | 6,093,000   | 3,952,000   | 1,533,000    | 983,000         | 957,000       | 2,154,000      | 6,053,000      | 12,636,000   | 97,889,000    |
| 23                       | Residential Seasonal                             | kWh           | 867,000        | 692,000     | 712,000     | 484,000     | 467,000     | 732,000     | 1,227,000    | 1,244,000       | 994,000       | 836,000        | 941,000        | 935,000      | 10,131,000    |
| 24                       | Residential Controlled Access                    | kWh           | 932,000        | 700,000     | 660,000     | 420,000     | 279,000     | 77,000      | 50,000       | 40,000          | 41,000        | 156,000        | 449,000        | 750,000      | 4,554,000     |
|                          | Residential Electric Vehicle                     |               |                |             |             |             |             |             |              |                 |               |                |                |              |               |
| 28                       | On - Peak Energy                                 | kWh           | 1,000          | 0           | 0           | 0           | 0           | 0           | 0            | 0               | 0             | 0              | 1,000          | 2,000        | 2,000         |
| 28                       | Off - Peak Energy                                | kWh           | 1,000          | 1,000       | 1,000       | 1,000       | 1,000       | 2,000       | 1,000        | 1,000           | 1,000         | 1,000          | 1,000          | 1,000        | 13,000        |
| RES                      | Total (Excl. Dual Fuel)                          | kWh           | 107,066,000    | 81,380,000  | 85,727,000  | 63,673,000  | 60,664,000  | 59,474,000  | 82,913,000   | 80,768,000      | 68,101,000    | 64,806,000     | 86,314,000     | 108,725,000  | 949,611,000   |
| 25                       | General Service - All Energy                     | kWh           | 60,876,082     | 59,912,056  | 60,843,067  | 49,312,013  | 51,693,030  | 53,721,415  | 58,261,705   | 61,371,147      | 54,423,813    | 49,596,211     | 53,507,737     | 65,226,149   | 678,744,425   |
| 25                       | GS - Non-Demand Meter - Energy                   | kWh           | 6,393,973      | 6,322,018   | 6,212,623   | 4,752,257   | 4,685,898   | 4,445,464   | 4,701,777    | 4,855,045       | 4,281,696     | 4,080,905      | 4,729,161      | 6,208,352    | 61,669,169    |
| 25                       | GS - Demand Meter - Energy                       | kWh           | 54,482,109     | 53,590,038  | 54,630,444  | 44,559,756  | 47,007,132  | 49,275,951  | 53,559,928   | 56,516,102      | 50,142,117    | 45,515,306     | 48,778,576     | 59,017,797   | 617,075,256   |
| 25                       | GS - Demand Meter - Demand                       | kW            | 186,039        | 174,844     | 193,438     | 157,540     | 183,695     | 206,607     | 218,235      | 214,483         | 197,985       | 196,557        | 197,430        | 213,824      | 2,340,677     |
| 25                       | GS - High Volt Adjustment                        | kW            | 9,297          | 8,846       | 9,574       | 7,856       | 8,903       | 8,520       | 7,744        | 8,452           | 7,438         | 7,962          | 8,310          | 10,444       | 103,346       |
| 26                       | Dual Fuel - Commercial/Industrial                | kWh           | 3,546,000      | 3,518,000   | 3,231,000   | 2,633,000   | 1,655,000   | 1,371,000   | 1,818,000    | 1,808,000       | 1,900,000     | 1,502,000      | 2,124,000      | 2,627,000    | 27,733,000    |
| 27                       | Commercial Controlled Access                     | kWh           | 157,000        | 154,000     | 105,000     | 77,000      | 37,000      | 20,000      | 11,000       | 11,000          | 10,000        | 28,000         | 66,000         | 111,000      | 787,000       |
| GS                       | Total (Excl. Dual Fuel)                          | kWh           | 61,033,082     | 60,066,056  | 60,948,067  | 49,389,013  | 51,730,030  | 53,741,415  | 58,272,705   | 61,382,147      | 54,433,813    | 49,624,211     | 53,573,737     | 65,337,149   | 679,531,425   |
| 75                       | Large Light & Power - All Energy                 | kWh           | 107,953,000    | 104,460,000 | 110,420,000 | 101,654,000 | 102,712,000 | 103,184,000 | 108,013,000  | 108,736,000     | 104,949,000   | 103,596,000    | 100,109,000    | 107,496,000  | 1,263,282,000 |
| 75                       | 1st Block Demand (1st 100kW)                     | kW            | 37,172         | 34,993      | 40,230      | 33,885      | 38,153      | 39,572      | 40,583       | 39,412          | 36,510        | 39,353         | 37,717         | 40,494       | 458,074       |
| 75                       | 2nd Block Demand (over 100kW)                    | kW            | 202,521        | 198,802     | 209,167     | 194,611     | 199,053     | 208,099     | 209,459      | 201,868         | 205,250       | 208,514        | 196,211        | 201,452      | 2,435,007     |
| 75                       | High Volt Adjustment                             | kW            | 143,245        | 136,885     | 141,017     | 135,166     | 132,545     | 132,802     | 129,318      | 121,264         | 130,056       | 129,084        | 128,416        | 131,185      | 1,590,983     |
| 75                       | Transmission Volt Adjustment                     | kWh           | 1,564,000      | 1,435,000   | 1,564,000   | 1,521,000   | 1,564,000   | 1,521,000   | 1,564,000    | 1,564,000       | 1,521,000     | 1,564,000      | 1,521,000      | 1,565,000    | 18,468,000    |
| TRADE SECRET DATA BEGINS |  |               |                |             |             |             |             |             |              |                 |               |                |                |              |               |
| 75                       | LLP - Gerdau Energy (included above)             | kWh           |                |             |             |             |             |             |              |                 |               |                |                |              |               |
| 75                       | LLP - Gerdau Demand (included above)             | kW            |                |             |             |             |             |             |              |                 |               |                |                |              |               |
| TRADE SECRET DATA BEGINS |  |               |                |             |             |             |             |             |              |                 |               |                |                |              |               |
| 75                       | Northern Foundry - Energy All (included above)   | kWh           |                |             |             |             |             |             |              |                 |               |                |                |              |               |
| 75                       | Northern Foundry - Demand All (included above)   | kW            |                |             |             |             |             |             |              |                 |               |                |                |              |               |
| TRADE SECRET DATA BEGINS |  |               |                |             |             |             |             |             |              |                 |               |                |                |              |               |
| 75                       | ME Global - Energy All (included above)          | kWh           |                |             |             |             |             |             |              |                 |               |                |                |              |               |
| 75                       | ME Global - Demand All (included above)          | kW            |                |             |             |             |             |             |              |                 |               |                |                |              |               |
| TRADE SECRET DATA BEGINS |  |               |                |             |             |             |             |             |              |                 |               |                |                |              |               |
| 75                       | Minnesota Pipeline - Energy All (included above) | kWh           |                |             |             |             |             |             |              |                 |               |                |                |              |               |
| 75                       | Minnesota Pipeline - Demand All (included above) | kW            |                |             |             |             |             |             |              |                 |               |                |                |              |               |
| TRADE SECRET DATA BEGINS |  |               |                |             |             |             |             |             |              |                 |               |                |                |              |               |
| 75                       | Enbridge - Energy All (included above)           | kWh           |                |             |             |             |             |             |              |                 |               |                |                |              |               |
| 75                       | Enbridge - Demand All (included above)           | kW            |                |             |             |             |             |             |              |                 |               |                |                |              |               |
| TRADE SECRET DATA BEGINS |  |               |                |             |             |             |             |             |              |                 |               |                |                |              |               |
| 75S                      | Large Light & Power - School Rate - Energy All   | kWh           | 3,514,000      | 3,489,000   | 3,462,000   | 2,968,000   | 3,324,000   | 3,668,000   | 3,245,000    | 2,931,000       | 3,412,000     | 3,368,000      | 3,313,000      | 3,993,000    | 40,687,000    |
| 75S                      | Demand Block1                                    | kW            | 2,130          | 2,014       | 2,300       | 1,878       | 2,041       | 2,170       | 2,279        | 2,038           | 2,114         | 2,109          | 2,087          | 2,451        | 25,611        |
| 75S                      | Demand Block2                                    | kW            | 2,007          | 1,893       | 2,105       | 1,787       | 1,837       | 2,116       | 2,073        | 1,847           | 2,018         | 1,966          | 1,988          | 2,229        | 23,866        |
| 75S                      | Demand Block3                                    | kW            | 6,590          | 6,068       | 6,902       | 5,541       | 7,519       | 9,703       | 7,908        | 5,476           | 7,824         | 8,040          | 6,026          | 7,194        | 84,789        |
| 75S                      | High Volt Adjustment                             | kW            | 454            | 423         | 477         | 369         | 429         | 368         | 496          | 316             | 238           | 422            | 378            | 579          | 4,949         |
| LLP                      | Total  | kWh           | 111,467,000    | 107,949,000 | 113,882,000 | 104,622,000 | 106,036,000 | 106,852,000 | 111,258,000  | 111,667,000     | 108,361,000   | 106,964,000    | 103,422,000    | 111,489,000  | 1,303,969,000 |

## Minnesota Power

## Docket No. E015/GR-19-442

Minnesota Power  
Budgeted Energy, Demand & Billing Units

## Test Year 2020 - By Month

| Rate  | Description                                     |        | 31<br>January | 28<br>February | 31<br>March | 30<br>April | 31<br>May | 30<br>June | 31<br>July | 31<br>August | 30<br>September | 31<br>October | 30<br>November | 31<br>December | 365<br>Total |
|-------|---|--------|---------------|----------------|-------------|-------------|-----------|------------|------------|--------------|-----------------|---------------|----------------|----------------|--------------|
| 76    | Outdoor Lighting - Energy                       | kWh    | 13,285        | 10,860         | 10,530      | 8,655       | 7,567     | 6,673      | 7,211      | 8,413        | 9,636           | 11,477        | 12,464         | 13,625         | 120,396      |
| 76    | Outdoor Lighting - Energy                       | kWh    | 5,674         | 4,624          | 4,496       | 3,698       | 3,235     | 2,860      | 3,066      | 3,616        | 4,120           | 4,917         | 5,339          | 5,797          | 51,442       |
| 77    | Area Lighting - Energy                          | kWh    | 662,598       | 542,286        | 524,712     | 431,086     | 378,486   | 332,973    | 358,757    | 419,396      | 479,199         | 572,514       | 621,285        | 678,526        | 6,001,818    |
| 77    | Area Lighting - Energy                          | kWh    | 9,184         | 7,485          | 7,277       | 5,986       | 5,237     | 4,629      | 4,962      | 5,853        | 6,669           | 7,960         | 8,642          | 9,384          | 83,268       |
| 80 84 | Highway and Ornamental Street Lighting - Energy | kWh    | 80,783        | 66,099         | 64,116      | 52,699      | 46,231    | 40,714     | 43,838     | 51,406       | 58,597          | 69,988        | 75,991         | 83,034         | 733,496      |
| 80-84 | Highway and Ornamental Street Lighting - Energy | kWh    | 563,303       | 492,257        | 406,503     | 366,966     | 301,607   | 252,776    | 265,779    | 272,918      | 380,172         | 375,302       | 418,334        | 456,146        | 4,552,063    |
| 83    | Overhead Street Lighting - Energy               | kWh    | 954,317       | 780,255        | 756,059     | 619,382     | 546,091   | 479,777    | 515,678    | 604,021      | 688,568         | 825,171       | 893,238        | 979,085        | 8,641,642    |
| 83    | Overhead Street Lighting - Energy               | kWh    | 28,946        | 25,295         | 20,889      | 18,857      | 15,498    | 12,989     | 13,657     | 14,024       | 19,536          | 19,285        | 21,497         | 23,440         | 233,914      |
|       |   |        | 983,263       | 805,550        | 776,948     | 638,239     | 561,589   | 492,766    | 529,335    | 618,045      | 708,104         | 844,456       | 914,735        | 1,002,525      | 8,875,556    |
| 76    | Service Agreements                              | sa     | 3             | 3              | 3           | 3           | 3         | 3          | 3          | 3            | 3               | 3             | 3              | 3              | 36           |
| 77    | Service Agreements                              | sa     | 9             | 9              | 9           | 9           | 9         | 9          | 9          | 9            | 9               | 9             | 9              | 9              | 108          |
| 80    | Service Agreements                              | sa     | 86            | 86             | 86          | 86          | 86        | 86         | 86         | 86           | 86              | 86            | 86             | 86             | 1,032        |
| 83    | Service Agreements                              | sa     | 36            | 36             | 36          | 36          | 36        | 36         | 36         | 36           | 36              | 36            | 36             | 36             | 432          |
| 84    | Service Agreements                              | sa     | 169           | 169            | 169         | 169         | 169       | 169        | 169        | 169          | 169             | 169           | 169            | 169            | 2,028        |
| AFR   | AFR Adjustment                                  | kWh    | 0             | 0              | 0           | 0           | 0         | 0          | 0          | 0            | 0               | 0             | 0              | 0              | 0            |
| LIGHT | Total   | kWh    | 2,318,090     | 1,929,161      | 1,794,582   | 1,507,329   | 1,303,952 | 1,133,391  | 1,212,948  | 1,379,647    | 1,646,497       | 1,886,614     | 2,056,790      | 2,249,037      | 20,418,039   |
| 87    | Municipal Pumping - Energy All                  | kWh    | 0             | 0              | 0           | 0           | 0         | 0          | 0          | 0            | 0               | 0             | 0              | 0              | 0            |
|       | MP - Non-Demand Meter - Energy                  | kWh    | 0             | 0              | 0           | 0           | 0         | 0          | 0          | 0            | 0               | 0             | 0              | 0              | 0            |
|       | MP - Demand Meter - Energy                      | kWh    | 0             | 0              | 0           | 0           | 0         | 0          | 0          | 0            | 0               | 0             | 0              | 0              | 0            |
|       | MP - Demand Meter - Demand                      | kW     | 0             | 0              | 0           | 0           | 0         | 0          | 0          | 0            | 0               | 0             | 0              | 0              | 0            |
|       | High Volt Adjustment                            | kW     | 0             | 0              | 0           | 0           | 0         | 0          | 0          | 0            | 0               | 0             | 0              | 0              | 0            |
| CSG   |   |        |               |                |             |             |           |            |            |              |                 |               |                |                |              |
| 20    | Option 1  | kWh    | 4,754         | 7,192          | 11,320      | 12,597      | 14,236    | 15,048     | 16,970     | 14,819       | 11,373          | 7,495         | 4,915          | 3,197          | 123,915      |
| 20    | Option 2  | kWh    | 22,911        | 34,658         | 54,552      | 60,707      | 68,606    | 72,518     | 81,784     | 71,418       | 54,810          | 36,123        | 23,687         | 15,407         | 597,181      |
| 20    | Option 3  | kWh    | 2,119         | 3,206          | 5,046       | 5,615       | 6,346     | 6,708      | 7,565      | 6,606        | 5,070           | 3,341         | 2,191          | 1,425          | 55,239       |
| 25    | Option 1  | kWh    | 2,406         | 3,639          | 5,728       | 6,374       | 7,204     | 7,614      | 8,587      | 7,499        | 5,755           | 3,793         | 2,487          | 1,618          | 62,704       |
| 25D   | Option 1  | kWh    | 27,378        | 41,416         | 65,190      | 72,545      | 81,984    | 86,659     | 97,732     | 85,345       | 65,497          | 43,167        | 28,306         | 18,411         | 713,631      |
| 20    | Option 1  | blocks | 83            | 83             | 83          | 83          | 83        | 83         | 83         | 83           | 83              | 83            | 83             | 83             | 996          |
| 20    | Option 2  | blocks | 400           | 400            | 400         | 400         | 400       | 400        | 400        | 400          | 400             | 400           | 400            | 400            | 4,800        |
| 20    | Option 3  | blocks | 37            | 37             | 37          | 37          | 37        | 37         | 37         | 37           | 37              | 37            | 37             | 37             | 444          |
| 25    | Option 1  | blocks | 520           | 520            | 520         | 520         | 520       | 520        | 520        | 520          | 520             | 520           | 520            | 520            | 6,240        |

## Customers Bills

| Rate  | Description                                      |       | January | February | March   | April   | May     | June    | July    | August  | September | October | November | December | Total     |
|-------|--|-------|---------|----------|---------|---------|---------|---------|---------|---------|-----------|---------|----------|----------|-----------|
| 20    | Residential Standard (Total)                     | Count | 109,152 | 109,145  | 109,178 | 109,161 | 109,176 | 109,188 | 109,183 | 109,214 | 109,205   | 109,244 | 109,246  | 109,271  | 1,310,363 |
| 20    | Residential Standard (Excl. CARE)                | Count | 105,095 | 105,088  | 105,120 | 105,104 | 105,118 | 105,130 | 105,125 | 105,155 | 105,146   | 105,183 | 105,185  | 105,209  | 1,261,658 |
| 20    | Residential Standard (CARE)                      | Count | 4,057   | 4,057    | 4,058   | 4,057   | 4,058   | 4,058   | 4,058   | 4,059   | 4,059     | 4,061   | 4,061    | 4,062    | 48,705    |
| 20    | Residential Standard (Non - LIHEAP)              | Count | 97,497  | 97,490   | 97,520  | 97,505  | 97,518  | 97,529  | 97,525  | 97,553  | 97,544    | 97,579  | 97,580   | 97,602   | 1,170,442 |
| 20    | Residential Standard (LIHEAP Non-Care)           | Count | 7,598   | 7,598    | 7,600   | 7,599   | 7,600   | 7,601   | 7,600   | 7,602   | 7,602     | 7,604   | 7,605    | 7,607    | 91,216    |
| 21    | Dual Fuel - Residential                          | Count | 7,654   | 7,652    | 7,654   | 7,656   | 7,671   | 7,675   | 7,680   | 7,683   | 7,687     | 7,692   | 7,697    | 7,698    | 92,109    |
| 23    | Residential Seasonal                             | Count | 3,130   | 3,153    | 3,131   | 3,142   | 3,131   | 3,120   | 3,143   | 3,132   | 3,155     | 3,122   | 3,144    | 3,133    | 37,636    |
| 24    | Residential Controlled Access                    | Count | 315     | 315      | 315     | 315     | 315     | 327     | 327     | 315     | 315       | 327     | 316      | 316      | 3,818     |
| 25    | General Service                                  | Count | 20,749  | 20,755   | 20,775  | 20,798  | 20,822  | 20,828  | 20,848  | 20,879  | 20,878    | 20,879  | 20,910   | 20,915   | 250,036   |
| 26    | Dual Fuel - Commercial/Industrial                | Count | 543     | 543      | 543     | 544     | 543     | 543     | 543     | 543     | 543       | 543     | 543      | 543      | 6,517     |
| 27    | Commercial Controlled Access                     | Count | 58      | 60       | 56      | 58      | 58      | 58      | 56      | 56      | 58        | 58      | 58       | 58       | 692       |
| 28    | Residential Electric Vehicle                     | Count | 3       | 3        | 3       | 3       | 3       | 3       | 3       | 3       | 3         | 3       | 3        | 3        | 36        |
| 75    | Large Light & Power                              | Count | 398     | 400      | 401     | 406     | 404     | 406     | 406     | 400     | 400       | 420     | 398      | 405      | 4,844     |
| 75S   | Large Light & Power - School Rate                | Count | 43      | 43       | 41      | 43      | 41      | 44      | 43      | 39      | 43        | 43      | 42       | 45       | 510       |
| 76    | Outdoor Lighting                                 | Count | 95      | 95       | 95      | 95      | 95      | 95      | 95      | 95      | 95        | 95      | 95       | 95       | 1,140     |
| 77    | Area Lighting                                    | Count | 6,039   | 6,039    | 6,039   | 6,039   | 6,039   | 6,039   | 6,039   | 6,039   | 6,039     | 6,039   | 6,039    | 6,039    | 72,468    |
| 80 84 | Highway and Ornamental Street Lighting           | Count | 592     | 592      | 592     | 592     | 592     | 592     | 592     | 592     | 592       | 592     | 592      | 592      | 7,104     |
| 83    | Overhead Street Lighting                         | Count | 12,301  | 12,301   | 12,301  | 12,301  | 12,301  | 12,301  | 12,301  | 12,301  | 12,301    | 12,301  | 12,301   | 12,301   | 147,612   |
| 80 84 | Highway and Ornamental Street Lighting (Metered) | Count | -       | -        | -       | -       | -       | -       | -       | -       | -         | -       | -        | -        | -         |
| 87    | Municipal Pumping                                | Count | -       | -        | -       | -       | -       | -       | -       | -       | -         | -       | -        | -        | -         |

MINNESOTA POWER  
TEST YEAR 2020  
Non-LP Rates

**Tabs**

**Non-LP General Rates** - Summary of the rates used for General revenue calculations.

**Non-LP Current Rates** - Summary of the rates used for Present revenue calculations.

## Minnesota Power

Docket No. E015/GR-19-442

Minnesota Power  
Non-LP Interim Rates  
TEST YEAR 2020Interim Rate Increase 7.70000%

| Rate | Description                       | Monthly<br>Customer<br>Charge | Energy<br>Charge/kWh | Demand<br>Charge/kW |
|------|-----------------------------------|-------------------------------|----------------------|---------------------|
| 20   | Residential Standard (Incl. CARE) |                               |                      |                     |
|      | Customer Charge                   | \$ 8.00                       |                      |                     |
|      | Block 1 Energy (0-400 kWh)        |                               | \$ 0.05272           |                     |
|      | Block 2 Energy (401-800 kWh)      |                               | \$ 0.07616           |                     |
|      | Block 3 Energy (801-1200 kWh)     |                               | \$ 0.09962           |                     |
|      | Block 4 Energy (Over 12000 kWh)   |                               | \$ 0.12502           |                     |
|      |                                   |                               | \$ -                 |                     |
| 21   | Dual Fuel - Residential           |                               |                      |                     |
|      | Customer Chg                      | \$ 8.00                       |                      |                     |
|      | Energy - All                      |                               | \$ 0.05412           |                     |
| 23   | Seasonal Residential              |                               |                      |                     |
|      | Customer Chg                      | \$ 10.00                      |                      |                     |
|      | Energy - All                      |                               | \$ 0.08702           |                     |
| 24   | Controlled Access Residential     |                               |                      |                     |
|      | Customer Chg                      | \$ 8.00                       |                      |                     |
|      | Energy - All                      |                               | \$ 0.04618           |                     |
| 25   | General Service                   |                               |                      |                     |
|      | Customer Chg                      | \$ 12.00                      |                      |                     |
|      | Demand Meter - Energy             |                               | \$ 0.05423           |                     |
|      | No Demand Meter -Energy           |                               | \$ 0.08008           |                     |
|      | Demand Meter - Demand             |                               |                      | \$ 6.50             |
|      | High Voltage Discount             |                               |                      | \$ (2.00)           |
|      | Transmission Service Discount     |                               | \$ (0.00350)         |                     |
| 26   | Dual Fuel - Commercial/Industrial |                               |                      |                     |
|      | Customer Chg                      | \$ 12.00                      |                      |                     |
|      | High Voltage Energy               |                               | \$ 0.04786           |                     |
|      | Low Voltage Energy                |                               | \$ 0.05367           |                     |
| 27   | Controlled Access Commercial      |                               |                      |                     |
|      | Customer Chg                      | \$ 12.00                      |                      |                     |
|      | Energy - High Voltage             |                               | \$ 0.03992           |                     |
|      | Energy - Low Voltage              |                               | \$ 0.04573           |                     |
| 28   | Residential Electric Vehicle      |                               |                      |                     |
|      | Customer Chg                      | \$ 4.25                       |                      |                     |
|      | Energy - On-Peak                  |                               | \$ 0.09612           |                     |
|      | Energy - Off-Peak                 |                               | \$ 0.01752           |                     |
| 75   | Large Light & Power               |                               |                      |                     |
|      | Customer Chg                      | \$ 1,200.00                   |                      |                     |
|      | Energy - All                      |                               | \$ 0.03669           |                     |
|      | Demand - 1st 100kW                |                               |                      | \$ -                |
|      | Demand - All Additional           |                               |                      | \$ 10.50            |
|      | High Voltage Discount             |                               |                      | \$ (2.00)           |
|      | Foundry Discount                  |                               |                      | \$ (2.50)           |
|      | Transmission Service Discount     |                               | \$ (0.00350)         |                     |
| 75S  | Large Light & Power - Schools     |                               |                      |                     |
|      | Customer Chg                      | \$ 600.00                     |                      |                     |
|      | Energy - All                      |                               | \$ 0.03669           |                     |
|      | Demand - 1st 50 kW                |                               |                      | \$ -                |
|      | Demand - 2nd 50 kW                |                               |                      | \$ 12.00            |
|      | Demand - All Additional           |                               |                      | \$ 10.50            |
|      | High Voltage Discount             |                               |                      | \$ (2.00)           |
|      | Transmission Service Discount     |                               |                      |                     |
|      | LLP Time of Use                   |                               |                      |                     |
|      | Customer Chg                      | \$ 1,200.00                   |                      |                     |
|      | On-Peak Energy                    |                               | \$ 0.04195           |                     |
|      | Off-Peak Energy                   |                               | \$ 0.03133           |                     |
|      | On-Peak Demand                    |                               |                      | \$ 10.90            |
|      | Off-Peak Demand                   |                               |                      | \$ 4.25             |
| 87   | Municipal Pumping                 |                               |                      |                     |
|      | Customer Chg                      | \$ 12.00                      |                      |                     |
|      | Demand Meter - Energy             |                               | \$ 0.07619           |                     |
|      | No Demand Meter -Energy           |                               | \$ 0.10204           |                     |
|      | Demand Meter - Demand             |                               |                      | \$ 6.50             |
|      | High Voltage Discount             |                               |                      | \$ (2.00)           |
|      | Transmission Service Discount     |                               | \$ (0.00350)         |                     |

| Fuel Clause           | Class Cost Facto | January | February | March   | April    | May | June     | July    | August  | September | October | November | December |         |
|-----------------------|------------------|---------|----------|---------|----------|-----|----------|---------|---------|-----------|---------|----------|----------|---------|
|                       | E8760            | 0.00151 | 0.00048  | 0.00087 | -0.00062 |     | -0.00127 | 0.00434 | 0.00657 | 0.00683   | 0.00502 | 0.00451  | 0.00445  | 0.0057  |
| Residential           | 1.01406          | 0.00153 | 0.00049  | 0.00088 | -0.00063 |     | -0.00129 | 0.00440 | 0.00666 | 0.00693   | 0.00509 | 0.00457  | 0.00451  | 0.00578 |
| General Service       | 1.03518          | 0.00156 | 0.00050  | 0.00090 | -0.00064 |     | -0.00131 | 0.00449 | 0.00680 | 0.00707   | 0.00520 | 0.00467  | 0.00461  | 0.00590 |
| Large Light and Power | 1.00982          | 0.00152 | 0.00048  | 0.00088 | -0.00063 |     | -0.00128 | 0.00438 | 0.00663 | 0.00690   | 0.00507 | 0.00455  | 0.00449  | 0.00576 |
| Large Power           | 0.99024          | 0.00150 | 0.00048  | 0.00086 | -0.00061 |     | -0.00126 | 0.00430 | 0.00651 | 0.00676   | 0.00497 | 0.00447  | 0.00441  | 0.00564 |
| Municipal Pumping     | 1.01571          | 0.00153 | 0.00049  | 0.00088 | -0.00063 |     | -0.00129 | 0.00441 | 0.00667 | 0.00694   | 0.00510 | 0.00458  | 0.00452  | 0.00579 |
| Lighting              | 0.82572          | 0.00125 | 0.00040  | 0.00072 | -0.00051 |     | -0.00105 | 0.00358 | 0.00542 | 0.00564   | 0.00415 | 0.00372  | 0.00367  | 0.00471 |

Base Cost of Fuel 0.02121

Minnesota Power  
Non-LP Interim Rates  
TEST YEAR 2020

Revenue Adjustments for Riders Included in Base Rates

|  | January            | February  | March     | April     | May       | June      | July      | August    | September | October   | November  | December  |
|--|--------------------|-----------|-----------|-----------|-----------|-----------|-----------|-----------|-----------|-----------|-----------|-----------|
| Retail SEA                               | -0.000110          | -0.000060 | -0.000070 | -0.000110 | -0.000140 | -0.000160 | -0.000200 | -0.000200 | -0.000230 | -0.000250 | -0.000210 | -0.000110 |
| Boswell 4 Environmental Adjustment       | 0.000000           | 0.000000  | 0.000000  | 0.000000  | 0.000000  | 0.000000  | 0.000000  | 0.000000  | 0.000000  | 0.000000  | 0.000000  | 0.000000  |
| Renewable Resource Adjustment            | 0.000000           | 0.000000  | 0.000000  | 0.000000  | 0.000000  | 0.000000  | 0.000000  | 0.000000  | 0.000000  | 0.000000  | 0.000000  | 0.000000  |
| Transmission Adjustment (\$)             | 0.000000           | 0.000000  | 0.000000  | 0.000000  | 0.000000  | 0.000000  | 0.000000  | 0.000000  | 0.000000  | 0.000000  | 0.000000  | 0.000000  |
| Fuel Adjustment Clause                   | 0.000000           | 0.000000  | 0.000000  | 0.000000  | 0.000000  | 0.000000  | 0.000000  | 0.000000  | 0.000000  | 0.000000  | 0.000000  | 0.000000  |
| Conservation Program Adjustment (\$/kWh) | 0.000000           | 0.000000  | 0.000000  | 0.000000  | 0.000000  | 0.000000  | 0.000000  | 0.000000  | 0.000000  | 0.000000  | 0.000000  | 0.000000  |
| Excess ADIT Credit                       | -0.015259          | -0.015259 | -0.015259 | -0.015259 | -0.015259 | -0.015259 | -0.015259 | -0.015259 | -0.015259 | -0.015259 | -0.015259 | -0.015259 |
| <u>Adjustments for Remaining Riders</u>  |                    |           |           |           |           |           |           |           |           |           |           |           |
| Boswell 4 Environmental Adjustment       | 0.000000           | 0.000000  | 0.000000  | 0.000000  | 0.000000  | 0.000000  | 0.000000  | 0.000000  | 0.000000  | 0.000000  | 0.000000  | 0.000000  |
| Renewable Resource Adjustment            | 0.000000           | 0.000000  | 0.000000  | 0.000000  | 0.000000  | 0.000000  | 0.000000  | 0.000000  | 0.000000  | 0.000000  | 0.000000  | 0.000000  |
| Transmission Adjustment (\$)             | 0.000000           | 0.000000  | 0.000000  | 0.000000  | 0.000000  | 0.000000  | 0.000000  | 0.000000  | 0.000000  | 0.000000  | 0.000000  | 0.000000  |
| Fuel Adjustment Clause                   | 0.000000           | 0.000000  | 0.000000  | 0.000000  | 0.000000  | 0.000000  | 0.000000  | 0.000000  | 0.000000  | 0.000000  | 0.000000  | 0.000000  |
| Conservation Program Adjustment          | -0.000137          | -0.000137 | -0.000137 | -0.000137 | -0.000137 | -0.000137 | -0.000137 | -0.000137 | 0.000372  | 0.000372  | 0.000372  | 0.000372  |
| Grid Prodject Adjustment                 | 0.000000           | 0.000000  | 0.000000  | 0.000000  | 0.000000  | 0.000000  | 0.000000  | 0.000000  | 0.000000  | 0.000000  | 0.000000  | 0.000000  |
| CCRC                                     | -0.003299          | -0.003299 | -0.003299 | -0.003299 | -0.003299 | -0.003299 | -0.003299 | -0.003299 | -0.003299 | -0.003299 | -0.003299 | -0.003299 |
| CARE                                     | General            |           |           |           |           |           |           |           |           |           |           |           |
| Service Charge Discount                  | -\$1.00 per Bill   |           |           |           |           |           |           |           |           |           |           |           |
| Block 1 Discount                         | -\$0.01945 per kWh |           |           |           |           |           |           |           |           |           |           |           |
| Block 2 Discount                         | -\$0.02559 per kWh |           |           |           |           |           |           |           |           |           |           |           |
| Block 3 Discount                         | -\$0.03173 per kWh |           |           |           |           |           |           |           |           |           |           |           |
| Block 4 Discount                         | -\$0.03839 per kWh |           |           |           |           |           |           |           |           |           |           |           |
|  | \$0.00000          |           |           |           |           |           |           |           |           |           |           |           |
| Residential Surcharge                    | \$1.03 per Bill    |           |           |           |           |           |           |           |           |           |           |           |
| General Service Surcharge                | \$1.55 per Bill    |           |           |           |           |           |           |           |           |           |           |           |
| Large Light & Power Surcharge            | \$19.35 per Bill   |           |           |           |           |           |           |           |           |           |           |           |
| Municipal Pumping Surcharge              | \$0.67 per Bill    |           |           |           |           |           |           |           |           |           |           |           |

Minnesota Power  
Docket No. E015/GR-19-442

Minnesota Power  
Non-LP Current Rates  
TEST YEAR 2020

| Rate | Description                       | Monthly<br>Customer<br>Charge | Energy<br>Charge/kWh | Demand<br>Charge/kW |
|------|-----------------------------------|-------------------------------|----------------------|---------------------|
| 20   | Residential Standard (Incl. CARE) |                               |                      |                     |
|      | Customer Charge                   | \$ 8.00                       |                      |                     |
|      | Block 1 Energy (0-400 kWh)        |                               | \$ 0.07423           |                     |
|      | Block 2 Energy (401-800 kWh)      |                               | \$ 0.09767           |                     |
|      | Block 3 Energy (801-1200 kWh)     |                               | \$ 0.12113           |                     |
|      | Block 4 Energy (Over 12000 kWh)   |                               | \$ 0.14653           |                     |
|      |                                   |                               | \$ -                 |                     |
| 21   | Dual Fuel - Residential           |                               |                      |                     |
|      | Customer Chg                      | \$ 8.00                       |                      |                     |
|      | Energy - All                      |                               | \$ 0.07563           |                     |
| 23   | Seasonal Residential              |                               |                      |                     |
|      | Customer Chg                      | \$ 10.00                      |                      |                     |
|      | Energy - All                      |                               | \$ 0.10853           |                     |
| 24   | Controlled Access Residential     |                               |                      |                     |
|      | Customer Chg                      | \$ 8.00                       |                      |                     |
|      | Energy - All                      |                               | \$ 0.06769           |                     |
| 25   | General Service                   |                               |                      |                     |
|      | Customer Chg                      | \$ 12.00                      |                      |                     |
|      | Demand Meter - Energy             |                               | \$ 0.07619           |                     |
|      | No Demand Meter -Energy           |                               | \$ 0.10204           |                     |
|      | Demand Meter - Demand             |                               |                      | \$ 6.50             |
|      | High Voltage Discount             |                               |                      | \$ (2.00)           |
|      | Transmission Service Discount     |                               | \$ (0.00350)         |                     |
| 26   | Dual Fuel - Commercial/Industrial |                               |                      |                     |
|      | Customer Chg                      | \$ 12.00                      |                      |                     |
|      | High Voltage Energy               |                               | \$ 0.06982           |                     |
|      | Low Voltage Energy                |                               | \$ 0.07563           |                     |
| 27   | Controlled Access Commercial      |                               |                      |                     |
|      | Customer Chg                      | \$ 12.00                      |                      |                     |
|      | Energy - High Voltage             |                               | \$ 0.06188           |                     |
|      | Energy - Low Voltage              |                               | \$ 0.06769           |                     |
| 28   | Residential Electric Vehicle      |                               |                      |                     |
|      | Customer Chg                      | \$ 4.25                       |                      |                     |
|      | Energy - On-Peak                  |                               | \$ 0.11763           |                     |
|      | Energy - Off-Peak                 |                               | \$ 0.03903           |                     |
| 75   | Large Light & Power               |                               |                      |                     |
|      | Customer Chg                      | \$ 1,200.00                   |                      |                     |
|      | Energy - All                      |                               | \$ 0.05811           |                     |
|      | Demand - 1st 100kW                |                               |                      | \$ -                |
|      | Demand - All Additional           |                               |                      | \$ 10.50            |
|      | High Voltage Discount             |                               |                      | \$ (2.00)           |
|      | Foundry Discount                  |                               |                      | \$ (2.50)           |
|      | Transmission Service Discount     |                               | \$ (0.00350)         |                     |
| 75S  | Large Light & Power - Schools     |                               |                      |                     |
|      | Customer Chg                      | \$ 600.00                     |                      |                     |
|      | Energy - All                      |                               | \$ 0.05811           |                     |
|      | Demand - 1st 50 kW                |                               |                      | \$ -                |
|      | Demand - 2nd 50 kW                |                               |                      | \$ 12.00            |
|      | Demand - All Additional           |                               |                      | \$ 10.50            |
|      | High Voltage Discount             |                               |                      | \$ (2.00)           |
|      | Transmission Service Discount     |                               |                      |                     |
|      | LLP Time of Use                   |                               |                      |                     |
|      | Customer Chg                      | \$ 1,200.00                   |                      |                     |
|      | On-Peak Energy                    |                               | \$ 0.06337           |                     |
|      | Off-Peak Energy                   |                               | \$ 0.05275           |                     |
|      | On-Peak Demand                    |                               |                      | \$ 10.90            |
|      | Off-Peak Demand                   |                               |                      | \$ 4.25             |
| 87   | Municipal Pumping                 |                               |                      |                     |
|      | Customer Chg                      | \$ 12.00                      |                      |                     |
|      | Demand Meter - Energy             |                               | \$ 0.07619           |                     |
|      | No Demand Meter -Energy           |                               | \$ 0.10204           |                     |
|      | Demand Meter - Demand             |                               |                      | \$ 6.50             |
|      | High Voltage Discount             |                               |                      | \$ (2.00)           |
|      | Transmission Service Discount     |                               | \$ (0.00350)         |                     |

| Fuel Clause           | Class Cost Fac | January | February | March   | April    | May      | June    | July    | August  | September | October | November | December |
|-----------------------|----------------|---------|----------|---------|----------|----------|---------|---------|---------|-----------|---------|----------|----------|
|                       | E8760          | 0.00151 | 0.00048  | 0.00087 | -0.00062 | -0.00127 | 0.00434 | 0.00657 | 0.00683 | 0.00502   | 0.00451 | 0.00445  | 0.0057   |
| Residential           | 1.01406        | 0.00153 | 0.00049  | 0.00088 | -0.00063 | -0.00129 | 0.00440 | 0.00666 | 0.00693 | 0.00509   | 0.00457 | 0.00451  | 0.00578  |
| General Service       | 1.03518        | 0.00156 | 0.00050  | 0.00090 | -0.00064 | -0.00131 | 0.00449 | 0.00680 | 0.00707 | 0.00520   | 0.00467 | 0.00461  | 0.00590  |
| Large Light and Power | 1.00982        | 0.00152 | 0.00048  | 0.00088 | -0.00063 | -0.00128 | 0.00438 | 0.00663 | 0.00690 | 0.00507   | 0.00455 | 0.00449  | 0.00576  |
| Large Power           | 0.99024        | 0.00150 | 0.00048  | 0.00086 | -0.00061 | -0.00126 | 0.00430 | 0.00651 | 0.00676 | 0.00497   | 0.00447 | 0.00441  | 0.00564  |
| Municipal Pumping     | 1.01571        | 0.00153 | 0.00049  | 0.00088 | -0.00063 | -0.00129 | 0.00441 | 0.00667 | 0.00694 | 0.00510   | 0.00458 | 0.00452  | 0.00579  |
| Lighting              | 0.82572        | 0.00125 | 0.00040  | 0.00072 | -0.00051 | -0.00105 | 0.00358 | 0.00542 | 0.00564 | 0.00415   | 0.00372 | 0.00367  | 0.00471  |

Bse Cost of Fuel 0.02121

Minnesota Power  
Non-LP Current Rates  
TEST YEAR 2020

Revenue Adjustments for Riders Included in Base Rates  
Base Rates

|                                    | January   | February  | March     | April     | May       | June      | July      | August    | September | October   | November  | December  |
|------------------------------------|-----------|-----------|-----------|-----------|-----------|-----------|-----------|-----------|-----------|-----------|-----------|-----------|
| Retail SEA                         | -0.000110 | -0.000060 | -0.000070 | -0.000110 | -0.000140 | -0.000160 | -0.000200 | -0.000200 | -0.000230 | -0.000250 | -0.000210 | -0.000110 |
| Boswell 4 Environmental Adjustment | 0.000000  | 0.000000  | 0.000000  | 0.000000  | 0.000000  | 0.000000  | 0.000000  | 0.000000  | 0.000000  | 0.000000  | 0.000000  | 0.000000  |
| Renewable Resource Adjustment      | 0.000000  | 0.000000  | 0.000000  | 0.000000  | 0.000000  | 0.000000  | 0.000000  | 0.000000  | 0.000000  | 0.000000  | 0.000000  | 0.000000  |
| Transmission Adjustment (\$)       | 0.000000  | 0.000000  | 0.000000  | 0.000000  | 0.000000  | 0.000000  | 0.000000  | 0.000000  | 0.000000  | 0.000000  | 0.000000  | 0.000000  |
| Fuel Adjustment Clause             | 0.000000  | 0.000000  | 0.000000  | 0.000000  | 0.000000  | 0.000000  | 0.000000  | 0.000000  | 0.000000  | 0.000000  | 0.000000  | 0.000000  |
| Conservation Program Adjustment    | 0.000000  | 0.000000  | 0.000000  | 0.000000  | 0.000000  | 0.000000  | 0.000000  | 0.000000  | 0.000000  | 0.000000  | 0.000000  | 0.000000  |
| Excess ADIT Credit                 | -0.015259 | -0.015259 | -0.015259 | -0.015259 | -0.015259 | -0.015259 | -0.015259 | -0.015259 | -0.015259 | -0.015259 | -0.015259 | -0.015259 |
| Adjustments for Remaining Riders   |           |           |           |           |           |           |           |           |           |           |           |           |
| Boswell 4 Environmental Adjustment | 0.000000  | 0.000000  | 0.000000  | 0.000000  | 0.000000  | 0.000000  | 0.000000  | 0.000000  | 0.000000  | 0.000000  | 0.000000  | 0.000000  |
| Renewable Resource Adjustment      | 0.000000  | 0.000000  | 0.000000  | 0.000000  | 0.000000  | 0.000000  | 0.000000  | 0.000000  | 0.000000  | 0.000000  | 0.000000  | 0.000000  |
| Transmission Adjustment (\$)       | 0.000000  | 0.000000  | 0.000000  | 0.000000  | 0.000000  | 0.000000  | 0.000000  | 0.000000  | 0.000000  | 0.000000  | 0.000000  | 0.000000  |
| Fuel Adjustment Clause             | 0.000000  | 0.000000  | 0.000000  | 0.000000  | 0.000000  | 0.000000  | 0.000000  | 0.000000  | 0.000000  | 0.000000  | 0.000000  | 0.000000  |
| Conservation Program Adjustment    | -0.000137 | -0.000137 | -0.000137 | -0.000137 | -0.000137 | -0.000137 | -0.000137 | -0.000137 | 0.000372  | 0.000372  | 0.000372  | 0.000372  |
| CCRC                               | -0.003299 | -0.003299 | -0.003299 | -0.003299 | -0.003299 | -0.003299 | -0.003299 | -0.003299 | -0.003299 | -0.003299 | -0.003299 | -0.003299 |

CARE

Present

|                               |                    |
|-------------------------------|--------------------|
| Service Charge Discount       | -\$1.00 per Bill   |
| Block 1 Discount              | -\$0.01945 per kWh |
| Block 2 Discount              | -\$0.02559 per kWh |
| Block 3 Discount              | -\$0.03173 per kWh |
| Block 4 Discount              | -\$0.03639 per kWh |
| Block 5 Discount              | \$0.00000 per kWh  |
| Residential Surcharge         | \$1.03 per Bill    |
| General Service Surcharge     | \$1.55 per Bill    |
| Large Light & Power Surcharge | \$19.35 per Bill   |
| Municipal Pumping Surcharge   | \$0.67 per Bill    |
| Large Power                   | \$63.00 per Bill   |



MINNESOTA POWER  
TEST YEAR 2020  
Supporting Documentation

**Tabs**

**Sales Summary Rate 25** - Summary of Energy and Customer counts for Rate 25 (General Service). The "volumes" tab and the "Monthly Sales - Non-LP Rates" tab break out the various components of this rate and this tab summarizes and totals the various components.

**Sales Summary Rate 75** - Summary of Energy and Customer counts for Rate 75 (Large Light and Power). The "volumes" tab and the "Monthly Sales - Non-LP Rates" tab break out the various components of this rate and this tab summarizes and totals the various components.

**RATE 20 - Revenue** - This tab shows the monthly revenue calculations for Rate 20 (Residential).

**RATE 21 - Revenue** - This tab shows the monthly revenue calculations for Rate 21 (Residential Dual Fuel).

**RATE 23 - Revenue** - This tab shows the monthly revenue calculations for Rate 23 (Residential Seasonal).

**RATE 24 - Revenue** - This tab shows the monthly revenue calculations for Rate 24 (Residential Controlled Access).

**RATE 25 - Revenue** - This tab shows the monthly revenue calculations for Rate 25 (General Service).

**RATE 26 - Revenue** - This tab shows the monthly revenue calculations for Rate 26 (Commercial/Industrial Dual Fuel).

**RATE 27 - Revenue** - This tab shows the monthly revenue calculations for Rate 27 (Commercial Controlled Access).

**RATE 28 - Revenue** - This tab shows the monthly revenue calculations for Rate 28 (Residential Electric Vehicle).

**RATE 75 - Revenue** - This tab shows the monthly revenue calculations for Rate 75 (Large Light and Power).

**RATE 75S - Revenue** - This tab shows the monthly revenue calculations for Rate 75S (Large Light and Power - Schools Rate).

**Silver Bay PC RATE - Revenue** - This tab shows the monthly revenue calculations for Silver Bay Power Company.

**RATE 76 - Revenue** - This tab shows the monthly revenue calculations for Rate 76 (Outdoor Lighting).

**RATE 77 - Revenue** - This tab shows the monthly revenue calculations for Rate 77 (Area Lighting).

**RATE 80-84 - Revenue** - This tab shows the monthly revenue calculations for Rate 80-84 (Highway Lighting).

**RATE 83 - Revenue** - This tab shows the monthly revenue calculations for Rate 83 (Overhead Lighting).

**RATE 80-84 METERED - Rev** - This tab shows the monthly revenue calculations for Rate 80-84 (Metered Lighting).

**RATE 87 - Revenue** - This tab shows the monthly revenue calculations for Rate 87 (Municipal Pumping).

**Energy - MWh**

| Rate             | Description              |     | January | February | March    | April    | May      | June     | July     | August   | September | October  | November | December | Total     |
|------------------|--------------------------|-----|---------|----------|----------|----------|----------|----------|----------|----------|-----------|----------|----------|----------|-----------|
| 25               | Miscellaneous Commercial | MWh | 57,152  | 56,305   | 57,063   | 45,684   | 48,062   | 50,591   | 55,192   | 58,372   | 51,321    | 46,084   | 49,869   | 61,233   | 636,928   |
|                  | Demand                   | MWh | 50,880  | 50,109   | 50,981   | 41,055   | 43,495   | 46,251   | 50,580   | 53,605   | 47,120    | 42,093   | 45,245   | 55,161   | 576,575   |
|                  | Non-Demand               | MWh | 6,272   | 6,196    | 6,082    | 4,629    | 4,567    | 4,340    | 4,612    | 4,767    | 4,201     | 3,991    | 4,624    | 6,072    | 60,353    |
|                  | Demand kW                | kW  | 172,266 | 161,589  | 178,611  | 143,688  | 168,646  | 192,459  | 204,088  | 201,456  | 184,790   | 182,071  | 182,614  | 197,654  | 2,169,932 |
| 25               | Miscellaneous Industrial | MWh | 1,541   | 1,416    | 1,548    | 1,517    | 1,633    | 1,418    | 1,371    | 1,416    | 1,348     | 1,449    | 1,543    | 1,791    | 17,991    |
|                  | Demand                   | MWh | 1,494   | 1,371    | 1,496    | 1,469    | 1,590    | 1,383    | 1,340    | 1,383    | 1,319     | 1,418    | 1,508    | 1,741    | 17,512    |
|                  | Non-Demand               | MWh | 47      | 45       | 52       | 48       | 43       | 35       | 31       | 33       | 29        | 31       | 35       | 50       | 479       |
|                  | Demand kW                | kW  | 6,469   | 5,574    | 6,707    | 6,661    | 7,708    | 7,858    | 7,072    | 6,874    | 7,315     | 7,291    | 7,695    | 7,547    | 84,771    |
| 25               | Individually Billed      | MWh | 950     | 945      | 950      | 900      | 750      | 525      | 435      | 435      | 670       | 830      | 900      | 875      | 9,165     |
|                  | Demand                   | MWh | 950     | 945      | 950      | 900      | 750      | 525      | 435      | 435      | 670       | 830      | 900      | 875      | 9,165     |
|                  | Non-Demand               | MWh | 0       | 0        | 0        | 0        | 0        | 0        | 0        | 0        | 0         | 0        | 0        | 0        | 0         |
|                  | Demand kW                | kW  | 3,150   | 3,650    | 3,650    | 2,750    | 2,750    | 1,325    | 1,300    | 1,150    | 1,250     | 1,300    | 2,050    | 3,500    | 27,825    |
| 25               | Public Authorities       | MWh | 1,185   | 1,195    | 1,235    | 1,169    | 1,205    | 1,154    | 1,232    | 1,105    | 1,044     | 1,191    | 1,154    | 1,279    | 14,148    |
|                  | Demand                   | MWh | 1,141   | 1,147    | 1,187    | 1,121    | 1,156    | 1,106    | 1,194    | 1,072    | 1,014     | 1,155    | 1,110    | 1,222    | 13,625    |
|                  | Non-Demand               | MWh | 44      | 48       | 48       | 48       | 49       | 48       | 38       | 33       | 30        | 36       | 44       | 57       | 523       |
|                  | Demand kW                | kW  | 4,052   | 3,929    | 4,366    | 4,336    | 4,483    | 4,866    | 5,676    | 4,894    | 4,528     | 5,793    | 4,969    | 5,021    | 56,913    |
| 25               | Lighting                 | MWh | 48      | 51       | 47       | 42       | 43       | 33       | 32       | 43       | 41        | 42       | 42       | 48       | 512       |
|                  | Demand                   | MWh | 17      | 18       | 16       | 15       | 16       | 11       | 11       | 21       | 19        | 19       | 16       | 19       | 198       |
|                  | Non-Demand               | MWh | 31      | 33       | 31       | 27       | 27       | 22       | 21       | 22       | 22        | 23       | 26       | 29       | 314       |
|                  | Demand kW                | kW  | 102     | 102      | 104      | 105      | 108      | 99       | 99       | 109      | 102       | 102      | 102      | 102      | 1,236     |
| Total            |                          |     | MWh     | 60,876   | 59,912   | 60,843   | 49,312   | 51,693   | 53,721   | 58,262   | 61,371    | 54,424   | 49,596   | 53,508   | 678,744   |
| Demand Total     |                          |     | MWh     | 54,482   | 53,590   | 54,630   | 44,560   | 47,007   | 49,276   | 53,560   | 56,516    | 50,142   | 45,515   | 48,779   | 617,075   |
| Non-Demand Total |                          |     | MWh     | 6,394    | 6,322    | 6,213    | 4,752    | 4,686    | 4,445    | 4,702    | 4,855     | 4,282    | 4,081    | 4,729    | 61,669    |
| Demand kW Total  |                          |     | kW      | 186,039  | 174,844  | 193,438  | 157,540  | 183,695  | 206,607  | 214,483  | 197,985   | 196,557  | 197,430  | 213,824  | 2,340,677 |
| High Voltage kW  |                          |     | kW      | 9,297.00 | 8,846.00 | 9,574.00 | 7,856.00 | 8,903.00 | 8,520.00 | 7,744.00 | 8,452.00  | 7,438.00 | 7,962.00 | 8,310.00 | 103,346   |

**# of Customers Bills**

| Rate  | Description              |       | January | February | March  | April  | May    | June   | July   | August | September | October | November | December | Total   |
|-------|--------------------------|-------|---------|----------|--------|--------|--------|--------|--------|--------|-----------|---------|----------|----------|---------|
| 25    | Miscellaneous Commercial | Count | 20,151  | 20,158   | 20,178 | 20,203 | 20,224 | 20,233 | 20,253 | 20,285 | 20,284    | 20,286  | 20,317   | 20,322   | 242,894 |
| 25    | Miscellaneous Industrial | Count | 262     | 260      | 260    | 258    | 261    | 258    | 259    | 258    | 258       | 257     | 257      | 257      | 3,105   |
| 25    | Other Public Authorities | Count | 265     | 266      | 266    | 266    | 266    | 266    | 265    | 265    | 265       | 265     | 265      | 265      | 3,185   |
| 25    | Individually Billed      | Count | 2       | 2        | 2      | 2      | 2      | 2      | 2      | 2      | 2         | 2       | 2        | 2        | 24      |
| 25    | Lighting                 | Count | 69      | 69       | 69     | 69     | 69     | 69     | 69     | 69     | 69        | 69      | 69       | 69       | 828     |
| Total |                          |       |         | 20,749   | 20,755 | 20,775 | 20,798 | 20,822 | 20,828 | 20,848 | 20,879    | 20,878  | 20,879   | 20,910   | 250,036 |



## Minnesota Power

Minnesota Power Docket No. E015/GR-19-442

Residential Standard - Rate 20

TEST YEAR 2020

Present Rate Revenue

|                                 | January       | February     | March        | April        | May          | June         | July         | August       | September    | October      | November     | December      | Total          |
|---------------------------------|---------------|--------------|--------------|--------------|--------------|--------------|--------------|--------------|--------------|--------------|--------------|---------------|----------------|
| Minimum Charge                  | \$ 873,216    | \$ 873,160   | \$ 873,424   | \$ 873,288   | \$ 873,408   | \$ 873,504   | \$ 873,464   | \$ 873,712   | \$ 873,640   | \$ 873,952   | \$ 873,968   | \$ 874,168    | \$ 10,482,904  |
| Energy Blocks                   |               |              |              |              |              |              |              |              |              |              |              |               |                |
| Block 1 Energy (0-400 kWh)      | \$ 3,056,049  | \$ 2,436,748 | \$ 2,888,512 | \$ 2,227,197 | \$ 2,428,880 | \$ 2,393,324 | \$ 3,075,349 | \$ 2,886,953 | \$ 2,494,648 | \$ 2,633,755 | \$ 3,293,140 | \$ 3,581,894  | \$ 33,396,448  |
| Block 2 Energy (401-800 kWh)    | \$ 2,671,296  | \$ 2,019,810 | \$ 2,149,236 | \$ 1,642,036 | \$ 1,564,362 | \$ 1,579,688 | \$ 2,260,443 | \$ 2,218,980 | \$ 1,888,034 | \$ 1,765,487 | \$ 2,311,967 | \$ 2,840,631  | \$ 24,911,970  |
| Block 3 Energy (801-1200 kWh)   | \$ 1,780,005  | \$ 1,287,612 | \$ 1,231,286 | \$ 907,021   | \$ 719,997   | \$ 702,796   | \$ 1,144,073 | \$ 1,189,012 | \$ 961,045   | \$ 734,290   | \$ 1,096,590 | \$ 1,644,097  | \$ 13,397,826  |
| Block 4 Energy (Over 12000 kWh) | \$ 3,226,884  | \$ 2,316,053 | \$ 1,934,343 | \$ 1,228,801 | \$ 754,190   | \$ 637,845   | \$ 1,100,587 | \$ 1,166,965 | \$ 897,203   | \$ 607,806   | \$ 1,143,667 | \$ 2,360,452  | \$ 17,374,795  |
| Total Base Revenue              | \$ 11,607,450 | \$ 8,933,383 | \$ 9,076,801 | \$ 6,878,343 | \$ 6,340,837 | \$ 6,187,157 | \$ 8,453,916 | \$ 8,335,622 | \$ 7,114,570 | \$ 6,615,290 | \$ 8,719,331 | \$ 11,301,243 | \$ 99,563,943  |
| Fuel Clause Adjustment          | \$ 161,142    | \$ 38,912    | \$ 74,358    | \$ (39,414)  | \$ (77,051)  | \$ 257,771   | \$ 543,181   | \$ 549,866   | \$ 341,042   | \$ 291,633   | \$ 383,086   | \$ 618,591    | \$ 3,143,117   |
| Subtotal                        | \$ 11,768,592 | \$ 8,972,296 | \$ 9,151,160 | \$ 6,838,929 | \$ 6,263,786 | \$ 6,444,928 | \$ 8,997,097 | \$ 8,885,488 | \$ 7,455,613 | \$ 6,906,923 | \$ 9,102,417 | \$ 11,919,834 | \$ 102,707,060 |

Adjustments for Riders Included in Base Rates

|  |               |              |              |              |              |              |              |              |              |              |              |               |                |
|--|---------------|--------------|--------------|--------------|--------------|--------------|--------------|--------------|--------------|--------------|--------------|---------------|----------------|
| Boswell 4 Environmental Adjustment (per kWh) | \$ -          | \$ -         | \$ -         | \$ -         | \$ -         | \$ -         | \$ -         | \$ -         | \$ -         | \$ -         | \$ -         | \$ -          | \$ -           |
| Renewable Resource Adjustment (per kWh)      | \$ -          | \$ -         | \$ -         | \$ -         | \$ -         | \$ -         | \$ -         | \$ -         | \$ -         | \$ -         | \$ -         | \$ -          | \$ -           |
| Transmission Adjustment (per kWh)            | \$ -          | \$ -         | \$ -         | \$ -         | \$ -         | \$ -         | \$ -         | \$ -         | \$ -         | \$ -         | \$ -         | \$ -          | \$ -           |
| Excess ADIT Credit                           | \$ (177,118)  | \$ (136,314) | \$ (138,503) | \$ (104,957) | \$ (96,755)  | \$ (94,410)  | \$ (128,998) | \$ (127,193) | \$ (108,561) | \$ (100,943) | \$ (133,048) | \$ (172,446)  | \$ (1,519,246) |
| Subtotal Revenue                             | \$ 11,591,474 | \$ 8,835,981 | \$ 9,012,657 | \$ 6,733,972 | \$ 6,167,031 | \$ 6,350,518 | \$ 8,868,099 | \$ 8,758,294 | \$ 7,347,051 | \$ 6,805,980 | \$ 8,969,369 | \$ 11,747,388 | \$ 101,187,814 |

Adjustments for Remaining Riders

|  |               |              |              |              |              |              |              |              |              |              |              |               |                |
|--|---------------|--------------|--------------|--------------|--------------|--------------|--------------|--------------|--------------|--------------|--------------|---------------|----------------|
| Boswell 4 Environmental Adjustment (per kWh) | \$ -          | \$ -         | \$ -         | \$ -         | \$ -         | \$ -         | \$ -         | \$ -         | \$ -         | \$ -         | \$ -         | \$ -          | \$ -           |
| Renewable Resource Adjustment (per kWh)      | \$ -          | \$ -         | \$ -         | \$ -         | \$ -         | \$ -         | \$ -         | \$ -         | \$ -         | \$ -         | \$ -         | \$ -          | \$ -           |
| Transmission Adjustment (per kWh)            | \$ -          | \$ -         | \$ -         | \$ -         | \$ -         | \$ -         | \$ -         | \$ -         | \$ -         | \$ -         | \$ -         | \$ -          | \$ -           |
| Solar Energy Adjustment                      | \$ (11,576)   | \$ (4,797)   | \$ (5,900)   | \$ (6,896)   | \$ (8,376)   | \$ (9,371)   | \$ (16,306)  | \$ (15,878)  | \$ (15,409)  | \$ (15,942)  | \$ (17,828)  | \$ (11,772)   | \$ (140,050)   |
| Community Solar Garden - Customer Charge     | \$ 6,838      | \$ 6,838     | \$ 6,838     | \$ 6,838     | \$ 6,838     | \$ 6,838     | \$ 6,838     | \$ 6,838     | \$ 6,838     | \$ 6,838     | \$ 6,838     | \$ 6,838      | \$ 82,058      |
| Community Solar Garden - Energy              | \$ 236        | \$ 357       | \$ 563       | \$ 626       | \$ 708       | \$ 748       | \$ 844       | \$ 737       | \$ 565       | \$ 373       | \$ 244       | \$ 159        | \$ 6,159       |
| Conservation Program Adjustment (per kWh)    | \$ (14,422)   | \$ (10,958)  | \$ (11,557)  | \$ (8,599)   | \$ (8,209)   | \$ (8,037)   | \$ (11,184)  | \$ (10,889)  | \$ 24,949    | \$ 23,739    | \$ 31,592    | \$ 39,819     | \$ 36,244      |
| CARE Surcharge (per Bill)                    | \$ 112,427    | \$ 112,419   | \$ 112,453   | \$ 112,436   | \$ 112,451   | \$ 112,464   | \$ 112,458   | \$ 112,490   | \$ 112,481   | \$ 112,521   | \$ 112,523   | \$ 112,549    | \$ 1,349,674   |
| TOTAL REVENUE                                | \$ 11,684,977 | \$ 8,939,841 | \$ 9,115,054 | \$ 6,838,377 | \$ 6,270,443 | \$ 6,453,159 | \$ 8,960,749 | \$ 8,851,592 | \$ 7,476,476 | \$ 6,933,509 | \$ 9,102,739 | \$ 11,894,981 | \$ 102,521,899 |

General Rate Revenue

|                                 | January       | February     | March        | April        | May          | June         | July         | August       | September    | October      | November     | December      | Total          |
|---------------------------------|---------------|--------------|--------------|--------------|--------------|--------------|--------------|--------------|--------------|--------------|--------------|---------------|----------------|
| Minimum Charge                  | \$ 873,216    | \$ 873,160   | \$ 873,424   | \$ 873,288   | \$ 873,408   | \$ 873,504   | \$ 873,464   | \$ 873,712   | \$ 873,640   | \$ 873,952   | \$ 873,968   | \$ 874,168    | \$ 10,482,904  |
| Energy Blocks                   |               |              |              |              |              |              |              |              |              |              |              |               |                |
| Block 1 Energy (0-400 kWh)      | \$ 2,170,556  | \$ 1,730,698 | \$ 2,051,563 | \$ 1,581,865 | \$ 1,725,110 | \$ 1,699,856 | \$ 2,184,264 | \$ 2,050,456 | \$ 1,771,821 | \$ 1,870,622 | \$ 2,338,949 | \$ 2,544,037  | \$ 23,719,796  |
| Block 2 Energy (401-800 kWh)    | \$ 2,083,041  | \$ 1,575,022 | \$ 1,675,946 | \$ 1,280,438 | \$ 1,219,869 | \$ 1,231,820 | \$ 1,762,664 | \$ 1,730,332 | \$ 1,472,264 | \$ 1,376,704 | \$ 1,802,841 | \$ 2,215,087  | \$ 19,426,028  |
| Block 3 Energy (801-1200 kWh)   | \$ 1,463,942  | \$ 1,058,980 | \$ 1,012,655 | \$ 745,968   | \$ 592,152   | \$ 578,006   | \$ 940,928   | \$ 977,887   | \$ 790,399   | \$ 603,907   | \$ 901,876   | \$ 1,352,167  | \$ 11,018,867  |
| Block 4 Energy (Over 12000 kWh) | \$ 2,753,230  | \$ 1,976,094 | \$ 1,650,413 | \$ 1,048,433 | \$ 643,487   | \$ 544,220   | \$ 939,039   | \$ 995,674   | \$ 765,508   | \$ 518,590   | \$ 975,795   | \$ 2,013,976  | \$ 14,824,458  |
| Base Cost of Fuel               | \$ 2,263,464  | \$ 1,719,430 | \$ 1,812,800 | \$ 1,348,352 | \$ 1,286,811 | \$ 1,259,752 | \$ 1,753,558 | \$ 1,707,562 | \$ 1,440,937 | \$ 1,371,515 | \$ 1,825,901 | \$ 2,301,808  | \$ 20,091,890  |
| Total Base Revenue              | \$ 11,607,450 | \$ 8,933,383 | \$ 9,076,801 | \$ 6,878,343 | \$ 6,340,837 | \$ 6,187,157 | \$ 8,453,916 | \$ 8,335,622 | \$ 7,114,570 | \$ 6,615,290 | \$ 8,719,331 | \$ 11,301,243 | \$ 99,563,943  |
| Fuel Clause Adjustment          | \$ 161,142    | \$ 38,912    | \$ 74,358    | \$ (39,414)  | \$ (77,051)  | \$ 257,771   | \$ 543,181   | \$ 549,866   | \$ 341,042   | \$ 291,633   | \$ 383,086   | \$ 618,591    | \$ 3,143,117   |
| Subtotal                        | \$ 11,768,592 | \$ 8,972,296 | \$ 9,151,160 | \$ 6,838,929 | \$ 6,263,786 | \$ 6,444,928 | \$ 8,997,097 | \$ 8,885,488 | \$ 7,455,613 | \$ 6,906,923 | \$ 9,102,417 | \$ 11,919,834 | \$ 102,707,060 |

Adjustments for Riders Included in Base Rates

|  |               |              |              |              |              |              |              |              |              |              |              |               |                |
|--|---------------|--------------|--------------|--------------|--------------|--------------|--------------|--------------|--------------|--------------|--------------|---------------|----------------|
| Boswell 4 Environmental Adjustment (per kWh) | \$ -          | \$ -         | \$ -         | \$ -         | \$ -         | \$ -         | \$ -         | \$ -         | \$ -         | \$ -         | \$ -         | \$ -          | \$ -           |
| Renewable Resource Adjustment (per kWh)      | \$ -          | \$ -         | \$ -         | \$ -         | \$ -         | \$ -         | \$ -         | \$ -         | \$ -         | \$ -         | \$ -         | \$ -          | \$ -           |
| Transmission Adjustment (per kWh)            | \$ -          | \$ -         | \$ -         | \$ -         | \$ -         | \$ -         | \$ -         | \$ -         | \$ -         | \$ -         | \$ -         | \$ -          | \$ -           |
| Excess ADIT Credit                           | \$ (177,118)  | \$ (136,314) | \$ (138,503) | \$ (104,957) | \$ (96,755)  | \$ (94,410)  | \$ (128,998) | \$ (127,193) | \$ (108,561) | \$ (100,943) | \$ (133,048) | \$ (172,446)  | \$ (1,519,246) |
| Subtotal Revenue                             | \$ 11,591,474 | \$ 8,835,981 | \$ 9,012,657 | \$ 6,733,972 | \$ 6,167,031 | \$ 6,350,518 | \$ 8,868,099 | \$ 8,758,294 | \$ 7,347,051 | \$ 6,805,980 | \$ 8,969,369 | \$ 11,747,388 | \$ 101,187,814 |

Adjustments for Remaining Riders

|  |               |              |              |              |              |              |              |              |              |              |              |               |                |
|--|---------------|--------------|--------------|--------------|--------------|--------------|--------------|--------------|--------------|--------------|--------------|---------------|----------------|
| Boswell 4 Environmental Adjustment (per kWh) | \$ -          | \$ -         | \$ -         | \$ -         | \$ -         | \$ -         | \$ -         | \$ -         | \$ -         | \$ -         | \$ -         | \$ -          | \$ -           |
| Renewable Resource Adjustment (per kWh)      | \$ -          | \$ -         | \$ -         | \$ -         | \$ -         | \$ -         | \$ -         | \$ -         | \$ -         | \$ -         | \$ -         | \$ -          | \$ -           |
| Transmission Adjustment (per kWh)            | \$ -          | \$ -         | \$ -         | \$ -         | \$ -         | \$ -         | \$ -         | \$ -         | \$ -         | \$ -         | \$ -         | \$ -          | \$ -           |
| Solar Energy Adjustment                      | \$ (11,576)   | \$ (4,797)   | \$ (5,900)   | \$ (6,896)   | \$ (8,376)   | \$ (9,371)   | \$ (16,306)  | \$ (15,878)  | \$ (15,409)  | \$ (15,942)  | \$ (17,828)  | \$ (11,772)   | \$ (140,050)   |
| Community Solar Garden - Customer Charge     | \$ 6,838      | \$ 6,838     | \$ 6,838     | \$ 6,838     | \$ 6,838     | \$ 6,838     | \$ 6,838     | \$ 6,838     | \$ 6,838     | \$ 6,838     | \$ 6,838     | \$ 6,838      | \$ 82,058      |
| Community Solar Garden - Energy              | \$ 236        | \$ 357       | \$ 563       | \$ 626       | \$ 708       | \$ 748       | \$ 844       | \$ 737       | \$ 565       | \$ 373       | \$ 244       | \$ 159        | \$ 6,159       |
| Conservation Program Adjustment (per kWh)    | \$ (14,422)   | \$ (10,958)  | \$ (11,557)  | \$ (8,599)   | \$ (8,209)   | \$ (8,037)   | \$ (11,184)  | \$ (10,889)  | \$ 24,949    | \$ 23,739    | \$ 31,592    | \$ 39,819     | \$ 36,244      |
| CARE Surcharge (per Bill)                    | \$ 112,427    | \$ 112,419   | \$ 112,453   | \$ 112,436   | \$ 112,451   | \$ 112,464   | \$ 112,458   | \$ 112,490   | \$ 112,481   | \$ 112,521   | \$ 112,523   | \$ 112,549    | \$ 1,349,674   |
| TOTAL REVENUE                                | \$ 11,684,977 | \$ 8,939,841 | \$ 9,115,054 | \$ 6,838,377 | \$ 6,270,443 | \$ 6,453,159 | \$ 8,960,749 | \$ 8,851,592 | \$ 7,476,476 | \$ 6,933,509 | \$ 9,102,739 | \$ 11,894,981 | \$ 102,521,899 |

Minnesota Power  
**Minnesota Power**  
**Residential Dual Fuel - Rate 21**  
**TEST YEAR 2020**

**Present Rate Revenue**

|  | January      | February     | March        | April       | May        | June       | July       | August     | September  | October    | November   | December     | Total        |
|--|--------------|--------------|--------------|-------------|------------|------------|------------|------------|------------|------------|------------|--------------|--------------|
| Minimum Charge                                       | \$ 61,232    | \$ 61,216    | \$ 61,232    | \$ 61,328   | \$ 61,368  | \$ 61,400  | \$ 61,440  | \$ 61,464  | \$ 61,496  | \$ 61,536  | \$ 61,576  | \$ 61,584    | \$ 736,872   |
| Energy - All kWh                                     | \$ 1,393,634 | \$ 1,426,457 | \$ 1,136,870 | \$ 847,661  | \$ 460,814 | \$ 298,890 | \$ 115,941 | \$ 74,344  | \$ 72,378  | \$ 162,907 | \$ 457,788 | \$ 955,661   | \$ 7,403,345 |
| Total Base Revenue                                   | \$ 1,454,866 | \$ 1,487,673 | \$ 1,198,102 | \$ 908,989  | \$ 522,182 | \$ 360,290 | \$ 177,381 | \$ 135,808 | \$ 133,874 | \$ 224,443 | \$ 519,364 | \$ 1,017,245 | \$ 8,140,217 |
| Fuel Clause Adjustment                               | \$ 28,216    | \$ 9,181     | \$ 13,262    | \$ (7,047)  | \$ (7,847) | \$ 17,393  | \$ 10,213  | \$ 6,808   | \$ 4,872   | \$ 9,851   | \$ 27,315  | \$ 73,038    | \$ 185,254   |
| Subtotal   | \$ 1,483,082 | \$ 1,496,854 | \$ 1,211,364 | \$ 901,942  | \$ 514,335 | \$ 377,683 | \$ 187,594 | \$ 142,617 | \$ 138,746 | \$ 234,294 | \$ 546,679 | \$ 1,090,283 | \$ 8,325,472 |
| <b>Adjustments for Riders Included in Base Rates</b> |              |              |              |             |            |            |            |            |            |            |            |              |              |
| Boswell 4 Environmental Adjustment (per kWh)         | \$ -         | \$ -         | \$ -         | \$ -        | \$ -       | \$ -       | \$ -       | \$ -       | \$ -       | \$ -       | \$ -       | \$ -         | \$ -         |
| Renewable Resource Adjustment (per kWh)              | \$ -         | \$ -         | \$ -         | \$ -        | \$ -       | \$ -       | \$ -       | \$ -       | \$ -       | \$ -       | \$ -       | \$ -         | \$ -         |
| Transmission Adjustment (per kWh)                    | \$ -         | \$ -         | \$ -         | \$ -        | \$ -       | \$ -       | \$ -       | \$ -       | \$ -       | \$ -       | \$ -       | \$ -         | \$ -         |
| Excess ADIT Credit                                   | \$ (22,200)  | \$ (22,700)  | \$ (18,282)  | \$ (13,870) | \$ (7,968) | \$ (5,498) | \$ (2,707) | \$ (2,072) | \$ (2,043) | \$ (3,425) | \$ (7,925) | \$ (15,522)  | \$ (124,212) |
| Subtotal Revenue                                     | \$ 1,460,882 | \$ 1,474,154 | \$ 1,193,082 | \$ 888,072  | \$ 506,367 | \$ 372,185 | \$ 184,888 | \$ 140,544 | \$ 136,703 | \$ 230,869 | \$ 538,754 | \$ 1,074,760 | \$ 8,201,260 |

**Adjustments for Remaining Riders**

|  |              |              |              |            |            |            |            |            |            |            |            |              |              |
|--|--------------|--------------|--------------|------------|------------|------------|------------|------------|------------|------------|------------|--------------|--------------|
| Boswell 4 Environmental Adjustment (per kWh) | \$ -         | \$ -         | \$ -         | \$ -       | \$ -       | \$ -       | \$ -       | \$ -       | \$ -       | \$ -       | \$ -       | \$ -         | \$ -         |
| Renewable Resource Adjustment (per kWh)      | \$ -         | \$ -         | \$ -         | \$ -       | \$ -       | \$ -       | \$ -       | \$ -       | \$ -       | \$ -       | \$ -       | \$ -         | \$ -         |
| Transmission Adjustment (per kWh)            | \$ -         | \$ -         | \$ -         | \$ -       | \$ -       | \$ -       | \$ -       | \$ -       | \$ -       | \$ -       | \$ -       | \$ -         | \$ -         |
| Solar Energy Adjustment                      | \$ (2,027)   | \$ (1,132)   | \$ (1,052)   | \$ (1,233) | \$ (853)   | \$ (632)   | \$ (307)   | \$ (197)   | \$ (220)   | \$ (539)   | \$ (1,271) | \$ (1,390)   | \$ (10,852)  |
| Conservation Program Adjustment (per kWh)    | \$ (2,524)   | \$ (2,584)   | \$ (2,059)   | \$ (1,535) | \$ (835)   | \$ (541)   | \$ (210)   | \$ (135)   | \$ 356     | \$ 801     | \$ 2,252   | \$ 4,701     | \$ (2,315)   |
| TOTAL REVENUE                                | \$ 1,456,331 | \$ 1,470,438 | \$ 1,189,970 | \$ 885,304 | \$ 504,679 | \$ 371,011 | \$ 184,371 | \$ 140,213 | \$ 136,839 | \$ 231,132 | \$ 539,735 | \$ 1,078,071 | \$ 8,188,093 |

**General Rate Revenue**

|  | January      | February     | March        | April       | May        | June       | July       | August     | September  | October    | November   | December     | Total        |
|--|--------------|--------------|--------------|-------------|------------|------------|------------|------------|------------|------------|------------|--------------|--------------|
| <b>Dual Fuel Rate</b>                                |              |              |              |             |            |            |            |            |            |            |            |              |              |
| Minimum Charge                                       | \$ 61,232    | \$ 61,216    | \$ 61,232    | \$ 61,328   | \$ 61,368  | \$ 61,400  | \$ 61,440  | \$ 61,464  | \$ 61,496  | \$ 61,536  | \$ 61,576  | \$ 61,584    | \$ 736,872   |
| Energy - All kWh                                     | \$ 997,302   | \$ 1,020,791 | \$ 813,559   | \$ 606,597  | \$ 329,764 | \$ 213,889 | \$ 82,969  | \$ 53,202  | \$ 51,795  | \$ 116,578 | \$ 327,599 | \$ 683,883   | \$ 5,297,928 |
| Base Cost of Fuel                                    | \$ 396,332   | \$ 405,666   | \$ 323,311   | \$ 241,064  | \$ 131,050 | \$ 85,000  | \$ 32,972  | \$ 21,143  | \$ 20,583  | \$ 46,329  | \$ 130,189 | \$ 271,778   | \$ 2,105,417 |
| Total Base Revenue                                   | \$ 1,454,866 | \$ 1,487,673 | \$ 1,198,102 | \$ 908,989  | \$ 522,182 | \$ 360,290 | \$ 177,381 | \$ 135,808 | \$ 133,874 | \$ 224,443 | \$ 519,364 | \$ 1,017,245 | \$ 8,140,217 |
| Fuel Clause Adjustment                               | \$ 28,216    | \$ 9,181     | \$ 13,262    | \$ (7,047)  | \$ (7,847) | \$ 17,393  | \$ 10,213  | \$ 6,808   | \$ 4,872   | \$ 9,851   | \$ 27,315  | \$ 73,038    | \$ 185,254   |
| Subtotal   | \$ 1,483,082 | \$ 1,496,854 | \$ 1,211,364 | \$ 901,942  | \$ 514,335 | \$ 377,683 | \$ 187,594 | \$ 142,617 | \$ 138,746 | \$ 234,294 | \$ 546,679 | \$ 1,090,283 | \$ 8,325,472 |
| <b>Adjustments for Riders Included in Base Rates</b> |              |              |              |             |            |            |            |            |            |            |            |              |              |
| Boswell 4 Environmental Adjustment (per kWh)         | \$ -         | \$ -         | \$ -         | \$ -        | \$ -       | \$ -       | \$ -       | \$ -       | \$ -       | \$ -       | \$ -       | \$ -         | \$ -         |
| Renewable Resource Adjustment (per kWh)              | \$ -         | \$ -         | \$ -         | \$ -        | \$ -       | \$ -       | \$ -       | \$ -       | \$ -       | \$ -       | \$ -       | \$ -         | \$ -         |
| Transmission Adjustment (per kWh)                    | \$ -         | \$ -         | \$ -         | \$ -        | \$ -       | \$ -       | \$ -       | \$ -       | \$ -       | \$ -       | \$ -       | \$ -         | \$ -         |
| Excess ADIT Credit                                   | \$ (22,200)  | \$ (22,700)  | \$ (18,282)  | \$ (13,870) | \$ (7,968) | \$ (5,498) | \$ (2,707) | \$ (2,072) | \$ (2,043) | \$ (3,425) | \$ (7,925) | \$ (15,522)  | \$ (124,212) |
| Subtotal Revenue                                     | \$ 1,460,882 | \$ 1,474,154 | \$ 1,193,082 | \$ 888,072  | \$ 506,367 | \$ 372,185 | \$ 184,888 | \$ 140,544 | \$ 136,703 | \$ 230,869 | \$ 538,754 | \$ 1,074,760 | \$ 8,201,260 |
| <b>Adjustments for Remaining Riders</b>              |              |              |              |             |            |            |            |            |            |            |            |              |              |
| Boswell 4 Environmental Adjustment (per kWh)         | \$ -         | \$ -         | \$ -         | \$ -        | \$ -       | \$ -       | \$ -       | \$ -       | \$ -       | \$ -       | \$ -       | \$ -         | \$ -         |
| Renewable Resource Adjustment (per kWh)              | \$ -         | \$ -         | \$ -         | \$ -        | \$ -       | \$ -       | \$ -       | \$ -       | \$ -       | \$ -       | \$ -       | \$ -         | \$ -         |
| Transmission Adjustment (per kWh)                    | \$ -         | \$ -         | \$ -         | \$ -        | \$ -       | \$ -       | \$ -       | \$ -       | \$ -       | \$ -       | \$ -       | \$ -         | \$ -         |
| Solar Energy Adjustment                              | \$ (2,027)   | \$ (1,132)   | \$ (1,052)   | \$ (1,233)  | \$ (853)   | \$ (632)   | \$ (307)   | \$ (197)   | \$ (220)   | \$ (539)   | \$ (1,271) | \$ (1,390)   | \$ (10,852)  |
| Conservation Program Adjustment (per kWh)            | \$ (2,524)   | \$ (2,584)   | \$ (2,059)   | \$ (1,535)  | \$ (835)   | \$ (541)   | \$ (210)   | \$ (135)   | \$ 356     | \$ 801     | \$ 2,252   | \$ 4,701     | \$ (2,315)   |
| TOTAL REVENUE  | \$ 1,456,331 | \$ 1,470,438 | \$ 1,189,970 | \$ 885,304  | \$ 504,679 | \$ 371,011 | \$ 184,371 | \$ 140,213 | \$ 136,839 | \$ 231,132 | \$ 539,735 | \$ 1,078,071 | \$ 8,188,093 |

**Present Rate Revenue**

|  | January    | February   | March      | April      | May        | June       | July       | August     | September  | October    | November   | December   | Total        |
|--|------------|------------|------------|------------|------------|------------|------------|------------|------------|------------|------------|------------|--------------|
| Minimum Charge                                       | \$ 31,300  | \$ 31,530  | \$ 31,310  | \$ 31,420  | \$ 31,310  | \$ 31,200  | \$ 31,430  | \$ 31,320  | \$ 31,550  | \$ 31,220  | \$ 31,440  | \$ 31,330  | \$ 376,360   |
| Energy - All kWh                                     | \$ 94,096  | \$ 75,103  | \$ 77,273  | \$ 52,529  | \$ 50,684  | \$ 79,444  | \$ 133,166 | \$ 135,011 | \$ 107,879 | \$ 90,731  | \$ 102,127 | \$ 101,476 | \$ 1,099,517 |
| Total Base Revenue                                   | \$ 125,396 | \$ 106,633 | \$ 108,583 | \$ 83,949  | \$ 81,994  | \$ 110,644 | \$ 164,596 | \$ 166,331 | \$ 139,429 | \$ 121,951 | \$ 133,567 | \$ 132,806 | \$ 1,475,877 |
| Fuel Clause Adjustment                               | \$ 1,328   | \$ 337     | \$ 628     | \$ (304)   | \$ (601)   | \$ 3,222   | \$ 8,175   | \$ 8,616   | \$ 5,060   | \$ 3,823   | \$ 4,246   | \$ 5,404   | \$ 39,933    |
| Subtotal   | \$ 126,723 | \$ 106,970 | \$ 109,212 | \$ 83,644  | \$ 81,392  | \$ 113,866 | \$ 172,771 | \$ 174,947 | \$ 144,489 | \$ 125,774 | \$ 137,813 | \$ 138,210 | \$ 1,515,811 |
| <u>Adjustments for Riders Included in Base Rates</u> |            |            |            |            |            |            |            |            |            |            |            |            |              |
| Boswell 4 Environmental Adjustment (per kWh)         | \$ -       | \$ -       | \$ -       | \$ -       | \$ -       | \$ -       | \$ -       | \$ -       | \$ -       | \$ -       | \$ -       | \$ -       | \$ -         |
| Renewable Resource Adjustment (per kWh)              | \$ -       | \$ -       | \$ -       | \$ -       | \$ -       | \$ -       | \$ -       | \$ -       | \$ -       | \$ -       | \$ -       | \$ -       | \$ -         |
| Transmission Adjustment (per kWh)                    | \$ -       | \$ -       | \$ -       | \$ -       | \$ -       | \$ -       | \$ -       | \$ -       | \$ -       | \$ -       | \$ -       | \$ -       | \$ -         |
| Excess ADIT Credit                                   | \$ (1,913) | \$ (1,627) | \$ (1,657) | \$ (1,281) | \$ (1,251) | \$ (1,688) | \$ (2,512) | \$ (2,538) | \$ (2,128) | \$ (1,861) | \$ (2,038) | \$ (2,026) | \$ (22,520)  |
| Subtotal Revenue                                     | \$ 124,810 | \$ 105,342 | \$ 107,555 | \$ 82,363  | \$ 80,141  | \$ 112,177 | \$ 170,259 | \$ 172,409 | \$ 142,361 | \$ 123,914 | \$ 135,775 | \$ 136,184 | \$ 1,493,290 |
| <u>Adjustments for Remaining Riders</u>              |            |            |            |            |            |            |            |            |            |            |            |            |              |
| Boswell 4 Environmental Adjustment (per kWh)         | \$ -       | \$ -       | \$ -       | \$ -       | \$ -       | \$ -       | \$ -       | \$ -       | \$ -       | \$ -       | \$ -       | \$ -       | \$ -         |
| Renewable Resource Adjustment (per kWh)              | \$ -       | \$ -       | \$ -       | \$ -       | \$ -       | \$ -       | \$ -       | \$ -       | \$ -       | \$ -       | \$ -       | \$ -       | \$ -         |
| Transmission Adjustment (per kWh)                    | \$ -       | \$ -       | \$ -       | \$ -       | \$ -       | \$ -       | \$ -       | \$ -       | \$ -       | \$ -       | \$ -       | \$ -       | \$ -         |
| Solar Energy Adjustment                              | \$ (95)    | \$ (42)    | \$ (50)    | \$ (53)    | \$ (65)    | \$ (117)   | \$ (245)   | \$ (249)   | \$ (229)   | \$ (209)   | \$ (198)   | \$ (103)   | \$ (1,655)   |
| Conservation Program Adjustment (per kWh)            | \$ (119)   | \$ (95)    | \$ (98)    | \$ (66)    | \$ (64)    | \$ (100)   | \$ (168)   | \$ (170)   | \$ 370     | \$ 311     | \$ 350     | \$ 348     | \$ 498       |
| CARE Surcharge (per Bill)                            | \$ 3,224   | \$ 3,248   | \$ 3,225   | \$ 3,236   | \$ 3,225   | \$ 3,214   | \$ 3,237   | \$ 3,226   | \$ 3,250   | \$ 3,216   | \$ 3,238   | \$ 3,227   | \$ 38,765    |
| TOTAL REVENUE  | \$ 127,819 | \$ 108,454 | \$ 110,632 | \$ 85,480  | \$ 83,237  | \$ 115,173 | \$ 173,083 | \$ 175,216 | \$ 145,752 | \$ 127,231 | \$ 139,166 | \$ 139,655 | \$ 1,530,899 |

**General Rate Revenue**

|  | January    | February   | March      | April      | May        | June       | July       | August     | September  | October    | November   | December   | Total        |
|--|------------|------------|------------|------------|------------|------------|------------|------------|------------|------------|------------|------------|--------------|
| Minimum Charge                                       | \$ 31,300  | \$ 31,530  | \$ 31,310  | \$ 31,420  | \$ 31,310  | \$ 31,200  | \$ 31,430  | \$ 31,320  | \$ 31,550  | \$ 31,220  | \$ 31,440  | \$ 31,330  | \$ 376,360   |
| Energy - All kWh                                     | \$ 75,448  | \$ 60,219  | \$ 61,960  | \$ 42,119  | \$ 40,639  | \$ 63,700  | \$ 106,776 | \$ 108,255 | \$ 86,500  | \$ 72,750  | \$ 81,888  | \$ 81,365  | \$ 881,618   |
| Base Cost of Fuel                                    | \$ 18,648  | \$ 14,884  | \$ 15,314  | \$ 10,410  | \$ 10,044  | \$ 15,744  | \$ 26,391  | \$ 26,756  | \$ 21,379  | \$ 17,981  | \$ 20,239  | \$ 20,110  | \$ 217,900   |
| Total Base Revenue                                   | \$ 125,396 | \$ 106,633 | \$ 108,583 | \$ 83,949  | \$ 81,994  | \$ 110,644 | \$ 164,596 | \$ 166,331 | \$ 139,429 | \$ 121,951 | \$ 133,567 | \$ 132,806 | \$ 1,257,978 |
| Fuel Clause Adjustment                               | \$ 1,328   | \$ 337     | \$ 628     | \$ (304)   | \$ (601)   | \$ 3,222   | \$ 8,175   | \$ 8,616   | \$ 5,060   | \$ 3,823   | \$ 4,246   | \$ 5,404   | \$ 39,933    |
| Subtotal   | \$ 126,723 | \$ 106,970 | \$ 109,212 | \$ 83,644  | \$ 81,392  | \$ 113,866 | \$ 172,771 | \$ 174,947 | \$ 144,489 | \$ 125,774 | \$ 137,813 | \$ 138,210 | \$ 1,515,811 |
| <u>Adjustments for Riders Included in Base Rates</u> |            |            |            |            |            |            |            |            |            |            |            |            |              |
| Boswell 4 Environmental Adjustment (per kWh)         | \$ -       | \$ -       | \$ -       | \$ -       | \$ -       | \$ -       | \$ -       | \$ -       | \$ -       | \$ -       | \$ -       | \$ -       | \$ -         |
| Renewable Resource Adjustment (per kWh)              | \$ -       | \$ -       | \$ -       | \$ -       | \$ -       | \$ -       | \$ -       | \$ -       | \$ -       | \$ -       | \$ -       | \$ -       | \$ -         |
| Transmission Adjustment (per kWh)                    | \$ -       | \$ -       | \$ -       | \$ -       | \$ -       | \$ -       | \$ -       | \$ -       | \$ -       | \$ -       | \$ -       | \$ -       | \$ -         |
| Excess ADIT Credit                                   | \$ (1,913) | \$ (1,627) | \$ (1,657) | \$ (1,281) | \$ (1,251) | \$ (1,688) | \$ (2,512) | \$ (2,538) | \$ (2,128) | \$ (1,861) | \$ (2,038) | \$ (2,026) | \$ (22,520)  |
| Subtotal Revenue                                     | \$ 124,810 | \$ 105,342 | \$ 107,555 | \$ 82,363  | \$ 80,141  | \$ 112,177 | \$ 170,259 | \$ 172,409 | \$ 142,361 | \$ 123,914 | \$ 135,775 | \$ 136,184 | \$ 1,493,290 |
| <u>Adjustments for Remaining Riders</u>              |            |            |            |            |            |            |            |            |            |            |            |            |              |
| Boswell 4 Environmental Adjustment (per kWh)         | \$ -       | \$ -       | \$ -       | \$ -       | \$ -       | \$ -       | \$ -       | \$ -       | \$ -       | \$ -       | \$ -       | \$ -       | \$ -         |
| Renewable Resource Adjustment (per kWh)              | \$ -       | \$ -       | \$ -       | \$ -       | \$ -       | \$ -       | \$ -       | \$ -       | \$ -       | \$ -       | \$ -       | \$ -       | \$ -         |
| Transmission Adjustment (per kWh)                    | \$ -       | \$ -       | \$ -       | \$ -       | \$ -       | \$ -       | \$ -       | \$ -       | \$ -       | \$ -       | \$ -       | \$ -       | \$ -         |
| Solar Energy Adjustment                              | \$ (95)    | \$ (42)    | \$ (50)    | \$ (53)    | \$ (65)    | \$ (117)   | \$ (245)   | \$ (249)   | \$ (229)   | \$ (209)   | \$ (198)   | \$ (103)   | \$ (1,655)   |
| Conservation Program Adjustment (per kWh)            | \$ (119)   | \$ (95)    | \$ (98)    | \$ (66)    | \$ (64)    | \$ (100)   | \$ (168)   | \$ (170)   | \$ 370     | \$ 311     | \$ 350     | \$ 348     | \$ 498       |
| CARE Surcharge (per Bill)                            | \$ 3,224   | \$ 3,248   | \$ 3,225   | \$ 3,236   | \$ 3,225   | \$ 3,214   | \$ 3,237   | \$ 3,226   | \$ 3,250   | \$ 3,216   | \$ 3,238   | \$ 3,227   | \$ 38,765    |
| TOTAL REVENUE  | \$ 127,819 | \$ 108,454 | \$ 110,632 | \$ 85,480  | \$ 83,237  | \$ 115,173 | \$ 173,083 | \$ 175,216 | \$ 145,752 | \$ 127,231 | \$ 139,166 | \$ 139,655 | \$ 1,530,899 |

| Present Rate Revenue                                 |            |           |           |           |           |          |          |          |           |           |           |           |            |      |
|--|------------|-----------|-----------|-----------|-----------|----------|----------|----------|-----------|-----------|-----------|-----------|------------|------|
|  | January    | February  | March     | April     | May       | June     | July     | August   | September | October   | November  | December  | Total      |      |
| Minimum Charge                                       | \$ 2,520   | \$ 2,520  | \$ 2,520  | \$ 2,520  | \$ 2,520  | \$ 2,616 | \$ 2,616 | \$ 2,520 | \$ 2,520  | \$ 2,616  | \$ 2,528  | \$ 2,528  | \$ 30,544  | \$ - |
| Energy - All kWh                                     | \$ 63,087  | \$ 47,383 | \$ 44,675 | \$ 28,430 | \$ 18,886 | \$ 5,212 | \$ 3,385 | \$ 2,708 | \$ 2,775  | \$ 10,560 | \$ 30,393 | \$ 50,768 | \$ 308,260 | \$ - |
| Total Base Revenue                                   | \$ 65,607  | \$ 49,903 | \$ 47,195 | \$ 30,950 | \$ 21,406 | \$ 7,828 | \$ 6,001 | \$ 5,228 | \$ 5,295  | \$ 13,176 | \$ 32,921 | \$ 53,296 | \$ 338,804 | \$ - |
| Fuel Clause Adjustment                               | \$ 1,427   | \$ 341    | \$ 582    | \$ (264)  | \$ (359)  | \$ 339   | \$ 333   | \$ 277   | \$ 209    | \$ 713    | \$ 2,026  | \$ 4,335  | \$ 9,959   | \$ - |
| Subtotal   | \$ 67,034  | \$ 50,244 | \$ 47,778 | \$ 30,686 | \$ 21,046 | \$ 8,167 | \$ 6,334 | \$ 5,505 | \$ 5,504  | \$ 13,889 | \$ 34,947 | \$ 57,631 | \$ 348,763 | \$ - |
| <u>Adjustments for Riders Included in Base Rates</u> |            |           |           |           |           |          |          |          |           |           |           |           |            |      |
| Boswell 4 Environmental Adjustment (per kWh)         | \$ -       | \$ -      | \$ -      | \$ -      | \$ -      | \$ -     | \$ -     | \$ -     | \$ -      | \$ -      | \$ -      | \$ -      | \$ -       | \$ - |
| Renewable Resource Adjustment (per kWh)              | \$ -       | \$ -      | \$ -      | \$ -      | \$ -      | \$ -     | \$ -     | \$ -     | \$ -      | \$ -      | \$ -      | \$ -      | \$ -       | \$ - |
| Transmission Adjustment (per kWh)                    | \$ -       | \$ -      | \$ -      | \$ -      | \$ -      | \$ -     | \$ -     | \$ -     | \$ -      | \$ -      | \$ -      | \$ -      | \$ -       | \$ - |
| Excess ADIT Credit                                   | \$ (1,001) | \$ (761)  | \$ (720)  | \$ (472)  | \$ (327)  | \$ (119) | \$ (92)  | \$ (80)  | \$ (81)   | \$ (201)  | \$ (502)  | \$ (813)  | \$ (5,170) | \$ - |
| Subtotal Revenue                                     | \$ 66,033  | \$ 49,482 | \$ 47,058 | \$ 30,213 | \$ 20,720 | \$ 8,048 | \$ 6,242 | \$ 5,425 | \$ 5,423  | \$ 13,688 | \$ 34,445 | \$ 56,817 | \$ 343,594 | \$ - |
| <u>Adjustments for Remaining Riders</u>              |            |           |           |           |           |          |          |          |           |           |           |           |            |      |
| Boswell 4 Environmental Adjustment (per kWh)         | \$ -       | \$ -      | \$ -      | \$ -      | \$ -      | \$ -     | \$ -     | \$ -     | \$ -      | \$ -      | \$ -      | \$ -      | \$ -       | \$ - |
| Renewable Resource Adjustment (per kWh)              | \$ -       | \$ -      | \$ -      | \$ -      | \$ -      | \$ -     | \$ -     | \$ -     | \$ -      | \$ -      | \$ -      | \$ -      | \$ -       | \$ - |
| Transmission Adjustment (per kWh)                    | \$ -       | \$ -      | \$ -      | \$ -      | \$ -      | \$ -     | \$ -     | \$ -     | \$ -      | \$ -      | \$ -      | \$ -      | \$ -       | \$ - |
| Solar Energy Adjustment                              | \$ (103)   | \$ (42)   | \$ (46)   | \$ (46)   | \$ (39)   | \$ (12)  | \$ (10)  | \$ (8)   | \$ (9)    | \$ (39)   | \$ (94)   | \$ (83)   | \$ (532)   | \$ - |
| Conservation Program Adjustment (per kWh)            | \$ (128)   | \$ (96)   | \$ (90)   | \$ (58)   | \$ (38)   | \$ (11)  | \$ (7)   | \$ (5)   | \$ 15     | \$ 58     | \$ 167    | \$ 279    | \$ 87      | \$ - |
| TOTAL REVENUE  | \$ 65,803  | \$ 49,344 | \$ 46,921 | \$ 30,110 | \$ 20,642 | \$ 8,025 | \$ 6,225 | \$ 5,411 | \$ 5,429  | \$ 13,707 | \$ 34,517 | \$ 57,014 | \$ 343,149 | \$ - |
| General Rate Revenue                                 |            |           |           |           |           |          |          |          |           |           |           |           |            |      |
|  | January    | February  | March     | April     | May       | June     | July     | August   | September | October   | November  | December  | Total      |      |
| Minimum Charge                                       | \$ 2,520   | \$ 2,520  | \$ 2,520  | \$ 2,520  | \$ 2,520  | \$ 2,616 | \$ 2,616 | \$ 2,520 | \$ 2,520  | \$ 2,616  | \$ 2,528  | \$ 2,528  | \$ 30,544  | \$ - |
| Energy - All kWh                                     | \$ 43,041  | \$ 32,327 | \$ 30,480 | \$ 19,396 | \$ 12,885 | \$ 3,556 | \$ 2,309 | \$ 1,847 | \$ 1,893  | \$ 7,204  | \$ 20,736 | \$ 34,636 | \$ 210,312 | \$ - |
| Base Cost of Fuel                                    | \$ 20,046  | \$ 15,056 | \$ 14,195 | \$ 9,033  | \$ 6,001  | \$ 1,656 | \$ 1,075 | \$ 860   | \$ 882    | \$ 3,355  | \$ 9,657  | \$ 16,131 | \$ 97,948  | \$ - |
| Total Base Revenue                                   | \$ 65,607  | \$ 49,903 | \$ 47,195 | \$ 30,950 | \$ 21,406 | \$ 7,828 | \$ 6,001 | \$ 5,228 | \$ 5,295  | \$ 13,176 | \$ 32,921 | \$ 53,296 | \$ 240,856 | \$ - |
| Fuel Clause Adjustment                               | \$ 1,427   | \$ 341    | \$ 582    | \$ (264)  | \$ (359)  | \$ 339   | \$ 333   | \$ 277   | \$ 209    | \$ 713    | \$ 2,026  | \$ 4,335  | \$ 9,959   | \$ - |
| Subtotal   | \$ 67,034  | \$ 50,244 | \$ 47,778 | \$ 30,686 | \$ 21,046 | \$ 8,167 | \$ 6,334 | \$ 5,505 | \$ 5,504  | \$ 13,889 | \$ 34,947 | \$ 57,631 | \$ 348,763 | \$ - |
| <u>Adjustments for Riders Included in Base Rates</u> |            |           |           |           |           |          |          |          |           |           |           |           |            |      |
| Boswell 4 Environmental Adjustment (per kWh)         | \$ -       | \$ -      | \$ -      | \$ -      | \$ -      | \$ -     | \$ -     | \$ -     | \$ -      | \$ -      | \$ -      | \$ -      | \$ -       | \$ - |
| Renewable Resource Adjustment (per kWh)              | \$ -       | \$ -      | \$ -      | \$ -      | \$ -      | \$ -     | \$ -     | \$ -     | \$ -      | \$ -      | \$ -      | \$ -      | \$ -       | \$ - |
| Transmission Adjustment (per kWh)                    | \$ -       | \$ -      | \$ -      | \$ -      | \$ -      | \$ -     | \$ -     | \$ -     | \$ -      | \$ -      | \$ -      | \$ -      | \$ -       | \$ - |
| Excess ADIT Credit                                   | \$ (1,001) | \$ (761)  | \$ (720)  | \$ (472)  | \$ (327)  | \$ (119) | \$ (92)  | \$ (80)  | \$ (81)   | \$ (201)  | \$ (502)  | \$ (813)  | \$ (5,170) | \$ - |
| Subtotal Revenue                                     | \$ 66,033  | \$ 49,482 | \$ 47,058 | \$ 30,213 | \$ 20,720 | \$ 8,048 | \$ 6,242 | \$ 5,425 | \$ 5,423  | \$ 13,688 | \$ 34,445 | \$ 56,817 | \$ 343,594 | \$ - |
| <u>Adjustments for Remaining Riders</u>              |            |           |           |           |           |          |          |          |           |           |           |           |            |      |
| Boswell 4 Environmental Adjustment (per kWh)         | \$ -       | \$ -      | \$ -      | \$ -      | \$ -      | \$ -     | \$ -     | \$ -     | \$ -      | \$ -      | \$ -      | \$ -      | \$ -       | \$ - |
| Renewable Resource Adjustment (per kWh)              | \$ -       | \$ -      | \$ -      | \$ -      | \$ -      | \$ -     | \$ -     | \$ -     | \$ -      | \$ -      | \$ -      | \$ -      | \$ -       | \$ - |
| Transmission Adjustment (per kWh)                    | \$ -       | \$ -      | \$ -      | \$ -      | \$ -      | \$ -     | \$ -     | \$ -     | \$ -      | \$ -      | \$ -      | \$ -      | \$ -       | \$ - |
| Solar Energy Adjustment                              | \$ (103)   | \$ (42)   | \$ (46)   | \$ (46)   | \$ (39)   | \$ (12)  | \$ (10)  | \$ (8)   | \$ (9)    | \$ (39)   | \$ (94)   | \$ (83)   | \$ (532)   | \$ - |
| Conservation Program Adjustment (per kWh)            | \$ (128)   | \$ (96)   | \$ (90)   | \$ (58)   | \$ (38)   | \$ (11)  | \$ (7)   | \$ (5)   | \$ 15     | \$ 58     | \$ 167    | \$ 279    | \$ 87      | \$ - |
| TOTAL REVENUE  | \$ 65,803  | \$ 49,344 | \$ 46,921 | \$ 30,110 | \$ 20,642 | \$ 8,025 | \$ 6,225 | \$ 5,411 | \$ 5,429  | \$ 13,707 | \$ 34,517 | \$ 57,014 | \$ 343,149 | \$ - |

Minnesota Power  
**Minnesota Power**  
**Residential Electric Vehicle - Rate 28**  
**TEST YEAR 2020**

**Present Rate Revenue**

|                        | January   | February | March    | April    | May      | June     | July     | August   | September | October  | November | December  | Total  |
|------------------------|-----------|----------|----------|----------|----------|----------|----------|----------|-----------|----------|----------|-----------|--------|
| Minimum Charge         | \$ 13     | \$ 13    | \$ 13    | \$ 13    | \$ 13    | \$ 13    | \$ 13    | \$ 13    | \$ 13     | \$ 13    | \$ 13    | \$ 13     | \$ 153 |
| Energy Blocks          |           |          |          |          |          |          |          |          |           |          |          |           |        |
| Energy On - Peak       | \$ 117.63 | \$ -     | \$ -     | \$ -     | \$ -     | \$ -     | \$ -     | \$ -     | \$ -      | \$ -     | \$ -     | \$ 117.63 | \$ 235 |
| Energy Off - Peak      | \$ 39.03  | \$ 39.03 | \$ 39.03 | \$ 39.03 | \$ 39.03 | \$ 78.06 | \$ 39.03 | \$ 39.03 | \$ 39.03  | \$ 39.03 | \$ 39.03 | \$ 39.03  | \$ 507 |
| Total Base Revenue     | \$ 169    | \$ 52    | \$ 52    | \$ 52    | \$ 52    | \$ 91    | \$ 52    | \$ 52    | \$ 52     | \$ 52    | \$ 52    | \$ 169    | \$ 896 |
| Fuel Clause Adjustment | \$ 3      | \$ 0     | \$ 1     | \$ (1)   | \$ (1)   | \$ 9     | \$ 7     | \$ 7     | \$ 5      | \$ 5     | \$ 5     | \$ 12     | \$ 51  |
| Subtotal               | \$ 172    | \$ 52    | \$ 53    | \$ 51    | \$ 50    | \$ 100   | \$ 58    | \$ 59    | \$ 57     | \$ 56    | \$ 56    | \$ 181    | \$ 946 |

Adjustments for Riders Included in Base Rates

|  |           |           |           |           |           |           |           |           |           |           |           |           |         |
|--|-----------|-----------|-----------|-----------|-----------|-----------|-----------|-----------|-----------|-----------|-----------|-----------|---------|
| Boswell 4 Environmental Adjustment (per kWh) | \$ -      | \$ -      | \$ -      | \$ -      | \$ -      | \$ -      | \$ -      | \$ -      | \$ -      | \$ -      | \$ -      | \$ -      | \$ -    |
| Renewable Resource Adjustment (per kWh)      | \$ -      | \$ -      | \$ -      | \$ -      | \$ -      | \$ -      | \$ -      | \$ -      | \$ -      | \$ -      | \$ -      | \$ -      | \$ -    |
| Transmission Adjustment (per kWh)            | \$ -      | \$ -      | \$ -      | \$ -      | \$ -      | \$ -      | \$ -      | \$ -      | \$ -      | \$ -      | \$ -      | \$ -      | \$ -    |
| Excess ADIT Credit                           | \$ (2.59) | \$ (0.79) | \$ (0.79) | \$ (0.79) | \$ (0.79) | \$ (1.39) | \$ (0.79) | \$ (0.79) | \$ (0.79) | \$ (0.79) | \$ (0.79) | \$ (2.59) | \$ (14) |
| Subtotal Revenue                             | \$ 170    | \$ 51     | \$ 52     | \$ 50     | \$ 50     | \$ 98     | \$ 58     | \$ 58     | \$ 56     | \$ 56     | \$ 56     | \$ 178    | \$ 933  |

Adjustments for Remaining Riders

|  |        |        |        |        |        |        |        |        |        |        |        |        |        |
|--|--------|--------|--------|--------|--------|--------|--------|--------|--------|--------|--------|--------|--------|
| Boswell 4 Environmental Adjustment (per kWh) | \$ -   | \$ -   | \$ -   | \$ -   | \$ -   | \$ -   | \$ -   | \$ -   | \$ -   | \$ -   | \$ -   | \$ -   | \$ -   |
| Renewable Resource Adjustment (per kWh)      | \$ -   | \$ -   | \$ -   | \$ -   | \$ -   | \$ -   | \$ -   | \$ -   | \$ -   | \$ -   | \$ -   | \$ -   | \$ -   |
| Transmission Adjustment (per kWh)            | \$ -   | \$ -   | \$ -   | \$ -   | \$ -   | \$ -   | \$ -   | \$ -   | \$ -   | \$ -   | \$ -   | \$ -   | \$ -   |
| Solar Energy Adjustment                      | \$ (0) | \$ (0) | \$ (0) | \$ (0) | \$ (0) | \$ (0) | \$ (0) | \$ (0) | \$ (0) | \$ (0) | \$ (0) | \$ (0) | \$ (2) |
| Conservation Program Adjustment (per kWh)    | \$ (0) | \$ (0) | \$ (0) | \$ (0) | \$ (0) | \$ (0) | \$ (0) | \$ (0) | \$ 0   | \$ 0   | \$ 0   | \$ 1   | \$ 0   |
| CARE Surcharge (per Bill)                    | \$ -   | \$ -   | \$ -   | \$ -   | \$ -   | \$ -   | \$ -   | \$ -   | \$ -   | \$ -   | \$ -   | \$ -   | \$ -   |

|               |        |       |       |       |       |       |       |       |       |       |       |        |        |
|---------------|--------|-------|-------|-------|-------|-------|-------|-------|-------|-------|-------|--------|--------|
| TOTAL REVENUE | \$ 169 | \$ 51 | \$ 52 | \$ 50 | \$ 49 | \$ 98 | \$ 57 | \$ 58 | \$ 56 | \$ 56 | \$ 56 | \$ 179 | \$ 931 |
|---------------|--------|-------|-------|-------|-------|-------|-------|-------|-------|-------|-------|--------|--------|

**General Rate Revenue**

|                        | January  | February | March    | April    | May      | June     | July     | August   | September | October  | November | December | Total  |
|------------------------|----------|----------|----------|----------|----------|----------|----------|----------|-----------|----------|----------|----------|--------|
| Minimum Charge         | \$ 13    | \$ 13    | \$ 13    | \$ 13    | \$ 13    | \$ 13    | \$ 13    | \$ 13    | \$ 13     | \$ 13    | \$ 13    | \$ 13    | \$ 153 |
| Energy Blocks          |          |          |          |          |          |          |          |          |           |          |          |          |        |
| Energy On - Peak       | \$ 96.12 | \$ -     | \$ -     | \$ -     | \$ -     | \$ -     | \$ -     | \$ -     | \$ -      | \$ -     | \$ -     | \$ 96.12 | \$ 192 |
| Energy Off - Peak      | \$ 17.52 | \$ 17.52 | \$ 17.52 | \$ 17.52 | \$ 17.52 | \$ 35.04 | \$ 17.52 | \$ 17.52 | \$ 17.52  | \$ 17.52 | \$ 17.52 | \$ 17.52 | \$ 228 |
| Base Cost of Fuel      | \$ 43    | \$ 22    | \$ 22    | \$ 22    | \$ 22    | \$ 43    | \$ 22    | \$ 22    | \$ 22     | \$ 22    | \$ 22    | \$ 43    | \$ 323 |
| Total Base Revenue     | \$ 169   | \$ 52    | \$ 52    | \$ 52    | \$ 52    | \$ 91    | \$ 52    | \$ 52    | \$ 52     | \$ 52    | \$ 52    | \$ 169   | \$ 573 |
| Fuel Clause Adjustment | \$ 3     | \$ 0     | \$ 1     | \$ (1)   | \$ (1)   | \$ 9     | \$ 7     | \$ 7     | \$ 5      | \$ 5     | \$ 5     | \$ 12    | \$ 51  |
| Subtotal               | \$ 172   | \$ 52    | \$ 53    | \$ 51    | \$ 50    | \$ 100   | \$ 58    | \$ 59    | \$ 57     | \$ 56    | \$ 56    | \$ 181   | \$ 946 |

Adjustments for Riders Included in Base Rates

|  |           |           |           |           |           |           |           |           |           |           |           |           |         |
|--|-----------|-----------|-----------|-----------|-----------|-----------|-----------|-----------|-----------|-----------|-----------|-----------|---------|
| Boswell 4 Environmental Adjustment (per kWh) | \$ -      | \$ -      | \$ -      | \$ -      | \$ -      | \$ -      | \$ -      | \$ -      | \$ -      | \$ -      | \$ -      | \$ -      | \$ -    |
| Renewable Resource Adjustment (per kWh)      | \$ -      | \$ -      | \$ -      | \$ -      | \$ -      | \$ -      | \$ -      | \$ -      | \$ -      | \$ -      | \$ -      | \$ -      | \$ -    |
| Transmission Adjustment (per kWh)            | \$ -      | \$ -      | \$ -      | \$ -      | \$ -      | \$ -      | \$ -      | \$ -      | \$ -      | \$ -      | \$ -      | \$ -      | \$ -    |
| Excess ADIT Credit                           | \$ (2.59) | \$ (0.79) | \$ (0.79) | \$ (0.79) | \$ (0.79) | \$ (1.39) | \$ (0.79) | \$ (0.79) | \$ (0.79) | \$ (0.79) | \$ (0.79) | \$ (2.59) | \$ (14) |
| Subtotal Revenue                             | \$ 170    | \$ 51     | \$ 52     | \$ 50     | \$ 50     | \$ 98     | \$ 58     | \$ 58     | \$ 56     | \$ 56     | \$ 56     | \$ 178    | \$ 933  |

Adjustments for Remaining Riders

|  |           |           |           |           |           |           |           |           |           |           |           |           |        |
|--|-----------|-----------|-----------|-----------|-----------|-----------|-----------|-----------|-----------|-----------|-----------|-----------|--------|
| Boswell 4 Environmental Adjustment (per kWh) | \$ -      | \$ -      | \$ -      | \$ -      | \$ -      | \$ -      | \$ -      | \$ -      | \$ -      | \$ -      | \$ -      | \$ -      | \$ -   |
| Renewable Resource Adjustment (per kWh)      | \$ -      | \$ -      | \$ -      | \$ -      | \$ -      | \$ -      | \$ -      | \$ -      | \$ -      | \$ -      | \$ -      | \$ -      | \$ -   |
| Transmission Adjustment (per kWh)            | \$ -      | \$ -      | \$ -      | \$ -      | \$ -      | \$ -      | \$ -      | \$ -      | \$ -      | \$ -      | \$ -      | \$ -      | \$ -   |
| Solar Energy Adjustment                      | \$ (0.22) | \$ (0.06) | \$ (0.07) | \$ (0.11) | \$ (0.14) | \$ (0.32) | \$ (0.20) | \$ (0.20) | \$ (0.23) | \$ (0.25) | \$ (0.21) | \$ (0.22) | \$ (2) |
| Conservation Program Adjustment (per kWh)    | \$ (0)    | \$ (0)    | \$ (0)    | \$ (0)    | \$ (0)    | \$ (0)    | \$ (0)    | \$ (0)    | \$ 0      | \$ 0      | \$ 0      | \$ 1      | \$ 0   |
| CARE Surcharge (per Bill)                    | \$ -      | \$ -      | \$ -      | \$ -      | \$ -      | \$ -      | \$ -      | \$ -      | \$ -      | \$ -      | \$ -      | \$ -      | \$ -   |

|               |        |       |       |       |       |       |       |       |       |       |       |        |        |
|---------------|--------|-------|-------|-------|-------|-------|-------|-------|-------|-------|-------|--------|--------|
| TOTAL REVENUE | \$ 169 | \$ 51 | \$ 52 | \$ 50 | \$ 49 | \$ 98 | \$ 57 | \$ 58 | \$ 56 | \$ 56 | \$ 56 | \$ 179 | \$ 931 |
|---------------|--------|-------|-------|-------|-------|-------|-------|-------|-------|-------|-------|--------|--------|



## Minnesota Power

Minnesota Power Docket No. E015/GR-19-442

General Service - Rate 25

TEST YEAR 2020

**Present Rate Revenue**

|  | January      | February     | March        | April        | May          | June         | July         | August       | September    | October      | November     | December     | Total          |
|--|--------------|--------------|--------------|--------------|--------------|--------------|--------------|--------------|--------------|--------------|--------------|--------------|----------------|
| Minimum Charge   | \$ 248,988   | \$ 249,060   | \$ 249,300   | \$ 249,576   | \$ 249,864   | \$ 249,936   | \$ 250,176   | \$ 250,548   | \$ 250,536   | \$ 250,548   | \$ 250,920   | \$ 250,980   | \$ 3,000,432   |
| No Demand Meter<br>Energy - All kWh  | \$ 652,227   | \$ 644,774   | \$ 633,426   | \$ 484,352   | \$ 477,507   | \$ 452,937   | \$ 479,004   | \$ 494,740   | \$ 436,391   | \$ 416,078   | \$ 482,342   | \$ 633,356   | \$ 6,287,134   |
| Demand Meter<br>Demand - All kW  | \$ 1,209,254 | \$ 1,136,486 | \$ 1,257,347 | \$ 1,024,010 | \$ 1,194,018 | \$ 1,342,946 | \$ 1,418,528 | \$ 1,394,140 | \$ 1,286,903 | \$ 1,277,621 | \$ 1,283,295 | \$ 1,389,856 | \$ 15,214,401  |
| Energy - All kWh   | \$ 4,148,552 | \$ 4,079,334 | \$ 4,156,484 | \$ 3,388,543 | \$ 3,574,167 | \$ 3,746,612 | \$ 4,072,021 | \$ 4,298,356 | \$ 3,814,491 | \$ 3,463,964 | \$ 3,713,917 | \$ 4,494,925 | \$ 46,951,365  |
| Service Voltage Adjustment<br>High Voltage Service<br>Transmission Voltage Service | \$ (18,594)  | \$ (17,692)  | \$ (19,148)  | \$ (15,712)  | \$ (17,806)  | \$ (17,040)  | \$ (15,488)  | \$ (16,904)  | \$ (14,876)  | \$ (15,924)  | \$ (16,620)  | \$ (20,888)  | \$ (206,692)   |
| Total Base Revenue   | \$ 6,240,426 | \$ 6,091,962 | \$ 6,277,408 | \$ 5,130,769 | \$ 5,477,750 | \$ 5,775,390 | \$ 6,204,241 | \$ 6,420,880 | \$ 5,773,445 | \$ 5,392,286 | \$ 5,713,854 | \$ 6,748,229 | \$ 71,246,639  |
| Fuel Clause Adjustment   | \$ 95,110    | \$ 29,747    | \$ 54,732    | \$ (31,598)  | \$ (67,842)  | \$ 240,930   | \$ 395,522   | \$ 433,255   | \$ 282,449   | \$ 231,329   | \$ 246,344   | \$ 384,750   | \$ 2,294,727   |
| Subtotal   | \$ 6,335,536 | \$ 6,121,709 | \$ 6,332,140 | \$ 5,099,170 | \$ 5,409,907 | \$ 6,016,319 | \$ 6,599,763 | \$ 6,854,135 | \$ 6,055,893 | \$ 5,623,615 | \$ 5,960,198 | \$ 7,132,980 | \$ 73,541,366  |
| <b>Adjustments for Riders Included in Base Rates</b>                               |              |              |              |              |              |              |              |              |              |              |              |              |                |
| Boswell 4 Environmental Adjustment (per kWh)                                       | \$ -         | \$ -         | \$ -         | \$ -         | \$ -         | \$ -         | \$ -         | \$ -         | \$ -         | \$ -         | \$ -         | \$ -         | \$ -           |
| Renewable Resource Adjustment (per kWh)  | \$ -         | \$ -         | \$ -         | \$ -         | \$ -         | \$ -         | \$ -         | \$ -         | \$ -         | \$ -         | \$ -         | \$ -         | \$ -           |
| Transmission Adjustment (per kWh)  | \$ -         | \$ -         | \$ -         | \$ -         | \$ -         | \$ -         | \$ -         | \$ -         | \$ -         | \$ -         | \$ -         | \$ -         | \$ -           |
| Excess ADIT Credit   | \$ (95,223)  | \$ (92,957)  | \$ (95,787)  | \$ (78,290)  | \$ (83,585)  | \$ (88,127)  | \$ (94,671)  | \$ (97,976)  | \$ (88,097)  | \$ (82,281)  | \$ (87,188)  | \$ (102,971) | \$ (1,087,152) |
| Subtotal Revenue   | \$ 6,240,314 | \$ 6,028,752 | \$ 6,236,353 | \$ 5,020,880 | \$ 5,326,322 | \$ 5,928,193 | \$ 6,505,093 | \$ 6,756,158 | \$ 5,967,796 | \$ 5,541,334 | \$ 5,873,011 | \$ 7,030,008 | \$ 72,454,214  |
| <b>Adjustments for Remaining Riders</b>  |              |              |              |              |              |              |              |              |              |              |              |              |                |
| Boswell 4 Environmental Adjustment (per kWh)                                       | \$ -         | \$ -         | \$ -         | \$ -         | \$ -         | \$ -         | \$ -         | \$ -         | \$ -         | \$ -         | \$ -         | \$ -         | \$ -           |
| Renewable Resource Adjustment (per kWh)  | \$ -         | \$ -         | \$ -         | \$ -         | \$ -         | \$ -         | \$ -         | \$ -         | \$ -         | \$ -         | \$ -         | \$ -         | \$ -           |
| Transmission Adjustment (per kWh)  | \$ -         | \$ -         | \$ -         | \$ -         | \$ -         | \$ -         | \$ -         | \$ -         | \$ -         | \$ -         | \$ -         | \$ -         | \$ -           |
| Solar Energy Adjustment  | \$ (6,677)   | \$ (3,583)   | \$ (4,244)   | \$ (5,399)   | \$ (7,204)   | \$ (8,556)   | \$ (11,601)  | \$ (12,226)  | \$ (12,467)  | \$ (12,350)  | \$ (11,199)  | \$ (7,156)   | \$ (102,660)   |
| Community Solar Garden - Customer Charge   | \$ 3,697     | \$ 3,697     | \$ 3,697     | \$ 3,697     | \$ 3,697     | \$ 3,697     | \$ 3,697     | \$ 3,697     | \$ 3,697     | \$ 3,697     | \$ 3,697     | \$ 3,697     | \$ 44,366      |
| Conservation Program Adjustment (per kWh)  | \$ (8,319)   | \$ (8,187)   | \$ (8,315)   | \$ (6,735)   | \$ (7,061)   | \$ (7,339)   | \$ (7,961)   | \$ (8,387)   | \$ 20,190    | \$ 18,394    | \$ 19,849    | \$ 24,208    | \$ 20,335      |
| CCRC Credit for CIP-exempt   | \$ (495)     | \$ (495)     | \$ (495)     | \$ (495)     | \$ (495)     | \$ (495)     | \$ (495)     | \$ (495)     | \$ (495)     | \$ (495)     | \$ (495)     | \$ (495)     | \$ (5,938)     |
| CARE Surcharge (per Bill)  | \$ 32,161    | \$ 32,170    | \$ 32,201    | \$ 32,237    | \$ 32,274    | \$ 32,283    | \$ 32,314    | \$ 32,362    | \$ 32,361    | \$ 32,362    | \$ 32,411    | \$ 32,418    | \$ 387,556     |
| TOTAL REVENUE  | \$ 6,260,681 | \$ 6,052,354 | \$ 6,259,198 | \$ 5,044,185 | \$ 5,347,534 | \$ 5,947,783 | \$ 6,521,047 | \$ 6,771,110 | \$ 6,011,083 | \$ 5,582,943 | \$ 5,917,274 | \$ 7,082,681 | \$ 72,797,873  |

**General Rate Revenue**

|  | January      | February     | March        | April        | May          | June         | July         | August       | September    | October      | November     | December     | Total          |
|--|--------------|--------------|--------------|--------------|--------------|--------------|--------------|--------------|--------------|--------------|--------------|--------------|----------------|
| Minimum Charge   | \$ 248,988   | \$ 249,060   | \$ 249,300   | \$ 249,576   | \$ 249,864   | \$ 249,936   | \$ 250,176   | \$ 250,548   | \$ 250,536   | \$ 250,548   | \$ 250,920   | \$ 250,980   | \$ 3,000,432   |
| No Demand Meter<br>Energy - All kWh  | \$ 511,839   | \$ 505,967   | \$ 497,020   | \$ 380,011   | \$ 374,623   | \$ 355,331   | \$ 375,771   | \$ 388,142   | \$ 342,382   | \$ 326,476   | \$ 378,508   | \$ 497,044   | \$ 4,933,115   |
| Demand Meter<br>Demand - All kW  | \$ 1,209,254 | \$ 1,136,486 | \$ 1,257,347 | \$ 1,024,010 | \$ 1,194,018 | \$ 1,342,946 | \$ 1,418,528 | \$ 1,394,140 | \$ 1,286,903 | \$ 1,277,621 | \$ 1,283,295 | \$ 1,389,856 | \$ 15,214,401  |
| Energy - All kWh   | \$ 2,952,334 | \$ 2,902,702 | \$ 2,957,009 | \$ 2,410,181 | \$ 2,542,071 | \$ 2,664,701 | \$ 2,896,050 | \$ 3,057,479 | \$ 2,713,562 | \$ 2,464,622 | \$ 2,642,926 | \$ 3,199,121 | \$ 33,402,757  |
| Service Voltage Adjustment<br>High Voltage Service<br>Transmission Voltage Service | \$ (18,594)  | \$ (17,692)  | \$ (19,148)  | \$ (15,712)  | \$ (17,806)  | \$ (17,040)  | \$ (15,488)  | \$ (16,904)  | \$ (14,876)  | \$ (15,924)  | \$ (16,620)  | \$ (20,888)  | \$ (206,692)   |
| Base Cost of Fuel  | \$ 1,336,605 | \$ 1,315,439 | \$ 1,335,881 | \$ 1,082,703 | \$ 1,134,981 | \$ 1,179,516 | \$ 1,279,204 | \$ 1,347,475 | \$ 1,194,938 | \$ 1,088,943 | \$ 1,174,825 | \$ 1,432,116 | \$ 14,902,626  |
| Total Base Revenue   | \$ 6,240,426 | \$ 6,091,962 | \$ 6,277,408 | \$ 5,130,769 | \$ 5,477,750 | \$ 5,775,390 | \$ 6,204,241 | \$ 6,420,880 | \$ 5,773,445 | \$ 5,392,286 | \$ 5,713,854 | \$ 6,748,229 | \$ 71,246,639  |
| Fuel Clause Adjustment   | \$ 95,110    | \$ 29,747    | \$ 54,732    | \$ (31,598)  | \$ (67,842)  | \$ 240,930   | \$ 395,522   | \$ 433,255   | \$ 282,449   | \$ 231,329   | \$ 246,344   | \$ 384,750   | \$ 2,294,727   |
| Subtotal   | \$ 6,335,536 | \$ 6,121,709 | \$ 6,332,140 | \$ 5,099,170 | \$ 5,409,907 | \$ 6,016,319 | \$ 6,599,763 | \$ 6,854,135 | \$ 6,055,893 | \$ 5,623,615 | \$ 5,960,198 | \$ 7,132,980 | \$ 73,541,366  |
| <b>Adjustments for Riders Included in Base Rates</b>                               |              |              |              |              |              |              |              |              |              |              |              |              |                |
| Boswell 4 Environmental Adjustment (per kWh)                                       | \$ -         | \$ -         | \$ -         | \$ -         | \$ -         | \$ -         | \$ -         | \$ -         | \$ -         | \$ -         | \$ -         | \$ -         | \$ -           |
| Renewable Resource Adjustment (per kWh)  | \$ -         | \$ -         | \$ -         | \$ -         | \$ -         | \$ -         | \$ -         | \$ -         | \$ -         | \$ -         | \$ -         | \$ -         | \$ -           |
| Transmission Adjustment (per kWh)  | \$ -         | \$ -         | \$ -         | \$ -         | \$ -         | \$ -         | \$ -         | \$ -         | \$ -         | \$ -         | \$ -         | \$ -         | \$ -           |
| Excess ADIT Credit   | \$ (95,223)  | \$ (92,957)  | \$ (95,787)  | \$ (78,290)  | \$ (83,585)  | \$ (88,127)  | \$ (94,671)  | \$ (97,976)  | \$ (88,097)  | \$ (82,281)  | \$ (87,188)  | \$ (102,971) | \$ (1,087,152) |
| Subtotal Revenue   | \$ 6,240,314 | \$ 6,028,752 | \$ 6,236,353 | \$ 5,020,880 | \$ 5,326,322 | \$ 5,928,193 | \$ 6,505,093 | \$ 6,756,158 | \$ 5,967,796 | \$ 5,541,334 | \$ 5,873,011 | \$ 7,030,008 | \$ 72,454,214  |
| <b>Adjustments for Remaining Riders</b>  |              |              |              |              |              |              |              |              |              |              |              |              |                |
| Boswell 4 Environmental Adjustment (per kWh)                                       | \$ -         | \$ -         | \$ -         | \$ -         | \$ -         | \$ -         | \$ -         | \$ -         | \$ -         | \$ -         | \$ -         | \$ -         | \$ -           |
| Renewable Resource Adjustment (per kWh)  | \$ -         | \$ -         | \$ -         | \$ -         | \$ -         | \$ -         | \$ -         | \$ -         | \$ -         | \$ -         | \$ -         | \$ -         | \$ -           |
| Transmission Adjustment (per kWh)  | \$ -         | \$ -         | \$ -         | \$ -         | \$ -         | \$ -         | \$ -         | \$ -         | \$ -         | \$ -         | \$ -         | \$ -         | \$ -           |
| Solar Energy Adjustment  | \$ (6,677)   | \$ (3,583)   | \$ (4,244)   | \$ (5,399)   | \$ (7,204)   | \$ (8,556)   | \$ (11,601)  | \$ (12,226)  | \$ (12,467)  | \$ (12,350)  | \$ (11,199)  | \$ (7,156)   | \$ (102,660)   |
| Community Solar Garden - Customer Charge   | \$ 3,697     | \$ 3,697     | \$ 3,697     | \$ 3,697     | \$ 3,697     | \$ 3,697     | \$ 3,697     | \$ 3,697     | \$ 3,697     | \$ 3,697     | \$ 3,697     | \$ 3,697     | \$ 44,366      |
| Conservation Program Adjustment (per kWh)  | \$ (8,319)   | \$ (8,187)   | \$ (8,315)   | \$ (6,735)   | \$ (7,061)   | \$ (7,339)   | \$ (7,961)   | \$ (8,387)   | \$ 20,190    | \$ 18,394    | \$ 19,849    | \$ 24,208    | \$ 20,335      |
| CCRC Credit for CIP-exempt   | \$ (495)     | \$ (495)     | \$ (495)     | \$ (495)     | \$ (495)     | \$ (495)     | \$ (495)     | \$ (495)     | \$ (495)     | \$ (495)     | \$ (495)     | \$ (495)     | \$ (5,938)     |
| CARE Surcharge (per Bill)  | \$ 32,161    | \$ 32,170    | \$ 32,201    | \$ 32,237    | \$ 32,274    | \$ 32,283    | \$ 32,314    | \$ 32,362    | \$ 32,361    | \$ 32,362    | \$ 32,411    | \$ 32,418    | \$ 387,556     |
| TOTAL REVENUE  | \$ 6,260,681 | \$ 6,052,354 | \$ 6,259,198 | \$ 5,044,185 | \$ 5,347,534 | \$ 5,947,783 | \$ 6,521,047 | \$ 6,771,110 | \$ 6,011,083 | \$ 5,582,943 | \$ 5,917,274 | \$ 7,082,681 | \$ 72,797,873  |

Minnesota Power  
**Minnesota Power**  
**Commercial/Industrial Dual Fuel - Rate 26**  
**TEST YEAR 2020**

**Present Rate Revenue**

|  | January    | February   | March      | April      | May        | June       | July       | August     | September  | October    | November   | December   | Total        |
|--|------------|------------|------------|------------|------------|------------|------------|------------|------------|------------|------------|------------|--------------|
| Minimum Charge                                       | \$ 6,516   | \$ 6,516   | \$ 6,516   | \$ 6,528   | \$ 6,516   | \$ 6,516   | \$ 6,516   | \$ 6,516   | \$ 6,516   | \$ 6,516   | \$ 6,516   | \$ 6,516   | \$ 78,204    |
| Energy - All kWh                                     |            |            |            |            |            |            |            |            |            |            |            |            |              |
| Low Voltage Service kWh                              | \$ 254,383 | \$ 252,375 | \$ 231,786 | \$ 188,886 | \$ 118,727 | \$ 98,353  | \$ 130,420 | \$ 129,702 | \$ 136,302 | \$ 107,751 | \$ 152,372 | \$ 188,456 | \$ 1,989,512 |
| High Voltage Service                                 | \$ 12,741  | \$ 12,640  | \$ 11,609  | \$ 9,460   | \$ 5,946   | \$ 4,926   | \$ 6,532   | \$ 6,496   | \$ 6,827   | \$ 5,397   | \$ 7,631   | \$ 9,439   | \$ 99,643    |
| Total Base Revenue                                   | \$ 273,640 | \$ 271,531 | \$ 249,911 | \$ 204,875 | \$ 131,189 | \$ 109,795 | \$ 143,468 | \$ 142,714 | \$ 149,645 | \$ 119,663 | \$ 166,519 | \$ 204,411 | \$ 2,167,359 |
| Fuel Clause Adjustment                               | \$ 5,543   | \$ 1,748   | \$ 2,910   | \$ (1,690) | \$ (2,176) | \$ 6,159   | \$ 12,364  | \$ 12,783  | \$ 9,874   | \$ 7,012   | \$ 9,784   | \$ 15,501  | \$ 79,813    |
| Subtotal   | \$ 279,183 | \$ 273,279 | \$ 252,820 | \$ 203,185 | \$ 129,013 | \$ 115,954 | \$ 155,832 | \$ 155,498 | \$ 159,518 | \$ 126,676 | \$ 176,303 | \$ 219,911 | \$ 2,247,172 |
| <u>Adjustments for Riders Included in Base Rates</u> |            |            |            |            |            |            |            |            |            |            |            |            |              |
| Boswell 4 Environmental Adjustment (per kWh)         | \$ -       | \$ -       | \$ -       | \$ -       | \$ -       | \$ -       | \$ -       | \$ -       | \$ -       | \$ -       | \$ -       | \$ -       | \$ -         |
| Renewable Resource Adjustment (per kWh)              | \$ -       | \$ -       | \$ -       | \$ -       | \$ -       | \$ -       | \$ -       | \$ -       | \$ -       | \$ -       | \$ -       | \$ -       | \$ -         |
| Transmission Adjustment (per kWh)                    | \$ -       | \$ -       | \$ -       | \$ -       | \$ -       | \$ -       | \$ -       | \$ -       | \$ -       | \$ -       | \$ -       | \$ -       | \$ -         |
| Excess ADIT Credit                                   | \$ (4,175) | \$ (4,143) | \$ (3,813) | \$ (3,126) | \$ (2,002) | \$ (1,675) | \$ (2,189) | \$ (2,178) | \$ (2,283) | \$ (1,826) | \$ (2,541) | \$ (3,119) | \$ (33,072)  |
| Subtotal Revenue                                     | \$ 275,007 | \$ 269,135 | \$ 249,007 | \$ 200,058 | \$ 127,011 | \$ 114,279 | \$ 153,643 | \$ 153,320 | \$ 157,235 | \$ 124,850 | \$ 173,762 | \$ 216,792 | \$ 2,214,100 |
| <u>Adjustments for Remaining Riders</u>              |            |            |            |            |            |            |            |            |            |            |            |            |              |
| Boswell 4 Environmental Adjustment (per kWh)         | \$ -       | \$ -       | \$ -       | \$ -       | \$ -       | \$ -       | \$ -       | \$ -       | \$ -       | \$ -       | \$ -       | \$ -       | \$ -         |
| Renewable Resource Adjustment (per kWh)              | \$ -       | \$ -       | \$ -       | \$ -       | \$ -       | \$ -       | \$ -       | \$ -       | \$ -       | \$ -       | \$ -       | \$ -       | \$ -         |
| Transmission Adjustment (per kWh)                    | \$ -       | \$ -       | \$ -       | \$ -       | \$ -       | \$ -       | \$ -       | \$ -       | \$ -       | \$ -       | \$ -       | \$ -       | \$ -         |
| Solar Energy Adjustment                              | \$ (390)   | \$ (211)   | \$ (226)   | \$ (290)   | \$ (232)   | \$ (219)   | \$ (364)   | \$ (362)   | \$ (437)   | \$ (376)   | \$ (446)   | \$ (289)   | \$ (3,841)   |
| Conservation Program Adjustment (per kWh)            | \$ (486)   | \$ (482)   | \$ (443)   | \$ (361)   | \$ (227)   | \$ (188)   | \$ (249)   | \$ (248)   | \$ 707     | \$ 559     | \$ 790     | \$ 977     | \$ 350       |
| TOTAL REVENUE  | \$ 274,131 | \$ 268,442 | \$ 248,338 | \$ 199,408 | \$ 126,553 | \$ 113,872 | \$ 153,030 | \$ 152,711 | \$ 157,505 | \$ 125,033 | \$ 174,107 | \$ 217,480 | \$ 2,210,610 |

**General Rate Revenue**

|  | January    | February   | March      | April      | May        | June       | July       | August     | September  | October    | November   | December   | Total        |
|--|------------|------------|------------|------------|------------|------------|------------|------------|------------|------------|------------|------------|--------------|
| Minimum Charge                                       | \$ 6,516   | \$ 6,516   | \$ 6,516   | \$ 6,528   | \$ 6,516   | \$ 6,516   | \$ 6,516   | \$ 6,516   | \$ 6,516   | \$ 6,516   | \$ 6,516   | \$ 6,516   | \$ 78,204    |
| Energy - All kWh                                     |            |            |            |            |            |            |            |            |            |            |            |            |              |
| Low Voltage Service                                  | \$ 180,533 | \$ 179,108 | \$ 164,496 | \$ 134,051 | \$ 84,259  | \$ 69,800  | \$ 92,558  | \$ 92,048  | \$ 96,732  | \$ 76,469  | \$ 108,137 | \$ 133,745 | \$ 1,411,936 |
| High Voltage Service                                 | \$ 8,734   | \$ 8,665   | \$ 7,958   | \$ 6,485   | \$ 4,076   | \$ 3,377   | \$ 4,478   | \$ 4,453   | \$ 4,680   | \$ 3,700   | \$ 5,232   | \$ 6,470   | \$ 68,308    |
| Base Cost of Fuel                                    | \$ 77,857  | \$ 77,242  | \$ 70,940  | \$ 57,811  | \$ 36,337  | \$ 30,102  | \$ 39,916  | \$ 39,697  | \$ 41,717  | \$ 32,978  | \$ 46,635  | \$ 57,679  | \$ 608,910   |
| Total Base Revenue                                   | \$ 273,640 | \$ 271,531 | \$ 249,911 | \$ 204,875 | \$ 131,189 | \$ 109,795 | \$ 143,468 | \$ 142,714 | \$ 149,645 | \$ 119,663 | \$ 166,519 | \$ 204,411 | \$ 2,167,359 |
| Fuel Clause Adjustment                               | \$ 5,543   | \$ 1,748   | \$ 2,910   | \$ (1,690) | \$ (2,176) | \$ 6,159   | \$ 12,364  | \$ 12,783  | \$ 9,874   | \$ 7,012   | \$ 9,784   | \$ 15,501  | \$ 79,813    |
| Subtotal   | \$ 279,183 | \$ 273,279 | \$ 252,820 | \$ 203,185 | \$ 129,013 | \$ 115,954 | \$ 155,832 | \$ 155,498 | \$ 159,518 | \$ 126,676 | \$ 176,303 | \$ 219,911 | \$ 2,247,172 |
| <u>Adjustments for Riders Included in Base Rates</u> |            |            |            |            |            |            |            |            |            |            |            |            |              |
| Boswell 4 Environmental Adjustment (per kWh)         | \$ -       | \$ -       | \$ -       | \$ -       | \$ -       | \$ -       | \$ -       | \$ -       | \$ -       | \$ -       | \$ -       | \$ -       | \$ -         |
| Renewable Resource Adjustment (per kWh)              | \$ -       | \$ -       | \$ -       | \$ -       | \$ -       | \$ -       | \$ -       | \$ -       | \$ -       | \$ -       | \$ -       | \$ -       | \$ -         |
| Transmission Adjustment (per kWh)                    | \$ -       | \$ -       | \$ -       | \$ -       | \$ -       | \$ -       | \$ -       | \$ -       | \$ -       | \$ -       | \$ -       | \$ -       | \$ -         |
| Excess ADIT Credit                                   | \$ (4,175) | \$ (4,143) | \$ (3,813) | \$ (3,126) | \$ (2,002) | \$ (1,675) | \$ (2,189) | \$ (2,178) | \$ (2,283) | \$ (1,826) | \$ (2,541) | \$ (3,119) | \$ (33,072)  |
| Subtotal Revenue                                     | \$ 275,007 | \$ 269,135 | \$ 249,007 | \$ 200,058 | \$ 127,011 | \$ 114,279 | \$ 153,643 | \$ 153,320 | \$ 157,235 | \$ 124,850 | \$ 173,762 | \$ 216,792 | \$ 2,214,100 |
| <u>Adjustments for Remaining Riders</u>              |            |            |            |            |            |            |            |            |            |            |            |            |              |
| Boswell 4 Environmental Adjustment (per kWh)         | \$ -       | \$ -       | \$ -       | \$ -       | \$ -       | \$ -       | \$ -       | \$ -       | \$ -       | \$ -       | \$ -       | \$ -       | \$ -         |
| Renewable Resource Adjustment (per kWh)              | \$ -       | \$ -       | \$ -       | \$ -       | \$ -       | \$ -       | \$ -       | \$ -       | \$ -       | \$ -       | \$ -       | \$ -       | \$ -         |
| Transmission Adjustment (per kWh)                    | \$ -       | \$ -       | \$ -       | \$ -       | \$ -       | \$ -       | \$ -       | \$ -       | \$ -       | \$ -       | \$ -       | \$ -       | \$ -         |
| Solar Energy Adjustment                              | \$ (390)   | \$ (211)   | \$ (226)   | \$ (290)   | \$ (232)   | \$ (219)   | \$ (364)   | \$ (362)   | \$ (437)   | \$ (376)   | \$ (446)   | \$ (289)   | \$ (3,841)   |
| Conservation Program Adjustment (per kWh)            | \$ (486)   | \$ (482)   | \$ (443)   | \$ (361)   | \$ (227)   | \$ (188)   | \$ (249)   | \$ (248)   | \$ 707     | \$ 559     | \$ 790     | \$ 977     | \$ 350       |
| TOTAL REVENUE  | \$ 274,131 | \$ 268,442 | \$ 248,338 | \$ 199,408 | \$ 126,553 | \$ 113,872 | \$ 153,030 | \$ 152,711 | \$ 157,505 | \$ 125,033 | \$ 174,107 | \$ 217,480 | \$ 2,210,610 |

**Present Rate Revenue**

|  | January     | February    | March       | April      | May        | June       | July       | August     | September  | October    | November   | December    | Total     |
|--|-------------|-------------|-------------|------------|------------|------------|------------|------------|------------|------------|------------|-------------|-----------|
| Minimum Charge                                       | \$ 696      | \$ 720      | \$ 672      | \$ 696     | \$ 696     | \$ 696     | \$ 672     | \$ 672     | \$ 696     | \$ 696     | \$ 696     | \$ 696      | \$ 8,304  |
| Energy   |             |             |             |            |            |            |            |            |            |            |            |             |           |
| High Voltage   |             |             |             |            |            |            |            |            |            |            |            |             | \$ -      |
| Low Voltage  | \$ 10,627   | \$ 10,424   | \$ 7,107    | \$ 5,212   | \$ 2,505   | \$ 1,354   | \$ 745     | \$ 745     | \$ 677     | \$ 1,895   | \$ 4,468   | \$ 7,514    | \$ 53,272 |
| Total Base Revenue                                   | \$ 11,323   | \$ 11,144   | \$ 7,779    | \$ 5,908   | \$ 3,201   | \$ 2,050   | \$ 1,417   | \$ 1,417   | \$ 1,373   | \$ 2,591   | \$ 5,164   | \$ 8,210    | \$ 61,576 |
| Fuel Clause Adjustment                               | \$ 245      | \$ 77       | \$ 95       | \$ (49)    | \$ (49)    | \$ 90      | \$ 75      | \$ 78      | \$ 52      | \$ 131     | \$ 304     | \$ 655      | \$ 1,703  |
| Subtotal   | \$ 11,569   | \$ 11,221   | \$ 7,874    | \$ 5,859   | \$ 3,152   | \$ 2,140   | \$ 1,491   | \$ 1,494   | \$ 1,425   | \$ 2,722   | \$ 5,468   | \$ 8,865    | \$ 63,279 |
| <u>Adjustments for Riders Included in Base Rates</u> |             |             |             |            |            |            |            |            |            |            |            |             |           |
| Boswell 4 Environmental Adjustment (per kWh)         | \$ -        | \$ -        | \$ -        | \$ -       | \$ -       | \$ -       | \$ -       | \$ -       | \$ -       | \$ -       | \$ -       | \$ -        | \$ -      |
| Renewable Resource Adjustment (per kWh)              | \$ -        | \$ -        | \$ -        | \$ -       | \$ -       | \$ -       | \$ -       | \$ -       | \$ -       | \$ -       | \$ -       | \$ -        | \$ -      |
| Transmission Adjustment (per kWh)                    | \$ -        | \$ -        | \$ -        | \$ -       | \$ -       | \$ -       | \$ -       | \$ -       | \$ -       | \$ -       | \$ -       | \$ -        | \$ -      |
| Excess ADIT Credit                                   | \$ (172.78) | \$ (170.05) | \$ (118.71) | \$ (90.15) | \$ (48.84) | \$ (31.28) | \$ (21.62) | \$ (21.62) | \$ (20.95) | \$ (39.54) | \$ (78.79) | \$ (125.27) | \$ (940)  |
| Subtotal Revenue                                     | \$ 11,396   | \$ 11,051   | \$ 7,755    | \$ 5,769   | \$ 3,103   | \$ 2,108   | \$ 1,470   | \$ 1,473   | \$ 1,404   | \$ 2,683   | \$ 5,389   | \$ 8,739    | \$ 62,339 |
| <u>Adjustments for Remaining Riders</u>              |             |             |             |            |            |            |            |            |            |            |            |             |           |
| Boswell 4 Environmental Adjustment (per kWh)         | \$ -        | \$ -        | \$ -        | \$ -       | \$ -       | \$ -       | \$ -       | \$ -       | \$ -       | \$ -       | \$ -       | \$ -        | \$ -      |
| Renewable Resource Adjustment (per kWh)              | \$ -        | \$ -        | \$ -        | \$ -       | \$ -       | \$ -       | \$ -       | \$ -       | \$ -       | \$ -       | \$ -       | \$ -        | \$ -      |
| Transmission Adjustment (per kWh)                    | \$ -        | \$ -        | \$ -        | \$ -       | \$ -       | \$ -       | \$ -       | \$ -       | \$ -       | \$ -       | \$ -       | \$ -        | \$ -      |
| Solar Energy Adjustment                              | \$ (17)     | \$ (9)      | \$ (7)      | \$ (8)     | \$ (5)     | \$ (3)     | \$ (2)     | \$ (2)     | \$ (2)     | \$ (7)     | \$ (14)    | \$ (12)     | \$ (90)   |
| Conservation Program Adjustment (per kWh)            | \$ (22)     | \$ (21)     | \$ (14)     | \$ (11)    | \$ (5)     | \$ (3)     | \$ (2)     | \$ (2)     | \$ 4       | \$ 10      | \$ 25      | \$ 41       | \$ 2      |

|               |           |           |          |          |          |          |          |          |          |          |          |          |           |
|---------------|-----------|-----------|----------|----------|----------|----------|----------|----------|----------|----------|----------|----------|-----------|
| TOTAL REVENUE | \$ 11,357 | \$ 11,020 | \$ 7,734 | \$ 5,750 | \$ 3,093 | \$ 2,102 | \$ 1,466 | \$ 1,469 | \$ 1,405 | \$ 2,686 | \$ 5,399 | \$ 8,768 | \$ 62,250 |
|---------------|-----------|-----------|----------|----------|----------|----------|----------|----------|----------|----------|----------|----------|-----------|

**General Rate Revenue**

|  | January     | February    | March       | April      | May        | June       | July       | August     | September  | October    | November   | December    | Total     |
|--|-------------|-------------|-------------|------------|------------|------------|------------|------------|------------|------------|------------|-------------|-----------|
| Minimum Charge                                       | \$ 696      | \$ 720      | \$ 672      | \$ 696     | \$ 696     | \$ 696     | \$ 672     | \$ 672     | \$ 696     | \$ 696     | \$ 696     | \$ 696      | \$ 8,304  |
| Energy - All kWh                                     | \$ 7,180    | \$ 7,043    | \$ 4,802    | \$ 3,522   | \$ 1,692   | \$ 915     | \$ 503     | \$ 503     | \$ 457     | \$ 1,281   | \$ 3,018   | \$ 5,076    | \$ 35,993 |
| Base Cost of Fuel                                    | \$ 3,447    | \$ 3,381    | \$ 2,305    | \$ 1,691   | \$ 812     | \$ 439     | \$ 242     | \$ 242     | \$ 220     | \$ 615     | \$ 1,449   | \$ 2,437    | \$ 17,280 |
| Total Base Revenue                                   | \$ 11,323   | \$ 11,144   | \$ 7,779    | \$ 5,908   | \$ 3,201   | \$ 2,050   | \$ 1,417   | \$ 1,417   | \$ 1,373   | \$ 2,591   | \$ 5,164   | \$ 8,210    | \$ 44,297 |
| Fuel Clause Adjustment                               | \$ 245      | \$ 77       | \$ 95       | \$ (49)    | \$ (49)    | \$ 90      | \$ 75      | \$ 78      | \$ 52      | \$ 131     | \$ 304     | \$ 655      | \$ 1,703  |
| Subtotal   | \$ 11,569   | \$ 11,221   | \$ 7,874    | \$ 5,859   | \$ 3,152   | \$ 2,140   | \$ 1,491   | \$ 1,494   | \$ 1,425   | \$ 2,722   | \$ 5,468   | \$ 8,865    | \$ 63,279 |
| <u>Adjustments for Riders Included in Base Rates</u> |             |             |             |            |            |            |            |            |            |            |            |             |           |
| Boswell 4 Environmental Adjustment (per kWh)         | \$ -        | \$ -        | \$ -        | \$ -       | \$ -       | \$ -       | \$ -       | \$ -       | \$ -       | \$ -       | \$ -       | \$ -        | \$ -      |
| Renewable Resource Adjustment (per kWh)              | \$ -        | \$ -        | \$ -        | \$ -       | \$ -       | \$ -       | \$ -       | \$ -       | \$ -       | \$ -       | \$ -       | \$ -        | \$ -      |
| Transmission Adjustment (per kWh)                    | \$ -        | \$ -        | \$ -        | \$ -       | \$ -       | \$ -       | \$ -       | \$ -       | \$ -       | \$ -       | \$ -       | \$ -        | \$ -      |
| Excess ADIT Credit                                   | \$ (172.78) | \$ (170.05) | \$ (118.71) | \$ (90.15) | \$ (48.84) | \$ (31.28) | \$ (21.62) | \$ (21.62) | \$ (20.95) | \$ (39.54) | \$ (78.79) | \$ (125.27) | \$ (940)  |
| Subtotal Revenue                                     | \$ 11,396   | \$ 11,051   | \$ 7,755    | \$ 5,769   | \$ 3,103   | \$ 2,108   | \$ 1,470   | \$ 1,473   | \$ 1,404   | \$ 2,683   | \$ 5,389   | \$ 8,739    | \$ 62,339 |
| <u>Adjustments for Remaining Riders</u>              |             |             |             |            |            |            |            |            |            |            |            |             |           |
| Boswell 4 Environmental Adjustment (per kWh)         | \$ -        | \$ -        | \$ -        | \$ -       | \$ -       | \$ -       | \$ -       | \$ -       | \$ -       | \$ -       | \$ -       | \$ -        | \$ -      |
| Renewable Resource Adjustment (per kWh)              | \$ -        | \$ -        | \$ -        | \$ -       | \$ -       | \$ -       | \$ -       | \$ -       | \$ -       | \$ -       | \$ -       | \$ -        | \$ -      |
| Transmission Adjustment (per kWh)                    | \$ -        | \$ -        | \$ -        | \$ -       | \$ -       | \$ -       | \$ -       | \$ -       | \$ -       | \$ -       | \$ -       | \$ -        | \$ -      |
| Solar Energy Adjustment                              | \$ (17)     | \$ (9)      | \$ (7)      | \$ (8)     | \$ (5)     | \$ (3)     | \$ (2)     | \$ (2)     | \$ (2)     | \$ (7)     | \$ (14)    | \$ (12)     | \$ (90)   |
| Conservation Program Adjustment (per kWh)            | \$ (22)     | \$ (21)     | \$ (14)     | \$ (11)    | \$ (5)     | \$ (3)     | \$ (2)     | \$ (2)     | \$ 4       | \$ 10      | \$ 25      | \$ 41       | \$ 2      |

|               |           |           |          |          |          |          |          |          |          |          |          |          |           |
|---------------|-----------|-----------|----------|----------|----------|----------|----------|----------|----------|----------|----------|----------|-----------|
| TOTAL REVENUE | \$ 11,357 | \$ 11,020 | \$ 7,734 | \$ 5,750 | \$ 3,093 | \$ 2,102 | \$ 1,466 | \$ 1,469 | \$ 1,405 | \$ 2,686 | \$ 5,399 | \$ 8,768 | \$ 62,250 |
|---------------|-----------|-----------|----------|----------|----------|----------|----------|----------|----------|----------|----------|----------|-----------|

Minnesota Power  
Large Light and Power - Rate 75  
TEST YEAR 2020

Present Rate Revenue

|   | January                  | February     | March        | April        | May          | June         | July         | August       | September    | October      | November     | December     | Total          |
|---|--------------------------|--------------|--------------|--------------|--------------|--------------|--------------|--------------|--------------|--------------|--------------|--------------|----------------|
| Minimum Charge                                | \$ 475,200               | \$ 477,600   | \$ 478,800   | \$ 484,800   | \$ 482,400   | \$ 484,800   | \$ 484,800   | \$ 477,600   | \$ 477,600   | \$ 501,600   | \$ 475,200   | \$ 483,600   | \$ 5,784,000   |
| Demand Blocks                                 |                          |              |              |              |              |              |              |              |              |              |              |              |                |
| First 100 kW or less                          | \$ -                     | \$ -         | \$ -         | \$ -         | \$ -         | \$ -         | \$ -         | \$ -         | \$ -         | \$ -         | \$ -         | \$ -         | \$ -           |
| Over 100 kW                                   | \$ 1,544,173             | \$ 1,495,190 | \$ 1,593,103 | \$ 1,452,760 | \$ 1,507,717 | \$ 1,645,172 | \$ 1,672,609 | \$ 1,634,262 | \$ 1,661,163 | \$ 1,637,097 | \$ 1,496,366 | \$ 1,552,446 | \$ 18,892,055  |
| Energy - All                                  | \$ 4,424,379             | \$ 4,281,603 | \$ 4,481,269 | \$ 4,004,128 | \$ 4,253,129 | \$ 4,506,489 | \$ 4,735,733 | \$ 4,855,904 | \$ 4,631,716 | \$ 4,420,602 | \$ 4,106,169 | \$ 4,434,374 | \$ 53,135,493  |
| Service Voltage Adjustment                    |                          |              |              |              |              |              |              |              |              |              |              |              |                |
| High Voltage Service                          | \$ (175,176)             | \$ (160,564) | \$ (166,748) | \$ (157,426) | \$ (153,768) | \$ (162,372) | \$ (157,910) | \$ (149,680) | \$ (165,624) | \$ (152,568) | \$ (149,032) | \$ (154,770) | \$ (1,905,638) |
| Foundry Discount                              | \$ (47,000)              | \$ (49,000)  | \$ (49,000)  | \$ (49,000)  | \$ (47,500)  | \$ (47,750)  | \$ (48,500)  | \$ (48,750)  | \$ (49,500)  | \$ (46,500)  | \$ (46,750)  | \$ (47,750)  | \$ (577,000)   |
| Transmission Voltage Service                  | \$ (5,474)               | \$ (5,023)   | \$ (5,474)   | \$ (5,324)   | \$ (5,474)   | \$ (5,324)   | \$ (5,474)   | \$ (5,474)   | \$ (5,324)   | \$ (5,474)   | \$ (5,324)   | \$ (5,478)   | \$ (64,638)    |
| Business Incentive Discount                   | \$ (15,900)              | \$ (15,900)  | \$ (15,900)  | \$ (15,900)  | \$ (15,900)  | \$ (15,900)  | \$ (15,900)  | \$ (15,900)  | \$ (15,900)  | \$ (15,900)  | \$ (15,900)  | \$ (15,900)  | \$ (190,800)   |
| Total Base Revenue                            | \$ 6,200,202             | \$ 6,023,906 | \$ 6,316,049 | \$ 5,714,038 | \$ 6,020,604 | \$ 6,405,115 | \$ 6,665,357 | \$ 6,747,962 | \$ 6,534,131 | \$ 6,338,857 | \$ 5,860,729 | \$ 6,246,523 | \$ 75,073,472  |
| Gerdau Base Revenue                           | TRADE SECRET DATA BEGINS |              |              |              |              |              |              |              |              |              |              |              |                |
| Pipelines                                     | TRADE SECRET DATA BEGINS |              |              |              |              |              |              |              |              |              |              |              |                |
| Fuel Clause Adjustment                        | \$ 167,658               | \$ 51,494    | \$ 98,759    | \$ (64,878)  | \$ (134,258) | \$ 460,368   | \$ 729,591   | \$ 764,016   | \$ 542,187   | \$ 476,233   | \$ 453,491   | \$ 623,579   | \$ 4,168,239   |
| Subtotal                                      | \$ 8,683,898             | \$ 8,334,390 | \$ 8,828,430 | \$ 8,013,472 | \$ 8,077,823 | \$ 8,798,455 | \$ 9,357,757 | \$ 9,400,168 | \$ 8,959,724 | \$ 8,797,953 | \$ 8,409,472 | \$ 9,059,844 | \$ 104,721,386 |
| Adjustments for Riders Included in Base Rates |                          |              |              |              |              |              |              |              |              |              |              |              |                |
| Boswell 4 Environmental Adjustment (per kWh)  | \$ -                     | \$ -         | \$ -         | \$ -         | \$ -         | \$ -         | \$ -         | \$ -         | \$ -         | \$ -         | \$ -         | \$ -         | \$ -           |
| Renewable Resource Adjustment (per kWh)       | \$ -                     | \$ -         | \$ -         | \$ -         | \$ -         | \$ -         | \$ -         | \$ -         | \$ -         | \$ -         | \$ -         | \$ -         | \$ -           |
| Transmission Adjustment (per kWh)             | \$ -                     | \$ -         | \$ -         | \$ -         | \$ -         | \$ -         | \$ -         | \$ -         | \$ -         | \$ -         | \$ -         | \$ -         | \$ -           |
| Excess ADIT Credit                            | \$ (129,949)             | \$ (126,389) | \$ (133,206) | \$ (123,268) | \$ (125,308) | \$ (127,231) | \$ (131,657) | \$ (131,779) | \$ (128,443) | \$ (126,981) | \$ (121,400) | \$ (128,729) | \$ (1,534,340) |
| Subtotal Revenue                              | \$ 8,553,948             | \$ 8,208,001 | \$ 8,695,224 | \$ 7,890,204 | \$ 7,952,515 | \$ 8,671,224 | \$ 9,226,100 | \$ 9,268,389 | \$ 8,831,281 | \$ 8,670,972 | \$ 8,288,072 | \$ 8,931,115 | \$ 103,187,045 |
| Adjustments for Remaining Riders              |                          |              |              |              |              |              |              |              |              |              |              |              |                |
| Boswell 4 Environmental Adjustment (per kWh)  | \$ -                     | \$ -         | \$ -         | \$ -         | \$ -         | \$ -         | \$ -         | \$ -         | \$ -         | \$ -         | \$ -         | \$ -         | \$ -           |
| Renewable Resource Adjustment (per kWh)       | \$ -                     | \$ -         | \$ -         | \$ -         | \$ -         | \$ -         | \$ -         | \$ -         | \$ -         | \$ -         | \$ -         | \$ -         | \$ -           |
| Transmission Adjustment (per kWh)             | \$ -                     | \$ -         | \$ -         | \$ -         | \$ -         | \$ -         | \$ -         | \$ -         | \$ -         | \$ -         | \$ -         | \$ -         | \$ -           |
| Solar Energy Adjustment                       | \$ (11,947)              | \$ (6,302)   | \$ (7,775)   | \$ (11,256)  | \$ (14,469)  | \$ (16,600)  | \$ (21,726)  | \$ (21,887)  | \$ (24,302)  | \$ (25,807)  | \$ (20,920)  | \$ (11,770)  | \$ (194,760)   |
| Conservation Program Adjustment (per kWh)     | \$ (10,319)              | \$ (10,030)  | \$ (10,473)  | \$ (9,387)   | \$ (9,829)   | \$ (10,397)  | \$ (10,930)  | \$ (11,287)  | \$ 29,441    | \$ 28,107    | \$ 26,020    | \$ 27,782    | \$ 28,697      |
| CCRC Credit for CIP-exempt                    | \$ (114,248)             | \$ (108,943) | \$ (118,659) | \$ (115,815) | \$ (108,692) | \$ (96,172)  | \$ (99,587)  | \$ (93,661)  | \$ (91,758)  | \$ (95,713)  | \$ (102,176) | \$ (111,025) | \$ (1,256,449) |
| Care Surcharge                                | \$ 7,721                 | \$ 7,759     | \$ 7,779     | \$ 7,875     | \$ 7,837     | \$ 7,875     | \$ 7,875     | \$ 7,759     | \$ 7,759     | \$ 8,146     | \$ 7,721     | \$ 7,856     | \$ 93,964      |
| TOTAL REVENUE                                 | \$ 8,425,155             | \$ 8,090,486 | \$ 8,566,096 | \$ 7,761,622 | \$ 7,827,362 | \$ 8,555,930 | \$ 9,101,732 | \$ 9,149,313 | \$ 8,752,421 | \$ 8,585,704 | \$ 8,198,715 | \$ 8,843,959 | \$ 101,858,497 |

**PUBLIC DOCUMENT**  
**TRADE SECRET DATA EXCISED**

Minnesota Power  
Docket No. E015/GR-19-442

Volume 4  
IR - 02, Sales Forecast, Revenue and Rate Design Data  
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**Minnesota Power**  
**Large Light and Power - Rate 75**  
**TEST YEAR 2020**

**General Rate Revenue**

|  | January                  | February     | March        | April        | May          | June         | July         | August       | September    | October      | November     | December     | Total          |
|--|--------------------------|--------------|--------------|--------------|--------------|--------------|--------------|--------------|--------------|--------------|--------------|--------------|----------------|
| Minimum Charge                                       | \$ 475,200               | \$ 477,600   | \$ 478,800   | \$ 484,800   | \$ 482,400   | \$ 484,800   | \$ 484,800   | \$ 477,600   | \$ 477,600   | \$ 501,600   | \$ 475,200   | \$ 483,600   | \$ 5,784,000   |
| Demand Blocks  |                          |              |              |              |              |              |              |              |              |              |              |              |                |
| First 100 kW or less                                 | \$ -                     | \$ -         | \$ -         | \$ -         | \$ -         | \$ -         | \$ -         | \$ -         | \$ -         | \$ -         | \$ -         | \$ -         | \$ -           |
| Over 100 kW  | \$ 1,544,173             | \$ 1,495,190 | \$ 1,593,103 | \$ 1,452,760 | \$ 1,507,717 | \$ 1,645,172 | \$ 1,672,609 | \$ 1,634,262 | \$ 1,661,163 | \$ 1,637,097 | \$ 1,496,366 | \$ 1,552,446 | \$ 18,892,055  |
| Energy - All   | \$ 2,793,634             | \$ 2,703,482 | \$ 2,829,555 | \$ 2,528,280 | \$ 2,685,504 | \$ 2,845,479 | \$ 2,990,228 | \$ 3,066,107 | \$ 2,924,550 | \$ 2,791,249 | \$ 2,592,710 | \$ 2,799,945 | \$ 33,550,723  |
| Service Voltage Adjustment                           |                          |              |              |              |              |              |              |              |              |              |              |              |                |
| High Voltage Service                                 | \$ (175,176)             | \$ (160,564) | \$ (166,748) | \$ (157,426) | \$ (153,768) | \$ (162,372) | \$ (157,910) | \$ (149,680) | \$ (165,624) | \$ (152,568) | \$ (149,032) | \$ (154,770) | \$ (1,905,638) |
| Foundry Discount                                     | \$ (47,000)              | \$ (49,000)  | \$ (49,000)  | \$ (49,000)  | \$ (47,500)  | \$ (47,750)  | \$ (48,500)  | \$ (48,750)  | \$ (49,500)  | \$ (46,500)  | \$ (46,750)  | \$ (47,750)  | \$ (577,000)   |
| Transmission Voltage Service                         | \$ (5,474)               | \$ (5,023)   | \$ (5,474)   | \$ (5,324)   | \$ (5,474)   | \$ (5,324)   | \$ (5,474)   | \$ (5,474)   | \$ (5,324)   | \$ (5,474)   | \$ (5,324)   | \$ (5,478)   | \$ (64,638)    |
| Business Incentive Discount                          | \$ (15,900)              | \$ (15,900)  | \$ (15,900)  | \$ (15,900)  | \$ (15,900)  | \$ (15,900)  | \$ (15,900)  | \$ (15,900)  | \$ (15,900)  | \$ (15,900)  | \$ (15,900)  | \$ (15,900)  | \$ (190,800)   |
| Base Cost of Fuel                                    | \$ 1,630,745             | \$ 1,578,121 | \$ 1,651,714 | \$ 1,475,848 | \$ 1,567,625 | \$ 1,661,009 | \$ 1,745,504 | \$ 1,789,797 | \$ 1,707,166 | \$ 1,629,353 | \$ 1,513,459 | \$ 1,634,428 | \$ 19,584,769  |
| Total Base Revenue                                   | \$ 6,200,202             | \$ 6,023,907 | \$ 6,316,049 | \$ 5,714,038 | \$ 6,020,603 | \$ 6,405,115 | \$ 6,665,357 | \$ 6,747,962 | \$ 6,534,131 | \$ 6,338,857 | \$ 5,860,729 | \$ 6,246,522 | \$ 75,073,471  |
| Gerdau Base Revenue                                  | TRADE SECRET DATA BEGINS |              |              |              |              |              |              |              |              |              |              |              |                |
|  | TRADE SECRET DATA BEGINS |              |              |              |              |              |              |              |              |              |              |              |                |
| Pipelines  | TRADE SECRET DATA BEGINS |              |              |              |              |              |              |              |              |              |              |              |                |
|  | TRADE SECRET DATA BEGINS |              |              |              |              |              |              |              |              |              |              |              |                |
| Fuel Clause Adjustment                               | \$ 167,658               | \$ 51,494    | \$ 98,759    | \$ (64,878)  | \$ (134,258) | \$ 460,368   | \$ 729,591   | \$ 764,016   | \$ 542,187   | \$ 476,233   | \$ 453,491   | \$ 623,579   | \$ 4,168,239   |
| Subtotal   | \$ 8,683,898             | \$ 8,334,389 | \$ 8,828,430 | \$ 8,013,472 | \$ 8,077,823 | \$ 8,798,455 | \$ 9,357,757 | \$ 9,400,168 | \$ 8,959,724 | \$ 8,797,954 | \$ 8,409,472 | \$ 9,059,843 | \$ 104,721,385 |
| <u>Adjustments for Riders Included in Base Rates</u> |                          |              |              |              |              |              |              |              |              |              |              |              |                |
| Boswell 4 Environmental Adjustment (per kWh)         | \$ -                     | \$ -         | \$ -         | \$ -         | \$ -         | \$ -         | \$ -         | \$ -         | \$ -         | \$ -         | \$ -         | \$ -         | \$ -           |
| Renewable Resource Adjustment (per kWh)              | \$ -                     | \$ -         | \$ -         | \$ -         | \$ -         | \$ -         | \$ -         | \$ -         | \$ -         | \$ -         | \$ -         | \$ -         | \$ -           |
| Transmission Adjustment (per kWh)                    | \$ -                     | \$ -         | \$ -         | \$ -         | \$ -         | \$ -         | \$ -         | \$ -         | \$ -         | \$ -         | \$ -         | \$ -         | \$ -           |
| Excess ADIT Credit                                   | \$ (129,949)             | \$ (126,389) | \$ (133,206) | \$ (123,268) | \$ (125,308) | \$ (127,231) | \$ (131,657) | \$ (131,779) | \$ (128,443) | \$ (126,981) | \$ (121,400) | \$ (128,729) | \$ (1,534,340) |
| Subtotal Revenue                                     | \$ 8,553,949             | \$ 8,208,001 | \$ 8,695,224 | \$ 7,890,205 | \$ 7,952,515 | \$ 8,671,224 | \$ 9,226,100 | \$ 9,268,389 | \$ 8,831,281 | \$ 8,670,972 | \$ 8,288,071 | \$ 8,931,114 | \$ 103,187,045 |
| <u>Adjustments for Remaining Riders</u>              |                          |              |              |              |              |              |              |              |              |              |              |              |                |
| Boswell 4 Environmental Adjustment (per kWh)         | \$ -                     | \$ -         | \$ -         | \$ -         | \$ -         | \$ -         | \$ -         | \$ -         | \$ -         | \$ -         | \$ -         | \$ -         | \$ -           |
| Renewable Resource Adjustment (per kWh)              | \$ -                     | \$ -         | \$ -         | \$ -         | \$ -         | \$ -         | \$ -         | \$ -         | \$ -         | \$ -         | \$ -         | \$ -         | \$ -           |
| Transmission Adjustment (per kWh)                    | \$ -                     | \$ -         | \$ -         | \$ -         | \$ -         | \$ -         | \$ -         | \$ -         | \$ -         | \$ -         | \$ -         | \$ -         | \$ -           |
| Solar Energy Adjustment                              | \$ (11,947)              | \$ (6,302)   | \$ (7,775)   | \$ (11,256)  | \$ (14,469)  | \$ (16,600)  | \$ (21,726)  | \$ (21,887)  | \$ (24,302)  | \$ (25,807)  | \$ (20,920)  | \$ (11,770)  | \$ (194,760)   |
| Conservation Program Adjustment (per kWh)            | \$ (10,319)              | \$ (10,030)  | \$ (10,473)  | \$ (9,387)   | \$ (9,829)   | \$ (10,397)  | \$ (10,930)  | \$ (11,287)  | \$ 29,441    | \$ 28,107    | \$ 26,020    | \$ 27,782    | \$ 28,697      |
| CCRC Credit for CIP-exempt                           | \$ (114,248)             | \$ (108,943) | \$ (118,659) | \$ (115,815) | \$ (108,692) | \$ (96,172)  | \$ (99,587)  | \$ (93,661)  | \$ (91,758)  | \$ (95,713)  | \$ (102,176) | \$ (111,025) | \$ (1,256,449) |
| Care Surcharge                                       | \$ 7,721                 | \$ 7,759     | \$ 7,779     | \$ 7,875     | \$ 7,837     | \$ 7,875     | \$ 7,875     | \$ 7,759     | \$ 7,759     | \$ 8,146     | \$ 7,721     | \$ 7,856     | \$ 93,964      |
| TOTAL REVENUE  | \$ 8,425,155             | \$ 8,090,485 | \$ 8,566,096 | \$ 7,761,622 | \$ 7,827,362 | \$ 8,555,930 | \$ 9,101,732 | \$ 9,149,313 | \$ 8,752,421 | \$ 8,585,705 | \$ 8,198,715 | \$ 8,843,958 | \$ 101,858,496 |

Gerdau & Pipeline Base Revenues are broken out above for General Rates. Their FAC, Rider and CIP revenues are included in Current Rates and General Rates rider totals.

**Present Rate Revenue**

|  | January    | February   | March      | April      | May        | June       | July       | August     | September  | October    | November   | December   | Total        |
|--|------------|------------|------------|------------|------------|------------|------------|------------|------------|------------|------------|------------|--------------|
| Minimum Charge                                       | \$ 25,800  | \$ 25,800  | \$ 24,600  | \$ 25,800  | \$ 24,600  | \$ 26,400  | \$ 25,800  | \$ 23,400  | \$ 25,800  | \$ 25,800  | \$ 25,200  | \$ 27,000  | \$ 306,000   |
| Demand Blocks  |            |            |            |            |            |            |            |            |            |            |            |            |              |
| Block 1  | \$ -       | \$ -       | \$ -       | \$ -       | \$ -       | \$ -       | \$ -       | \$ -       | \$ -       | \$ -       | \$ -       | \$ -       | \$ -         |
| Block 2  | \$ 24,084  | \$ 22,716  | \$ 25,260  | \$ 21,444  | \$ 22,044  | \$ 25,392  | \$ 24,876  | \$ 22,164  | \$ 24,216  | \$ 23,592  | \$ 23,856  | \$ 26,748  | \$ 286,392   |
| Block 3  | \$ 69,195  | \$ 63,714  | \$ 72,471  | \$ 58,181  | \$ 78,950  | \$ 101,882 | \$ 83,013  | \$ 57,498  | \$ 82,152  | \$ 84,420  | \$ 63,273  | \$ 75,537  | \$ 890,285   |
| Energy - All   | \$ 204,199 | \$ 202,746 | \$ 201,177 | \$ 172,470 | \$ 193,158 | \$ 213,147 | \$ 188,567 | \$ 170,320 | \$ 198,271 | \$ 195,714 | \$ 192,518 | \$ 232,033 | \$ 2,364,322 |
| Service Voltage Adjustment                           |            |            |            |            |            |            |            |            |            |            |            |            |              |
| High Voltage Service                                 | \$ (908)   | \$ (846)   | \$ (954)   | \$ (738)   | \$ (858)   | \$ (736)   | \$ (992)   | \$ (632)   | \$ (476)   | \$ (844)   | \$ (756)   | \$ (1,158) | \$ (9,898)   |
| Transmission Voltage Service (Rate 75F)              | \$ -       | \$ -       | \$ -       | \$ -       | \$ -       | \$ -       | \$ -       | \$ -       | \$ -       | \$ -       | \$ -       | \$ -       | \$ -         |
| Total Base Revenue                                   | \$ 322,370 | \$ 314,130 | \$ 322,554 | \$ 277,157 | \$ 317,893 | \$ 366,085 | \$ 321,264 | \$ 272,750 | \$ 329,963 | \$ 328,682 | \$ 304,091 | \$ 360,160 | \$ 3,837,100 |
| Fuel Clause Adjustment                               | \$ 5,358   | \$ 1,691   | \$ 3,042   | \$ (1,858) | \$ (4,263) | \$ 16,075  | \$ 21,529  | \$ 20,215  | \$ 17,296  | \$ 15,339  | \$ 14,888  | \$ 22,984  | \$ 132,296   |
| Subtotal   | \$ 327,728 | \$ 315,821 | \$ 325,595 | \$ 275,299 | \$ 313,630 | \$ 382,160 | \$ 342,793 | \$ 292,966 | \$ 347,260 | \$ 344,021 | \$ 318,979 | \$ 383,144 | \$ 3,969,396 |
| <u>Adjustments for Riders Included in Base Rates</u> |            |            |            |            |            |            |            |            |            |            |            |            |              |
| Boswell 4 Environmental Adjustment (per kWh)         | \$ -       | \$ -       | \$ -       | \$ -       | \$ -       | \$ -       | \$ -       | \$ -       | \$ -       | \$ -       | \$ -       | \$ -       | \$ -         |
| Renewable Resource Adjustment (per kWh)              | \$ -       | \$ -       | \$ -       | \$ -       | \$ -       | \$ -       | \$ -       | \$ -       | \$ -       | \$ -       | \$ -       | \$ -       | \$ -         |
| Transmission Adjustment (per kWh)                    | \$ -       | \$ -       | \$ -       | \$ -       | \$ -       | \$ -       | \$ -       | \$ -       | \$ -       | \$ -       | \$ -       | \$ -       | \$ -         |
| Excess ADIT Credit                                   | \$ (4,919) | \$ (4,793) | \$ (4,922) | \$ (4,229) | \$ (4,851) | \$ (5,586) | \$ (4,902) | \$ (4,162) | \$ (5,035) | \$ (5,015) | \$ (4,640) | \$ (5,496) | \$ (58,550)  |
| Subtotal Revenue                                     | \$ 322,809 | \$ 311,028 | \$ 320,673 | \$ 271,070 | \$ 308,779 | \$ 376,574 | \$ 337,891 | \$ 288,804 | \$ 342,225 | \$ 339,006 | \$ 314,339 | \$ 377,648 | \$ 3,910,846 |
| <u>Adjustments for Remaining Riders</u>              |            |            |            |            |            |            |            |            |            |            |            |            |              |
| Boswell 4 Environmental Adjustment (per kWh)         | \$ -       | \$ -       | \$ -       | \$ -       | \$ -       | \$ -       | \$ -       | \$ -       | \$ -       | \$ -       | \$ -       | \$ -       | \$ -         |
| Renewable Resource Adjustment (per kWh)              | \$ -       | \$ -       | \$ -       | \$ -       | \$ -       | \$ -       | \$ -       | \$ -       | \$ -       | \$ -       | \$ -       | \$ -       | \$ -         |
| Transmission Adjustment (per kWh)                    | \$ -       | \$ -       | \$ -       | \$ -       | \$ -       | \$ -       | \$ -       | \$ -       | \$ -       | \$ -       | \$ -       | \$ -       | \$ -         |
| Solar Energy Adjustment                              | \$ (387)   | \$ (209)   | \$ (242)   | \$ (326)   | \$ (465)   | \$ (587)   | \$ (649)   | \$ (586)   | \$ (785)   | \$ (842)   | \$ (696)   | \$ (439)   | \$ (6,214)   |
| Conservation Program Adjustment (per kWh)            | \$ (481)   | \$ (478)   | \$ (474)   | \$ (407)   | \$ (455)   | \$ (503)   | \$ (445)   | \$ (402)   | \$ 1,269   | \$ 1,253   | \$ 1,232   | \$ 1,485   | \$ 1,596     |
| CARE Surcharge (per Bill)                            | \$ 832     | \$ 832     | \$ 793     | \$ 832     | \$ 793     | \$ 851     | \$ 832     | \$ 755     | \$ 832     | \$ 832     | \$ 813     | \$ 871     | \$ 9,869     |
| TOTAL REVENUE  | \$ 322,773 | \$ 311,172 | \$ 320,750 | \$ 271,169 | \$ 308,652 | \$ 376,336 | \$ 337,629 | \$ 288,571 | \$ 343,541 | \$ 340,249 | \$ 315,688 | \$ 379,565 | \$ 3,916,096 |

**General Rate Revenue**

|  | January    | February   | March      | April      | May        | June       | July       | August     | September  | October    | November   | December   | Total        |
|--|------------|------------|------------|------------|------------|------------|------------|------------|------------|------------|------------|------------|--------------|
| Minimum Charge                                       | \$ 25,800  | \$ 25,800  | \$ 24,600  | \$ 25,800  | \$ 24,600  | \$ 26,400  | \$ 25,800  | \$ 23,400  | \$ 25,800  | \$ 25,800  | \$ 25,200  | \$ 27,000  | \$ 306,000   |
| Demand Blocks  |            |            |            |            |            |            |            |            |            |            |            |            |              |
| Block 1  | \$ -       | \$ -       | \$ -       | \$ -       | \$ -       | \$ -       | \$ -       | \$ -       | \$ -       | \$ -       | \$ -       | \$ -       | \$ -         |
| Block 2  | \$ 24,084  | \$ 22,716  | \$ 25,260  | \$ 21,444  | \$ 22,044  | \$ 25,392  | \$ 24,876  | \$ 22,164  | \$ 24,216  | \$ 23,592  | \$ 23,856  | \$ 26,748  | \$ 286,392   |
| Block 3  | \$ 69,195  | \$ 63,714  | \$ 72,471  | \$ 58,181  | \$ 78,950  | \$ 101,882 | \$ 83,013  | \$ 57,498  | \$ 82,152  | \$ 84,420  | \$ 63,273  | \$ 75,537  | \$ 890,285   |
| Energy - All   | \$ 128,935 | \$ 128,017 | \$ 127,027 | \$ 108,901 | \$ 121,963 | \$ 134,585 | \$ 119,065 | \$ 107,543 | \$ 125,192 | \$ 123,578 | \$ 121,560 | \$ 146,510 | \$ 1,492,876 |
| Service Voltage Adjustment                           |            |            |            |            |            |            |            |            |            |            |            |            |              |
| High Voltage Service                                 | \$ (908)   | \$ (846)   | \$ (954)   | \$ (738)   | \$ (858)   | \$ (736)   | \$ (992)   | \$ (632)   | \$ (476)   | \$ (844)   | \$ (756)   | \$ (1,158) | \$ (9,898)   |
| Transmission Voltage Service (Rate 75F)              | \$ -       | \$ -       | \$ -       | \$ -       | \$ -       | \$ -       | \$ -       | \$ -       | \$ -       | \$ -       | \$ -       | \$ -       | \$ -         |
| Base Cost of Fuel                                    | \$ 75,264  | \$ 74,728  | \$ 74,150  | \$ 63,569  | \$ 71,194  | \$ 78,562  | \$ 69,502  | \$ 62,777  | \$ 73,079  | \$ 72,137  | \$ 70,959  | \$ 85,523  | \$ 871,446   |
| Total Base Revenue                                   | \$ 322,370 | \$ 314,130 | \$ 322,554 | \$ 277,157 | \$ 317,893 | \$ 366,085 | \$ 321,264 | \$ 272,750 | \$ 329,963 | \$ 328,682 | \$ 304,091 | \$ 360,160 | \$ 3,837,100 |
| Fuel Clause Adjustment                               | \$ 5,358   | \$ 1,691   | \$ 3,042   | \$ (1,858) | \$ (4,263) | \$ 16,075  | \$ 21,529  | \$ 20,215  | \$ 17,296  | \$ 15,339  | \$ 14,888  | \$ 22,984  | \$ 132,296   |
| Subtotal   | \$ 327,728 | \$ 315,821 | \$ 325,595 | \$ 275,299 | \$ 313,630 | \$ 382,160 | \$ 342,793 | \$ 292,966 | \$ 347,260 | \$ 344,021 | \$ 318,979 | \$ 383,144 | \$ 3,969,396 |
| <u>Adjustments for Riders Included in Base Rates</u> |            |            |            |            |            |            |            |            |            |            |            |            |              |
| Boswell 4 Environmental Adjustment (per kWh)         | \$ -       | \$ -       | \$ -       | \$ -       | \$ -       | \$ -       | \$ -       | \$ -       | \$ -       | \$ -       | \$ -       | \$ -       | \$ -         |
| Renewable Resource Adjustment (per kWh)              | \$ -       | \$ -       | \$ -       | \$ -       | \$ -       | \$ -       | \$ -       | \$ -       | \$ -       | \$ -       | \$ -       | \$ -       | \$ -         |
| Transmission Adjustment (per kWh)                    | \$ -       | \$ -       | \$ -       | \$ -       | \$ -       | \$ -       | \$ -       | \$ -       | \$ -       | \$ -       | \$ -       | \$ -       | \$ -         |
| Excess ADIT Credit                                   | \$ (4,919) | \$ (4,793) | \$ (4,922) | \$ (4,229) | \$ (4,851) | \$ (5,586) | \$ (4,902) | \$ (4,162) | \$ (5,035) | \$ (5,015) | \$ (4,640) | \$ (5,496) | \$ (58,550)  |
| Subtotal Revenue                                     | \$ 322,809 | \$ 311,028 | \$ 320,673 | \$ 271,070 | \$ 308,779 | \$ 376,574 | \$ 337,891 | \$ 288,804 | \$ 342,225 | \$ 339,006 | \$ 314,339 | \$ 377,648 | \$ 3,910,846 |
| <u>Adjustments for Remaining Riders</u>              |            |            |            |            |            |            |            |            |            |            |            |            |              |
| Boswell 4 Environmental Adjustment (per kWh)         | \$ -       | \$ -       | \$ -       | \$ -       | \$ -       | \$ -       | \$ -       | \$ -       | \$ -       | \$ -       | \$ -       | \$ -       | \$ -         |
| Renewable Resource Adjustment (per kWh)              | \$ -       | \$ -       | \$ -       | \$ -       | \$ -       | \$ -       | \$ -       | \$ -       | \$ -       | \$ -       | \$ -       | \$ -       | \$ -         |
| Transmission Adjustment (per kWh)                    | \$ -       | \$ -       | \$ -       | \$ -       | \$ -       | \$ -       | \$ -       | \$ -       | \$ -       | \$ -       | \$ -       | \$ -       | \$ -         |
| Solar Energy Adjustment                              | \$ (387)   | \$ (209)   | \$ (242)   | \$ (326)   | \$ (465)   | \$ (587)   | \$ (649)   | \$ (586)   | \$ (785)   | \$ (842)   | \$ (696)   | \$ (439)   | \$ (6,214)   |
| Conservation Program Adjustment (per kWh)            | \$ (481)   | \$ (478)   | \$ (474)   | \$ (407)   | \$ (455)   | \$ (503)   | \$ (445)   | \$ (402)   | \$ 1,269   | \$ 1,253   | \$ 1,232   | \$ 1,485   | \$ 1,596     |
| CARE Surcharge (per Bill)                            | \$ 832     | \$ 832     | \$ 793     | \$ 832     | \$ 793     | \$ 851     | \$ 832     | \$ 755     | \$ 832     | \$ 832     | \$ 813     | \$ 871     | \$ 9,869     |
| TOTAL REVENUE  | \$ 322,773 | \$ 311,172 | \$ 320,750 | \$ 271,169 | \$ 308,652 | \$ 376,336 | \$ 337,629 | \$ 288,571 | \$ 343,541 | \$ 340,249 | \$ 315,688 | \$ 379,565 | \$ 3,916,096 |

Minnesota Power  
Silver Bay Power Rate  
TEST YEAR 2020

Present Rate Revenue

|  | January                  | February | March | April | May | June | July | August | September | October | November | December | Total |
|--|--------------------------|----------|-------|-------|-----|------|------|--------|-----------|---------|----------|----------|-------|
|  | TRADE SECRET DATA BEGINS |          |       |       |     |      |      |        |           |         |          |          |       |
| Pool within a Pool/Control Area Charge               |                          |          |       |       |     |      |      |        |           |         |          |          |       |
| Demand   |                          |          |       |       |     |      |      |        |           |         |          |          |       |
| Energy - All (Economy)                               |                          |          |       |       |     |      |      |        |           |         |          |          |       |
| Amortization   |                          |          |       |       |     |      |      |        |           |         |          |          |       |
| Total Base Revenue                                   |                          |          |       |       |     |      |      |        |           |         |          |          |       |
| Fuel Clause Adjustment (No FAC for SBPC)             |                          |          |       |       |     |      |      |        |           |         |          |          |       |
| Subtotal   |                          |          |       |       |     |      |      |        |           |         |          |          |       |
| <u>Adjustments for Riders Included in Base Rates</u> |                          |          |       |       |     |      |      |        |           |         |          |          |       |
| Boswell 4 Environmental Adjustment                   |                          |          |       |       |     |      |      |        |           |         |          |          |       |
| Renewable Resource Adjustment                        |                          |          |       |       |     |      |      |        |           |         |          |          |       |
| Transmission Adjustment                              |                          |          |       |       |     |      |      |        |           |         |          |          |       |
| Conservation Program Adjustment (per kWh)            |                          |          |       |       |     |      |      |        |           |         |          |          |       |
| Subtotal Revenue                                     |                          |          |       |       |     |      |      |        |           |         |          |          |       |
| <u>Adjustments for Remaining Riders</u>              |                          |          |       |       |     |      |      |        |           |         |          |          |       |
| Boswell 4 Environmental Adjustment (per kWh)         |                          |          |       |       |     |      |      |        |           |         |          |          |       |
| Renewable Resource Adjustment (per kWh)              |                          |          |       |       |     |      |      |        |           |         |          |          |       |
| Transmission Adjustment (per kWh)                    |                          |          |       |       |     |      |      |        |           |         |          |          |       |
| Conservation Program Adjustment (per kWh)            |                          |          |       |       |     |      |      |        |           |         |          |          |       |
| TOTAL REVENUE  |                          |          |       |       |     |      |      |        |           |         |          |          |       |

TRADE SECRET DATA ENDS



## Minnesota Power

Docket No. E015/GR-19-442

Minnesota Power  
Outdoor Lighting - Rate 76  
TEST YEAR 2020

|                | Present | General |
|----------------|---------|---------|
| Service Charge | \$2.09  | \$2.09  |

## Present Rate Revenue

| Type of Lamp                                  | Option | January  | February | March    | April    | May      | June     | July     | August   | September | October  | November | December | Total  |
|---|--------|----------|----------|----------|----------|----------|----------|----------|----------|-----------|----------|----------|----------|--------|
| Service Charge                                | IV     | \$ 6     | \$ 6     | \$ 6     | \$ 6     | \$ 6     | \$ 6     | \$ 6     | \$ 6     | \$ 6      | \$ 6     | \$ 6     | \$ 6     | 75     |
| Mercury Vapor                                 |        |          |          |          |          |          |          |          |          |           |          |          |          |        |
| 7000 Lumen (175W)                             | I      | \$ 143   | \$ 143   | \$ 143   | \$ 143   | \$ 143   | \$ 143   | \$ 143   | \$ 143   | \$ 143    | \$ 143   | \$ 143   | \$ 143   | 1,715  |
| 7000 Lumen (175W)                             | II     | \$ 19    | \$ 19    | \$ 19    | \$ 19    | \$ 19    | \$ 19    | \$ 19    | \$ 19    | \$ 19     | \$ 19    | \$ 19    | \$ 19    | 227    |
| 20,000 Lumen (400W)                           | I      | \$ 86    | \$ 86    | \$ 86    | \$ 86    | \$ 86    | \$ 86    | \$ 86    | \$ 86    | \$ 86     | \$ 86    | \$ 86    | \$ 86    | 1,027  |
| Sodium Vapor                                  |        |          |          |          |          |          |          |          |          |           |          |          |          |        |
| 8,500 Lumen (100W)                            | I      | \$ 296   | \$ 296   | \$ 296   | \$ 296   | \$ 296   | \$ 296   | \$ 296   | \$ 296   | \$ 296    | \$ 296   | \$ 296   | \$ 296   | 3,558  |
| 14,000 Lumen (150W)                           | I      | \$ 26    | \$ 26    | \$ 26    | \$ 26    | \$ 26    | \$ 26    | \$ 26    | \$ 26    | \$ 26     | \$ 26    | \$ 26    | \$ 26    | 310    |
| 23,000 Lumen (250W)                           | I      | \$ 223   | \$ 223   | \$ 223   | \$ 223   | \$ 223   | \$ 223   | \$ 223   | \$ 223   | \$ 223    | \$ 223   | \$ 223   | \$ 223   | 2,674  |
| 45,000 Lumen (400W)                           | I      | \$ 152   | \$ 152   | \$ 152   | \$ 152   | \$ 152   | \$ 152   | \$ 152   | \$ 152   | \$ 152    | \$ 152   | \$ 152   | \$ 152   | 1,827  |
| Metal Halide                                  |        |          |          |          |          |          |          |          |          |           |          |          |          |        |
| 17,000 Lumen (250W)                           | I      | \$ 18    | \$ 18    | \$ 18    | \$ 18    | \$ 18    | \$ 18    | \$ 18    | \$ 18    | \$ 18     | \$ 18    | \$ 18    | \$ 18    | 221    |
| 28800 Lumen (400W)                            | I      | \$ 695   | \$ 695   | \$ 695   | \$ 695   | \$ 695   | \$ 695   | \$ 695   | \$ 695   | \$ 695    | \$ 695   | \$ 695   | \$ 695   | 8,334  |
| Pole Charge                                   |        | \$ 120   | \$ 120   | \$ 120   | \$ 120   | \$ 120   | \$ 120   | \$ 120   | \$ 120   | \$ 120    | \$ 120   | \$ 120   | \$ 120   | 1,434  |
| Energy Charge                                 |        | \$ 405   | \$ 330   | \$ 321   | \$ 264   | \$ 231   | \$ 204   | \$ 219   | \$ 258   | \$ 294    | \$ 351   | \$ 381   | \$ 414   | 3,674  |
| Total Base Revenue                            |        | \$ 2,189 | \$ 2,114 | \$ 2,105 | \$ 2,048 | \$ 2,015 | \$ 1,988 | \$ 2,002 | \$ 2,042 | \$ 2,078  | \$ 2,135 | \$ 2,165 | \$ 2,197 | 25,076 |
| Fuel Adjustment                               |        | \$ 24    | \$ 6     | \$ 11    | \$ (6)   | \$ (11)  | \$ 34    | \$ 56    | \$ 68    | \$ 57     | \$ 61    | \$ 65    | \$ 91    | 456    |
| Subtotal Revenue                              |        | \$ 2,212 | \$ 2,120 | \$ 2,115 | \$ 2,041 | \$ 2,003 | \$ 2,022 | \$ 2,058 | \$ 2,110 | \$ 2,135  | \$ 2,196 | \$ 2,230 | \$ 2,289 | 25,531 |
| Adjustments for Riders Included in Base Rates |        |          |          |          |          |          |          |          |          |           |          |          |          |        |
| Boswell 4 Environmental Adjustment            |        | \$ -     | \$ -     | \$ -     | \$ -     | \$ -     | \$ -     | \$ -     | \$ -     | \$ -      | \$ -     | \$ -     | \$ -     | -      |
| Renewable Resource Adjustment                 |        | \$ -     | \$ -     | \$ -     | \$ -     | \$ -     | \$ -     | \$ -     | \$ -     | \$ -      | \$ -     | \$ -     | \$ -     | -      |
| Transmission Adjustment                       |        | \$ -     | \$ -     | \$ -     | \$ -     | \$ -     | \$ -     | \$ -     | \$ -     | \$ -      | \$ -     | \$ -     | \$ -     | -      |
| Conservation Program Adjustment (per kWh)     |        | \$ -     | \$ -     | \$ -     | \$ -     | \$ -     | \$ -     | \$ -     | \$ -     | \$ -      | \$ -     | \$ -     | \$ -     | -      |
| Excess ADIT Credit                            |        | \$ (33)  | \$ (32)  | \$ (32)  | \$ (31)  | \$ (31)  | \$ (30)  | \$ (31)  | \$ (31)  | \$ (32)   | \$ (33)  | \$ (33)  | \$ (34)  | (383)  |
| Subtotal Revenue                              |        | \$ 2,179 | \$ 2,088 | \$ 2,083 | \$ 2,010 | \$ 1,972 | \$ 1,992 | \$ 2,028 | \$ 2,078 | \$ 2,103  | \$ 2,163 | \$ 2,197 | \$ 2,255 | 25,149 |
| Boswell 4 Environmental Adjustment            |        | \$ -     | \$ -     | \$ -     | \$ -     | \$ -     | \$ -     | \$ -     | \$ -     | \$ -      | \$ -     | \$ -     | \$ -     | -      |
| Renewable Resource Adjustment                 |        | \$ -     | \$ -     | \$ -     | \$ -     | \$ -     | \$ -     | \$ -     | \$ -     | \$ -      | \$ -     | \$ -     | \$ -     | -      |
| Transmission Adjustment                       |        | \$ -     | \$ -     | \$ -     | \$ -     | \$ -     | \$ -     | \$ -     | \$ -     | \$ -      | \$ -     | \$ -     | \$ -     | -      |
| Solar Energy Adjustment                       |        | \$ (2)   | \$ (1)   | \$ (1)   | \$ (1)   | \$ (2)   | \$ (2)   | \$ (2)   | \$ (2)   | \$ (3)    | \$ (4)   | \$ (4)   | \$ (2)   | (26)   |
| Conservation Program Adjustment (per kWh)     |        | \$ (3)   | \$ (2)   | \$ (2)   | \$ (2)   | \$ (1)   | \$ (1)   | \$ (1)   | \$ (2)   | \$ 5      | \$ 6     | \$ 7     | \$ 7     | 11     |
| TOTAL REVENUE                                 |        | \$ 2,174 | \$ 2,085 | \$ 2,080 | \$ 2,007 | \$ 1,969 | \$ 1,989 | \$ 2,024 | \$ 2,074 | \$ 2,105  | \$ 2,165 | \$ 2,200 | \$ 2,260 | 25,133 |

## General Rate Revenue

| Type of Lamp                                  | Option | January  | February | March    | April    | May      | June     | July     | August   | September | October  | November | December | Total  |
|---|--------|----------|----------|----------|----------|----------|----------|----------|----------|-----------|----------|----------|----------|--------|
| Service Charge                                | IV     | \$ 6     | \$ 6     | \$ 6     | \$ 6     | \$ 6     | \$ 6     | \$ 6     | \$ 6     | \$ 6      | \$ 6     | \$ 6     | \$ 6     | 75.24  |
| Mercury Vapor                                 |        |          |          |          |          |          |          |          |          |           |          |          |          |        |
| 7000 Lumen (175W)                             | I      | \$ 129   | \$ 129   | \$ 129   | \$ 129   | \$ 129   | \$ 129   | \$ 129   | \$ 129   | \$ 129    | \$ 129   | \$ 129   | \$ 129   | 1,544  |
| 7000 Lumen (175W)                             | II     | \$ 16    | \$ 16    | \$ 16    | \$ 16    | \$ 16    | \$ 16    | \$ 16    | \$ 16    | \$ 16     | \$ 16    | \$ 16    | \$ 16    | 196    |
| 20,000 Lumen (400W)                           | I      | \$ 74    | \$ 74    | \$ 74    | \$ 74    | \$ 74    | \$ 74    | \$ 74    | \$ 74    | \$ 74     | \$ 74    | \$ 74    | \$ 74    | 891    |
| Sodium Vapor                                  |        |          |          |          |          |          |          |          |          |           |          |          |          |        |
| 8,500 Lumen (100W)                            | I      | \$ 277   | \$ 277   | \$ 277   | \$ 277   | \$ 277   | \$ 277   | \$ 277   | \$ 277   | \$ 277    | \$ 277   | \$ 277   | \$ 277   | 3,319  |
| 14,000 Lumen (150W)                           | I      | \$ 24    | \$ 24    | \$ 24    | \$ 24    | \$ 24    | \$ 24    | \$ 24    | \$ 24    | \$ 24     | \$ 24    | \$ 24    | \$ 24    | 284    |
| 23,000 Lumen (250W)                           | I      | \$ 201   | \$ 201   | \$ 201   | \$ 201   | \$ 201   | \$ 201   | \$ 201   | \$ 201   | \$ 201    | \$ 201   | \$ 201   | \$ 201   | 2,417  |
| 45,000 Lumen (400W)                           | I      | \$ 135   | \$ 135   | \$ 135   | \$ 135   | \$ 135   | \$ 135   | \$ 135   | \$ 135   | \$ 135    | \$ 135   | \$ 135   | \$ 135   | 1,616  |
| Metal Halide                                  |        |          |          |          |          |          |          |          |          |           |          |          |          |        |
| 17,000 Lumen (250W)                           | I      | \$ 17    | \$ 17    | \$ 17    | \$ 17    | \$ 17    | \$ 17    | \$ 17    | \$ 17    | \$ 17     | \$ 17    | \$ 17    | \$ 17    | 199    |
| 28800 Lumen (400W)                            | I      | \$ 610   | \$ 610   | \$ 610   | \$ 610   | \$ 610   | \$ 610   | \$ 610   | \$ 610   | \$ 610    | \$ 610   | \$ 610   | \$ 610   | 7,319  |
| Pole Charge                                   |        | \$ 120   | \$ 120   | \$ 120   | \$ 120   | \$ 120   | \$ 120   | \$ 120   | \$ 120   | \$ 120    | \$ 120   | \$ 120   | \$ 120   | 1,434  |
| Energy Charge                                 |        | \$ 306   | \$ 249   | \$ 242   | \$ 199   | \$ 174   | \$ 154   | \$ 165   | \$ 195   | \$ 222    | \$ 265   | \$ 288   | \$ 312   | 2,773  |
| Base Cost of Fuel                             |        | \$ 332   | \$ 271   | \$ 263   | \$ 216   | \$ 189   | \$ 167   | \$ 180   | \$ 211   | \$ 241    | \$ 287   | \$ 312   | \$ 340   | 3,009  |
| Total Base Revenue                            |        | \$ 2,246 | \$ 2,128 | \$ 2,113 | \$ 2,023 | \$ 1,971 | \$ 1,929 | \$ 1,953 | \$ 2,013 | \$ 2,071  | \$ 2,160 | \$ 2,207 | \$ 2,260 | 25,076 |
| Fuel Adjustment                               |        | \$ 24    | \$ 6     | \$ 11    | \$ (6)   | \$ (11)  | \$ 34    | \$ 56    | \$ 68    | \$ 57     | \$ 61    | \$ 65    | \$ 91    | 456    |
| Subtotal Revenue                              |        | \$ 2,269 | \$ 2,134 | \$ 2,124 | \$ 2,017 | \$ 1,960 | \$ 1,963 | \$ 2,009 | \$ 2,081 | \$ 2,128  | \$ 2,221 | \$ 2,273 | \$ 2,352 | 25,531 |
| Adjustments for Riders Included in Base Rates |        |          |          |          |          |          |          |          |          |           |          |          |          |        |
| Boswell 4 Environmental Adjustment            |        | \$ -     | \$ -     | \$ -     | \$ -     | \$ -     | \$ -     | \$ -     | \$ -     | \$ -      | \$ -     | \$ -     | \$ -     | -      |
| Renewable Resource Adjustment                 |        | \$ -     | \$ -     | \$ -     | \$ -     | \$ -     | \$ -     | \$ -     | \$ -     | \$ -      | \$ -     | \$ -     | \$ -     | -      |
| Transmission Adjustment                       |        | \$ -     | \$ -     | \$ -     | \$ -     | \$ -     | \$ -     | \$ -     | \$ -     | \$ -      | \$ -     | \$ -     | \$ -     | -      |
| Conservation Program Adjustment               |        | \$ -     | \$ -     | \$ -     | \$ -     | \$ -     | \$ -     | \$ -     | \$ -     | \$ -      | \$ -     | \$ -     | \$ -     | -      |
| Excess ADIT Credit                            |        | \$ (34)  | \$ (32)  | \$ (32)  | \$ (31)  | \$ (30)  | \$ (29)  | \$ (30)  | \$ (31)  | \$ (32)   | \$ (33)  | \$ (34)  | \$ (34)  | (383)  |
| Subtotal Revenue                              |        | \$ 2,235 | \$ 2,102 | \$ 2,092 | \$ 1,986 | \$ 1,930 | \$ 1,934 | \$ 1,979 | \$ 2,050 | \$ 2,096  | \$ 2,188 | \$ 2,239 | \$ 2,317 | 25,149 |
| Boswell 4 Environmental Adjustment            |        | \$ -     | \$ -     | \$ -     | \$ -     | \$ -     | \$ -     | \$ -     | \$ -     | \$ -      | \$ -     | \$ -     | \$ -     | -      |
| Renewable Resource Adjustment                 |        | \$ -     | \$ -     | \$ -     | \$ -     | \$ -     | \$ -     | \$ -     | \$ -     | \$ -      | \$ -     | \$ -     | \$ -     | -      |
| Transmission Adjustment                       |        | \$ -     | \$ -     | \$ -     | \$ -     | \$ -     | \$ -     | \$ -     | \$ -     | \$ -      | \$ -     | \$ -     | \$ -     | -      |
| Solar Energy Adjustment                       |        | \$ (2)   | \$ (1)   | \$ (1)   | \$ (1)   | \$ (2)   | \$ (2)   | \$ (2)   | \$ (2)   | \$ (3)    | \$ (4)   | \$ (4)   | \$ (2)   | (26)   |
| Conservation Program Adjustment               |        | \$ (3)   | \$ (2)   | \$ (2)   | \$ (2)   | \$ (1)   | \$ (1)   | \$ (1)   | \$ (2)   | \$ 5      | \$ 6     | \$ 7     | \$ 7     | 11     |
| TOTAL REVENUE                                 |        | \$ 2,230 | \$ 2,099 | \$ 2,089 | \$ 1,983 | \$ 1,927 | \$ 1,931 | \$ 1,975 | \$ 2,046 | \$ 2,098  | \$ 2,190 | \$ 2,242 | \$ 2,322 | 25,133 |

Minnesota Power  
**Minnesota Power**  
**Area Lighting - Rate 77**  
**TEST YEAR 2020**

|                | Present | General |
|----------------|---------|---------|
| Service Charge | \$2.09  | \$2.09  |

**Present Rate Revenue**

| Type of Lamp                                  | Option | January    | February   | March      | April      | May        | June       | July       | August     | September  | October    | November   | December   | Total     |
|---|--------|------------|------------|------------|------------|------------|------------|------------|------------|------------|------------|------------|------------|-----------|
| Service Charge                                | IV     | \$ 19      | \$ 19      | \$ 19      | \$ 19      | \$ 19      | \$ 19      | \$ 19      | \$ 19      | \$ 19      | \$ 19      | \$ 19      | \$ 19      | 226       |
| Mercury Vapor                                 |        |            |            |            |            |            |            |            |            |            |            |            |            |           |
| 7,000 Lumen (175W)                            | I      | \$ 12,548  | \$ 12,548  | \$ 12,548  | \$ 12,548  | \$ 12,548  | \$ 12,548  | \$ 12,548  | \$ 12,548  | \$ 12,548  | \$ 12,548  | \$ 12,548  | \$ 12,548  | 150,580   |
| 7,000 Lumen (175W)                            | II     | \$ 992     | \$ 992     | \$ 992     | \$ 992     | \$ 992     | \$ 992     | \$ 992     | \$ 992     | \$ 992     | \$ 992     | \$ 992     | \$ 992     | 11,907    |
| 20,000 Lumen (400W)                           | I      | \$ 2,160   | \$ 2,160   | \$ 2,160   | \$ 2,160   | \$ 2,160   | \$ 2,160   | \$ 2,160   | \$ 2,160   | \$ 2,160   | \$ 2,160   | \$ 2,160   | \$ 2,160   | 25,925    |
| 20,000 Lumen (400W)                           | II     | \$ 79      | \$ 79      | \$ 79      | \$ 79      | \$ 79      | \$ 79      | \$ 79      | \$ 79      | \$ 79      | \$ 79      | \$ 79      | \$ 79      | 943       |
| 55,000 Lumen (1,000W)                         | I      | \$ 42      | \$ 42      | \$ 42      | \$ 42      | \$ 42      | \$ 42      | \$ 42      | \$ 42      | \$ 42      | \$ 42      | \$ 42      | \$ 42      | 500       |
| 55,000 Lumen (1,000W)                         | II     | \$ 32      | \$ 32      | \$ 32      | \$ 32      | \$ 32      | \$ 32      | \$ 32      | \$ 32      | \$ 32      | \$ 32      | \$ 32      | \$ 32      | 382       |
| Sodium Vapor                                  |        |            |            |            |            |            |            |            |            |            |            |            |            |           |
| 8,500 Lumen (100W)                            | I      | \$ 27,395  | \$ 27,395  | \$ 27,395  | \$ 27,395  | \$ 27,395  | \$ 27,395  | \$ 27,395  | \$ 27,395  | \$ 27,395  | \$ 27,395  | \$ 27,395  | \$ 27,395  | 328,741   |
| 8,500 Lumen (100W)                            | II     | \$ 266     | \$ 266     | \$ 266     | \$ 266     | \$ 266     | \$ 266     | \$ 266     | \$ 266     | \$ 266     | \$ 266     | \$ 266     | \$ 266     | 3,192     |
| 8,500 Lumen (100W)                            | III    | \$ 7       | \$ 7       | \$ 7       | \$ 7       | \$ 7       | \$ 7       | \$ 7       | \$ 7       | \$ 7       | \$ 7       | \$ 7       | \$ 7       | 80        |
| 14,000 Lumen (150W)                           | I      | \$ 4,315   | \$ 4,315   | \$ 4,315   | \$ 4,315   | \$ 4,315   | \$ 4,315   | \$ 4,315   | \$ 4,315   | \$ 4,315   | \$ 4,315   | \$ 4,315   | \$ 4,315   | 51,783    |
| 14,000 Lumen (150W)                           | II     | \$ 17      | \$ 17      | \$ 17      | \$ 17      | \$ 17      | \$ 17      | \$ 17      | \$ 17      | \$ 17      | \$ 17      | \$ 17      | \$ 17      | 207       |
| 23,000 Lumen (250W)                           | I      | \$ 16,453  | \$ 16,453  | \$ 16,453  | \$ 16,453  | \$ 16,453  | \$ 16,453  | \$ 16,453  | \$ 16,453  | \$ 16,453  | \$ 16,453  | \$ 16,453  | \$ 16,453  | 197,436   |
| 23,000 Lumen (250W)                           | II     | \$ 236     | \$ 236     | \$ 236     | \$ 236     | \$ 236     | \$ 236     | \$ 236     | \$ 236     | \$ 236     | \$ 236     | \$ 236     | \$ 236     | 2,834     |
| 23,000 Lumen (250W)                           | III    | \$ -       | \$ -       | \$ -       | \$ -       | \$ -       | \$ -       | \$ -       | \$ -       | \$ -       | \$ -       | \$ -       | \$ -       | -         |
| 45,000 Lumen (400W)                           | I      | \$ 16,395  | \$ 16,395  | \$ 16,395  | \$ 16,395  | \$ 16,395  | \$ 16,395  | \$ 16,395  | \$ 16,395  | \$ 16,395  | \$ 16,395  | \$ 16,395  | \$ 16,395  | 196,746   |
| 45,000 Lumen (400W)                           | II     | \$ 197     | \$ 197     | \$ 197     | \$ 197     | \$ 197     | \$ 197     | \$ 197     | \$ 197     | \$ 197     | \$ 197     | \$ 197     | \$ 197     | 2,360     |
| Metal Halide                                  |        |            |            |            |            |            |            |            |            |            |            |            |            |           |
| 17,000 Lumen (250W)                           | I      | \$ 2,910   | \$ 2,910   | \$ 2,910   | \$ 2,910   | \$ 2,910   | \$ 2,910   | \$ 2,910   | \$ 2,910   | \$ 2,910   | \$ 2,910   | \$ 2,910   | \$ 2,910   | 34,924    |
| 17,000 Lumen (250W)                           | II     | \$ -       | \$ -       | \$ -       | \$ -       | \$ -       | \$ -       | \$ -       | \$ -       | \$ -       | \$ -       | \$ -       | \$ -       | -         |
| 28,800 Lumen (400W)                           | I      | \$ 4,699   | \$ 4,699   | \$ 4,699   | \$ 4,699   | \$ 4,699   | \$ 4,699   | \$ 4,699   | \$ 4,699   | \$ 4,699   | \$ 4,699   | \$ 4,699   | \$ 4,699   | 56,393    |
| 28,800 Lumen (400W)                           | II     | \$ -       | \$ -       | \$ -       | \$ -       | \$ -       | \$ -       | \$ -       | \$ -       | \$ -       | \$ -       | \$ -       | \$ -       | -         |
| 28,800 Lumen (400W)                           | III    | \$ -       | \$ -       | \$ -       | \$ -       | \$ -       | \$ -       | \$ -       | \$ -       | \$ -       | \$ -       | \$ -       | \$ -       | -         |
| 88,000 Lumen (1,000W)                         | I      | \$ 2,540   | \$ 2,540   | \$ 2,540   | \$ 2,540   | \$ 2,540   | \$ 2,540   | \$ 2,540   | \$ 2,540   | \$ 2,540   | \$ 2,540   | \$ 2,540   | \$ 2,540   | 30,474    |
| 88,000 Lumen (1,000W)                         | II     | \$ -       | \$ -       | \$ -       | \$ -       | \$ -       | \$ -       | \$ -       | \$ -       | \$ -       | \$ -       | \$ -       | \$ -       | -         |
| 88,000 Lumen (1,000W)                         | III    | \$ -       | \$ -       | \$ -       | \$ -       | \$ -       | \$ -       | \$ -       | \$ -       | \$ -       | \$ -       | \$ -       | \$ -       | -         |
| Pole Charge                                   |        | \$ 8,911   | \$ 8,911   | \$ 8,911   | \$ 8,911   | \$ 8,911   | \$ 8,911   | \$ 8,911   | \$ 8,911   | \$ 8,911   | \$ 8,911   | \$ 8,911   | \$ 8,911   | 106,931   |
| Energy Charge                                 |        | \$ 656     | \$ 535     | \$ 520     | \$ 428     | \$ 374     | \$ 331     | \$ 354     | \$ 418     | \$ 476     | \$ 568     | \$ 617     | \$ 670     | 5,947     |
| Total Base Revenue                            |        | \$ 100,870 | \$ 100,748 | \$ 100,733 | \$ 100,641 | \$ 100,588 | \$ 100,544 | \$ 100,568 | \$ 100,632 | \$ 100,690 | \$ 100,782 | \$ 100,831 | \$ 100,884 | 1,208,512 |
| Fuel Adjustment                               |        | \$ 838     | \$ 218     | \$ 382     | \$ (224)   | \$ (402)   | \$ 1,210   | \$ 1,973   | \$ 2,398   | \$ 2,014   | \$ 2,162   | \$ 2,315   | \$ 3,238   | 16,121    |
| Subtotal Revenue                              |        | \$ 101,707 | \$ 100,966 | \$ 101,116 | \$ 100,418 | \$ 100,185 | \$ 101,754 | \$ 102,541 | \$ 103,030 | \$ 102,704 | \$ 102,944 | \$ 103,146 | \$ 104,122 | 1,224,633 |
| Adjustments for Riders Included in Base Rates |        |            |            |            |            |            |            |            |            |            |            |            |            |           |
| Boswell 4 Environmental Adjustment            |        | \$ -       | \$ -       | \$ -       | \$ -       | \$ -       | \$ -       | \$ -       | \$ -       | \$ -       | \$ -       | \$ -       | \$ -       | -         |
| Renewable Resource Adjustment                 |        | \$ -       | \$ -       | \$ -       | \$ -       | \$ -       | \$ -       | \$ -       | \$ -       | \$ -       | \$ -       | \$ -       | \$ -       | -         |
| Transmission Adjustment                       |        | \$ -       | \$ -       | \$ -       | \$ -       | \$ -       | \$ -       | \$ -       | \$ -       | \$ -       | \$ -       | \$ -       | \$ -       | -         |
| Excess ADIT Credit                            |        | \$ (1,539) | \$ (1,537) | \$ (1,537) | \$ (1,536) | \$ (1,535) | \$ (1,534) | \$ (1,535) | \$ (1,536) | \$ (1,536) | \$ (1,538) | \$ (1,539) | \$ (1,539) | (18,441)  |
| Subtotal Revenue                              |        | \$ 100,168 | \$ 99,429  | \$ 99,579  | \$ 98,882  | \$ 98,650  | \$ 100,220 | \$ 101,007 | \$ 101,494 | \$ 101,168 | \$ 101,406 | \$ 101,607 | \$ 102,582 | 1,206,192 |
| Boswell 4 Environmental Adjustment            |        | \$ -       | \$ -       | \$ -       | \$ -       | \$ -       | \$ -       | \$ -       | \$ -       | \$ -       | \$ -       | \$ -       | \$ -       | -         |
| Renewable Resource Adjustment                 |        | \$ -       | \$ -       | \$ -       | \$ -       | \$ -       | \$ -       | \$ -       | \$ -       | \$ -       | \$ -       | \$ -       | \$ -       | -         |
| Transmission Adjustment                       |        | \$ -       | \$ -       | \$ -       | \$ -       | \$ -       | \$ -       | \$ -       | \$ -       | \$ -       | \$ -       | \$ -       | \$ -       | -         |
| Solar Energy Adjustment                       |        | \$ (74)    | \$ (33)    | \$ (37)    | \$ (48)    | \$ (54)    | \$ (54)    | \$ (73)    | \$ (85)    | \$ (112)   | \$ (145)   | \$ (132)   | \$ (76)    | (923)     |
| Conservation Program Adjustment               |        | \$ (92)    | \$ (75)    | \$ (73)    | \$ (60)    | \$ (53)    | \$ (46)    | \$ (50)    | \$ (58)    | \$ 181     | \$ 216     | \$ 234     | \$ 256     | 380       |
| TOTAL REVENUE                                 |        | \$ 100,002 | \$ 99,321  | \$ 99,468  | \$ 98,774  | \$ 98,544  | \$ 100,120 | \$ 100,884 | \$ 101,351 | \$ 101,237 | \$ 101,477 | \$ 101,709 | \$ 102,762 | 1,205,649 |

Minnesota Power  
 Minnesota Power  
 Area Lighting - Rate 77  
 TEST YEAR 2020

|                | Present | General |
|----------------|---------|---------|
| Service Charge | \$2.09  | \$2.09  |

## General Rate Revenue

| Type of Lamp                                  | Option | January    | February   | March      | April      | May        | June       | July       | August     | September  | October    | November   | December   | Total     |
|---|--------|------------|------------|------------|------------|------------|------------|------------|------------|------------|------------|------------|------------|-----------|
| Service Charge                                | IV     | \$ 19      | \$ 19      | \$ 19      | \$ 19      | \$ 19      | \$ 19      | \$ 19      | \$ 19      | \$ 19      | \$ 19      | \$ 19      | \$ 19      | 226       |
| Mercury Vapor                                 |        |            |            |            |            |            |            |            |            |            |            |            |            |           |
| 7,000 Lumen (175W)                            | I      | \$ 11,296  | \$ 11,296  | \$ 11,296  | \$ 11,296  | \$ 11,296  | \$ 11,296  | \$ 11,296  | \$ 11,296  | \$ 11,296  | \$ 11,296  | \$ 11,296  | \$ 11,296  | 135,557   |
| 7,000 Lumen (175W)                            | II     | \$ 856     | \$ 856     | \$ 856     | \$ 856     | \$ 856     | \$ 856     | \$ 856     | \$ 856     | \$ 856     | \$ 856     | \$ 856     | \$ 856     | 10,274    |
| 20,000 Lumen (400W)                           | I      | \$ 1,876   | \$ 1,876   | \$ 1,876   | \$ 1,876   | \$ 1,876   | \$ 1,876   | \$ 1,876   | \$ 1,876   | \$ 1,876   | \$ 1,876   | \$ 1,876   | \$ 1,876   | 22,507    |
| 20,000 Lumen (400W)                           | II     | \$ 65      | \$ 65      | \$ 65      | \$ 65      | \$ 65      | \$ 65      | \$ 65      | \$ 65      | \$ 65      | \$ 65      | \$ 65      | \$ 65      | 774       |
| 55,000 Lumen (1,000W)                         | I      | \$ 35      | \$ 35      | \$ 35      | \$ 35      | \$ 35      | \$ 35      | \$ 35      | \$ 35      | \$ 35      | \$ 35      | \$ 35      | \$ 35      | 419       |
| 55,000 Lumen (1,000W)                         | II     | \$ 25      | \$ 25      | \$ 25      | \$ 25      | \$ 25      | \$ 25      | \$ 25      | \$ 25      | \$ 25      | \$ 25      | \$ 25      | \$ 25      | 301       |
| Sodium Vapor                                  |        |            |            |            |            |            |            |            |            |            |            |            |            |           |
| 8,500 Lumen (100W)                            | I      | \$ 25,560  | \$ 25,560  | \$ 25,560  | \$ 25,560  | \$ 25,560  | \$ 25,560  | \$ 25,560  | \$ 25,560  | \$ 25,560  | \$ 25,560  | \$ 25,560  | \$ 25,560  | 306,718   |
| 8,500 Lumen (100W)                            | II     | \$ 237     | \$ 237     | \$ 237     | \$ 237     | \$ 237     | \$ 237     | \$ 237     | \$ 237     | \$ 237     | \$ 237     | \$ 237     | \$ 237     | 2,839     |
| 8,500 Lumen (100W)                            | III    | \$ 6       | \$ 6       | \$ 6       | \$ 6       | \$ 6       | \$ 6       | \$ 6       | \$ 6       | \$ 6       | \$ 6       | \$ 6       | \$ 6       | 71        |
| 14,000 Lumen (150W)                           | I      | \$ 3,947   | \$ 3,947   | \$ 3,947   | \$ 3,947   | \$ 3,947   | \$ 3,947   | \$ 3,947   | \$ 3,947   | \$ 3,947   | \$ 3,947   | \$ 3,947   | \$ 3,947   | 47,361    |
| 14,000 Lumen (150W)                           | II     | \$ 15      | \$ 15      | \$ 15      | \$ 15      | \$ 15      | \$ 15      | \$ 15      | \$ 15      | \$ 15      | \$ 15      | \$ 15      | \$ 15      | 181       |
| 23,000 Lumen (250W)                           | I      | \$ 14,870  | \$ 14,870  | \$ 14,870  | \$ 14,870  | \$ 14,870  | \$ 14,870  | \$ 14,870  | \$ 14,870  | \$ 14,870  | \$ 14,870  | \$ 14,870  | \$ 14,870  | 178,443   |
| 23,000 Lumen (250W)                           | II     | \$ 200     | \$ 200     | \$ 200     | \$ 200     | \$ 200     | \$ 200     | \$ 200     | \$ 200     | \$ 200     | \$ 200     | \$ 200     | \$ 200     | 2,406     |
| 23,000 Lumen (250W)                           | III    | \$ -       | \$ -       | \$ -       | \$ -       | \$ -       | \$ -       | \$ -       | \$ -       | \$ -       | \$ -       | \$ -       | \$ -       | -         |
| 45,000 Lumen (400W)                           | I      | \$ 14,495  | \$ 14,495  | \$ 14,495  | \$ 14,495  | \$ 14,495  | \$ 14,495  | \$ 14,495  | \$ 14,495  | \$ 14,495  | \$ 14,495  | \$ 14,495  | \$ 14,495  | 173,937   |
| 45,000 Lumen (400W)                           | II     | \$ 161     | \$ 161     | \$ 161     | \$ 161     | \$ 161     | \$ 161     | \$ 161     | \$ 161     | \$ 161     | \$ 161     | \$ 161     | \$ 161     | 1,936     |
| Metal Halide                                  |        |            |            |            |            |            |            |            |            |            |            |            |            |           |
| 17,000 Lumen (250W)                           | I      | \$ 2,620   | \$ 2,620   | \$ 2,620   | \$ 2,620   | \$ 2,620   | \$ 2,620   | \$ 2,620   | \$ 2,620   | \$ 2,620   | \$ 2,620   | \$ 2,620   | \$ 2,620   | 31,438    |
| 17,000 Lumen (250W)                           | II     | \$ -       | \$ -       | \$ -       | \$ -       | \$ -       | \$ -       | \$ -       | \$ -       | \$ -       | \$ -       | \$ -       | \$ -       | -         |
| 28,800 Lumen (400W)                           | I      | \$ 4,127   | \$ 4,127   | \$ 4,127   | \$ 4,127   | \$ 4,127   | \$ 4,127   | \$ 4,127   | \$ 4,127   | \$ 4,127   | \$ 4,127   | \$ 4,127   | \$ 4,127   | 49,525    |
| 28,800 Lumen (400W)                           | II     | \$ -       | \$ -       | \$ -       | \$ -       | \$ -       | \$ -       | \$ -       | \$ -       | \$ -       | \$ -       | \$ -       | \$ -       | -         |
| 28,800 Lumen (400W)                           | III    | \$ -       | \$ -       | \$ -       | \$ -       | \$ -       | \$ -       | \$ -       | \$ -       | \$ -       | \$ -       | \$ -       | \$ -       | -         |
| 88,000 Lumen (1,000W)                         | I      | \$ 2,133   | \$ 2,133   | \$ 2,133   | \$ 2,133   | \$ 2,133   | \$ 2,133   | \$ 2,133   | \$ 2,133   | \$ 2,133   | \$ 2,133   | \$ 2,133   | \$ 2,133   | 25,602    |
| 88,000 Lumen (1,000W)                         | II     | \$ -       | \$ -       | \$ -       | \$ -       | \$ -       | \$ -       | \$ -       | \$ -       | \$ -       | \$ -       | \$ -       | \$ -       | -         |
| 88,000 Lumen (1,000W)                         | III    | \$ -       | \$ -       | \$ -       | \$ -       | \$ -       | \$ -       | \$ -       | \$ -       | \$ -       | \$ -       | \$ -       | \$ -       | -         |
| Pole Charge                                   |        | \$ 8,911   | \$ 8,911   | \$ 8,911   | \$ 8,911   | \$ 8,911   | \$ 8,911   | \$ 8,911   | \$ 8,911   | \$ 8,911   | \$ 8,911   | \$ 8,911   | \$ 8,911   | 106,931   |
| Energy Charge                                 |        | \$ 495     | \$ 403     | \$ 392     | \$ 323     | \$ 282     | \$ 250     | \$ 268     | \$ 316     | \$ 360     | \$ 429     | \$ 466     | \$ 506     | 4,489     |
| Base Cost of Fuel                             |        | \$ 11,765  | \$ 9,628   | \$ 9,317   | \$ 7,655   | \$ 6,720   | \$ 5,913   | \$ 6,370   | \$ 7,448   | \$ 8,509   | \$ 10,166  | \$ 11,032  | \$ 12,048  | 106,571   |
| Total Base Revenue                            |        | \$ 103,714 | \$ 101,486 | \$ 101,163 | \$ 99,431  | \$ 98,456  | \$ 97,616  | \$ 98,091  | \$ 99,217  | \$ 100,323 | \$ 102,049 | \$ 102,952 | \$ 104,007 | 1,208,505 |
| Fuel Adjustment                               |        | \$ 838     | \$ 218     | \$ 382     | \$ (224)   | \$ (402)   | \$ 1,210   | \$ 1,973   | \$ 2,398   | \$ 2,014   | \$ 2,162   | \$ 2,315   | \$ 3,238   | 16,121    |
| Subtotal Revenue                              |        | \$ 104,552 | \$ 101,704 | \$ 101,545 | \$ 99,207  | \$ 98,054  | \$ 98,826  | \$ 100,064 | \$ 101,615 | \$ 102,337 | \$ 104,211 | \$ 105,267 | \$ 107,245 | 1,224,626 |
| Adjustments for Riders Included in Base Rates |        |            |            |            |            |            |            |            |            |            |            |            |            |           |
| Boswell 4 Environmental Adjustment            |        | \$ -       | \$ -       | \$ -       | \$ -       | \$ -       | \$ -       | \$ -       | \$ -       | \$ -       | \$ -       | \$ -       | \$ -       | -         |
| Renewable Resource Adjustment                 |        | \$ -       | \$ -       | \$ -       | \$ -       | \$ -       | \$ -       | \$ -       | \$ -       | \$ -       | \$ -       | \$ -       | \$ -       | -         |
| Transmission Adjustment                       |        | \$ -       | \$ -       | \$ -       | \$ -       | \$ -       | \$ -       | \$ -       | \$ -       | \$ -       | \$ -       | \$ -       | \$ -       | -         |
| Excess ADIT Credit                            |        | \$ (1,583) | \$ (1,549) | \$ (1,544) | \$ (1,517) | \$ (1,502) | \$ (1,490) | \$ (1,497) | \$ (1,514) | \$ (1,531) | \$ (1,557) | \$ (1,571) | \$ (1,587) | (18,441)  |
| Subtotal Revenue                              |        | \$ 102,969 | \$ 100,155 | \$ 100,002 | \$ 97,690  | \$ 96,552  | \$ 97,336  | \$ 98,568  | \$ 100,101 | \$ 100,806 | \$ 102,654 | \$ 103,696 | \$ 105,658 | 1,206,185 |
| Boswell 4 Environmental Adjustment            |        | \$ -       | \$ -       | \$ -       | \$ -       | \$ -       | \$ -       | \$ -       | \$ -       | \$ -       | \$ -       | \$ -       | \$ -       | -         |
| Renewable Resource Adjustment                 |        | \$ -       | \$ -       | \$ -       | \$ -       | \$ -       | \$ -       | \$ -       | \$ -       | \$ -       | \$ -       | \$ -       | \$ -       | -         |
| Transmission Adjustment                       |        | \$ -       | \$ -       | \$ -       | \$ -       | \$ -       | \$ -       | \$ -       | \$ -       | \$ -       | \$ -       | \$ -       | \$ -       | -         |
| Solar Energy Adjustment                       |        | \$ (74)    | \$ (33)    | \$ (37)    | \$ (48)    | \$ (54)    | \$ (54)    | \$ (73)    | \$ (85)    | \$ (112)   | \$ (145)   | \$ (132)   | \$ (76)    | (923)     |
| Conservation Program Adjustment               |        | \$ (92)    | \$ (75)    | \$ (73)    | \$ (60)    | \$ (53)    | \$ (46)    | \$ (50)    | \$ (58)    | \$ 181     | \$ 216     | \$ 234     | \$ 256     | 380       |
| TOTAL REVENUE                                 |        | \$ 102,803 | \$ 100,047 | \$ 99,891  | \$ 97,582  | \$ 96,445  | \$ 97,236  | \$ 98,445  | \$ 99,958  | \$ 100,875 | \$ 102,724 | \$ 103,798 | \$ 105,838 | 1,205,643 |

Minnesota Power

Minnesota Power Packet No. E015/GR-19-442

Highway and Ornamental Street Lighting - Rate 80 &amp; 84

TEST YEAR 2020

|                | Present | General |
|----------------|---------|---------|
| Service Charge | \$2.09  | \$2.09  |

## Present Rate Revenue

| Type of Lamp   | Option | January   | February  | March     | April     | May       | June      | July      | August    | September | October   | November  | December  | Total   |
|--|--------|-----------|-----------|-----------|-----------|-----------|-----------|-----------|-----------|-----------|-----------|-----------|-----------|---------|
| Service Charge                                       | IV     | \$ 533    | \$ 533    | \$ 533    | \$ 533    | \$ 533    | \$ 533    | \$ 533    | \$ 533    | \$ 533    | \$ 533    | \$ 533    | \$ 533    | 6,395   |
| Mercury Vapor  |        |           |           |           |           |           |           |           |           |           |           |           |           |         |
| 7,000 Lumen (175W)                                   | III    | \$ 66     | \$ 66     | \$ 66     | \$ 66     | \$ 66     | \$ 66     | \$ 66     | \$ 66     | \$ 66     | \$ 66     | \$ 66     | \$ 66     | 794     |
| 10,000 Lumen (250W)                                  | III    | \$ 97     | \$ 97     | \$ 97     | \$ 97     | \$ 97     | \$ 97     | \$ 97     | \$ 97     | \$ 97     | \$ 97     | \$ 97     | \$ 97     | 1,162   |
| 20,000 Lumen (400W)                                  | III    | \$ 437    | \$ 437    | \$ 437    | \$ 437    | \$ 437    | \$ 437    | \$ 437    | \$ 437    | \$ 437    | \$ 437    | \$ 437    | \$ 437    | 5,238   |
| 55,000 Lumen (1,000W)                                | III    | \$ -      | \$ -      | \$ -      | \$ -      | \$ -      | \$ -      | \$ -      | \$ -      | \$ -      | \$ -      | \$ -      | \$ -      | -       |
| Sodium Vapor   |        |           |           |           |           |           |           |           |           |           |           |           |           |         |
| 8,500 Lumen (100W)                                   | III    | \$ 342    | \$ 342    | \$ 342    | \$ 342    | \$ 342    | \$ 342    | \$ 342    | \$ 342    | \$ 342    | \$ 342    | \$ 342    | \$ 342    | 4,100   |
| 14,000 Lumen (150W)                                  | I      | \$ 68     | \$ 68     | \$ 68     | \$ 68     | \$ 68     | \$ 68     | \$ 68     | \$ 68     | \$ 68     | \$ 68     | \$ 68     | \$ 68     | 812     |
| 14,000 Lumen (150W)                                  | IIIA   | \$ 971    | \$ 971    | \$ 971    | \$ 971    | \$ 971    | \$ 971    | \$ 971    | \$ 971    | \$ 971    | \$ 971    | \$ 971    | \$ 971    | 11,652  |
| 20,500 Lumen (200W)                                  | III    | \$ 904    | \$ 904    | \$ 904    | \$ 904    | \$ 904    | \$ 904    | \$ 904    | \$ 904    | \$ 904    | \$ 904    | \$ 904    | \$ 904    | 10,848  |
| 23,000 Lumen (250W)                                  | I      | \$ 22     | \$ 22     | \$ 22     | \$ 22     | \$ 22     | \$ 22     | \$ 22     | \$ 22     | \$ 22     | \$ 22     | \$ 22     | \$ 22     | 260     |
| 23,000 Lumen (250W)                                  | III    | \$ 2,673  | \$ 2,673  | \$ 2,673  | \$ 2,673  | \$ 2,673  | \$ 2,673  | \$ 2,673  | \$ 2,673  | \$ 2,673  | \$ 2,673  | \$ 2,673  | \$ 2,673  | 32,080  |
| 45,000 Lumen (400W)                                  | I      | \$ -      | \$ -      | \$ -      | \$ -      | \$ -      | \$ -      | \$ -      | \$ -      | \$ -      | \$ -      | \$ -      | \$ -      | -       |
| 45,000 Lumen (400W)                                  | III    | \$ 1,846  | \$ 1,846  | \$ 1,846  | \$ 1,846  | \$ 1,846  | \$ 1,846  | \$ 1,846  | \$ 1,846  | \$ 1,846  | \$ 1,846  | \$ 1,846  | \$ 1,846  | 22,149  |
| Light Emitting Diode (LED)                           |        |           |           |           |           |           |           |           |           |           |           |           |           |         |
| 4,000 Lumens (54 W or Less)                          | I      | \$ 26     | \$ 26     | \$ 26     | \$ 26     | \$ 26     | \$ 26     | \$ 26     | \$ 26     | \$ 26     | \$ 26     | \$ 26     | \$ 26     | 314     |
| Energy Charge  |        | \$ 40,231 | \$ 35,157 | \$ 29,032 | \$ 26,209 | \$ 21,541 | \$ 18,053 | \$ 18,982 | \$ 19,492 | \$ 27,152 | \$ 26,804 | \$ 29,877 | \$ 32,578 | 325,108 |
| Total Base Revenue                                   |        | \$ 48,215 | \$ 43,141 | \$ 37,016 | \$ 34,193 | \$ 29,525 | \$ 26,037 | \$ 26,966 | \$ 27,476 | \$ 35,136 | \$ 34,788 | \$ 37,861 | \$ 40,562 | 420,914 |
| Fuel Adjustment                                      |        | \$ 803    | \$ 221    | \$ 338    | \$ (215)  | \$ (365)  | \$ 1,052  | \$ 1,680  | \$ 1,829  | \$ 1,819  | \$ 1,658  | \$ 1,816  | \$ 2,538  | 13,174  |
| Solar Energy Adjustment                              |        | \$ (71)   | \$ (34)   | \$ (33)   | \$ (46)   | \$ (49)   | \$ (47)   | \$ (62)   | \$ (65)   | \$ (101)  | \$ (111)  | \$ (104)  | \$ (59)   | (781)   |
| Subtotal Revenue                                     |        | \$ 48,947 | \$ 43,329 | \$ 37,321 | \$ 33,932 | \$ 29,111 | \$ 27,042 | \$ 28,583 | \$ 29,240 | \$ 36,854 | \$ 36,335 | \$ 39,574 | \$ 43,040 | 433,308 |
| <u>Adjustments for Riders Included in Base Rates</u> |        |           |           |           |           |           |           |           |           |           |           |           |           |         |
| Boswell 4 Environmental Adjustment                   |        | \$ -      | \$ -      | \$ -      | \$ -      | \$ -      | \$ -      | \$ -      | \$ -      | \$ -      | \$ -      | \$ -      | \$ -      | -       |
| Renewable Resource Adjustment                        |        | \$ -      | \$ -      | \$ -      | \$ -      | \$ -      | \$ -      | \$ -      | \$ -      | \$ -      | \$ -      | \$ -      | \$ -      | -       |
| Transmission Adjustment                              |        | \$ -      | \$ -      | \$ -      | \$ -      | \$ -      | \$ -      | \$ -      | \$ -      | \$ -      | \$ -      | \$ -      | \$ -      | -       |
| Conservation Program Adjustment                      |        | \$ -      | \$ -      | \$ -      | \$ -      | \$ -      | \$ -      | \$ -      | \$ -      | \$ -      | \$ -      | \$ -      | \$ -      | -       |
| Excess ADIT Credit                                   |        | \$ (736)  | \$ (658)  | \$ (565)  | \$ (522)  | \$ (451)  | \$ (397)  | \$ (411)  | \$ (419)  | \$ (536)  | \$ (531)  | \$ (578)  | \$ (619)  | (6,423) |
| Subtotal Revenue                                     |        | \$ 48,211 | \$ 42,670 | \$ 36,757 | \$ 33,410 | \$ 28,661 | \$ 26,645 | \$ 28,172 | \$ 28,821 | \$ 36,317 | \$ 35,804 | \$ 38,996 | \$ 42,421 | 426,885 |
| Boswell 4 Environmental Adjustment                   |        | \$ -      | \$ -      | \$ -      | \$ -      | \$ -      | \$ -      | \$ -      | \$ -      | \$ -      | \$ -      | \$ -      | \$ -      | -       |
| Renewable Resource Adjustment                        |        | \$ -      | \$ -      | \$ -      | \$ -      | \$ -      | \$ -      | \$ -      | \$ -      | \$ -      | \$ -      | \$ -      | \$ -      | -       |
| Transmission Adjustment                              |        | \$ -      | \$ -      | \$ -      | \$ -      | \$ -      | \$ -      | \$ -      | \$ -      | \$ -      | \$ -      | \$ -      | \$ -      | -       |
| Conservation Program Adjustment                      |        | \$ (88)   | \$ (76)   | \$ (64)   | \$ (57)   | \$ (48)   | \$ (40)   | \$ (42)   | \$ (44)   | \$ 163    | \$ 166    | \$ 184    | \$ 201    | 252     |
| TOTAL REVENUE  |        | \$ 48,123 | \$ 42,594 | \$ 36,692 | \$ 33,352 | \$ 28,613 | \$ 26,604 | \$ 28,130 | \$ 28,776 | \$ 36,481 | \$ 35,970 | \$ 39,180 | \$ 42,622 | 427,137 |

Minnesota Power  
Minnesota Power  
Highway and Ornamental Street Lighting - Rate 80 & 84  
TEST YEAR 2020

|                |         |         |
|----------------|---------|---------|
|                | Present | General |
| Service Charge | \$2.09  | \$2.09  |

General Rate Revenue

| Type of Lamp                                  | Option | January   | February  | March     | April     | May       | June      | July      | August    | September | October   | November  | December  | Total   |
|---|--------|-----------|-----------|-----------|-----------|-----------|-----------|-----------|-----------|-----------|-----------|-----------|-----------|---------|
| Service Charge                                | IV     | \$ 533    | \$ 533    | \$ 533    | \$ 533    | \$ 533    | \$ 533    | \$ 533    | \$ 533    | \$ 533    | \$ 533    | \$ 533    | \$ 533    | 6,395   |
| Mercury Vapor                                 |        |           |           |           |           |           |           |           |           |           |           |           |           |         |
| 7,000 Lumen (175W)                            | III    | \$ 57     | \$ 57     | \$ 57     | \$ 57     | \$ 57     | \$ 57     | \$ 57     | \$ 57     | \$ 57     | \$ 57     | \$ 57     | \$ 57     | 685     |
| 10,000 Lumen (250W)                           | III    | \$ 83     | \$ 83     | \$ 83     | \$ 83     | \$ 83     | \$ 83     | \$ 83     | \$ 83     | \$ 83     | \$ 83     | \$ 83     | \$ 83     | 990     |
| 20,000 Lumen (400W)                           | III    | \$ 363    | \$ 363    | \$ 363    | \$ 363    | \$ 363    | \$ 363    | \$ 363    | \$ 363    | \$ 363    | \$ 363    | \$ 363    | \$ 363    | 4,359   |
| 55,000 Lumen (1,000W)                         | III    | \$ -      | \$ -      | \$ -      | \$ -      | \$ -      | \$ -      | \$ -      | \$ -      | \$ -      | \$ -      | \$ -      | \$ -      | -       |
| Sodium Vapor                                  |        |           |           |           |           |           |           |           |           |           |           |           |           |         |
| 8,500 Lumen (100W)                            | III    | \$ 307    | \$ 307    | \$ 307    | \$ 307    | \$ 307    | \$ 307    | \$ 307    | \$ 307    | \$ 307    | \$ 307    | \$ 307    | \$ 307    | 3,685   |
| 14,000 Lumen (150W)                           | I      | \$ 63     | \$ 63     | \$ 63     | \$ 63     | \$ 63     | \$ 63     | \$ 63     | \$ 63     | \$ 63     | \$ 63     | \$ 63     | \$ 63     | 759     |
| 14,000 Lumen (150W)                           | IIIA   | \$ 858    | \$ 858    | \$ 858    | \$ 858    | \$ 858    | \$ 858    | \$ 858    | \$ 858    | \$ 858    | \$ 858    | \$ 858    | \$ 858    | 10,302  |
| 20,500 Lumen (200W)                           | III    | \$ 776    | \$ 776    | \$ 776    | \$ 776    | \$ 776    | \$ 776    | \$ 776    | \$ 776    | \$ 776    | \$ 776    | \$ 776    | \$ 776    | 9,310   |
| 23,000 Lumen (250W)                           | I      | \$ 20     | \$ 20     | \$ 20     | \$ 20     | \$ 20     | \$ 20     | \$ 20     | \$ 20     | \$ 20     | \$ 20     | \$ 20     | \$ 20     | 239     |
| 23,000 Lumen (250W)                           | III    | \$ 2,296  | \$ 2,296  | \$ 2,296  | \$ 2,296  | \$ 2,296  | \$ 2,296  | \$ 2,296  | \$ 2,296  | \$ 2,296  | \$ 2,296  | \$ 2,296  | \$ 2,296  | 27,557  |
| 45,000 Lumen (400W)                           | I      | \$ -      | \$ -      | \$ -      | \$ -      | \$ -      | \$ -      | \$ -      | \$ -      | \$ -      | \$ -      | \$ -      | \$ -      | -       |
| 45,000 Lumen (400W)                           | III    | \$ 1,531  | \$ 1,531  | \$ 1,531  | \$ 1,531  | \$ 1,531  | \$ 1,531  | \$ 1,531  | \$ 1,531  | \$ 1,531  | \$ 1,531  | \$ 1,531  | \$ 1,531  | 18,371  |
| Light Emitting Diode (LED)                    |        |           |           |           |           |           |           |           |           |           |           |           |           |         |
| 4,000 Lumens (54 W or Less)                   | I      | \$ 26     | \$ 26     | \$ 26     | \$ 26     | \$ 26     | \$ 26     | \$ 26     | \$ 26     | \$ 26     | \$ 26     | \$ 26     | \$ 26     | 306     |
| Energy Charge                                 |        | \$ 30,366 | \$ 26,536 | \$ 21,913 | \$ 19,782 | \$ 16,259 | \$ 13,626 | \$ 14,327 | \$ 14,712 | \$ 20,494 | \$ 20,231 | \$ 22,551 | \$ 24,589 | 245,386 |
| Base Cost of Fuel                             |        | \$ 11,280 | \$ 9,779  | \$ 8,242  | \$ 7,350  | \$ 6,092  | \$ 5,140  | \$ 5,422  | \$ 5,680  | \$ 7,684  | \$ 7,799  | \$ 8,657  | \$ 9,443  | 92,569  |
| Total Base Revenue                            |        | \$ 48,559 | \$ 43,228 | \$ 37,069 | \$ 34,045 | \$ 29,264 | \$ 25,680 | \$ 26,663 | \$ 27,305 | \$ 35,091 | \$ 34,943 | \$ 38,122 | \$ 40,946 | 420,914 |
| Fuel Adjustment                               |        | \$ 803    | \$ 221    | \$ 338    | \$ (215)  | \$ (365)  | \$ 1,052  | \$ 1,680  | \$ 1,829  | \$ 1,819  | \$ 1,658  | \$ 1,816  | \$ 2,538  | 13,174  |
| Subtotal Revenue                              |        | \$ 49,362 | \$ 43,449 | \$ 37,407 | \$ 33,830 | \$ 28,899 | \$ 26,731 | \$ 28,343 | \$ 29,135 | \$ 36,910 | \$ 36,601 | \$ 39,938 | \$ 43,483 | 434,089 |
| Adjustments for Riders Included in Base Rates |        |           |           |           |           |           |           |           |           |           |           |           |           |         |
| Boswell 4 Environmental Adjustment            |        | \$ -      | \$ -      | \$ -      | \$ -      | \$ -      | \$ -      | \$ -      | \$ -      | \$ -      | \$ -      | \$ -      | \$ -      | -       |
| Renewable Resource Adjustment                 |        | \$ -      | \$ -      | \$ -      | \$ -      | \$ -      | \$ -      | \$ -      | \$ -      | \$ -      | \$ -      | \$ -      | \$ -      | -       |
| Transmission Adjustment                       |        | \$ -      | \$ -      | \$ -      | \$ -      | \$ -      | \$ -      | \$ -      | \$ -      | \$ -      | \$ -      | \$ -      | \$ -      | -       |
| Excess ADIT Credit                            |        | \$ (741)  | \$ (660)  | \$ (566)  | \$ (519)  | \$ (447)  | \$ (392)  | \$ (407)  | \$ (417)  | \$ (535)  | \$ (533)  | \$ (582)  | \$ (625)  | (6,423) |
| Subtotal Revenue                              |        | \$ 48,621 | \$ 42,790 | \$ 36,841 | \$ 33,311 | \$ 28,452 | \$ 26,340 | \$ 27,936 | \$ 28,718 | \$ 36,375 | \$ 36,068 | \$ 39,356 | \$ 42,858 | 427,666 |
| Boswell 4 Environmental Adjustment            |        | \$ -      | \$ -      | \$ -      | \$ -      | \$ -      | \$ -      | \$ -      | \$ -      | \$ -      | \$ -      | \$ -      | \$ -      | -       |
| Renewable Resource Adjustment                 |        | \$ -      | \$ -      | \$ -      | \$ -      | \$ -      | \$ -      | \$ -      | \$ -      | \$ -      | \$ -      | \$ -      | \$ -      | -       |
| Transmission Adjustment                       |        | \$ -      | \$ -      | \$ -      | \$ -      | \$ -      | \$ -      | \$ -      | \$ -      | \$ -      | \$ -      | \$ -      | \$ -      | -       |
| Solar Energy Adjustment                       |        | \$ (71)   | \$ (34)   | \$ (33)   | \$ (46)   | \$ (49)   | \$ (47)   | \$ (62)   | \$ (65)   | \$ (101)  | \$ (111)  | \$ (104)  | \$ (59)   | (781)   |
| Conservation Program Adjustment               |        | \$ (88)   | \$ (76)   | \$ (64)   | \$ (57)   | \$ (48)   | \$ (40)   | \$ (42)   | \$ (44)   | \$ 163    | \$ 166    | \$ 184    | \$ 201    | 252     |
| TOTAL REVENUE                                 |        | \$ 48,462 | \$ 42,680 | \$ 36,744 | \$ 33,207 | \$ 28,356 | \$ 26,252 | \$ 27,831 | \$ 28,609 | \$ 36,437 | \$ 36,123 | \$ 39,436 | \$ 43,000 | 427,137 |

Minnesota Power  
Docket No. E015/GR-19-442  
**Overhead Street Lighting - Rate 83**  
**TEST YEAR 2020**

|                |         |         |
|----------------|---------|---------|
|                | Present | General |
| Service Charge | \$2.09  | \$2.09  |

**Present Rate Revenue**

| Type of Lamp   | Option | January    | February   | March      | April      | May        | June       | July       | August     | September  | October    | November   | December   | Total     |
|--|--------|------------|------------|------------|------------|------------|------------|------------|------------|------------|------------|------------|------------|-----------|
| Service Charge                                       | IV     | \$ 75      | \$ 75      | \$ 75      | \$ 75      | \$ 75      | \$ 75      | \$ 75      | \$ 75      | \$ 75      | \$ 75      | \$ 75      | \$ 75      | 903       |
| Mercury Vapor  |        |            |            |            |            |            |            |            |            |            |            |            |            |           |
| 7,000 Lumen (175W)                                   | I      | \$ 16,845  | \$ 16,845  | \$ 16,845  | \$ 16,845  | \$ 16,845  | \$ 16,845  | \$ 16,845  | \$ 16,845  | \$ 16,845  | \$ 16,845  | \$ 16,845  | \$ 16,845  | 202,137   |
| 7,000 Lumen (175W)                                   | II     | \$ 13,365  | \$ 13,365  | \$ 13,365  | \$ 13,365  | \$ 13,365  | \$ 13,365  | \$ 13,365  | \$ 13,365  | \$ 13,365  | \$ 13,365  | \$ 13,365  | \$ 13,365  | 160,380   |
| 20,000 Lumen (400W)                                  | I      | \$ 658     | \$ 658     | \$ 658     | \$ 658     | \$ 658     | \$ 658     | \$ 658     | \$ 658     | \$ 658     | \$ 658     | \$ 658     | \$ 658     | 7,893     |
| 20,000 Lumen (400W)                                  | II     | \$ 811     | \$ 811     | \$ 811     | \$ 811     | \$ 811     | \$ 811     | \$ 811     | \$ 811     | \$ 811     | \$ 811     | \$ 811     | \$ 811     | 9,735     |
| Sodium Vapor   |        |            |            |            |            |            |            |            |            |            |            |            |            |           |
| 8,500 Lumen (100W)                                   | I      | \$ 16,687  | \$ 16,687  | \$ 16,687  | \$ 16,687  | \$ 16,687  | \$ 16,687  | \$ 16,687  | \$ 16,687  | \$ 16,687  | \$ 16,687  | \$ 16,687  | \$ 16,687  | 200,241   |
| 8,500 Lumen (100W)                                   | II     | \$ 23,630  | \$ 23,630  | \$ 23,630  | \$ 23,630  | \$ 23,630  | \$ 23,630  | \$ 23,630  | \$ 23,630  | \$ 23,630  | \$ 23,630  | \$ 23,630  | \$ 23,630  | 283,555   |
| 14,000 Lumen (150W)                                  | I      | \$ 20,101  | \$ 20,101  | \$ 20,101  | \$ 20,101  | \$ 20,101  | \$ 20,101  | \$ 20,101  | \$ 20,101  | \$ 20,101  | \$ 20,101  | \$ 20,101  | \$ 20,101  | 241,212   |
| 14,000 Lumen (150W)                                  | II     | \$ 11,619  | \$ 11,619  | \$ 11,619  | \$ 11,619  | \$ 11,619  | \$ 11,619  | \$ 11,619  | \$ 11,619  | \$ 11,619  | \$ 11,619  | \$ 11,619  | \$ 11,619  | 139,424   |
| 14,000 Lumen (150W)                                  | III    | \$ -       | \$ -       | \$ -       | \$ -       | \$ -       | \$ -       | \$ -       | \$ -       | \$ -       | \$ -       | \$ -       | \$ -       | -         |
| 20,500 Lumen (200W)                                  | I      | \$ 20      | \$ 20      | \$ 20      | \$ 20      | \$ 20      | \$ 20      | \$ 20      | \$ 20      | \$ 20      | \$ 20      | \$ 20      | \$ 20      | 241       |
| 20,500 Lumen (200W)                                  | II     | \$ 47      | \$ 47      | \$ 47      | \$ 47      | \$ 47      | \$ 47      | \$ 47      | \$ 47      | \$ 47      | \$ 47      | \$ 47      | \$ 47      | 570       |
| 23,000 Lumen (250W)                                  | I      | \$ 10,867  | \$ 10,867  | \$ 10,867  | \$ 10,867  | \$ 10,867  | \$ 10,867  | \$ 10,867  | \$ 10,867  | \$ 10,867  | \$ 10,867  | \$ 10,867  | \$ 10,867  | 130,400   |
| 23,000 Lumen (250W)                                  | II     | \$ 12,801  | \$ 12,801  | \$ 12,801  | \$ 12,801  | \$ 12,801  | \$ 12,801  | \$ 12,801  | \$ 12,801  | \$ 12,801  | \$ 12,801  | \$ 12,801  | \$ 12,801  | 153,617   |
| 23,000 Lumen (250W)                                  | III    | \$ 13      | \$ 13      | \$ 13      | \$ 13      | \$ 13      | \$ 13      | \$ 13      | \$ 13      | \$ 13      | \$ 13      | \$ 13      | \$ 13      | 152       |
| 45,000 Lumen (400W)                                  | I      | \$ 657     | \$ 657     | \$ 657     | \$ 657     | \$ 657     | \$ 657     | \$ 657     | \$ 657     | \$ 657     | \$ 657     | \$ 657     | \$ 657     | 7,885     |
| 45,000 Lumen (400W)                                  | II     | \$ 616     | \$ 616     | \$ 616     | \$ 616     | \$ 616     | \$ 616     | \$ 616     | \$ 616     | \$ 616     | \$ 616     | \$ 616     | \$ 616     | 7,389     |
| Metal Halide   |        |            |            |            |            |            |            |            |            |            |            |            |            |           |
| 28,800 Lumen (400W)                                  | I      | \$ -       | \$ -       | \$ -       | \$ -       | \$ -       | \$ -       | \$ -       | \$ -       | \$ -       | \$ -       | \$ -       | \$ -       | -         |
| Light Emitting Diode (LED)                           |        |            |            |            |            |            |            |            |            |            |            |            |            |           |
| 4,000 Lumens (54 W or Less)                          | I      | \$ 15,419  | \$ 15,419  | \$ 15,419  | \$ 15,419  | \$ 15,419  | \$ 15,419  | \$ 15,419  | \$ 15,419  | \$ 15,419  | \$ 15,419  | \$ 15,419  | \$ 15,419  | 185,024   |
| 8,800 Lumens (118 W or Less but > 54W)               | I      | \$ 8,973   | \$ 8,973   | \$ 8,973   | \$ 8,973   | \$ 8,973   | \$ 8,973   | \$ 8,973   | \$ 8,973   | \$ 8,973   | \$ 8,973   | \$ 8,973   | \$ 8,973   | 107,679   |
| Pole Charge  |        | \$ -       | \$ -       | \$ -       | \$ -       | \$ -       | \$ -       | \$ -       | \$ -       | \$ -       | \$ -       | \$ -       | \$ -       | -         |
| Energy Charge  |        | \$ 2,067   | \$ 1,807   | \$ 1,492   | \$ 1,347   | \$ 1,107   | \$ 928     | \$ 975     | \$ 1,002   | \$ 1,395   | \$ 1,377   | \$ 1,535   | \$ 1,674   | 16,706    |
| Total Base Revenue                                   |        | \$ 155,270 | \$ 155,010 | \$ 154,695 | \$ 154,550 | \$ 154,310 | \$ 154,131 | \$ 154,178 | \$ 154,205 | \$ 154,598 | \$ 154,580 | \$ 154,738 | \$ 154,877 | 1,855,143 |
| Fuel Adjustment                                      |        | \$ 1,226   | \$ 319     | \$ 558     | \$ (327)   | \$ (589)   | \$ 1,766   | \$ 2,872   | \$ 3,486   | \$ 2,935   | \$ 3,145   | \$ 3,361   | \$ 4,718   | 23,470    |
| Subtotal Revenue                                     |        | \$ 156,496 | \$ 155,329 | \$ 155,253 | \$ 154,223 | \$ 153,721 | \$ 155,897 | \$ 157,050 | \$ 157,690 | \$ 157,533 | \$ 157,725 | \$ 158,100 | \$ 159,596 | 1,878,613 |
| <b>Adjustments for Riders Included in Base Rates</b> |        |            |            |            |            |            |            |            |            |            |            |            |            |           |
| Boswell 4 Environmental Adjustment                   |        | \$ -       | \$ -       | \$ -       | \$ -       | \$ -       | \$ -       | \$ -       | \$ -       | \$ -       | \$ -       | \$ -       | \$ -       | -         |
| Renewable Resource Adjustment                        |        | \$ -       | \$ -       | \$ -       | \$ -       | \$ -       | \$ -       | \$ -       | \$ -       | \$ -       | \$ -       | \$ -       | \$ -       | -         |
| Transmission Adjustment                              |        | \$ -       | \$ -       | \$ -       | \$ -       | \$ -       | \$ -       | \$ -       | \$ -       | \$ -       | \$ -       | \$ -       | \$ -       | -         |
| Excess ADIT Credit                                   |        | \$ (2,369) | \$ (2,365) | \$ (2,360) | \$ (2,358) | \$ (2,355) | \$ (2,352) | \$ (2,353) | \$ (2,353) | \$ (2,359) | \$ (2,359) | \$ (2,361) | \$ (2,363) | (28,308)  |
| Subtotal Revenue                                     |        | \$ 154,127 | \$ 152,964 | \$ 152,893 | \$ 151,865 | \$ 151,366 | \$ 153,545 | \$ 154,698 | \$ 155,337 | \$ 155,174 | \$ 155,366 | \$ 155,738 | \$ 157,232 | 1,850,306 |
| <b>Additional Adjustments</b>                        |        |            |            |            |            |            |            |            |            |            |            |            |            |           |
| Boswell 4 Environmental Adjustment                   |        | \$ -       | \$ -       | \$ -       | \$ -       | \$ -       | \$ -       | \$ -       | \$ -       | \$ -       | \$ -       | \$ -       | \$ -       | -         |
| Renewable Resource Adjustment                        |        | \$ -       | \$ -       | \$ -       | \$ -       | \$ -       | \$ -       | \$ -       | \$ -       | \$ -       | \$ -       | \$ -       | \$ -       | -         |
| Transmission Adjustment                              |        | \$ -       | \$ -       | \$ -       | \$ -       | \$ -       | \$ -       | \$ -       | \$ -       | \$ -       | \$ -       | \$ -       | \$ -       | -         |
| Solar Energy Adjustment                              |        | \$ (108)   | \$ (48)    | \$ (54)    | \$ (70)    | \$ (79)    | \$ (79)    | \$ (106)   | \$ (124)   | \$ (163)   | \$ (211)   | \$ (192)   | \$ (110)   | (1,344)   |
| Conservation Program Adjustment                      |        | \$ (135)   | \$ (110)   | \$ (106)   | \$ (87)    | \$ (77)    | \$ (68)    | \$ (73)    | \$ (85)    | \$ 263     | \$ 314     | \$ 340     | \$ 373     | 550       |
| TOTAL REVENUE  |        | \$ 153,884 | \$ 152,805 | \$ 152,732 | \$ 151,707 | \$ 151,211 | \$ 153,398 | \$ 154,519 | \$ 155,129 | \$ 155,275 | \$ 155,469 | \$ 155,887 | \$ 157,495 | 1,849,512 |

Minnesota Power  
Docket No. E015/GR-19-442  
**Overhead Street Lighting - Rate 83**  
**TEST YEAR 2020**

|                |         |         |
|----------------|---------|---------|
|                | Present | General |
| Service Charge | \$2.09  | \$2.09  |

**General Rate Revenue**

| Type of Lamp   | Option | January    | February   | March      | April      | May        | June       | July       | August     | September  | October    | November   | December   | Total     |
|--|--------|------------|------------|------------|------------|------------|------------|------------|------------|------------|------------|------------|------------|-----------|
| Service Charge                                       | IV     | \$ 75      | \$ 75      | \$ 75      | \$ 75      | \$ 75      | \$ 75      | \$ 75      | \$ 75      | \$ 75      | \$ 75      | \$ 75      | \$ 75      | 903       |
| Mercury Vapor  |        |            |            |            |            |            |            |            |            |            |            |            |            |           |
| 7,000 Lumen (175W)                                   | I      | \$ 15,585  | \$ 15,585  | \$ 15,585  | \$ 15,585  | \$ 15,585  | \$ 15,585  | \$ 15,585  | \$ 15,585  | \$ 15,585  | \$ 15,585  | \$ 15,585  | \$ 15,585  | 187,021   |
| 7,000 Lumen (175W)                                   | II     | \$ 11,583  | \$ 11,583  | \$ 11,583  | \$ 11,583  | \$ 11,583  | \$ 11,583  | \$ 11,583  | \$ 11,583  | \$ 11,583  | \$ 11,583  | \$ 11,583  | \$ 11,583  | 138,996   |
| 20,000 Lumen (400W)                                  | I      | \$ 582     | \$ 582     | \$ 582     | \$ 582     | \$ 582     | \$ 582     | \$ 582     | \$ 582     | \$ 582     | \$ 582     | \$ 582     | \$ 582     | 6,979     |
| 20,000 Lumen (400W)                                  | II     | \$ 679     | \$ 679     | \$ 679     | \$ 679     | \$ 679     | \$ 679     | \$ 679     | \$ 679     | \$ 679     | \$ 679     | \$ 679     | \$ 679     | 8,144     |
| Sodium Vapor   |        |            |            |            |            |            |            |            |            |            |            |            |            |           |
| 8,500 Lumen (100W)                                   | I      | \$ 15,835  | \$ 15,835  | \$ 15,835  | \$ 15,835  | \$ 15,835  | \$ 15,835  | \$ 15,835  | \$ 15,835  | \$ 15,835  | \$ 15,835  | \$ 15,835  | \$ 15,835  | 190,020   |
| 8,500 Lumen (100W)                                   | II     | \$ 21,349  | \$ 21,349  | \$ 21,349  | \$ 21,349  | \$ 21,349  | \$ 21,349  | \$ 21,349  | \$ 21,349  | \$ 21,349  | \$ 21,349  | \$ 21,349  | \$ 21,349  | 256,183   |
| 14,000 Lumen (150W)                                  | I      | \$ 18,790  | \$ 18,790  | \$ 18,790  | \$ 18,790  | \$ 18,790  | \$ 18,790  | \$ 18,790  | \$ 18,790  | \$ 18,790  | \$ 18,790  | \$ 18,790  | \$ 18,790  | 225,482   |
| 14,000 Lumen (150W)                                  | II     | \$ 10,308  | \$ 10,308  | \$ 10,308  | \$ 10,308  | \$ 10,308  | \$ 10,308  | \$ 10,308  | \$ 10,308  | \$ 10,308  | \$ 10,308  | \$ 10,308  | \$ 10,308  | 123,694   |
| 14,000 Lumen (150W)                                  | III    | \$ -       | \$ -       | \$ -       | \$ -       | \$ -       | \$ -       | \$ -       | \$ -       | \$ -       | \$ -       | \$ -       | \$ -       | -         |
| 20,500 Lumen (200W)                                  | I      | \$ 18      | \$ 18      | \$ 18      | \$ 18      | \$ 18      | \$ 18      | \$ 18      | \$ 18      | \$ 18      | \$ 18      | \$ 18      | \$ 18      | 221       |
| 20,500 Lumen (200W)                                  | II     | \$ 41      | \$ 41      | \$ 41      | \$ 41      | \$ 41      | \$ 41      | \$ 41      | \$ 41      | \$ 41      | \$ 41      | \$ 41      | \$ 41      | 490       |
| 23,000 Lumen (250W)                                  | I      | \$ 9,972   | \$ 9,972   | \$ 9,972   | \$ 9,972   | \$ 9,972   | \$ 9,972   | \$ 9,972   | \$ 9,972   | \$ 9,972   | \$ 9,972   | \$ 9,972   | \$ 9,972   | 119,661   |
| 23,000 Lumen (250W)                                  | II     | \$ 11,038  | \$ 11,038  | \$ 11,038  | \$ 11,038  | \$ 11,038  | \$ 11,038  | \$ 11,038  | \$ 11,038  | \$ 11,038  | \$ 11,038  | \$ 11,038  | \$ 11,038  | 132,459   |
| 23,000 Lumen (250W)                                  | III    | \$ 11      | \$ 11      | \$ 11      | \$ 11      | \$ 11      | \$ 11      | \$ 11      | \$ 11      | \$ 11      | \$ 11      | \$ 11      | \$ 11      | 131       |
| 45,000 Lumen (400W)                                  | I      | \$ 587     | \$ 587     | \$ 587     | \$ 587     | \$ 587     | \$ 587     | \$ 587     | \$ 587     | \$ 587     | \$ 587     | \$ 587     | \$ 587     | 7,038     |
| 45,000 Lumen (400W)                                  | II     | \$ 516     | \$ 516     | \$ 516     | \$ 516     | \$ 516     | \$ 516     | \$ 516     | \$ 516     | \$ 516     | \$ 516     | \$ 516     | \$ 516     | 6,188     |
| Metal Halide   |        |            |            |            |            |            |            |            |            |            |            |            |            |           |
| 28,800 Lumen (400W)                                  | II     | \$ -       | \$ -       | \$ -       | \$ -       | \$ -       | \$ -       | \$ -       | \$ -       | \$ -       | \$ -       | \$ -       | \$ -       | -         |
| Light Emitting Diode (LED)                           |        |            |            |            |            |            |            |            |            |            |            |            |            |           |
| 4,000 Lumens (54 W or Less)                          | I      | \$ 15,030  | \$ 15,030  | \$ 15,030  | \$ 15,030  | \$ 15,030  | \$ 15,030  | \$ 15,030  | \$ 15,030  | \$ 15,030  | \$ 15,030  | \$ 15,030  | \$ 15,030  | 180,366   |
| 8,800 Lumens (118 W or Less but > 54W)               | I      | \$ 8,593   | \$ 8,593   | \$ 8,593   | \$ 8,593   | \$ 8,593   | \$ 8,593   | \$ 8,593   | \$ 8,593   | \$ 8,593   | \$ 8,593   | \$ 8,593   | \$ 8,593   | 103,115   |
| Pole Charge  |        | \$ -       | \$ -       | \$ -       | \$ -       | \$ -       | \$ -       | \$ -       | \$ -       | \$ -       | \$ -       | \$ -       | \$ -       | -         |
| Energy Charge  |        | \$ 1,560   | \$ 1,364   | \$ 1,126   | \$ 1,017   | \$ 835     | \$ 700     | \$ 736     | \$ 756     | \$ 1,053   | \$ 1,040   | \$ 1,159   | \$ 1,264   | 12,609    |
| Base Cost of Fuel                                    |        | \$ 17,220  | \$ 14,108  | \$ 13,607  | \$ 11,178  | \$ 9,835   | \$ 8,630   | \$ 9,271   | \$ 10,824  | \$ 12,401  | \$ 14,789  | \$ 16,020  | \$ 17,558  | 155,442   |
| Total Base Revenue                                   |        | \$ 159,372 | \$ 156,063 | \$ 155,324 | \$ 152,785 | \$ 151,262 | \$ 149,921 | \$ 150,598 | \$ 152,171 | \$ 154,045 | \$ 156,420 | \$ 157,770 | \$ 159,412 | 1,855,143 |
| Fuel Adjustment                                      |        | \$ 1,226   | \$ 319     | \$ 558     | \$ (327)   | \$ (589)   | \$ 1,766   | \$ 2,872   | \$ 3,486   | \$ 2,935   | \$ 3,145   | \$ 3,361   | \$ 4,718   | 23,470    |
| Subtotal Revenue                                     |        | \$ 160,598 | \$ 156,382 | \$ 155,882 | \$ 152,459 | \$ 150,673 | \$ 151,687 | \$ 153,469 | \$ 155,657 | \$ 156,981 | \$ 159,565 | \$ 161,131 | \$ 164,131 | 1,878,613 |
| <u>Adjustments for Riders Included in Base Rates</u> |        |            |            |            |            |            |            |            |            |            |            |            |            |           |
| Boswell 4 Environmental Adjustment                   |        | \$ -       | \$ -       | \$ -       | \$ -       | \$ -       | \$ -       | \$ -       | \$ -       | \$ -       | \$ -       | \$ -       | \$ -       | -         |
| Renewable Resource Adjustment                        |        | \$ -       | \$ -       | \$ -       | \$ -       | \$ -       | \$ -       | \$ -       | \$ -       | \$ -       | \$ -       | \$ -       | \$ -       | -         |
| Transmission Adjustment                              |        | \$ -       | \$ -       | \$ -       | \$ -       | \$ -       | \$ -       | \$ -       | \$ -       | \$ -       | \$ -       | \$ -       | \$ -       | -         |
| Excess ADIT Credit                                   |        | \$ (2,432) | \$ (2,381) | \$ (2,370) | \$ (2,331) | \$ (2,308) | \$ (2,288) | \$ (2,298) | \$ (2,322) | \$ (2,351) | \$ (2,387) | \$ (2,407) | \$ (2,432) | (28,308)  |
| Subtotal Revenue                                     |        | \$ 158,166 | \$ 154,000 | \$ 153,512 | \$ 150,127 | \$ 148,365 | \$ 149,399 | \$ 151,171 | \$ 153,335 | \$ 154,630 | \$ 157,178 | \$ 158,724 | \$ 161,698 | 1,850,306 |
| Boswell 4 Environmental Adjustment                   |        | \$ -       | \$ -       | \$ -       | \$ -       | \$ -       | \$ -       | \$ -       | \$ -       | \$ -       | \$ -       | \$ -       | \$ -       | -         |
| Renewable Resource Adjustment                        |        | \$ -       | \$ -       | \$ -       | \$ -       | \$ -       | \$ -       | \$ -       | \$ -       | \$ -       | \$ -       | \$ -       | \$ -       | -         |
| Transmission Adjustment                              |        | \$ -       | \$ -       | \$ -       | \$ -       | \$ -       | \$ -       | \$ -       | \$ -       | \$ -       | \$ -       | \$ -       | \$ -       | -         |
| Solar Energy Adjustment                              |        | \$ (108)   | \$ (48)    | \$ (54)    | \$ (70)    | \$ (79)    | \$ (79)    | \$ (106)   | \$ (124)   | \$ (163)   | \$ (211)   | \$ (192)   | \$ (110)   | (1,344)   |
| Conservation Program Adjustment                      |        | \$ (135)   | \$ (110)   | \$ (106)   | \$ (87)    | \$ (77)    | \$ (68)    | \$ (73)    | \$ (85)    | \$ 263     | \$ 314     | \$ 340     | \$ 373     | 550       |
| TOTAL REVENUE  |        | \$ 157,923 | \$ 153,842 | \$ 153,351 | \$ 149,970 | \$ 148,209 | \$ 149,253 | \$ 150,993 | \$ 153,126 | \$ 154,731 | \$ 157,281 | \$ 158,872 | \$ 161,961 | 1,849,512 |

## Minnesota Power

Minnesota Power Docket No. E015/GR-19-442

Municipal Pumping - Rate 87

TEST YEAR 2020

**Present Rate Revenue**

|  | January | February | March | April | May  | June | July | August | September | October | November | December | Total |
|--|---------|----------|-------|-------|------|------|------|--------|-----------|---------|----------|----------|-------|
| Minimum Charge                                       | \$ -    | \$ -     | \$ -  | \$ -  | \$ - | \$ - | \$ - | \$ -   | \$ -      | \$ -    | \$ -     | \$ -     | \$ -  |
| No Demand Meter                                      |         |          |       |       |      |      |      |        |           |         |          |          |       |
| Energy - All kWh                                     | \$ -    | \$ -     | \$ -  | \$ -  | \$ - | \$ - | \$ - | \$ -   | \$ -      | \$ -    | \$ -     | \$ -     | \$ -  |
| Demand Meter   |         |          |       |       |      |      |      |        |           |         |          |          |       |
| Demand - All kW                                      | \$ -    | \$ -     | \$ -  | \$ -  | \$ - | \$ - | \$ - | \$ -   | \$ -      | \$ -    | \$ -     | \$ -     | \$ -  |
| Energy - All kWh                                     | \$ -    | \$ -     | \$ -  | \$ -  | \$ - | \$ - | \$ - | \$ -   | \$ -      | \$ -    | \$ -     | \$ -     | \$ -  |
| Service Voltage Adjustment                           |         |          |       |       |      |      |      |        |           |         |          |          |       |
| High Voltage Service                                 | \$ -    | \$ -     | \$ -  | \$ -  | \$ - | \$ - | \$ - | \$ -   | \$ -      | \$ -    | \$ -     | \$ -     | \$ -  |
| Transmission Voltage Service                         |         |          |       |       |      |      |      |        |           |         |          |          |       |
| Total Base Revenue                                   | \$ -    | \$ -     | \$ -  | \$ -  | \$ - | \$ - | \$ - | \$ -   | \$ -      | \$ -    | \$ -     | \$ -     | \$ -  |
| Fuel Clause Adjustment                               | \$ -    | \$ -     | \$ -  | \$ -  | \$ - | \$ - | \$ - | \$ -   | \$ -      | \$ -    | \$ -     | \$ -     | \$ -  |
| Subtotal   | \$ -    | \$ -     | \$ -  | \$ -  | \$ - | \$ - | \$ - | \$ -   | \$ -      | \$ -    | \$ -     | \$ -     | \$ -  |
| <u>Adjustments for Riders Included in Base Rates</u> |         |          |       |       |      |      |      |        |           |         |          |          |       |
| Boswell 4 Environmental Adjustment (per kWh)         | \$ -    | \$ -     | \$ -  | \$ -  | \$ - | \$ - | \$ - | \$ -   | \$ -      | \$ -    | \$ -     | \$ -     | \$ -  |
| Renewable Resource Adjustment (per kWh)              | \$ -    | \$ -     | \$ -  | \$ -  | \$ - | \$ - | \$ - | \$ -   | \$ -      | \$ -    | \$ -     | \$ -     | \$ -  |
| Transmission Adjustment (per kWh)                    | \$ -    | \$ -     | \$ -  | \$ -  | \$ - | \$ - | \$ - | \$ -   | \$ -      | \$ -    | \$ -     | \$ -     | \$ -  |
| Excess ADIT Credit                                   | \$ -    | \$ -     | \$ -  | \$ -  | \$ - | \$ - | \$ - | \$ -   | \$ -      | \$ -    | \$ -     | \$ -     | \$ -  |
| Subtotal Revenue                                     | \$ -    | \$ -     | \$ -  | \$ -  | \$ - | \$ - | \$ - | \$ -   | \$ -      | \$ -    | \$ -     | \$ -     | \$ -  |

Adjustments for Remaining Riders

|  |      |      |      |      |      |      |      |      |      |      |      |      |      |
|--|------|------|------|------|------|------|------|------|------|------|------|------|------|
| Boswell 4 Environmental Adjustment (per kWh) | \$ - | \$ - | \$ - | \$ - | \$ - | \$ - | \$ - | \$ - | \$ - | \$ - | \$ - | \$ - | \$ - |
| Renewable Resource Adjustment (per kWh)      | \$ - | \$ - | \$ - | \$ - | \$ - | \$ - | \$ - | \$ - | \$ - | \$ - | \$ - | \$ - | \$ - |
| Transmission Adjustment (per kWh)            | \$ - | \$ - | \$ - | \$ - | \$ - | \$ - | \$ - | \$ - | \$ - | \$ - | \$ - | \$ - | \$ - |
| Conservation Program Adjustment (%)          | \$ - | \$ - | \$ - | \$ - | \$ - | \$ - | \$ - | \$ - | \$ - | \$ - | \$ - | \$ - | \$ - |
| CARE Surcharge (per Bill)                    | \$ - | \$ - | \$ - | \$ - | \$ - | \$ - | \$ - | \$ - | \$ - | \$ - | \$ - | \$ - | \$ - |
| Solar Energy Adjustment                      |      |      |      |      |      |      |      |      |      |      |      |      |      |
| TOTAL REVENUE                                | \$ - | \$ - | \$ - | \$ - | \$ - | \$ - | \$ - | \$ - | \$ - | \$ - | \$ - | \$ - | \$ - |

**General Rate Revenue**

|  | January | February | March | April | May  | June | July | August | September | October | November | December | Total |
|--|---------|----------|-------|-------|------|------|------|--------|-----------|---------|----------|----------|-------|
| Minimum Charge                                       | \$ -    | \$ -     | \$ -  | \$ -  | \$ - | \$ - | \$ - | \$ -   | \$ -      | \$ -    | \$ -     | \$ -     | \$ -  |
| No Demand Meter                                      |         |          |       |       |      |      |      |        |           |         |          |          |       |
| Energy - All kWh                                     | \$ -    | \$ -     | \$ -  | \$ -  | \$ - | \$ - | \$ - | \$ -   | \$ -      | \$ -    | \$ -     | \$ -     | \$ -  |
| Demand Meter   |         |          |       |       |      |      |      |        |           |         |          |          |       |
| Demand - All kW                                      | \$ -    | \$ -     | \$ -  | \$ -  | \$ - | \$ - | \$ - | \$ -   | \$ -      | \$ -    | \$ -     | \$ -     | \$ -  |
| Energy - All kWh                                     | \$ -    | \$ -     | \$ -  | \$ -  | \$ - | \$ - | \$ - | \$ -   | \$ -      | \$ -    | \$ -     | \$ -     | \$ -  |
| Service Voltage Adjustment                           |         |          |       |       |      |      |      |        |           |         |          |          |       |
| High Voltage Service                                 | \$ -    | \$ -     | \$ -  | \$ -  | \$ - | \$ - | \$ - | \$ -   | \$ -      | \$ -    | \$ -     | \$ -     | \$ -  |
| Transmission Voltage Service                         | \$ -    | \$ -     | \$ -  | \$ -  | \$ - | \$ - | \$ - | \$ -   | \$ -      | \$ -    | \$ -     | \$ -     | \$ -  |
| Total Base Revenue                                   | \$ -    | \$ -     | \$ -  | \$ -  | \$ - | \$ - | \$ - | \$ -   | \$ -      | \$ -    | \$ -     | \$ -     | \$ -  |
| Fuel Clause Adjustment                               | \$ -    | \$ -     | \$ -  | \$ -  | \$ - | \$ - | \$ - | \$ -   | \$ -      | \$ -    | \$ -     | \$ -     | \$ -  |
| Subtotal   | \$ -    | \$ -     | \$ -  | \$ -  | \$ - | \$ - | \$ - | \$ -   | \$ -      | \$ -    | \$ -     | \$ -     | \$ -  |
| <u>Adjustments for Riders Included in Base Rates</u> |         |          |       |       |      |      |      |        |           |         |          |          |       |
| Boswell 4 Environmental Adjustment (per kWh)         | \$ -    | \$ -     | \$ -  | \$ -  | \$ - | \$ - | \$ - | \$ -   | \$ -      | \$ -    | \$ -     | \$ -     | \$ -  |
| Renewable Resource Adjustment (per kWh)              | \$ -    | \$ -     | \$ -  | \$ -  | \$ - | \$ - | \$ - | \$ -   | \$ -      | \$ -    | \$ -     | \$ -     | \$ -  |
| Transmission Adjustment (per kWh)                    | \$ -    | \$ -     | \$ -  | \$ -  | \$ - | \$ - | \$ - | \$ -   | \$ -      | \$ -    | \$ -     | \$ -     | \$ -  |
| Conservation Program Adjustment (per kWh)            | \$ -    | \$ -     | \$ -  | \$ -  | \$ - | \$ - | \$ - | \$ -   | \$ -      | \$ -    | \$ -     | \$ -     | \$ -  |
| Excess ADIT Credit                                   | \$ -    | \$ -     | \$ -  | \$ -  | \$ - | \$ - | \$ - | \$ -   | \$ -      | \$ -    | \$ -     | \$ -     | \$ -  |
| Subtotal Revenue                                     | \$ -    | \$ -     | \$ -  | \$ -  | \$ - | \$ - | \$ - | \$ -   | \$ -      | \$ -    | \$ -     | \$ -     | \$ -  |
| <u>Adjustments for Remaining Riders</u>              |         |          |       |       |      |      |      |        |           |         |          |          |       |
| Boswell 4 Environmental Adjustment (per kWh)         | \$ -    | \$ -     | \$ -  | \$ -  | \$ - | \$ - | \$ - | \$ -   | \$ -      | \$ -    | \$ -     | \$ -     | \$ -  |
| Renewable Resource Adjustment (per kWh)              | \$ -    | \$ -     | \$ -  | \$ -  | \$ - | \$ - | \$ - | \$ -   | \$ -      | \$ -    | \$ -     | \$ -     | \$ -  |
| Transmission Adjustment (per kWh)                    | \$ -    | \$ -     | \$ -  | \$ -  | \$ - | \$ - | \$ - | \$ -   | \$ -      | \$ -    | \$ -     | \$ -     | \$ -  |
| Solar Energy Adjustment                              |         |          |       |       |      |      |      |        |           |         |          |          |       |
| Conservation Program Adjustment (per kWh)            | \$ -    | \$ -     | \$ -  | \$ -  | \$ - | \$ - | \$ - | \$ -   | \$ -      | \$ -    | \$ -     | \$ -     | \$ -  |
| CARE Surcharge (per Bill)                            | \$ -    | \$ -     | \$ -  | \$ -  | \$ - | \$ - | \$ - | \$ -   | \$ -      | \$ -    | \$ -     | \$ -     | \$ -  |
| TOTAL REVENUE  | \$ -    | \$ -     | \$ -  | \$ -  | \$ - | \$ - | \$ - | \$ -   | \$ -      | \$ -    | \$ -     | \$ -     | \$ -  |



MINNESOTA POWER  
TEST YEAR 2020  
Large Power Support

The first tab is the Monthly Sales budget for the Large Power customers for the test year. This tab shows budgeted Demand and breaks out the various types of Energy for each Large Power customer.

The second tab is the Large Power Rates for both Present and General Rates.

Minnesota Power  
Large Power Marketing Sales Budget Test Year 2020

| TRADE SECRET DATA BEGINS | Jan-17 | Feb-17 | Mar-17 | Apr-17 | May-17 | Jun-17 | Jul-17 | Aug-17 | Sep-17 | Oct-17 | Nov-17 | Dec-17 | TOTAL |
|--------------------------|--------|--------|--------|--------|--------|--------|--------|--------|--------|--------|--------|--------|-------|
|--------------------------|--------|--------|--------|--------|--------|--------|--------|--------|--------|--------|--------|--------|-------|

|                          |  |  |  |  |  |  |  |  |  |  |  |  |  |
|--------------------------|--|--|--|--|--|--|--|--|--|--|--|--|--|
| [Redacted Table Content] |  |  |  |  |  |  |  |  |  |  |  |  |  |
|--------------------------|--|--|--|--|--|--|--|--|--|--|--|--|--|

TRADE SECRET DATA ENDS

## Minnesota Power

Minnesota Power Docket No. E015/GR-19-442

Large Power Present and Proposed Rates

TEST YEAR 2020

## Interim Period Rate Increase

|  | 7.70000%        |                 |                 |                 |                 |                 |                 |                 |                 |                 |                 |                 |
|--|-----------------|-----------------|-----------------|-----------------|-----------------|-----------------|-----------------|-----------------|-----------------|-----------------|-----------------|-----------------|
|  | January         | February        | March           | April           | May             | June            | July            | August          | September       | October         | November        | December        |
| <b>Present Rates</b>                   |                 |                 |                 |                 |                 |                 |                 |                 |                 |                 |                 |                 |
| Minimum Billing Demand                 | 10,000          | 10,000          | 10,000          | 10,000          | 10,000          | 10,000          | 10,000          | 10,000          | 10,000          | 10,000          | 10,000          | 10,000          |
| Charge for Min. Demand                 | \$250,087       | \$250,087       | \$250,087       | \$250,087       | \$250,087       | \$250,087       | \$250,087       | \$250,087       | \$250,087       | \$250,087       | \$250,087       | \$250,087       |
| Firm Demand Rate per kW                | \$24.96         | \$24.96         | \$24.96         | \$24.96         | \$24.96         | \$24.96         | \$24.96         | \$24.96         | \$24.96         | \$24.96         | \$24.96         | \$24.96         |
| Low Voltage Adj per kWh                | \$1.75          | \$1.75          | \$1.75          | \$1.75          | \$1.75          | \$1.75          | \$1.75          | \$1.75          | \$1.75          | \$1.75          | \$1.75          | \$1.75          |
| Firm Energy Rate per kWh               | \$0.02778       | \$0.02778       | \$0.02778       | \$0.02778       | \$0.02778       | \$0.02778       | \$0.02778       | \$0.02778       | \$0.02778       | \$0.02778       | \$0.02778       | \$0.02778       |
| Fuel Adjustment per kWh                | \$0.00150       | \$0.00048       | \$0.00086       | -\$0.00061      | -\$0.00126      | \$0.00430       | \$0.00651       | \$0.00676       | \$0.00497       | \$0.00447       | \$0.00441       | \$0.00564       |
| Replacement Interruptible Discount/kWh | \$0.60          | \$0.60          | \$0.60          | \$0.60          | \$0.60          | \$0.60          | \$0.60          | \$0.60          | \$0.60          | \$0.60          | \$0.60          | \$0.60          |
| IPS Energy Rate per kWh                | \$0.040811      | \$0.037327      | \$0.038105      | \$0.036170      | \$0.035396      | \$0.034169      | \$0.037527      | \$0.036269      | \$0.034859      | \$0.033766      | \$0.034604      | \$0.036507      |
| Excess Energy Rate per kWh             | \$0.035208      | \$0.033254      | \$0.028403      | \$0.027930      | \$0.027636      | \$0.031792      | \$0.037570      | \$0.035447      | \$0.031503      | \$0.029436      | \$0.028667      | \$0.032865      |
| Pool within Pool Service Fee           | \$36,479        | \$36,479        | \$36,479        | \$36,479        | \$36,479        | \$36,479        | \$36,479        | \$36,479        | \$36,479        | \$36,479        | \$36,479        | \$36,479        |
| Low Voltage Adjustment                 | \$15,000        | \$15,000        | \$15,000        | \$15,000        | \$15,000        | \$15,000        | \$15,000        | \$15,000        | \$15,000        | \$15,000        | \$15,000        | \$15,000        |
| Non-Firm Energy Rate per kWh           | \$0.0368223     | \$0.0320449     | \$0.0337137     | \$0.0319621     | \$0.0310099     | \$0.0297184     | \$0.0323448     | \$0.0316166     | \$0.0303481     | \$0.0293987     | \$0.0300280     | \$0.0319220     |
| RFPS Energy Rate per kWh               | \$0.0408110     | \$0.3732700     | \$0.0381049     | \$0.0361701     | \$0.0353958     | \$0.0341691     | \$0.0375273     | \$0.0362689     | \$0.0348590     | \$0.0337659     | \$0.0346038     | \$0.0365070     |
| Curtable Credit                        | \$3,000,000,000 | \$3,000,000,000 | \$3,000,000,000 | \$3,000,000,000 | \$3,000,000,000 | \$3,000,000,000 | \$3,000,000,000 | \$3,000,000,000 | \$3,000,000,000 | \$3,000,000,000 | \$3,000,000,000 | \$3,000,000,000 |
| ESA Demand Charge Credit               | \$2.00          | \$2.00          | \$2.00          | \$2.00          | \$2.00          | \$2.00          | \$2.00          | \$2.00          | \$2.00          | \$2.00          | \$2.00          | \$2.00          |
| USS RIS                                | \$0.600000000   | \$0.600000000   | \$0.600000000   | \$0.600000000   | \$0.600000000   | \$0.600000000   | \$0.600000000   | \$0.600000000   | \$0.600000000   | \$0.600000000   | \$0.600000000   | \$0.600000000   |
| LP On Peak Energy per kWh              | \$0.02778       | \$0.02778       | \$0.02778       | \$0.02778       | \$0.02778       | \$0.02778       | \$0.02778       | \$0.02778       | \$0.02778       | \$0.02778       | \$0.02778       | \$0.02778       |
| EITE Energy Charge Credit              | -\$0.01150      | -\$0.01150      | -\$0.01150      | -\$0.01150      | -\$0.01150      | -\$0.01150      | -\$0.01150      | -\$0.01150      | -\$0.01150      | -\$0.01150      | -\$0.01150      | -\$0.01150      |
| <b>Adjustments</b>                     |                 |                 |                 |                 |                 |                 |                 |                 |                 |                 |                 |                 |
| Boswell 4 Demand Rider per kW          | \$0.000000000   | \$0.000000000   | \$0.000000000   | \$0.000000000   | \$0.000000000   | \$0.000000000   | \$0.000000000   | \$0.000000000   | \$0.000000000   | \$0.000000000   | \$0.000000000   | \$0.000000000   |
| Boswell 4 Energy Rider per kWh         | \$0.000000000   | \$0.000000000   | \$0.000000000   | \$0.000000000   | \$0.000000000   | \$0.000000000   | \$0.000000000   | \$0.000000000   | \$0.000000000   | \$0.000000000   | \$0.000000000   | \$0.000000000   |
| Renewable Resource Rider per kW        | \$0.000000000   | \$0.000000000   | \$0.000000000   | \$0.000000000   | \$0.000000000   | \$0.000000000   | \$0.000000000   | \$0.000000000   | \$0.000000000   | \$0.000000000   | \$0.000000000   | \$0.000000000   |
| Renewable Resource Rider per kWh       | \$0.000000000   | \$0.000000000   | \$0.000000000   | \$0.000000000   | \$0.000000000   | \$0.000000000   | \$0.000000000   | \$0.000000000   | \$0.000000000   | \$0.000000000   | \$0.000000000   | \$0.000000000   |
| Transmission Demand Rider per kW       | \$0.000000000   | \$0.000000000   | \$0.000000000   | \$0.000000000   | \$0.000000000   | \$0.000000000   | \$0.000000000   | \$0.000000000   | \$0.000000000   | \$0.000000000   | \$0.000000000   | \$0.000000000   |
| Transmission Energy Rider per kWh      | \$0.000000000   | \$0.000000000   | \$0.000000000   | \$0.000000000   | \$0.000000000   | \$0.000000000   | \$0.000000000   | \$0.000000000   | \$0.000000000   | \$0.000000000   | \$0.000000000   | \$0.000000000   |
| Personal Property Tax Adj per kWh      | \$0.000000000   | \$0.000000000   | \$0.000000000   | \$0.000000000   | \$0.000000000   | \$0.000000000   | \$0.000000000   | \$0.000000000   | \$0.000000000   | \$0.000000000   | \$0.000000000   | \$0.000000000   |
| Excess ADIT Credit                     | -0.015259       | -0.015259       | -0.015259       | -0.015259       | -0.015259       | -0.015259       | -0.015259       | -0.015259       | -0.015259       | -0.015259       | -0.015259       | -0.015259       |
| <b>Proposed Budget</b>                 |                 |                 |                 |                 |                 |                 |                 |                 |                 |                 |                 |                 |
| Boswell 4 Demand Rider per kW          | \$0.000000000   | \$0.000000000   | \$0.000000000   | \$0.000000000   | \$0.000000000   | \$0.000000000   | \$0.000000000   | \$0.000000000   | \$0.000000000   | \$0.000000000   | \$0.000000000   | \$0.000000000   |
| Boswell 4 Energy Rider per kWh         | \$0.000000000   | \$0.000000000   | \$0.000000000   | \$0.000000000   | \$0.000000000   | \$0.000000000   | \$0.000000000   | \$0.000000000   | \$0.000000000   | \$0.000000000   | \$0.000000000   | \$0.000000000   |
| Renewable Resource Rider per kW        | \$0.000000000   | \$0.000000000   | \$0.000000000   | \$0.000000000   | \$0.000000000   | \$0.000000000   | \$0.000000000   | \$0.000000000   | \$0.000000000   | \$0.000000000   | \$0.000000000   | \$0.000000000   |
| Renewable Resource Rider per kWh       | \$0.000000000   | \$0.000000000   | \$0.000000000   | \$0.000000000   | \$0.000000000   | \$0.000000000   | \$0.000000000   | \$0.000000000   | \$0.000000000   | \$0.000000000   | \$0.000000000   | \$0.000000000   |
| Transmission Demand Rider per kW       | \$0.000000000   | \$0.000000000   | \$0.000000000   | \$0.000000000   | \$0.000000000   | \$0.000000000   | \$0.000000000   | \$0.000000000   | \$0.000000000   | \$0.000000000   | \$0.000000000   | \$0.000000000   |
| Transmission Energy Rider per kWh      | \$0.000000000   | \$0.000000000   | \$0.000000000   | \$0.000000000   | \$0.000000000   | \$0.000000000   | \$0.000000000   | \$0.000000000   | \$0.000000000   | \$0.000000000   | \$0.000000000   | \$0.000000000   |
| CCRC Refund Rate per kWh               | \$0.000000000   | \$0.000000000   | \$0.000000000   | \$0.000000000   | \$0.000000000   | \$0.000000000   | \$0.000000000   | \$0.000000000   | \$0.000000000   | \$0.000000000   | \$0.000000000   | \$0.000000000   |

## Minnesota Power

Minnesota Power Docket No. E015/GR-19-442

Large Power Present and Proposed Rates

TEST YEAR 2020

## Interim Period Rate Increase

7.70000%

|                                       | January      | February     | March        | April        | May          | June         | July         | August       | September    | October      | November     | December     |
|---------------------------------------|--------------|--------------|--------------|--------------|--------------|--------------|--------------|--------------|--------------|--------------|--------------|--------------|
| <b>General/Proposed Rates</b>         |              |              |              |              |              |              |              |              |              |              |              |              |
| Minimum Billing Demand                | 10,000       | 10,000       | 10,000       | 10,000       | 10,000       | 10,000       | 10,000       | 10,000       | 10,000       | 10,000       | 10,000       | 10,000       |
| Charge for Min. Demand                | \$250,087    | \$250,087    | \$250,087    | \$250,087    | \$250,087    | \$250,087    | \$250,087    | \$250,087    | \$250,087    | \$250,087    | \$250,087    | \$250,087    |
| Firm Demand Rate per kW               | \$24.96      | \$24.96      | \$24.96      | \$24.96      | \$24.96      | \$24.96      | \$24.96      | \$24.96      | \$24.96      | \$24.96      | \$24.96      | \$24.96      |
| Low Voltage Adj per kW                | \$1.75       | \$1.75       | \$1.75       | \$1.75       | \$1.75       | \$1.75       | \$1.75       | \$1.75       | \$1.75       | \$1.75       | \$1.75       | \$1.75       |
| Firm Energy Rate per kWh              | \$0.00678    | \$0.00678    | \$0.00678    | \$0.00678    | \$0.00678    | \$0.00678    | \$0.00678    | \$0.00678    | \$0.00678    | \$0.00678    | \$0.00678    | \$0.00678    |
| Fuel Adjustment per kWh               | \$0.00150    | \$0.00048    | \$0.00086    | -\$0.00061   | -\$0.00126   | \$0.00430    | \$0.00651    | \$0.00676    | \$0.00497    | \$0.00447    | \$0.00441    | \$0.00564    |
| Replacement Interruptible Discount/kW | \$0.60       | \$0.60       | \$0.60       | \$0.60       | \$0.60       | \$0.60       | \$0.60       | \$0.60       | \$0.60       | \$0.60       | \$0.60       | \$0.60       |
| IPS Energy Rate per kWh               | \$0.040811   | \$0.037327   | \$0.038105   | \$0.036170   | \$0.035396   | \$0.034169   | \$0.037527   | \$0.036269   | \$0.034859   | \$0.033766   | \$0.034604   | \$0.036507   |
| Excess Energy Rate per kWh            | \$0.035208   | \$0.033254   | \$0.028403   | \$0.027930   | \$0.027636   | \$0.031792   | \$0.037570   | \$0.035447   | \$0.031503   | \$0.029436   | \$0.028667   | \$0.032865   |
| Pool within Pool Service Fee          | \$36,479     | \$36,479     | \$36,479     | \$36,479     | \$36,479     | \$34,789     | \$34,789     | \$34,789     | \$34,789     | \$34,789     | \$34,789     | \$34,789     |
| Low Voltage Adjustment                | \$15,000     | \$15,000     | \$15,000     | \$15,000     | \$15,000     | \$15,000     | \$15,000     | \$15,000     | \$15,000     | \$15,000     | \$15,000     | \$15,000     |
| Non-Firm Energy Rate per kWh          | \$0.0368223  | \$0.0320449  | \$0.0337137  | \$0.0319621  | \$0.0310099  | \$0.0297184  | \$0.0323448  | \$0.0316166  | \$0.0303481  | \$0.0293987  | \$0.0300280  | \$0.0319220  |
| RFPS Energy Rate per kWh              | \$0.0408110  | \$0.3732700  | \$0.0381049  | \$0.0361701  | \$0.0353958  | \$0.0341691  | \$0.0375273  | \$0.0362689  | \$0.0348590  | \$0.0337659  | \$0.0346038  | \$0.0365070  |
| Curtailable Credit                    | \$3.00       | \$3.00       | \$3.00       | \$3.00       | \$3.00       | \$3.00       | \$3.00       | \$3.00       | \$3.00       | \$3.00       | \$3.00       | \$3.00       |
| ESA Demand Charge Credit              | \$2.00       | \$2.00       | \$2.00       | \$2.00       | \$2.00       | \$2.00       | \$2.00       | \$2.00       | \$2.00       | \$2.00       | \$2.00       | \$2.00       |
| USS RIS                               | \$0.6000000  | \$0.6000000  | \$0.6000000  | \$0.6000000  | \$0.6000000  | \$0.6000000  | \$0.6000000  | \$0.6000000  | \$0.6000000  | \$0.6000000  | \$0.6000000  | \$0.6000000  |
| Boswell 4 Demand Rider per kW         | \$0.13000000 | \$0.13000000 | \$0.13000000 | \$0.13000000 | \$0.13000000 | \$0.13000000 | \$0.13000000 | \$0.13000000 | \$0.13000000 | \$0.13000000 | \$0.13000000 | \$0.13000000 |
| Boswell 4 Energy Rider per kWh        | \$0.00012000 | \$0.00012000 | \$0.00012000 | \$0.00012000 | \$0.00012000 | \$0.00012000 | \$0.00012000 | \$0.00012000 | \$0.00012000 | \$0.00012000 | \$0.00012000 | \$0.00012000 |
| Transmission Demand Rider per kW      | \$0.67000000 | \$0.67000000 | \$0.67000000 | \$0.67000000 | \$0.67000000 | \$0.67000000 | \$0.67000000 | \$0.67000000 | \$0.67000000 | \$0.67000000 | \$0.67000000 | \$0.67000000 |
| Transmission Energy Rider per kWh     | \$0.00064000 | \$0.00064000 | \$0.00064000 | \$0.00064000 | \$0.00064000 | \$0.00064000 | \$0.00064000 | \$0.00064000 | \$0.00064000 | \$0.00064000 | \$0.00064000 | \$0.00064000 |
| Renewable Resource Rider per kW       | \$1.49000000 | \$1.49000000 | \$1.49000000 | \$1.49000000 | \$1.49000000 | \$1.49000000 | \$1.49000000 | \$1.49000000 | \$1.49000000 | \$1.49000000 | \$1.49000000 | \$1.49000000 |
| Renewable Resource Rider per kWh      | \$0.00146000 | \$0.00146000 | \$0.00146000 | \$0.00146000 | \$0.00146000 | \$0.00146000 | \$0.00146000 | \$0.00146000 | \$0.00146000 | \$0.00146000 | \$0.00146000 | \$0.00146000 |
| Personal Property Tax Adj per kWh     | \$0.00000000 | \$0.00000000 | \$0.00000000 | \$0.00000000 | \$0.00000000 | \$0.00000000 | \$0.00000000 | \$0.00000000 | \$0.00000000 | \$0.00000000 | \$0.00000000 | \$0.00000000 |
| Conservation Program Adj per kWh      | \$0.00249400 | \$0.00249400 | \$0.00249400 | \$0.00249400 | \$0.00249400 | \$0.00249400 | \$0.00249400 | \$0.00249400 | \$0.00249400 | \$0.00249400 | \$0.00249400 | \$0.00249400 |
| CCRC Refund Rate per kWh              | \$0.00146680 | \$0.00146680 | \$0.00146680 | \$0.00146680 | \$0.00146680 | \$0.00146680 | \$0.00146680 | \$0.00146680 | \$0.00146680 | \$0.00146680 | \$0.00146680 | \$0.00146680 |
| CCRC Charge Rate per kWh              | \$0.00148972 | \$0.00148972 | \$0.00148972 | \$0.00148972 | \$0.00148972 | \$0.00148972 | \$0.00148972 | \$0.00148972 | \$0.00148972 | \$0.00148972 | \$0.00148972 | \$0.00148972 |

Interim Rate Increase 7.70%

## Adjustments

(Present Rates-Proposed Rates)

|                                   |              |              |              |              |              |              |              |              |              |              |              |              |
|-----------------------------------|--------------|--------------|--------------|--------------|--------------|--------------|--------------|--------------|--------------|--------------|--------------|--------------|
| Area Rider per kWh                | 0.000000     | 0.000000     | 0.000000     | 0.000000     | 0.000000     | 0.000000     | 0.000000     | 0.000000     | 0.000000     | 0.000000     | 0.000000     | 0.000000     |
| Boswell 3 Demand Rider per kW     | 0.000000     | 0.000000     | 0.000000     | 0.000000     | 0.000000     | 0.000000     | 0.000000     | 0.000000     | 0.000000     | 0.000000     | 0.000000     | 0.000000     |
| Boswell 3 Energy Rider per kWh    | 0.000000     | 0.000000     | 0.000000     | 0.000000     | 0.000000     | 0.000000     | 0.000000     | 0.000000     | 0.000000     | 0.000000     | 0.000000     | 0.000000     |
| Boswell 4 Demand Rider per kW     | \$0.00000000 | \$0.00000000 | \$0.00000000 | \$0.00000000 | \$0.00000000 | \$0.00000000 | \$0.00000000 | \$0.00000000 | \$0.00000000 | \$0.00000000 | \$0.00000000 | \$0.00000000 |
| Boswell 4 Energy Rider per kWh    | \$0.00000000 | \$0.00000000 | \$0.00000000 | \$0.00000000 | \$0.00000000 | \$0.00000000 | \$0.00000000 | \$0.00000000 | \$0.00000000 | \$0.00000000 | \$0.00000000 | \$0.00000000 |
| Renewable Resource Rider per kW   | \$0.00000000 | \$0.00000000 | \$0.00000000 | \$0.00000000 | \$0.00000000 | \$0.00000000 | \$0.00000000 | \$0.00000000 | \$0.00000000 | \$0.00000000 | \$0.00000000 | \$0.00000000 |
| Renewable Resource Rider per kWh  | \$0.00000000 | \$0.00000000 | \$0.00000000 | \$0.00000000 | \$0.00000000 | \$0.00000000 | \$0.00000000 | \$0.00000000 | \$0.00000000 | \$0.00000000 | \$0.00000000 | \$0.00000000 |
| Transmission Demand Rider per kW  | \$0.00000000 | \$0.00000000 | \$0.00000000 | \$0.00000000 | \$0.00000000 | \$0.00000000 | \$0.00000000 | \$0.00000000 | \$0.00000000 | \$0.00000000 | \$0.00000000 | \$0.00000000 |
| Transmission Energy Rider per kWh | \$0.00000000 | \$0.00000000 | \$0.00000000 | \$0.00000000 | \$0.00000000 | \$0.00000000 | \$0.00000000 | \$0.00000000 | \$0.00000000 | \$0.00000000 | \$0.00000000 | \$0.00000000 |
| Personal Property Tax Adj per kWh | \$0.00000000 | \$0.00000000 | \$0.00000000 | \$0.00000000 | \$0.00000000 | \$0.00000000 | \$0.00000000 | \$0.00000000 | \$0.00000000 | \$0.00000000 | \$0.00000000 | \$0.00000000 |
| Excess ADIT Credit                | 0.000000     | 0.000000     | 0.000000     | 0.000000     | 0.000000     | 0.000000     | 0.000000     | 0.000000     | 0.000000     | 0.000000     | 0.000000     | 0.000000     |
| CCRC Refund Rate per kWh          | \$0.00000000 | \$0.00000000 | \$0.00000000 | \$0.00000000 | \$0.00000000 | \$0.00000000 | \$0.00000000 | \$0.00000000 | \$0.00000000 | \$0.00000000 | \$0.00000000 | \$0.00000000 |

## Proposed Budget

|                                   |              |              |              |              |              |              |              |              |              |              |              |              |
|-----------------------------------|--------------|--------------|--------------|--------------|--------------|--------------|--------------|--------------|--------------|--------------|--------------|--------------|
| Boswell 4 Demand Rider per kW     | \$0.00000000 | \$0.00000000 | \$0.00000000 | \$0.00000000 | \$0.00000000 | \$0.00000000 | \$0.00000000 | \$0.00000000 | \$0.00000000 | \$0.00000000 | \$0.00000000 | \$0.00000000 |
| Boswell 4 Energy Rider per kWh    | \$0.00000000 | \$0.00000000 | \$0.00000000 | \$0.00000000 | \$0.00000000 | \$0.00000000 | \$0.00000000 | \$0.00000000 | \$0.00000000 | \$0.00000000 | \$0.00000000 | \$0.00000000 |
| Renewable Resource Rider per kW   | \$0.00000000 | \$0.00000000 | \$0.00000000 | \$0.00000000 | \$0.00000000 | \$0.00000000 | \$0.00000000 | \$0.00000000 | \$0.00000000 | \$0.00000000 | \$0.00000000 | \$0.00000000 |
| Renewable Resource Rider per kWh  | \$0.00000000 | \$0.00000000 | \$0.00000000 | \$0.00000000 | \$0.00000000 | \$0.00000000 | \$0.00000000 | \$0.00000000 | \$0.00000000 | \$0.00000000 | \$0.00000000 | \$0.00000000 |
| Transmission Demand Rider per kW  | \$0.00000000 | \$0.00000000 | \$0.00000000 | \$0.00000000 | \$0.00000000 | \$0.00000000 | \$0.00000000 | \$0.00000000 | \$0.00000000 | \$0.00000000 | \$0.00000000 | \$0.00000000 |
| Transmission Energy Rider per kWh | \$0.00000000 | \$0.00000000 | \$0.00000000 | \$0.00000000 | \$0.00000000 | \$0.00000000 | \$0.00000000 | \$0.00000000 | \$0.00000000 | \$0.00000000 | \$0.00000000 | \$0.00000000 |
| Personal Property Tax Adj per kWh | \$0.00000000 | \$0.00000000 | \$0.00000000 | \$0.00000000 | \$0.00000000 | \$0.00000000 | \$0.00000000 | \$0.00000000 | \$0.00000000 | \$0.00000000 | \$0.00000000 | \$0.00000000 |
| CCRC Refund Rate per kWh          | \$0.00000000 | \$0.00000000 | \$0.00000000 | \$0.00000000 | \$0.00000000 | \$0.00000000 | \$0.00000000 | \$0.00000000 | \$0.00000000 | \$0.00000000 | \$0.00000000 | \$0.00000000 |
| Amortized Fuel Adjustment         | \$0.00000000 | \$0.00000000 | \$0.00000000 | \$0.00000000 | \$0.00000000 | \$0.00000000 | \$0.00000000 | \$0.00000000 | \$0.00000000 | \$0.00000000 | \$0.00000000 | \$0.00000000 |

MINNESOTA POWER  
TEST YEAR 2020  
Supporting Data

The miscellaneous tabs that are here under "Supporting Data" are used as support for calculations throughout the Schedule E-1 and Schedule E-2 documents.

**Tab:**

**Silver Bay Power Corp Revenue** - Monthly usage and revenue budgeted for SBPC.

**Sales-2020 IndustMisc Dual Fuel** - This is a breakdown of the energy and customers that are billed under the Commercial/Industrial Dual Fuel Rate (Rate 26) but are included in the Industrial Miscellaneous Revenue Class.

**Sales-2020 Ind. Budgeted** - The Budget Revenue Model calculates some customers independently from the larger rate class. This tab has the detail for each of those customers. It shows the Customer, Rate, Energy and Demand by month.

**Calculation of Lighting by Mo.** - Summary of the various lighting rate classes by month. Uses lamp type to summarize each class usage and count by month.

**Sales-Lighting Rate 76** - Summarizes Lighting Rate usage by Lamp Type and Number of Lamps and breaks usage into Revenue Class.

**Sales-Lighting Rate 77** - Summarizes Lighting Rate usage by Lamp Type and Number of Lamps and breaks usage into Revenue Class.

**Sales-Lighting Rate 80-84** - Summarizes Lighting Rate usage by Lamp Type and Number of Lamps and breaks usage into Revenue Class.

**Sales-Lighting Rate 83** - Summarizes Lighting Rate usage by Lamp Type and Number of Lamps and breaks usage into Revenue Class.

**Sales-Lighting by Customer CI** - Summarizes monthly usage per lamp by type. Summarizes Revenue by month for each lamp type by revenue class.

**Sales - Test Year Gerdau** - Supports monthly Energy, Demand and Revenue for Gerdau.

**Sales - Test Year MN Pipeline** - Supports monthly Energy, Demand and Revenue for Minnesota Pipeline and shows them as if on LLP Time-of-Use rider for General rates.

**Sales - Test Year Endbridge** - Supports monthly Energy, Demand and Revenue for Endbridge and shows them as if on LLP Time-of-Use Rider for General rates.

**RRR-Cont-Rider(Present & General)** - Breaks out Renewable Resources Rider Revenue by month, by rate class and shows the applicable Energy and Demand components.

**RRR-BaseRates (Present & General)** - Breaks out Renewable Resources Rider Revenue that will be rolled into base rates by month, by rate class and shows the applicable Energy and Demand components.

**TCR-Cont-Rider (Present & General)**- Breaks out Transmission Rider Revenue by month, by rate class and shows the applicable Energy and Demand components.

**TCR\_BaseRates (Present & General)** - Breaks out Transmission Rider Revenue that will be rolled into base rates by month, by rate class and shows the applicable Energy and Demand components.

**Bos4-Cont-Rider (Present & General)**- Breaks out Boswell 4 Rider Revenue that will be rolled into base rates by month, by rate class and shows the applicable Energy and Demand components.

**Bos4-BaseRates (Present & General)**- Breaks out Boswell 4 Rider Revenue that will be rolled into base rates by month, by rate class and shows the applicable Energy and Demand components.

Minnesota Power  
Silver Bay Co Revenue  
TEST YEAR 2020

| Test Year              | RevenueMonth | Customers | MWH                      | kW | Revenue |
|------------------------|--------------|-----------|--------------------------|----|---------|
|                        |              |           | TRADE SECRET DATA BEGINS |    |         |
| 2017                   | 1            | 1.00      |                          |    |         |
| 2017                   | 2            | 1.00      |                          |    |         |
| 2017                   | 3            | 1.00      |                          |    |         |
| 2017                   | 4            | 1.00      |                          |    |         |
| 2017                   | 5            | 1.00      |                          |    |         |
| 2017                   | 6            | 1.00      |                          |    |         |
| 2017                   | 7            | 1.00      |                          |    |         |
| 2017                   | 8            | 1.00      |                          |    |         |
| 2017                   | 9            | 1.00      |                          |    |         |
| 2017                   | 10           | 1.00      |                          |    |         |
| 2017                   | 11           | 1.00      |                          |    |         |
| 2017                   | 12           | 1.00      |                          |    |         |
| TRADE SECRET DATA ENDS |              |           |                          |    |         |

|                         |                          |  |  |  |  |
|-------------------------|--------------------------|--|--|--|--|
| Total Test Year Revenue |                          |  |  |  |  |
|                         | TRADE SECRET DATA BEGINS |  |  |  |  |
|                         |                          |  |  |  |  |
| TRADE SECRET DATA ENDS  |                          |  |  |  |  |

**Minnesota Power**  
**Industrial Misc Dual Fuel**  
**TEST YEAR 2020**

| RateCombo | Text33 | Text36                | RevenueMonth | Rate | Customers | MWH   |
|-----------|--------|-----------------------|--------------|------|-----------|-------|
|           | 2020   | Indust Misc Dual Fuel | 1            | 26   | 6.00      | 44.00 |
|           | 2020   | Indust Misc Dual Fuel | 2            | 26   | 6.00      | 49.00 |
|           | 2020   | Indust Misc Dual Fuel | 3            | 26   | 6.00      | 49.00 |
|           | 2020   | Indust Misc Dual Fuel | 4            | 26   | 6.00      | 38.00 |
|           | 2020   | Indust Misc Dual Fuel | 5            | 26   | 6.00      | 36.00 |
|           | 2020   | Indust Misc Dual Fuel | 6            | 26   | 6.00      | 33.00 |
|           | 2020   | Indust Misc Dual Fuel | 7            | 26   | 6.00      | 27.00 |
|           | 2020   | Indust Misc Dual Fuel | 8            | 26   | 6.00      | 18.00 |
|           | 2020   | Indust Misc Dual Fuel | 9            | 26   | 6.00      | 20.00 |
|           | 2020   | Indust Misc Dual Fuel | 10           | 26   | 6.00      | 24.00 |
|           | 2020   | Indust Misc Dual Fuel | 11           | 26   | 6.00      | 29.00 |
|           | 2020   | Indust Misc Dual Fuel | 12           | 26   | 6.00      | 35.00 |

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Minnesota Power  
Individually Budgeted Customers  
TEST YEAR 2020

| RateCombo | Text36             | RevenueMonth | Rate | Customers | MWH                      | kW |
|-----------|--------------------|--------------|------|-----------|--------------------------|----|
|           |                    |              |      |           | TRADE SECRET DATA BEGINS |    |
|           | Nordic Metals SP 1 | 1            | 75L  | 1.00      |                          |    |
|           | Nordic Metals SP 1 | 2            | 75L  | 1.00      |                          |    |
|           | Nordic Metals SP 1 | 3            | 75L  | 1.00      |                          |    |
|           | Nordic Metals SP 1 | 4            | 75L  | 1.00      |                          |    |
|           | Nordic Metals SP 1 | 5            | 75L  | 1.00      |                          |    |
|           | Nordic Metals SP 1 | 6            | 75L  | 1.00      |                          |    |
|           | Nordic Metals SP 1 | 7            | 75L  | 1.00      |                          |    |
|           | Nordic Metals SP 1 | 8            | 75L  | 1.00      |                          |    |
|           | Nordic Metals SP 1 | 9            | 75L  | 1.00      |                          |    |
|           | Nordic Metals SP 1 | 10           | 75L  | 1.00      |                          |    |
|           | Nordic Metals SP 1 | 11           | 75L  | 1.00      |                          |    |
|           | Nordic Metals SP 1 | 12           | 75L  | 1.00      |                          |    |
|           |                    |              |      |           | TRADE SECRET DATA ENDS   |    |

| RateCombo | Text36             | RevenueMonth | Rate | Customers | MWH                      | kW |
|-----------|--------------------|--------------|------|-----------|--------------------------|----|
|           |                    |              |      |           | TRADE SECRET DATA BEGINS |    |
|           | Nordic Metals SP 2 | 1            | 75L  | 1.00      |                          |    |
|           | Nordic Metals SP 2 | 2            | 75L  | 1.00      |                          |    |
|           | Nordic Metals SP 2 | 3            | 75L  | 1.00      |                          |    |
|           | Nordic Metals SP 2 | 4            | 75L  | 1.00      |                          |    |
|           | Nordic Metals SP 2 | 5            | 75L  | 1.00      |                          |    |
|           | Nordic Metals SP 2 | 6            | 75L  | 1.00      |                          |    |
|           | Nordic Metals SP 2 | 7            | 75L  | 1.00      |                          |    |
|           | Nordic Metals SP 2 | 8            | 75L  | 1.00      |                          |    |
|           | Nordic Metals SP 2 | 9            | 75L  | 1.00      |                          |    |
|           | Nordic Metals SP 2 | 10           | 75L  | 1.00      |                          |    |
|           | Nordic Metals SP 2 | 11           | 75L  | 1.00      |                          |    |
|           | Nordic Metals SP 2 | 12           | 75L  | 1.00      |                          |    |
|           |                    |              |      |           | TRADE SECRET DATA ENDS   |    |

| RateCombo | Text36              | RevenueMonth | Rate | Customers | MWH                      | kW |
|-----------|---------------------|--------------|------|-----------|--------------------------|----|
|           |                     |              |      |           | TRADE SECRET DATA BEGINS |    |
|           | Central Bi Products | 1            | 75H  | 1.00      |                          |    |
|           | Central Bi Products | 2            | 75H  | 1.00      |                          |    |
|           | Central Bi Products | 3            | 75H  | 1.00      |                          |    |
|           | Central Bi Products | 4            | 75H  | 1.00      |                          |    |
|           | Central Bi Products | 5            | 75H  | 1.00      |                          |    |
|           | Central Bi Products | 6            | 75H  | 1.00      |                          |    |
|           | Central Bi Products | 7            | 75H  | 1.00      |                          |    |
|           | Central Bi Products | 8            | 75H  | 1.00      |                          |    |
|           | Central Bi Products | 9            | 75H  | 1.00      |                          |    |
|           | Central Bi Products | 10           | 75H  | 1.00      |                          |    |
|           | Central Bi Products | 11           | 75H  | 1.00      |                          |    |
|           | Central Bi Products | 12           | 75H  | 1.00      |                          |    |
|           |                     |              |      |           | TRADE SECRET DATA ENDS   |    |

| RateCombo | Text36                        | RevenueMonth | Rate | Customers | MWH                      | kW |
|-----------|-------------------------------|--------------|------|-----------|--------------------------|----|
|           |                               |              |      |           | TRADE SECRET DATA BEGINS |    |
|           | Central Bi Products - Poultry | 1            | 75H  | 1.00      |                          |    |
|           | Central Bi Products - Poultry | 2            | 75H  | 1.00      |                          |    |
|           | Central Bi Products - Poultry | 3            | 75H  | 1.00      |                          |    |
|           | Central Bi Products - Poultry | 4            | 75H  | 1.00      |                          |    |
|           | Central Bi Products - Poultry | 5            | 75H  | 1.00      |                          |    |
|           | Central Bi Products - Poultry | 6            | 75H  | 1.00      |                          |    |
|           | Central Bi Products - Poultry | 7            | 75H  | 1.00      |                          |    |
|           | Central Bi Products - Poultry | 8            | 75H  | 1.00      |                          |    |
|           | Central Bi Products - Poultry | 9            | 75H  | 1.00      |                          |    |
|           | Central Bi Products - Poultry | 10           | 75H  | 1.00      |                          |    |
|           | Central Bi Products - Poultry | 11           | 75H  | 1.00      |                          |    |
|           | Central Bi Products - Poultry | 12           | 75H  | 1.00      |                          |    |
|           |                               |              |      |           | TRADE SECRET DATA ENDS   |    |



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Docket No. E015/GR-19-442

Minnesota Power  
Individually Budgeted Customers  
TEST YEAR 2020

| RateCombo | Text36                | RevenueMonth | Rate | Customers | MWH                      | kW |
|-----------|-----------------------|--------------|------|-----------|--------------------------|----|
|           |                       |              |      |           | TRADE SECRET DATA BEGINS |    |
|           | Central MN Renewables | 1            | 75N  | 1.00      |                          |    |
|           | Central MN Renewables | 2            | 75N  | 1.00      |                          |    |
|           | Central MN Renewables | 3            | 75N  | 1.00      |                          |    |
|           | Central MN Renewables | 4            | 75N  | 1.00      |                          |    |
|           | Central MN Renewables | 5            | 75N  | 1.00      |                          |    |
|           | Central MN Renewables | 6            | 75N  | 1.00      |                          |    |
|           | Central MN Renewables | 7            | 75N  | 1.00      |                          |    |
|           | Central MN Renewables | 8            | 75N  | 1.00      |                          |    |
|           | Central MN Renewables | 9            | 75N  | 1.00      |                          |    |
|           | Central MN Renewables | 10           | 75N  | 1.00      |                          |    |
|           | Central MN Renewables | 11           | 75N  | 1.00      |                          |    |
|           | Central MN Renewables | 12           | 75N  | 1.00      |                          |    |

TRADE SECRET DATA ENDS

| RateCombo | Text36               | RevenueMonth | Rate | Customers | MWH                      | kW |
|-----------|----------------------|--------------|------|-----------|--------------------------|----|
|           |                      |              |      |           | TRADE SECRET DATA BEGINS |    |
|           | DM&IR -35th Ave West | 1            | 75H  | 1.00      |                          |    |
|           | DM&IR -35th Ave West | 2            | 75H  | 1.00      |                          |    |
|           | DM&IR -35th Ave West | 3            | 75H  | 1.00      |                          |    |
|           | DM&IR -35th Ave West | 4            | 75H  | 1.00      |                          |    |
|           | DM&IR -35th Ave West | 5            | 75H  | 1.00      |                          |    |
|           | DM&IR -35th Ave West | 6            | 75H  | 1.00      |                          |    |
|           | DM&IR -35th Ave West | 7            | 75H  | 1.00      |                          |    |
|           | DM&IR -35th Ave West | 8            | 75H  | 1.00      |                          |    |
|           | DM&IR -35th Ave West | 9            | 75H  | 1.00      |                          |    |
|           | DM&IR -35th Ave West | 10           | 75H  | 1.00      |                          |    |
|           | DM&IR -35th Ave West | 11           | 75H  | 1.00      |                          |    |
|           | DM&IR -35th Ave West | 12           | 75H  | 1.00      |                          |    |

TRADE SECRET DATA ENDS

| RateCombo | Text36            | RevenueMonth | Rate | Customers | MWH                      | kW |
|-----------|-------------------|--------------|------|-----------|--------------------------|----|
|           |                   |              |      |           | TRADE SECRET DATA BEGINS |    |
|           | DM&IR-Two Harbors | 1            | 75H  | 1.00      |                          |    |
|           | DM&IR-Two Harbors | 2            | 75H  | 1.00      |                          |    |
|           | DM&IR-Two Harbors | 3            | 75H  | 1.00      |                          |    |
|           | DM&IR-Two Harbors | 4            | 75H  | 1.00      |                          |    |
|           | DM&IR-Two Harbors | 5            | 75H  | 1.00      |                          |    |
|           | DM&IR-Two Harbors | 6            | 75H  | 1.00      |                          |    |
|           | DM&IR-Two Harbors | 7            | 75H  | 1.00      |                          |    |
|           | DM&IR-Two Harbors | 8            | 75H  | 1.00      |                          |    |
|           | DM&IR-Two Harbors | 9            | 75H  | 1.00      |                          |    |
|           | DM&IR-Two Harbors | 10           | 75H  | 1.00      |                          |    |
|           | DM&IR-Two Harbors | 11           | 75H  | 1.00      |                          |    |
|           | DM&IR-Two Harbors | 12           | 75H  | 1.00      |                          |    |

TRADE SECRET DATA ENDS

| RateCombo | Text36   | RevenueMonth | Rate  | Customers | MWH               | kW |
|-----------|----------|--------------|-------|-----------|-------------------|----|
|           |          |              |       |           | TRADE SECRET DATA |    |
|           | Enbridge | 1            | 75TOU | 0.00      |                   |    |
|           | Enbridge | 2            | 75TOU | 0.00      |                   |    |
|           | Enbridge | 3            | 75TOU | 0.00      |                   |    |
|           | Enbridge | 4            | 75TOU | 0.00      |                   |    |
|           | Enbridge | 5            | 75TOU | 0.00      |                   |    |
|           | Enbridge | 6            | 75TOU | 0.00      |                   |    |
|           | Enbridge | 7            | 75TOU | 0.00      |                   |    |
|           | Enbridge | 8            | 75TOU | 0.00      |                   |    |
|           | Enbridge | 9            | 75TOU | 0.00      |                   |    |
|           | Enbridge | 10           | 75TOU | 0.00      |                   |    |
|           | Enbridge | 11           | 75TOU | 0.00      |                   |    |
|           | Enbridge | 12           | 75TOU | 0.00      |                   |    |

TRADE SECRET DATA ENDS

Minnesota Power  
Individually Budgeted Customers  
TEST YEAR 2020

| RateCombo | Text36                        | RevenueMonth | Rate | Customers | MWH                      | kW |
|-----------|-------------------------------|--------------|------|-----------|--------------------------|----|
|           |                               |              |      |           | TRADE SECRET DATA BEGINS |    |
|           | GERDAU Ameristeel Interr Disc | 1            | 75H  | 1.00      |                          |    |
|           | GERDAU Ameristeel Interr Disc | 2            | 75H  | 1.00      |                          |    |
|           | GERDAU Ameristeel Interr Disc | 3            | 75H  | 1.00      |                          |    |
|           | GERDAU Ameristeel Interr Disc | 4            | 75H  | 1.00      |                          |    |
|           | GERDAU Ameristeel Interr Disc | 5            | 75H  | 1.00      |                          |    |
|           | GERDAU Ameristeel Interr Disc | 6            | 75H  | 1.00      |                          |    |
|           | GERDAU Ameristeel Interr Disc | 7            | 75H  | 1.00      |                          |    |
|           | GERDAU Ameristeel Interr Disc | 8            | 75H  | 1.00      |                          |    |
|           | GERDAU Ameristeel Interr Disc | 9            | 75H  | 1.00      |                          |    |
|           | GERDAU Ameristeel Interr Disc | 10           | 75H  | 1.00      |                          |    |
|           | GERDAU Ameristeel Interr Disc | 11           | 75H  | 1.00      |                          |    |
|           | GERDAU Ameristeel Interr Disc | 12           | 75H  | 1.00      |                          |    |
|           |                               |              |      |           | TRADE SECRET DATA ENDS   |    |

| RateCombo | Text36           | RevenueMonth | Rate  | Customers | MWH                      | kW |
|-----------|------------------|--------------|-------|-----------|--------------------------|----|
|           |                  |              |       |           | TRADE SECRET DATA BEGINS |    |
|           | Northern Foundry | 1            | 75FFM | 1.00      |                          |    |
|           | Northern Foundry | 2            | 75FFM | 1.00      |                          |    |
|           | Northern Foundry | 3            | 75FFM | 1.00      |                          |    |
|           | Northern Foundry | 4            | 75FFM | 1.00      |                          |    |
|           | Northern Foundry | 5            | 75FFM | 1.00      |                          |    |
|           | Northern Foundry | 6            | 75FFM | 1.00      |                          |    |
|           | Northern Foundry | 7            | 75FFM | 1.00      |                          |    |
|           | Northern Foundry | 8            | 75FFM | 1.00      |                          |    |
|           | Northern Foundry | 9            | 75FFM | 1.00      |                          |    |
|           | Northern Foundry | 10           | 75FFM | 1.00      |                          |    |
|           | Northern Foundry | 11           | 75FFM | 1.00      |                          |    |
|           | Northern Foundry | 12           | 75FFM | 1.00      |                          |    |
|           |                  |              |       |           | TRADE SECRET DATA ENDS   |    |

| RateCombo | Text36    | RevenueMonth | Rate | Customers | MWH                    | kW |
|-----------|-----------|--------------|------|-----------|------------------------|----|
|           |           |              |      |           |                        |    |
|           | RDO Foods | 1            | 75L  | 1.00      |                        |    |
|           | RDO Foods | 2            | 75L  | 1.00      |                        |    |
|           | RDO Foods | 3            | 75L  | 1.00      |                        |    |
|           | RDO Foods | 4            | 75L  | 1.00      |                        |    |
|           | RDO Foods | 5            | 75L  | 1.00      |                        |    |
|           | RDO Foods | 6            | 75L  | 1.00      |                        |    |
|           | RDO Foods | 7            | 75L  | 1.00      |                        |    |
|           | RDO Foods | 8            | 75L  | 1.00      |                        |    |
|           | RDO Foods | 9            | 75L  | 1.00      |                        |    |
|           | RDO Foods | 10           | 75L  | 1.00      |                        |    |
|           | RDO Foods | 11           | 75L  | 1.00      |                        |    |
|           | RDO Foods | 12           | 75L  | 1.00      |                        |    |
|           |           |              |      |           | TRADE SECRET DATA ENDS |    |

| RateCombo | Text36                  | RevenueMonth | Rate | Customers | MWH                      | kW |
|-----------|-------------------------|--------------|------|-----------|--------------------------|----|
|           |                         |              |      |           | TRADE SECRET DATA BEGINS |    |
|           | Long Prairie Packing Co | 1            | 75L  | 1.00      |                          |    |
|           | Long Prairie Packing Co | 2            | 75L  | 1.00      |                          |    |
|           | Long Prairie Packing Co | 3            | 75L  | 1.00      |                          |    |
|           | Long Prairie Packing Co | 4            | 75L  | 1.00      |                          |    |
|           | Long Prairie Packing Co | 5            | 75L  | 1.00      |                          |    |
|           | Long Prairie Packing Co | 6            | 75L  | 1.00      |                          |    |
|           | Long Prairie Packing Co | 7            | 75L  | 1.00      |                          |    |
|           | Long Prairie Packing Co | 8            | 75L  | 1.00      |                          |    |
|           | Long Prairie Packing Co | 9            | 75L  | 1.00      |                          |    |
|           | Long Prairie Packing Co | 10           | 75L  | 1.00      |                          |    |
|           | Long Prairie Packing Co | 11           | 75L  | 1.00      |                          |    |
|           | Long Prairie Packing Co | 12           | 75L  | 1.00      |                          |    |
|           |                         |              |      |           | TRADE SECRET DATA ENDS   |    |

Minnesota Power  
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| RateCombo | Text36     | RevenueMonth | Rate  | Customers | MWH                      | kW |
|-----------|------------|--------------|-------|-----------|--------------------------|----|
|           |            |              |       |           | TRADE SECRET DATA BEGINS |    |
|           | M E Global | 1            | 75FFM | 1.00      |                          |    |
|           | M E Global | 2            | 75FFM | 1.00      |                          |    |
|           | M E Global | 3            | 75FFM | 1.00      |                          |    |
|           | M E Global | 4            | 75FFM | 1.00      |                          |    |
|           | M E Global | 5            | 75FFM | 1.00      |                          |    |
|           | M E Global | 6            | 75FFM | 1.00      |                          |    |
|           | M E Global | 7            | 75FFM | 1.00      |                          |    |
|           | M E Global | 8            | 75FFM | 1.00      |                          |    |
|           | M E Global | 9            | 75FFM | 1.00      |                          |    |
|           | M E Global | 10           | 75FFM | 1.00      |                          |    |
|           | M E Global | 11           | 75FFM | 1.00      |                          |    |
|           | M E Global | 12           | 75FFM | 1.00      |                          |    |
|           |            |              |       |           | TRADE SECRET DATA ENDS   |    |

| RateCombo | Text36        | RevenueMonth | Rate | Customers | MWH                      | kW |
|-----------|---------------|--------------|------|-----------|--------------------------|----|
|           |               |              |      |           | TRADE SECRET DATA BEGINS |    |
|           | Mesabi Nugget | 1            | 75P  | 1.00      |                          |    |
|           | Mesabi Nugget | 2            | 75P  | 1.00      |                          |    |
|           | Mesabi Nugget | 3            | 75P  | 1.00      |                          |    |
|           | Mesabi Nugget | 4            | 75P  | 1.00      |                          |    |
|           | Mesabi Nugget | 5            | 75P  | 1.00      |                          |    |
|           | Mesabi Nugget | 6            | 75P  | 1.00      |                          |    |
|           | Mesabi Nugget | 7            | 75P  | 1.00      |                          |    |
|           | Mesabi Nugget | 8            | 75P  | 1.00      |                          |    |
|           | Mesabi Nugget | 9            | 75P  | 1.00      |                          |    |
|           | Mesabi Nugget | 10           | 75P  | 1.00      |                          |    |
|           | Mesabi Nugget | 11           | 75P  | 1.00      |                          |    |
|           | Mesabi Nugget | 12           | 75P  | 1.00      |                          |    |
|           |               |              |      |           | TRADE SECRET DATA ENDS   |    |

| RateCombo | Text36             | RevenueMonth | Rate | Customers | MWH                      | kW |
|-----------|--------------------|--------------|------|-----------|--------------------------|----|
|           |                    |              |      |           | TRADE SECRET DATA BEGINS |    |
|           | Minnesota Pipeline | 1            | 75F  | 1.00      |                          |    |
|           | Minnesota Pipeline | 2            | 75F  | 1.00      |                          |    |
|           | Minnesota Pipeline | 3            | 75F  | 1.00      |                          |    |
|           | Minnesota Pipeline | 4            | 75F  | 1.00      |                          |    |
|           | Minnesota Pipeline | 5            | 75F  | 1.00      |                          |    |
|           | Minnesota Pipeline | 6            | 75F  | 1.00      |                          |    |
|           | Minnesota Pipeline | 7            | 75F  | 1.00      |                          |    |
|           | Minnesota Pipeline | 8            | 75F  | 1.00      |                          |    |
|           | Minnesota Pipeline | 9            | 75F  | 1.00      |                          |    |
|           | Minnesota Pipeline | 10           | 75F  | 1.00      |                          |    |
|           | Minnesota Pipeline | 11           | 75F  | 1.00      |                          |    |
|           | Minnesota Pipeline | 12           | 75F  | 1.00      |                          |    |
|           |                    |              |      |           | TRADE SECRET DATA ENDS   |    |

| RateCombo | Text36               | RevenueMonth | Rate | Customers | MWH                      | kW |
|-----------|----------------------|--------------|------|-----------|--------------------------|----|
|           |                      |              |      |           | TRADE SECRET DATA BEGINS |    |
|           | Northern Natural Gas | 1            | 25D  | 1.00      |                          |    |
|           | Northern Natural Gas | 2            | 25D  | 1.00      |                          |    |
|           | Northern Natural Gas | 3            | 25D  | 1.00      |                          |    |
|           | Northern Natural Gas | 4            | 25D  | 1.00      |                          |    |
|           | Northern Natural Gas | 5            | 25D  | 1.00      |                          |    |
|           | Northern Natural Gas | 6            | 25D  | 1.00      |                          |    |
|           | Northern Natural Gas | 7            | 25D  | 1.00      |                          |    |
|           | Northern Natural Gas | 8            | 25D  | 1.00      |                          |    |
|           | Northern Natural Gas | 9            | 25D  | 1.00      |                          |    |
|           | Northern Natural Gas | 10           | 25D  | 1.00      |                          |    |
|           | Northern Natural Gas | 11           | 25D  | 1.00      |                          |    |
|           | Northern Natural Gas | 12           | 25D  | 1.00      |                          |    |
|           |                      |              |      |           | TRADE SECRET DATA ENDS   |    |

Minnesota Power  
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| RateCombo | Text36                     | RevenueMonth | Rate | Customers | MWH                      | kW |
|-----------|----------------------------|--------------|------|-----------|--------------------------|----|
|           |                            |              |      |           | TRADE SECRET DATA BEGINS |    |
|           | Mining Resources (Plant 3) | 1            | 25D  | 1.00      |                          |    |
|           | Mining Resources (Plant 3) | 2            | 25D  | 1.00      |                          |    |
|           | Mining Resources (Plant 3) | 3            | 25D  | 1.00      |                          |    |
|           | Mining Resources (Plant 3) | 4            | 25D  | 1.00      |                          |    |
|           | Mining Resources (Plant 3) | 5            | 25D  | 1.00      |                          |    |
|           | Mining Resources (Plant 3) | 6            | 25D  | 1.00      |                          |    |
|           | Mining Resources (Plant 3) | 7            | 25D  | 1.00      |                          |    |
|           | Mining Resources (Plant 3) | 8            | 25D  | 1.00      |                          |    |
|           | Mining Resources (Plant 3) | 9            | 25D  | 1.00      |                          |    |
|           | Mining Resources (Plant 3) | 10           | 25D  | 1.00      |                          |    |
|           | Mining Resources (Plant 3) | 11           | 25D  | 1.00      |                          |    |
|           | Mining Resources (Plant 3) | 12           | 25D  | 1.00      |                          |    |
|           |                            |              |      |           | TRADE SECRET DATA ENDS   |    |

| RateCombo | Text36         | RevenueMonth | Rate | Customers | MWH                      | kW |
|-----------|----------------|--------------|------|-----------|--------------------------|----|
|           |                |              |      |           | TRADE SECRET DATA BEGINS |    |
|           | Polymet Mining | 1            | 75F  | 1.00      |                          |    |
|           | Polymet Mining | 2            | 75F  | 1.00      |                          |    |
|           | Polymet Mining | 3            | 75F  | 1.00      |                          |    |
|           | Polymet Mining | 4            | 75F  | 1.00      |                          |    |
|           | Polymet Mining | 5            | 75F  | 1.00      |                          |    |
|           | Polymet Mining | 6            | 75F  | 1.00      |                          |    |
|           | Polymet Mining | 7            | 75F  | 1.00      |                          |    |
|           | Polymet Mining | 8            | 75F  | 1.00      |                          |    |
|           | Polymet Mining | 9            | 75F  | 1.00      |                          |    |
|           | Polymet Mining | 10           | 75F  | 1.00      |                          |    |
|           | Polymet Mining | 11           | 75F  | 1.00      |                          |    |
|           | Polymet Mining | 12           | 75F  | 1.00      |                          |    |
|           |                |              |      |           | TRADE SECRET DATA ENDS   |    |

| RateCombo | Text36                | RevenueMonth | Rate | Customers | MWH                      | kW |
|-----------|-----------------------|--------------|------|-----------|--------------------------|----|
|           |                       |              |      |           | TRADE SECRET DATA BEGINS |    |
|           | Silver Bay Power Corp | 1            | DIR  | 1.00      |                          |    |
|           | Silver Bay Power Corp | 2            | DIR  | 1.00      |                          |    |
|           | Silver Bay Power Corp | 3            | DIR  | 1.00      |                          |    |
|           | Silver Bay Power Corp | 4            | DIR  | 1.00      |                          |    |
|           | Silver Bay Power Corp | 5            | DIR  | 1.00      |                          |    |
|           | Silver Bay Power Corp | 6            | DIR  | 1.00      |                          |    |
|           | Silver Bay Power Corp | 7            | DIR  | 1.00      |                          |    |
|           | Silver Bay Power Corp | 8            | DIR  | 1.00      |                          |    |
|           | Silver Bay Power Corp | 9            | DIR  | 1.00      |                          |    |
|           | Silver Bay Power Corp | 10           | DIR  | 1.00      |                          |    |
|           | Silver Bay Power Corp | 11           | DIR  | 1.00      |                          |    |
|           | Silver Bay Power Corp | 12           | DIR  | 1.00      |                          |    |
|           |                       |              |      |           | TRADE SECRET DATA ENDS   |    |

| RateCombo | Text36             | RevenueMonth | Rate | Customers | MWH                      | kW |
|-----------|--------------------|--------------|------|-----------|--------------------------|----|
|           |                    |              |      |           | TRADE SECRET DATA BEGINS |    |
|           | Specialty Minerals | 1            | 75L  | 1.00      |                          |    |
|           | Specialty Minerals | 2            | 75L  | 1.00      |                          |    |
|           | Specialty Minerals | 3            | 75L  | 1.00      |                          |    |
|           | Specialty Minerals | 4            | 75L  | 1.00      |                          |    |
|           | Specialty Minerals | 5            | 75L  | 1.00      |                          |    |
|           | Specialty Minerals | 6            | 75L  | 1.00      |                          |    |
|           | Specialty Minerals | 7            | 75L  | 1.00      |                          |    |
|           | Specialty Minerals | 8            | 75L  | 1.00      |                          |    |
|           | Specialty Minerals | 9            | 75L  | 1.00      |                          |    |
|           | Specialty Minerals | 10           | 75L  | 1.00      |                          |    |
|           | Specialty Minerals | 11           | 75L  | 1.00      |                          |    |
|           | Specialty Minerals | 12           | 75L  | 1.00      |                          |    |
|           |                    |              |      |           | TRADE SECRET DATA ENDS   |    |

Minnesota Power  
Individually Budgeted Customers  
TEST YEAR 2020

| RateCombo | Text36                       | RevenueMonth | Rate | Customers | MWH                      | kW |
|-----------|------------------------------|--------------|------|-----------|--------------------------|----|
|           |                              |              |      |           | TRADE SECRET DATA BEGINS |    |
|           | Trident Seafood (Louis Kemp) | 1            | 75L  | 1.00      |                          |    |
|           | Trident Seafood (Louis Kemp) | 2            | 75L  | 1.00      |                          |    |
|           | Trident Seafood (Louis Kemp) | 3            | 75L  | 1.00      |                          |    |
|           | Trident Seafood (Louis Kemp) | 4            | 75L  | 1.00      |                          |    |
|           | Trident Seafood (Louis Kemp) | 5            | 75L  | 1.00      |                          |    |
|           | Trident Seafood (Louis Kemp) | 6            | 75L  | 1.00      |                          |    |
|           | Trident Seafood (Louis Kemp) | 7            | 75L  | 1.00      |                          |    |
|           | Trident Seafood (Louis Kemp) | 8            | 75L  | 1.00      |                          |    |
|           | Trident Seafood (Louis Kemp) | 9            | 75L  | 1.00      |                          |    |
|           | Trident Seafood (Louis Kemp) | 10           | 75L  | 1.00      |                          |    |
|           | Trident Seafood (Louis Kemp) | 11           | 75L  | 1.00      |                          |    |
|           | Trident Seafood (Louis Kemp) | 12           | 75L  | 1.00      |                          |    |
|           |                              |              |      |           | TRADE SECRET DATA ENDS   |    |

| RateCombo | Text36 | RevenueMonth | Rate | Customers | MWH                      | kW |
|-----------|--------|--------------|------|-----------|--------------------------|----|
|           |        |              |      |           | TRADE SECRET DATA BEGINS |    |
|           | USG    | 1            | 75O  | 1.00      |                          |    |
|           | USG    | 2            | 75O  | 1.00      |                          |    |
|           | USG    | 3            | 75O  | 1.00      |                          |    |
|           | USG    | 4            | 75O  | 1.00      |                          |    |
|           | USG    | 5            | 75O  | 1.00      |                          |    |
|           | USG    | 6            | 75O  | 1.00      |                          |    |
|           | USG    | 7            | 75O  | 1.00      |                          |    |
|           | USG    | 8            | 75O  | 1.00      |                          |    |
|           | USG    | 9            | 75O  | 1.00      |                          |    |
|           | USG    | 10           | 75O  | 1.00      |                          |    |
|           | USG    | 11           | 75O  | 1.00      |                          |    |
|           | USG    | 12           | 75O  | 1.00      |                          |    |
|           |        |              |      |           | TRADE SECRET DATA ENDS   |    |

## Minnesota Power

Minnesota Power Docket No. E015/GR-19-442

Calculation of Lighting by Month

TEST YEAR 2020

kWh Utilization per MP Rate Book - Lighting Tariffs

|            | <u>JAN</u> | <u>FEB</u> | <u>MAR</u> | <u>APR</u> | <u>MAY</u> | <u>JUN</u> | <u>JUL</u> | <u>AUG</u> | <u>SEP</u> | <u>OCT</u> | <u>NOV</u> | <u>DEC</u> | <u>TOTAL</u> |
|------------|------------|------------|------------|------------|------------|------------|------------|------------|------------|------------|------------|------------|--------------|
| A          | 51         | 42         | 41         | 34         | 29         | 26         | 28         | 33         | 37         | 45         | 48         | 54         | 468          |
| %          | 10.90%     | 8.97%      | 8.76%      | 7.26%      | 6.20%      | 5.56%      | 5.98%      | 7.05%      | 7.91%      | 9.62%      | 10.26%     | 11.54%     | 1            |
| G, J, L    | 135        | 110        | 107        | 88         | 77         | 68         | 73         | 86         | 98         | 117        | 127        | 138        | 1224         |
| %          | 11.03%     | 8.99%      | 8.74%      | 7.19%      | 6.29%      | 5.56%      | 5.96%      | 7.03%      | 8.01%      | 9.56%      | 10.38%     | 11.27%     | 1,000        |
| I          | 56         | 46         | 44         | 36         | 32         | 28         | 30         | 35         | 40         | 48         | 52         | 57         | 504          |
| %          | 11.11%     | 9.13%      | 8.73%      | 7.14%      | 6.35%      | 5.56%      | 5.95%      | 6.94%      | 7.94%      | 9.52%      | 10.32%     | 11.31%     | 1            |
| K          | 98         | 80         | 78         | 64         | 56         | 49         | 53         | 62         | 71         | 85         | 92         | 100        | 888          |
| %          | 11.04%     | 9.01%      | 8.78%      | 7.21%      | 6.31%      | 5.52%      | 5.97%      | 6.98%      | 8.00%      | 9.57%      | 10.36%     | 11.26%     | 1,000.1      |
| M, P, S    | 213        | 174        | 169        | 139        | 121        | 107        | 116        | 135        | 155        | 184        | 200        | 219        | 1932         |
| %          | 11.02%     | 9.01%      | 8.75%      | 7.19%      | 6.26%      | 5.54%      | 6.00%      | 6.99%      | 8.02%      | 9.52%      | 10.35%     | 11.34%     | 0.9999       |
| Q          | 508        | 417        | 404        | 332        | 290        | 256        | 277        | 323        | 370        | 441        | 479        | 523        | 4620         |
| %          | 11.00%     | 9.03%      | 8.74%      | 7.19%      | 6.28%      | 5.54%      | 6.00%      | 6.99%      | 8.01%      | 9.55%      | 10.37%     | 11.32%     | 1,000.2      |
| R          | 139        | 114        | 110        | 91         | 79         | 70         | 76         | 88         | 101        | 120        | 130        | 142        | 1260         |
| %          | 11.03%     | 9.05%      | 8.73%      | 7.22%      | 6.27%      | 5.56%      | 6.03%      | 6.98%      | 8.02%      | 9.52%      | 10.32%     | 11.27%     | 1            |
| U          | 485        | 398        | 385        | 317        | 277        | 245        | 264        | 309        | 353        | 421        | 457        | 499        | 4410         |
| %          | 11.00%     | 9.02%      | 8.73%      | 7.19%      | 6.28%      | 5.56%      | 5.99%      | 7.01%      | 8.00%      | 9.55%      | 10.36%     | 11.32%     | 1,000.1      |
| X          | 83         | 68         | 66         | 54         | 48         | 42         | 45         | 53         | 60         | 72         | 78         | 87         | 756          |
| %          | 10.98%     | 8.99%      | 8.73%      | 7.14%      | 6.35%      | 5.56%      | 5.95%      | 7.01%      | 7.94%      | 9.52%      | 10.32%     | 11.51%     | 1            |
| Z          | 222        | 182        | 176        | 145        | 127        | 112        | 121        | 141        | 161        | 192        | 209        | 228        | 2016         |
| %          | 11.01%     | 9.03%      | 8.73%      | 7.19%      | 6.30%      | 5.56%      | 6.00%      | 6.99%      | 7.99%      | 9.52%      | 10.37%     | 11.31%     | 1            |
| F          | 125        | 103        | 100        | 82         | 72         | 63         | 68         | 80         | 91         | 109        | 118        | 129        | 1140         |
| %          | 10.96%     | 9.04%      | 8.77%      | 7.19%      | 6.32%      | 5.53%      | 5.96%      | 7.02%      | 7.98%      | 9.56%      | 10.35%     | 11.32%     | 1            |
| V          | 226        | 185        | 179        | 147        | 129        | 114        | 123        | 144        | 164        | 196        | 213        | 232        | 2052         |
| %          | 11.01%     | 9.02%      | 8.72%      | 7.16%      | 6.29%      | 5.56%      | 5.99%      | 7.02%      | 7.99%      | 9.55%      | 10.38%     | 11.31%     | 1            |
| C          | 149        | 122        | 119        | 98         | 85         | 75         | 81         | 95         | 109        | 130        | 140        | 153        | 1356         |
| %          | 10.99%     | 9.00%      | 8.78%      | 7.23%      | 6.27%      | 5.53%      | 5.97%      | 7.01%      | 8.04%      | 9.59%      | 10.32%     | 11.28%     | 1,000.1      |
| W          | 25         | 20         | 20         | 16         | 14         | 13         | 14         | 16         | 18         | 22         | 23         | 25         | 226          |
| %          | 11.06%     | 8.85%      | 8.85%      | 7.08%      | 6.19%      | 5.75%      | 6.19%      | 7.08%      | 7.96%      | 9.73%      | 10.18%     | 11.06%     | 0.9998       |
| Y          | 56         | 46         | 44         | 36         | 32         | 28         | 30         | 35         | 40         | 48         | 52         | 58         | 505          |
| %          | 11.09%     | 9.11%      | 8.71%      | 7.13%      | 6.34%      | 5.54%      | 5.94%      | 6.93%      | 7.92%      | 9.50%      | 10.30%     | 11.49%     | 0.986328125  |
| No. Lamps  |            |            |            |            |            |            |            |            |            |            |            |            |              |
| 13 K       | 1,274      | 1,040      | 1,014      | 832        | 728        | 637        | 689        | 806        | 923        | 1,105      | 1,196      | 1,300      | 11,544       |
| 4 M/P      | 852        | 696        | 676        | 556        | 484        | 428        | 464        | 540        | 620        | 736        | 800        | 876        | 7,728        |
| 27 I       | 1,512      | 1,242      | 1,188      | 972        | 864        | 756        | 810        | 945        | 1,080      | 1,296      | 1,404      | 1,539      | 13,608       |
| 2 X        | 166        | 136        | 132        | 108        | 96         | 84         | 90         | 106        | 120        | 144        | 156        | 174        | 1,512        |
| 12 G/J     | 1,620      | 1,320      | 1,284      | 1,056      | 924        | 816        | 876        | 1,032      | 1,176      | 1,404      | 1,524      | 1,656      | 14,688       |
| 6 Z        | 1,332      | 1,092      | 1,056      | 870        | 762        | 672        | 726        | 846        | 966        | 1,152      | 1,254      | 1,368      | 12,096       |
| 1 R        | 139        | 114        | 110        | 91         | 79         | 70         | 76         | 88         | 101        | 120        | 130        | 142        | 1,260        |
| 30 S       | 6,390      | 5,220      | 5,070      | 4,170      | 3,630      | 3,210      | 3,480      | 4,050      | 4,650      | 5,520      | 6,000      | 6,570      | 57,960       |
| 76         | 13,285     | 10,860     | 10,530     | 8,655      | 7,567      | 6,673      | 7,211      | 8,413      | 9,636      | 11,477     | 12,464     | 13,625     | 120,396      |
| Metered 76 |            |            |            |            |            |            |            |            |            |            |            |            |              |
| G          | 5,674      | 4,624      | 4,496      | 3,698      | 3,235      | 2,860      | 3,066      | 3,616      | 4,120      | 4,917      | 5,339      | 5,797      | 51,437       |
| No. Lamps  |            |            |            |            |            |            |            |            |            |            |            |            |              |
| 966 K      | 94,668     | 77,280     | 75,348     | 61,824     | 54,096     | 47,334     | 51,198     | 59,892     | 68,586     | 82,110     | 88,872     | 96,600     | 857,808      |
| 105 K      | 10,290     | 8,400      | 8,190      | 6,720      | 5,880      | 5,145      | 5,565      | 6,510      | 7,455      | 8,925      | 9,660      | 10,500     | 93,240       |
| 101 M/P    | 21,513     | 17,574     | 17,069     | 14,039     | 12,221     | 10,807     | 11,716     | 13,635     | 15,655     | 18,584     | 20,200     | 22,119     | 195,132      |
| 5 M/P      | 1,065      | 870        | 845        | 695        | 605        | 535        | 580        | 675        | 775        | 920        | 1,000      | 1,095      | 9,660        |
| 1 Q        | 508        | 417        | 404        | 332        | 290        | 256        | 277        | 323        | 370        | 441        | 479        | 523        | 4,620        |
| 1 Q        | 508        | 417        | 404        | 332        | 290        | 256        | 277        | 323        | 370        | 441        | 479        | 523        | 4,620        |
| 2,495 I    | 139,720    | 114,770    | 109,780    | 89,820     | 79,840     | 69,860     | 74,850     | 87,325     | 99,800     | 119,760    | 129,740    | 142,215    | 1,257,480    |
| 40 I       | 2,240      | 1,840      | 1,760      | 1,440      | 1,280      | 1,120      | 1,200      | 1,400      | 1,600      | 1,920      | 2,080      | 2,280      | 20,160       |
| 1 I        | 56         | 46         | 44         | 36         | 32         | 28         | 30         | 35         | 40         | 48         | 52         | 57         | 504          |
| 334 X      | 27,722     | 22,712     | 22,044     | 18,036     | 16,032     | 14,028     | 15,030     | 17,702     | 20,040     | 24,048     | 26,052     | 29,058     | 252,504      |
| 2 X        | 166        | 136        | 132        | 108        | 96         | 84         | 90         | 106        | 120        | 144        | 156        | 174        | 1,512        |
| 886 G/J    | 119,610    | 97,460     | 94,802     | 77,968     | 68,222     | 60,248     | 64,678     | 76,196     | 86,828     | 103,662    | 112,522    | 122,268    | 1,084,464    |
| 20 G/J     | 2,700      | 2,200      | 2,140      | 1,760      | 1,540      | 1,360      | 1,460      | 1,720      | 1,960      | 2,340      | 2,540      | 2,760      | 24,480       |
| - G/J      | -          | -          | -          | -          | -          | -          | -          | -          | -          | -          | -          | -          | -            |
| 646 Z      | 143,412    | 117,572    | 113,696    | 93,670     | 82,042     | 72,352     | 78,166     | 91,086     | 104,006    | 124,032    | 135,014    | 147,288    | 1,302,336    |
| 12 Z       | 2,664      | 2,184      | 2,112      | 1,740      | 1,524      | 1,344      | 1,452      | 1,692      | 1,932      | 2,304      | 2,508      | 2,736      | 24,192       |
| 158 R      | 21,962     | 18,012     | 17,380     | 14,378     | 12,482     | 11,060     | 12,008     | 13,904     | 15,958     | 18,960     | 20,540     | 22,436     | 199,080      |
| 203 S      | 43,239     | 35,322     | 34,307     | 28,217     | 24,563     | 21,721     | 23,548     | 27,405     | 31,465     | 37,352     | 40,600     | 44,457     | 392,196      |
| - S        | -          | -          | -          | -          | -          | -          | -          | -          | -          | -          | -          | -          | -            |
| 63 U       | 30,555     | 25,074     | 24,255     | 19,971     | 17,451     | 15,435     | 16,632     | 19,467     | 22,239     | 26,523     | 28,791     | 31,437     | 277,830      |
| - U        | -          | -          | -          | -          | -          | -          | -          | -          | -          | -          | -          | -          | -            |
| 77         | 662,598    | 542,286    | 524,712    | 431,086    | 378,486    | 332,973    | 358,757    | 419,396    | 479,199    | 572,514    | 621,285    | 678,526    | 6,001,818    |
| Metered 77 |            |            |            |            |            |            |            |            |            |            |            |            |              |
| G          | 9,184      | 7,485      | 7,277      | 5,986      | 5,237      | 4,629      | 4,962      | 5,853      | 6,669      | 7,960      | 8,642      | 9,384      | 83,261       |

## Minnesota Power

Minnesota Power Docket No. E015/GR-19-442

Calculation of Lighting by Month

TEST YEAR 2020

|               |           |           |           |           |           |           |           |           |           |           |           |           |            |
|---------------|-----------|-----------|-----------|-----------|-----------|-----------|-----------|-----------|-----------|-----------|-----------|-----------|------------|
| No. Lamps     |           |           |           |           |           |           |           |           |           |           |           |           |            |
| 7 K           | 686.00    | 560.00    | 546.00    | 448.00    | 392.00    | 343.00    | 371.00    | 434.00    | 497.00    | 595.00    | 644.00    | 700.00    | 6,216.00   |
| 8 L           | 1,080.00  | 880.00    | 856.00    | 704.00    | 616.00    | 544.00    | 584.00    | 688.00    | 784.00    | 936.00    | 1,016.00  | 1,104.00  | 9,792.00   |
| 26 M/P        | 5,538.00  | 4,524.00  | 4,394.00  | 3,614.00  | 3,146.00  | 2,782.00  | 3,016.00  | 3,510.00  | 4,030.00  | 4,784.00  | 5,200.00  | 5,694.00  | 50,232.00  |
| - Q           | -         | -         | -         | -         | -         | -         | -         | -         | -         | -         | -         | -         | -          |
| 47 I          | 2,632.00  | 2,162.00  | 2,068.00  | 1,692.00  | 1,504.00  | 1,316.00  | 1,410.00  | 1,645.00  | 1,880.00  | 2,256.00  | 2,444.00  | 2,679.00  | 23,688.00  |
| 4 X           | 332.00    | 272.00    | 264.00    | 216.00    | 192.00    | 168.00    | 180.00    | 212.00    | 240.00    | 288.00    | 312.00    | 348.00    | 3,024.00   |
| - X           | -         | -         | -         | -         | -         | -         | -         | -         | -         | -         | -         | -         | -          |
| 102 X         | 8,466.00  | 6,936.00  | 6,732.00  | 5,508.00  | 4,896.00  | 4,284.00  | 4,590.00  | 5,406.00  | 6,120.00  | 7,344.00  | 7,956.00  | 8,874.00  | 77,112.00  |
| 77 F          | 9,625.00  | 7,931.00  | 7,700.00  | 6,314.00  | 5,544.00  | 4,851.00  | 5,236.00  | 6,160.00  | 7,007.00  | 8,393.00  | 9,086.00  | 9,933.00  | 87,780.00  |
| 1 G/J         | 135.00    | 110.00    | 107.00    | 88.00     | 77.00     | 68.00     | 73.00     | 86.00     | 98.00     | 117.00    | 127.00    | 138.00    | 1,224.00   |
| 211 G/J       | 28,485.00 | 23,210.00 | 22,577.00 | 18,568.00 | 16,247.00 | 14,348.00 | 15,403.00 | 18,146.00 | 20,678.00 | 24,687.00 | 26,797.00 | 29,118.00 | 258,264.00 |
| - Z           | -         | -         | -         | -         | -         | -         | -         | -         | -         | -         | -         | -         | -          |
| 107 Z         | 23,754.00 | 19,474.00 | 18,832.00 | 15,515.00 | 13,589.00 | 11,984.00 | 12,947.00 | 15,087.00 | 17,227.00 | 20,544.00 | 22,363.00 | 24,396.00 | 215,712.00 |
| 2             | 50.00     | 40.00     | 40.00     | 32.00     | 28.00     | 26.00     | 28.00     | 32.00     | 36.00     | 44.00     | 46.00     | 50.00     | 452.00     |
| 80-84         | 80,783.00 | 66,099.00 | 64,116.00 | 52,699.00 | 46,231.00 | 40,714.00 | 43,838.00 | 51,406.00 | 58,597.00 | 69,988.00 | 75,991.00 | 83,034.00 | 733,496.00 |
| Metered 80-84 |           |           |           |           |           |           |           |           |           |           |           |           |            |
| G             | 563,303   | 492,257   | 406,503   | 366,966   | 301,607   | 252,776   | 265,779   | 272,918   | 380,172   | 375,302   | 418,334   | 456,146   | 4,552,062  |
| No. Lamps     |           |           |           |           |           |           |           |           |           |           |           |           |            |
| 972 K         | 95,256    | 77,760    | 75,816    | 62,208    | 54,432    | 47,628    | 51,516    | 60,264    | 69,012    | 82,620    | 89,424    | 97,200    | 863,136    |
| 1,375 K       | 134,750   | 110,000   | 107,250   | 88,000    | 77,000    | 67,375    | 72,875    | 85,250    | 97,625    | 116,875   | 126,500   | 137,500   | 1,221,000  |
| 27 M/P        | 5,751     | 4,698     | 4,563     | 3,753     | 3,267     | 2,889     | 3,132     | 3,645     | 4,185     | 4,968     | 5,400     | 5,913     | 52,164     |
| 47 M/P        | 10,011    | 8,178     | 7,943     | 6,533     | 5,687     | 5,029     | 5,452     | 6,345     | 7,285     | 8,648     | 9,400     | 10,293    | 90,804     |
| 1,158 I       | 64,848    | 53,268    | 50,952    | 41,688    | 37,056    | 32,424    | 34,740    | 40,530    | 46,320    | 55,584    | 60,216    | 66,006    | 583,632    |
| 3,101 I       | 173,656   | 142,646   | 136,444   | 111,636   | 99,232    | 86,828    | 93,030    | 108,535   | 124,040   | 148,848   | 161,252   | 176,757   | 1,562,904  |
| 1,188 X       | 98,604    | 80,784    | 78,408    | 64,152    | 57,024    | 49,896    | 53,460    | 62,964    | 71,280    | 85,536    | 92,664    | 103,356   | 898,128    |
| 1,188 X       | 98,604    | 80,784    | 78,408    | 64,152    | 57,024    | 49,896    | 53,460    | 62,964    | 71,280    | 85,536    | 92,664    | 103,356   | 898,128    |
| - X           | -         | -         | -         | -         | -         | -         | -         | -         | -         | -         | -         | -         | -          |
| 5 F           | 625       | 515       | 500       | 410       | 360       | 315       | 340       | 400       | 455       | 545       | 590       | 645       | 5,700      |
| 501 G/J       | 67,635    | 55,110    | 53,607    | 44,088    | 38,577    | 34,068    | 36,573    | 43,086    | 49,098    | 58,617    | 63,627    | 69,138    | 613,224    |
| 987 G/J       | 133,245   | 108,570   | 105,609   | 86,856    | 75,999    | 67,116    | 72,051    | 84,882    | 96,726    | 115,479   | 125,349   | 136,206   | 1,208,088  |
| 1 G/J         | 135       | 110       | 107       | 88        | 77        | 68        | 73        | 86        | 98        | 117       | 127       | 138       | 1,224      |
| 24 Z          | 5,328     | 4,368     | 4,224     | 3,480     | 3,048     | 2,688     | 2,904     | 3,384     | 3,864     | 4,608     | 5,016     | 5,472     | 48,384     |
| 34 Z          | 7,548     | 6,188     | 5,984     | 4,930     | 4,318     | 3,808     | 4,114     | 4,794     | 5,474     | 6,528     | 7,106     | 7,752     | 68,544     |
| - S           | -         | -         | -         | -         | -         | -         | -         | -         | -         | -         | -         | -         | -          |
| 1,177 W       | 29,425    | 23,540    | 23,540    | 18,832    | 16,478    | 15,301    | 16,478    | 18,832    | 21,186    | 25,894    | 27,071    | 29,425    | 266,002    |
| 516 Y         | 28,896    | 23,736    | 22,704    | 18,576    | 16,512    | 14,448    | 15,480    | 18,060    | 20,640    | 24,768    | 26,832    | 29,928    | 260,580    |
| 83            | 954,317   | 780,255   | 756,059   | 619,382   | 546,091   | 479,777   | 515,678   | 604,021   | 688,568   | 825,171   | 893,238   | 979,085   | 8,641,642  |
| Metered 83    |           |           |           |           |           |           |           |           |           |           |           |           |            |
| G             | 28,946    | 25,295    | 20,889    | 18,857    | 15,498    | 12,989    | 13,657    | 14,024    | 19,536    | 19,285    | 21,497    | 23,440    | 233,914    |

Minnesota Power  
2020 Budgeted Revenue and KWh  
Outdoor Lighting Schedules 76 Total Company

Decrease 0.0000%

| Type of Lamp               | Option | Number of Lamps |       |        |       | CIS Code | Kwh/Lamp for Fuel Adjustmt | Rate Per Lamp | Proposed Rate Per Lamp | Annual Kwh |         |        | Annual Revenue |        |        |
|----------------------------|--------|-----------------|-------|--------|-------|----------|----------------------------|---------------|------------------------|------------|---------|--------|----------------|--------|--------|
|                            |        | Resid           | Comml | Indust | Total |          |                            |               |                        | Resid      | Comml   | Indust | Resid          | Comml  | Indust |
| Incandescent               |        |                 |       |        |       |          |                            |               |                        |            |         |        |                |        |        |
| 4000 Lumen                 | I      |                 |       |        |       | C        |                            |               |                        |            |         |        |                |        |        |
|                            | II     |                 |       |        |       |          |                            |               |                        |            |         |        |                |        |        |
| Mercury Vapor              |        |                 |       |        |       |          |                            |               |                        |            |         |        |                |        |        |
| 7000 Lumen (175W)          | I      | 3               | 8     | -      | 11    | K        | 74                         | 12.99         | 11.69                  | 2,664      | 7,104   | -      | 468            | 1,247  | -      |
|                            | II     | 2               | -     | -      | 2     |          | 74                         | 9.45          | 8.15                   | 1,776      | -       | -      | 227            | -      | -      |
| 20000 Lumen (400W)         | I      | -               | 4     | -      | 4     | M/P      | 161                        | 21.39         | 18.57                  | -          | 7,728   | -      | -              | 1,027  | -      |
|                            | II     | -               | -     | -      | -     |          | 161                        | 15.72         | 12.90                  | -          | -       | -      | -              | -      | -      |
| 55000 Lumen (1000W)        | I      | -               | -     | -      | -     | Q        | 385                        | 41.63         | 34.89                  | -          | -       | -      | -              | -      | -      |
|                            | II     | -               | -     | -      | -     |          | 385                        | 31.82         | 25.08                  | -          | -       | -      | -              | -      | -      |
| Sodium Vapor               |        |                 |       |        |       |          |                            |               |                        |            |         |        |                |        |        |
| 8500 Lumen (100W)          | I      | 15              | 12    | -      | 27    | I        | 42                         | 10.98         | 10.24                  | 7,560      | 6,048   | -      | 1,976          | 1,581  | -      |
|                            | II     | -               | -     | -      | -     |          | 42                         | 6.65          | 5.91                   | -          | -       | -      | -              | -      | -      |
|                            | III    | -               | -     | -      | -     |          | 42                         | 6.65          | 5.91                   | -          | -       | -      | -              | -      | -      |
| 14000 Lumen (150W)         | I      | 1               | 1     | -      | 2     | X        | 63                         | 12.92         | 11.82                  | 756        | 756     | -      | 155            | 155    | -      |
|                            | II     | -               | -     | -      | -     |          | 63                         | 8.63          | 7.53                   | -          | -       | -      | -              | -      | -      |
| 23000 Lumen (250W)         | I      | -               | 11    | 1      | 12    | G/J      | 102                        | 18.57         | 16.78                  | -          | 13,464  | 1,224  | -              | 2,451  | 223    |
|                            | II     | -               | -     | -      | -     |          | 102                        | 11.81         | 10.02                  | -          | -       | -      | -              | -      | -      |
|                            | III    | -               | -     | -      | -     |          | 102                        | 11.88         | 10.09                  | -          | -       | -      | -              | -      | -      |
| 45000 Lumen (400W)         | I      | -               | 5     | 1      | 6     | Z        | 168                        | 25.38         | 22.44                  | -          | 10,080  | 2,016  | -              | 1,523  | 305    |
|                            | II     | -               | -     | -      | -     |          | 168                        | 16.39         | 13.45                  | -          | -       | -      | -              | -      | -      |
|                            | III    | -               | -     | -      | -     |          | 168                        | 13.75         | 10.81                  | -          | -       | -      | -              | -      | -      |
| Metal Halide               |        |                 |       |        |       |          |                            |               |                        |            |         |        |                |        |        |
| 17000 Lumens (250W)        | I      | -               | 1     | -      | 1     | R        | 105                        | 18.42         | 16.58                  | -          | 1,260   | -      | -              | 221    | -      |
| 28800 Lumens (400W)        | I      | -               | 30    | -      | 30    |          | 161                        | 23.15         | 20.33                  | -          | 57,960  | -      | -              | 8,334  | -      |
|                            | III    | -               | -     | -      | -     |          | 161                        | 14.87         | 12.05                  | -          | -       | -      | -              | -      | -      |
| 88000 Lumens (1000W)       | I      | -               | -     | -      | -     |          | 368                        | 40.31         | 33.87                  | -          | -       | -      | -              | -      | -      |
|                            | III    | -               | -     | -      | -     |          | 368                        | 29.34         | 22.90                  | -          | -       | -      | -              | -      | -      |
| Light Emitting Diode (LED) |        |                 |       |        |       |          |                            |               |                        |            |         |        |                |        |        |
| 4,674 Lumens               | I      | -               | -     | -      | -     |          | 17                         | 9.49          | 9.19                   | -          | -       | -      | -              | -      | -      |
| Total Base Revenue         |        | 21              | 72    | 2      | 95    |          |                            |               |                        | 12,756     | 104,400 | 3,240  | 2,826          | 16,539 | 528    |
| Pole Charge                |        | 3               | 15    | -      | 18    |          |                            |               |                        | 6.64       | 6.64    |        |                |        |        |

|                 |              |            |                |  |
|-----------------|--------------|------------|----------------|--|
| Present General | 6.64         | 6.64       |                |  |
|                 | Rate Per kWh | Annual kWh | Annual Revenue |  |
|                 | 0.07142      | 51,437     | 3,673.63       |  |
|                 | 0.05391      |            |                |  |

10,033  
5,674



Minnesota Power  
2020 Budgeted Revenue and kWh  
Area Lighting Schedules 77 Total Company

Decrease 0.00%

| Type of Lamp               | Option | Number of Lamps |       |        |          |       |       | CIS Code | Kwh/Lamp for Fuel Adjustmt | Rate Per Lamp | Proposed Rate Per Lamp | Annual KWH |           |         |         |       | Annual Revenue |         |        |        |       |
|----------------------------|--------|-----------------|-------|--------|----------|-------|-------|----------|----------------------------|---------------|------------------------|------------|-----------|---------|---------|-------|----------------|---------|--------|--------|-------|
|                            |        | Resid           | CommI | Indust | Lighting | Other | Total |          |                            |               |                        | Resid      | CommI     | Indust  | St Ltg  | Other | Resid          | CommI   | Indust | St Ltg | Other |
| Mercury Vapor              |        |                 |       |        |          |       |       |          |                            |               |                        |            |           |         |         |       |                |         |        |        |       |
| 7000 Lumen (175W)          | I      | 488             | 457   | 15     | 4        | 2     | 966   | K        | 74                         | 12.99         | 11.69                  | 433,344    | 405,816   | 13,320  | 3,552   | 1,776 | 76,069         | 71,237  | 2,338  | 624    | 312   |
|                            | II     | 64              | 32    | -      | 9        | -     | 105   |          | 74                         | 9.45          | 8.15                   | 56,832     | 28,416    | -       | 7,992   | -     | 7,258          | 3,629   | -      | 1,021  | -     |
| 20000 Lumen (400W)         | I      | 3               | 97    | -      | 1        | -     | 101   | M/P      | 161                        | 21.39         | 18.57                  | 5,796      | 187,404   | -       | 1,932   | -     | 770            | 24,898  | -      | 257    | -     |
|                            | II     | -               | 5     | -      | -        | -     | 5     |          | 161                        | 15.72         | 12.90                  | -          | 9,660     | -       | -       | -     | -              | 943     | -      | -      | -     |
| 55000 Lumen (1000W)        | I      | -               | 1     | -      | -        | -     | 1     | Q        | 385                        | 41.63         | 34.89                  | -          | 4,620     | -       | -       | -     | -              | 500     | -      | -      | -     |
|                            | II     | -               | -     | 1      | -        | -     | 1     |          | 385                        | 31.82         | 25.08                  | -          | -         | 4,620   | -       | -     | -              | -       | 382    | -      | -     |
| Sodium Vapor               |        |                 |       |        |          |       |       |          |                            |               |                        |            |           |         |         |       |                |         |        |        |       |
| 8500 Lumen (100W)          | I      | 1,583           | 863   | 15     | 32       | 2     | 2,495 | I        | 42                         | 10.98         | 10.24                  | 797,832    | 434,952   | 7,560   | 16,128  | 1,008 | 208,576        | 113,709 | 1,976  | 4,216  | 264   |
|                            | II     | 17              | 14    | -      | 9        | -     | 40    |          | 42                         | 6.65          | 5.91                   | 8,568      | 7,056     | -       | 4,536   | -     | 1,357          | 1,117   | -      | 718    | -     |
|                            | III    | -               | 1     | -      | -        | -     | 1     |          | 42                         | 6.65          | 5.91                   | -          | 504       | -       | -       | -     | -              | 80      | -      | -      | -     |
| 14000 Lumen (150W)         | I      | 175             | 151   | 2      | 6        | -     | 334   | X        | 63                         | 12.92         | 11.82                  | 132,300    | 114,156   | 1,512   | 4,536   | -     | 27,132         | 23,411  | 310    | 930    | -     |
|                            | II     | 1               | -     | -      | 1        | -     | 2     |          | 63                         | 8.63          | 7.53                   | 756        | -         | -       | 756     | -     | 104            | -       | -      | 104    | -     |
| 23000 Lumen (250W)         | I      | 111             | 726   | 18     | 31       | -     | 886   | G/J      | 102                        | 18.57         | 16.78                  | 135,864    | 888,624   | 22,032  | 37,944  | -     | 24,735         | 161,782 | 4,011  | 6,908  | -     |
|                            | II     | -               | 9     | 7      | 4        | -     | 20    |          | 102                        | 11.81         | 10.02                  | -          | 11,016    | 8,568   | 4,896   | -     | -              | 1,275   | 992    | 567    | -     |
|                            | III    | -               | -     | -      | -        | -     | -     |          | 102                        | 11.88         | 10.09                  | -          | -         | -       | -       | -     | -              | -       | -      | -      | -     |
| 45000 Lumen (400W)         | I      | 33              | 538   | 34     | 40       | 1     | 646   | Z        | 168                        | 25.38         | 22.44                  | 66,528     | 1,084,608 | 68,544  | 80,640  | 2,016 | 10,050         | 163,853 | 10,355 | 12,182 | 305   |
|                            | II     | -               | 12    | -      | -        | -     | 12    |          | 168                        | 16.39         | 13.45                  | -          | 24,192    | -       | -       | -     | -              | 2,360   | -      | -      | -     |
|                            | III    | -               | -     | -      | -        | -     | -     |          | 168                        | 13.75         | 10.81                  | -          | -         | -       | -       | -     | -              | -       | -      | -      | -     |
| Metal Halide               |        |                 |       |        |          |       |       |          |                            |               |                        |            |           |         |         |       |                |         |        |        |       |
| 17000 Lumen (250W)         | I      | 23              | 133   | -      | 2        | -     | 158   | R        | 105                        | 18.42         | 16.58                  | 28,980     | 167,580   | -       | 2,520   | -     | 5,084          | 29,398  | -      | 442    | -     |
|                            | II     |                 |       |        |          |       |       |          |                            |               |                        |            |           |         |         |       |                |         |        |        |       |
| 28800 Lumen (400W)         | I      | 59              | 121   | -      | 23       | -     | 203   | S        | 161                        | 23.15         | 20.33                  | 113,988    | 233,772   | -       | 44,436  | -     | 16,390         | 33,614  | -      | 6,389  | -     |
|                            | II     |                 |       |        |          |       |       |          | 161                        | 14.87         | 12.05                  | -          | -         | -       | -       | -     | -              | -       | -      | -      | -     |
|                            | III    |                 |       |        |          |       |       |          |                            |               |                        |            |           |         |         |       |                |         |        |        |       |
| 88000 Lumen (1000W)        | I      | 2               | 41    | 7      | 13       | -     | 63    | U        | 368                        | 40.31         | 33.87                  | 8,820      | 180,810   | 30,870  | 57,330  | -     | 967            | 19,833  | 3,386  | 6,288  | -     |
|                            | II     | -               | -     | -      | -        | -     | -     |          | 368                        | 29.34         | 22.90                  | -          | -         | -       | -       | -     | -              | -       | -      | -      | -     |
|                            | III    | -               | -     | -      | -        | -     | -     |          | -                          |               |                        | -          | -         | -       | -       | -     | -              | -       | -      | -      | -     |
| Light Emitting Diode (LED) |        |                 |       |        |          |       |       |          |                            |               |                        |            |           |         |         |       |                |         |        |        |       |
| 4674 Lumens                | I      | -               | -     | -      | -        | -     | -     |          | 207                        | 17.00         | 13.37                  | -          | -         | -       | -       | -     | -              | -       | -      | -      | -     |
| Total Base Revenue         |        | 2,559           | 3,201 | 99     | 175      | 5     | 6,039 |          |                            |               |                        | 1,789,608  | 3,783,186 | 157,026 | 267,198 | 4,800 | 378,492        | 651,639 | 23,750 | 40,646 | 881   |
|                            |        |                 |       |        |          |       |       |          |                            |               |                        |            |           |         |         |       |                |         |        |        |       |
| Pole Charge                | I      | 304             | 971   | 14     | 32       | -     | 1,321 |          |                            | 6.64          | 6.64                   |            |           |         |         |       | 24,223         | 77,369  | 1,116  | 2,550  | -     |
|                            | II     | -               | 20    | 1      | -        | -     | 21    |          |                            | 6.64          | 6.64                   |            |           |         |         |       | -              | 1,594   | 80     | -      | -     |
|                            | III    | -               | -     | -      | -        | -     | -     |          |                            | 6.64          | 6.64                   |            |           |         |         |       | -              | -       | -      | -      | -     |
|                            |        |                 |       |        |          |       |       |          |                            |               |                        |            |           |         |         |       | 24,223         | 78,963  | 1,196  | 2,550  | -     |
| Total Poles                |        | 304             | 991   | 15     | 32       | -     | 1,342 |          |                            |               |                        |            |           |         |         |       |                |         |        |        |       |

|         | Rate Per kWh | Annual kWh | Annual Revenue |
|---------|--------------|------------|----------------|
| Present | 0.07142      | 83,261     | 5,947          |
| General | 0.05391      |            |                |

Minnesota Power  
2020 Budgeted Revenue and KWh  
Highway and Ornamental Street Lighting - Schedules 80, 84

| Type of Lamp                           | Option | Number<br>of<br>Lamps | CIS<br>Code | Kwh/Lamp<br>for Fuel<br>Adjustmt | Rate Per<br>Lamp | Proposed<br>Rate Per<br>Lamp | Decrease      | 0.00%             |
|--|--------|-----------------------|-------------|----------------------------------|------------------|------------------------------|---------------|-------------------|
|  |        |                       |             |                                  |                  |                              | Annual<br>KWH | Annual<br>Revenue |
| <b>Incandescent</b>                    |        |                       |             |                                  |                  |                              |               |                   |
| 4000 Lumen                             | III    | -                     | C           | -                                | 0                |                              | -             | -                 |
| <b>Mercury Vapor</b>                   |        |                       |             |                                  |                  |                              |               |                   |
| 7000 Lumen (175W)                      | I      | -                     |             | 74                               | 17.33            | 16.03                        | -             | -                 |
|  | II     | -                     |             | 74                               | 9.72             | 8.42                         | -             | -                 |
|  | III    | 7                     | K           | 74                               | 9.45             | 8.15                         | 6,216         | 793.80            |
| 10000 Lumen (250W)                     | III    | 8                     | L           | 102                              | 12.10            | 10.31                        | 9,792         | 1,161.60          |
| 20000 Lumen (400W)                     | I      | -                     |             | 161                              | 24.36            | 21.54                        | -             | -                 |
|  | II     | -                     |             | 161                              | 17.26            | 14.44                        | -             | -                 |
|  | III    | 26                    | M/P         | 161                              | 16.79            | 13.97                        | 50,232        | 5,238.48          |
| 55000 Lumen (1000W)                    | III    | -                     | O           | 385                              | 32.47            | 25.73                        | -             | -                 |
| <b>Sodium Vapor</b>                    |        |                       |             |                                  |                  |                              |               |                   |
| 8500 Lumen (100W)                      | I      | -                     |             | 42                               | 14.41            | 13.67                        | -             | -                 |
|  | II     | -                     |             | 42                               | 7.62             | 6.88                         | -             | -                 |
|  | III    | 47                    | I           | 42                               | 7.27             | 6.53                         | 23,688        | 4,100.28          |
| 14000 Lumen (150W)                     | I      | 4                     | X           | 63                               | 16.92            | 15.82                        | 3,024         | 812.16            |
|  | III    | -                     |             | 63                               | 9.78             | 8.68                         | -             | -                 |
| 14000 Lumen (150W)                     | III    | 102                   | A           | 63                               | 9.52             | 8.42                         | 77,112        | 11,652.48         |
| 20500 Lumen (200W)                     | I      | -                     |             | 95                               | 20.11            | 18.45                        | -             | -                 |
|  | II     | -                     | F           | 95                               | 11.87            | 10.21                        | -             | -                 |
|  | III    | 77                    |             | 95                               | 11.74            | 10.08                        | 87,780        | 10,847.76         |
| 23000 Lumen (250W)                     | I      | 1                     | G/J         | 102                              | 21.69            | 19.90                        | 1,224         | 260.28            |
|  | II     | -                     |             | 102                              | 12.97            | 11.18                        | -             | -                 |
|  | III    | 211                   |             | 102                              | 12.67            | 10.88                        | 258,264       | 32,080.44         |
| 45000 Lumen (400W)                     | I      | -                     | Z           | 168                              | 27.38            | 24.44                        | -             | -                 |
|  | II     | -                     |             | 168                              | 18.11            | 15.17                        | -             | -                 |
|  | III    | 107                   |             | 168                              | 17.25            | 14.31                        | 215,712       | 22,149.00         |
| <b>Metal Halide lamps</b>              |        |                       |             |                                  |                  |                              |               |                   |
| 28800 Lumen (400W)                     | II     | -                     | V           | 161                              | 16.14            | 13.32                        | -             | -                 |
| <b>Light Emitting Diode (LED)</b>      |        |                       |             |                                  |                  |                              |               |                   |
| 4,000 Lumens (54 W or Less)            | I      | 2                     |             | 19                               | 13.1             | 12.77                        | 452           | 314.40            |
| 8,800 Lumens (118 W or Less but > 54W) | I      | -                     |             | 42                               | 17.39            | 16.65                        | -             | -                 |
| 23,000 Lumens                          | I      | -                     |             | 78.75                            | 22.55            | 21.17                        | -             | -                 |
| <b>Total</b>                           |        | 592                   |             |                                  |                  |                              | 733,496       | 89,411            |

|         | Rate Per kWh | Annual kWh | Annual Revenue |
|---------|--------------|------------|----------------|
| Present | 0.07142      | 4552062    | 325,108        |
| General | 0.05391      |            |                |

Minnesota Power  
2020 Budgeted Revenue and KWh  
Overhead Street Lighting Schedules 83 Total Company

|  |        |                 |          |                            |               |                        | Decrease   | 0.00%          |
|--|--------|-----------------|----------|----------------------------|---------------|------------------------|------------|----------------|
| Type of Lamp                           | Option | Number of Lamps | CIS Code | Kwh/Lamp for Fuel Adjustmt | Rate Per Lamp | Proposed Rate Per Lamp | Annual KWH | Annual Revenue |
| <b>Mercury Vapor</b>                   |        |                 |          |                            |               |                        |            |                |
| 7000 Lumen (175W)                      | I      | 972             | K        | 74                         | 17.33         | 16.03                  | 863,136    | 202,137        |
|  | II     | 1,375           |          | 74                         | 9.72          | 8.42                   | 1,221,000  | 160,380        |
|  | III    | -               |          | 74                         | 9.45          | 8.15                   | -          | -              |
| 10000 Lumen (250W)                     | III    | -               | L        | 102                        | 12.10         | 10.31                  | -          | -              |
| 20000 Lumen (400W)                     | I      | 27              | M/P      | 161                        | 24.36         | 21.54                  | 52,164     | 7,893          |
|  | II     | 47              |          | 161                        | 17.26         | 14.44                  | 90,804     | 9,735          |
|  | III    | -               |          | 161                        | 16.79         | 13.97                  | -          | -              |
| 55000 Lumen (1000W)                    | III    | -               | O        | 385                        | 32.47         | 25.73                  | -          | -              |
| <b>Sodium Vapor</b>                    |        |                 |          |                            |               |                        |            |                |
| 8500 Lumen (100W)                      | I      | 1,158           | I        | 42                         | 14.41         | 13.67                  | 583,632    | 200,241        |
|  | II     | 3,101           |          | 42                         | 7.62          | 6.88                   | 1,562,904  | 283,555        |
|  | III    | -               |          | 42                         | 7.27          | 6.53                   | -          | -              |
| 14000 Lumen (150W)                     | I      | 1,188           | X        | 63                         | 16.92         | 15.82                  | 898,128    | 241,212        |
|  | II     | 1,188           |          | 63                         | 9.78          | 8.68                   | 898,128    | 139,424        |
|  | III    | -               |          | 63                         | 9.52          | 8.42                   | -          | -              |
| 20500 Lumen (200W)                     | I      | 1               | F        | 95                         | 20.11         | 18.45                  | 1,140      | 241            |
|  | II     | 4               |          | 95                         | 11.87         | 10.21                  | 4,560      | 570            |
|  | III    | -               |          | 95                         | 11.74         | 10.08                  | -          | -              |
| 23000 Lumen (250W)                     | I      | 501             | G/J      | 102                        | 21.69         | 19.90                  | 613,224    | 130,400        |
|  | II     | 987             |          | 102                        | 12.97         | 11.18                  | 1,208,088  | 153,617        |
|  | III    | 1               |          | 102                        | 12.67         | 10.88                  | 1,224      | 152            |
| 45000 Lumen (400W)                     | I      | 24              | Z        | 168                        | 27.38         | 24.44                  | 48,384     | 7,885          |
|  | II     | 34              |          | 168                        | 18.11         | 15.17                  | 68,544     | 7,389          |
|  | III    | -               |          | 168                        | 17.25         | 14.31                  | -          | -              |
| <b>Metal Halide Lamps</b>              |        |                 |          |                            |               |                        |            |                |
| 28800 Lumen (400W)                     | II     | -               | S        | 161                        | 16.14         | 13.32                  | -          | -              |
|  | II     | -               | S        | 0                          |               |                        | -          | -              |
| <b>Light Emitting Diode (LED)</b>      |        |                 |          |                            |               |                        |            |                |
| 4,000 Lumens (54 W or Less)            | I      | 1,177           | W        | 19                         | 13.10         | 12.77                  | 266,002    | 185,024        |
| 8,800 Lumens (118 W or Less but > 54W) | I      | 516             | Y        | 42                         | 17.39         | 16.65                  | 260,580    | 107,679        |
| 23,000 Lumens                          | I      | -               |          | 79                         | 22.55         | 21.17                  | -          | -              |
| Total Base Revenue                     |        | 12,301          |          |                            |               |                        | 8,641,642  | 1,837,534      |
| Metered - Energy Charge                |        |                 |          |                            | Rate/kWh      |                        |            |                |
|  |        |                 |          |                            | 0.07142       |                        | 212,470    | 15,175         |
| Total Lighting - Rate Schedule 83      |        |                 |          |                            |               |                        | 8,854,112  | 1,852,709      |

|         | Rate Per kWh | AnnualKWh | AnnualRevenue |
|---------|--------------|-----------|---------------|
| Present | 0.07142      | 233,914   | 16,706        |
| General | 0.05391      |           |               |

Minnesota Power  
Docket No. E015/GR-19-442  
Minnesota Power  
2020 Street Lighting Budget  
Lighting Monthly Breakdown Percentages

Lamp CIS Codes      Monthly kWh Usage per Lamp by Type per the MP Rate Book

|         | Jan    | Feb   | Mar   | Apr   | May   | Jun   | Jul   | Aug   | Sep   | Oct   | Nov    | Dec    | Total   |
|---------|--------|-------|-------|-------|-------|-------|-------|-------|-------|-------|--------|--------|---------|
| G, J, L | 135    | 110   | 107   | 88    | 77    | 68    | 73    | 86    | 98    | 117   | 127    | 138    | 1224    |
| %       | 11.03% | 8.99% | 8.74% | 7.19% | 6.29% | 5.56% | 5.96% | 7.03% | 8.01% | 9.56% | 10.38% | 11.27% | 100.00% |
| I       | 56     | 46    | 44    | 36    | 32    | 28    | 30    | 35    | 40    | 48    | 52     | 57     | 504     |
| %       | 11.11% | 9.13% | 8.73% | 7.14% | 6.35% | 5.56% | 5.95% | 6.94% | 7.94% | 9.52% | 10.32% | 11.31% | 100.00% |
| K       | 98     | 80    | 78    | 64    | 56    | 49    | 53    | 62    | 71    | 85    | 92     | 100    | 888     |
| %       | 11.04% | 9.01% | 8.78% | 7.21% | 6.31% | 5.52% | 5.97% | 6.98% | 8.00% | 9.57% | 10.36% | 11.26% | 100.00% |
| M, P, S | 213    | 174   | 169   | 139   | 121   | 107   | 116   | 135   | 155   | 184   | 200    | 219    | 1932    |
| %       | 11.02% | 9.01% | 8.75% | 7.19% | 6.26% | 5.54% | 6.00% | 6.99% | 8.02% | 9.52% | 10.35% | 11.34% | 100.00% |
| O, Q    | 508    | 417   | 404   | 332   | 290   | 256   | 277   | 323   | 370   | 441   | 479    | 523    | 4620    |
| %       | 11.00% | 9.03% | 8.74% | 7.19% | 6.28% | 5.54% | 6.00% | 6.99% | 8.01% | 9.55% | 10.37% | 11.32% | 100.00% |
| R       | 139    | 114   | 110   | 91    | 79    | 70    | 76    | 88    | 101   | 120   | 130    | 142    | 1260    |
| %       | 11.03% | 9.05% | 8.73% | 7.22% | 6.27% | 5.56% | 6.03% | 6.98% | 8.02% | 9.52% | 10.32% | 11.27% | 100.00% |
| U       | 485    | 398   | 385   | 317   | 277   | 245   | 264   | 309   | 353   | 421   | 457    | 499    | 4410    |
| %       | 11.00% | 9.02% | 8.73% | 7.19% | 6.28% | 5.56% | 5.99% | 7.01% | 8.00% | 9.55% | 10.36% | 11.32% | 100.00% |
| X       | 83     | 68    | 66    | 54    | 48    | 42    | 45    | 53    | 60    | 72    | 78     | 87     | 756     |
| %       | 10.98% | 8.99% | 8.73% | 7.14% | 6.35% | 5.56% | 5.95% | 7.01% | 7.94% | 9.52% | 10.32% | 11.51% | 100.00% |
| Z       | 222    | 182   | 176   | 145   | 127   | 112   | 121   | 141   | 161   | 192   | 209    | 228    | 2016    |
| %       | 11.01% | 9.03% | 8.73% | 7.19% | 6.30% | 5.56% | 6.00% | 6.99% | 7.99% | 9.52% | 10.37% | 11.31% | 100.00% |
| F       | 125    | 103   | 100   | 82    | 72    | 63    | 68    | 80    | 91    | 109   | 118    | 129    | 1140    |
| %       | 10.96% | 9.04% | 8.77% | 7.19% | 6.32% | 5.53% | 5.96% | 7.02% | 7.98% | 9.56% | 10.35% | 11.32% | 100.00% |
| V       | 226    | 185   | 179   | 147   | 129   | 114   | 123   | 144   | 164   | 196   | 213    | 232    | 2052    |
| %       | 11.01% | 9.02% | 8.72% | 7.16% | 6.29% | 5.56% | 5.99% | 7.02% | 7.99% | 9.55% | 10.38% | 11.31% | 100.00% |
| C       | 149    | 122   | 119   | 98    | 85    | 75    | 81    | 95    | 109   | 130   | 140    | 153    | 1356    |
| %       | 10.99% | 9.00% | 8.78% | 7.23% | 6.27% | 5.53% | 5.97% | 7.01% | 8.04% | 9.59% | 10.32% | 11.28% | 100.00% |

| Residential           |           |          |          |          |          |          |          |          |          |          |          |          |          |           |
|-----------------------|-----------|----------|----------|----------|----------|----------|----------|----------|----------|----------|----------|----------|----------|-----------|
| Rates 76.77           | Total     | Jan      | Feb      | Mar      | Apr      | May      | Jun      | Jul      | Aug      | Sep      | Oct      | Nov      | Dec      | Total     |
| 7000 Lumens kWh (K)   | 1,040,736 | 114,856  | 93,760   | 91,416   | 75,008   | 65,632   | 57,428   | 62,116   | 72,664   | 83,212   | 99,620   | 107,824  | 117,200  | 1,040,736 |
| 7000 Lumens \$        | \$136,965 | \$15,116 | \$12,339 | \$12,031 | \$9,871  | \$8,637  | \$7,558  | \$8,175  | \$9,563  | \$10,951 | \$13,110 | \$14,190 | \$15,424 | \$136,965 |
| 20000 Lumens MWh (M)  | 17,388    | 1,917    | 1,566    | 1,521    | 1,251    | 1,089    | 963      | 1,044    | 1,215    | 1,395    | 1,656    | 1,800    | 1,971    | 17,388    |
| 20000 Lumens \$       | \$1,738   | \$192    | \$157    | \$152    | \$125    | \$109    | \$96     | \$104    | \$121    | \$139    | \$166    | \$180    | \$197    | \$1,738   |
| 8500 Lumens MWh (I)   | 686,952   | 76,328   | 62,698   | 59,972   | 49,068   | 43,616   | 38,164   | 40,890   | 47,705   | 54,520   | 65,424   | 70,876   | 77,691   | 686,952   |
| 8500 Lumens \$        | \$145,579 | \$16,175 | \$13,287 | \$12,709 | \$10,399 | \$9,243  | \$8,088  | \$8,665  | \$10,110 | \$11,554 | \$13,865 | \$15,020 | \$16,464 | \$145,579 |
| 14000 Lumens MWh (X)  | 92,988    | 10,209   | 8,364    | 8,118    | 6,642    | 5,904    | 5,166    | 5,535    | 6,519    | 7,380    | 8,856    | 9,594    | 10,701   | 92,988    |
| 14000 Lumens \$       | \$15,158  | \$1,664  | \$1,363  | \$1,323  | \$1,083  | \$962    | \$842    | \$902    | \$1,063  | \$1,203  | \$1,444  | \$1,564  | \$1,744  | \$15,158  |
| 23000 Lumens MWh (G)  | 137,088   | 15,120   | 12,320   | 11,984   | 9,856    | 8,624    | 7,616    | 8,176    | 9,632    | 10,976   | 13,104   | 14,224   | 15,456   | 137,088   |
| 23000 Lumens \$       | \$18,972  | \$2,093  | \$1,705  | \$1,659  | \$1,364  | \$1,194  | \$1,054  | \$1,132  | \$1,333  | \$1,519  | \$1,814  | \$1,969  | \$2,139  | \$18,972  |
| 45000 Lumens MWh (Z)  | 112,896   | 12,432   | 10,192   | 9,856    | 8,120    | 7,112    | 6,272    | 6,776    | 7,896    | 9,016    | 10,752   | 11,704   | 12,768   | 112,896   |
| 45000 Lumens \$       | \$12,580  | \$1,385  | \$1,136  | \$1,098  | \$905    | \$792    | \$699    | \$755    | \$880    | \$1,005  | \$1,198  | \$1,304  | \$1,423  | \$12,580  |
| 17000 Lumens MWh (R)  | 28,980    | 3,197    | 2,622    | 2,530    | 2,093    | 1,817    | 1,610    | 1,748    | 2,024    | 2,323    | 2,760    | 2,990    | 3,266    | 28,980    |
| 17000 Lumens \$       | \$3,732   | \$412    | \$338    | \$326    | \$270    | \$234    | \$207    | \$225    | \$261    | \$299    | \$355    | \$385    | \$421    | \$3,732   |
| 28800 Lumens MWh (S)  | 113,988   | 12,567   | 10,266   | 9,971    | 8,201    | 7,139    | 6,313    | 6,844    | 7,965    | 9,145    | 10,856   | 11,800   | 12,921   | 113,988   |
| 28800 Lumens \$       | \$12,107  | \$1,335  | \$1,090  | \$1,059  | \$871    | \$758    | \$671    | \$727    | \$846    | \$971    | \$1,153  | \$1,253  | \$1,372  | \$12,107  |
| 88000 Lumens MWh (U)  | 44,100    | 4,850    | 3,980    | 3,850    | 3,170    | 2,770    | 2,450    | 2,640    | 3,090    | 3,530    | 4,210    | 4,570    | 4,990    | 44,100    |
| 88000 Lumens \$       | \$3,300   | \$363    | \$298    | \$288    | \$237    | \$207    | \$183    | \$198    | \$231    | \$264    | \$315    | \$342    | \$373    | \$3,300   |
| Pole Charge           | \$14,364  | \$1,197  | \$1,197  | \$1,197  | \$1,197  | \$1,197  | \$1,197  | \$1,197  | \$1,197  | \$1,197  | \$1,197  | \$1,197  | \$1,197  | \$14,364  |
| Total Residential KWH | 2,275,116 | 251,476  | 205,768  | 199,218  | 163,409  | 143,703  | 125,982  | 135,769  | 158,710  | 181,497  | 217,238  | 235,382  | 256,964  | 2,275,116 |
| Total Residential Rev | \$364,495 | \$39,931 | \$32,910 | \$31,842 | \$26,321 | \$23,334 | \$20,595 | \$22,080 | \$25,604 | \$29,103 | \$34,616 | \$37,404 | \$40,755 | \$364,495 |

Minnesota Power  
2020 Street Lighting Budget  
Lighting Monthly Breakdown Percentages

Commercial

| <u>Rates 76, 77</u>    | <u>Total</u> | <u>Jan</u> | <u>Feb</u> | <u>Mar</u> | <u>Apr</u> | <u>May</u> | <u>Jun</u> | <u>Jul</u> | <u>Aug</u> | <u>Sep</u> | <u>Oct</u> | <u>Nov</u> | <u>Dec</u> | <u>Total</u> |
|------------------------|--------------|------------|------------|------------|------------|------------|------------|------------|------------|------------|------------|------------|------------|--------------|
| 7000 Lumens MWh (K)    | 797,424      | 88,004     | 71,840     | 70,044     | 57,472     | 50,288     | 44,002     | 47,594     | 55,676     | 63,758     | 76,330     | 82,616     | 89,800     | 797,424      |
| 7000 Lumens \$         | \$106,071    | \$11,706   | \$9,556    | \$9,317    | \$7,645    | \$6,689    | \$5,853    | \$6,331    | \$7,406    | \$8,481    | \$10,153   | \$10,989   | \$11,945   | 106,071      |
| 20000 Lumens MWh (M)   | 407,652      | 44,943     | 36,714     | 35,659     | 29,329     | 25,531     | 22,577     | 24,476     | 28,485     | 32,705     | 38,824     | 42,200     | 46,209     | 407,652      |
| 20000 Lumens \$        | \$39,925     | \$4,402    | \$3,596    | \$3,492    | \$2,872    | \$2,500    | \$2,211    | \$2,397    | \$2,790    | \$3,203    | \$3,802    | \$4,133    | \$4,526    | 39,925       |
| 55000 Lumens MWh (Q)   | 50,820       | 5,588      | 4,587      | 4,444      | 3,652      | 3,190      | 2,816      | 3,047      | 3,553      | 4,070      | 4,851      | 5,269      | 5,753      | 50,820       |
| 55000 Lumens \$        | \$3,722      | \$409      | \$336      | \$325      | \$267      | \$234      | \$206      | \$223      | \$260      | \$298      | \$355      | \$386      | \$421      | 3,722        |
| 8500 Lumens MWh (I)    | 372,960      | 41,440     | 34,040     | 32,560     | 26,640     | 23,680     | 20,720     | 22,200     | 25,900     | 29,600     | 35,520     | 38,480     | 42,180     | 372,960      |
| 8500 Lumens \$         | \$78,244     | \$8,694    | \$7,141    | \$6,831    | \$5,589    | \$4,968    | \$4,347    | \$4,657    | \$5,434    | \$6,210    | \$7,452    | \$8,073    | \$8,849    | 78,244       |
| 14000 Lumens Mwh (X)   | 83,160       | 9,130      | 7,480      | 7,260      | 5,940      | 5,280      | 4,620      | 4,950      | 5,830      | 6,600      | 7,920      | 8,580      | 9,570      | 83,160       |
| 14000 Lumens \$        | \$13,511     | \$1,483    | \$1,215    | \$1,180    | \$965      | \$858      | \$751      | \$804      | \$947      | \$1,072    | \$1,287    | \$1,394    | \$1,555    | 13,511       |
| 23000 Lumens MWh (G)   | 854,352      | 94,230     | 76,780     | 74,686     | 61,424     | 53,746     | 47,464     | 50,954     | 60,028     | 68,404     | 81,666     | 88,646     | 96,324     | 854,352      |
| 23000 Lumens \$        | \$121,264    | \$13,375   | \$10,898   | \$10,601   | \$8,718    | \$7,629    | \$6,737    | \$7,232    | \$8,520    | \$9,709    | \$11,591   | \$12,582   | \$13,672   | 121,264      |
| 45000 Lumens MWh (Z)   | 1,120,896    | 123,432    | 101,192    | 97,856     | 80,620     | 70,612     | 62,272     | 67,276     | 78,396     | 89,516     | 106,752    | 116,204    | 126,768    | 1,120,896    |
| 45000 Lumens \$        | \$123,461    | \$13,595   | \$11,146   | \$10,778   | \$8,880    | \$7,778    | \$6,859    | \$7,410    | \$8,635    | \$9,860    | \$11,758   | \$12,799   | \$13,963   | 123,461      |
| 17000 Lumens MWh (R) @ | 109,620      | 12,093     | 9,918      | 9,570      | 7,917      | 6,873      | 6,090      | 6,612      | 7,656      | 8,787      | 10,440     | 11,310     | 12,354     | 109,620      |
| 17000 Lumens \$        | \$14,115     | \$1,557    | \$1,277    | \$1,232    | \$1,019    | \$885      | \$784      | \$851      | \$986      | \$1,131    | \$1,344    | \$1,456    | \$1,591    | 14,115       |
| 28800 Lumens MWh (S)   | 247,296      | 27,264     | 22,272     | 21,632     | 17,792     | 15,488     | 13,696     | 14,848     | 17,280     | 19,840     | 23,552     | 25,600     | 28,032     | 247,296      |
| 28800 Lumens \$        | \$26,174     | \$2,886    | \$2,357    | \$2,290    | \$1,883    | \$1,639    | \$1,450    | \$1,572    | \$1,829    | \$2,100    | \$2,493    | \$2,710    | \$2,967    | 26,174       |
| 88000 Lumens MWh (U)   | 158,760      | 17,460     | 14,328     | 13,860     | 11,412     | 9,972      | 8,820      | 9,504      | 11,124     | 12,708     | 15,156     | 16,452     | 17,964     | 158,760      |
| 88000 Lumens \$        | \$11,650     | \$1,281    | \$1,051    | \$1,017    | \$837      | \$732      | \$647      | \$697      | \$816      | \$933      | \$1,112    | \$1,207    | \$1,318    | 11,650       |
| Poles 77               | \$47,607     | \$3,967    | \$3,967    | \$3,967    | \$3,967    | \$3,967    | \$3,967    | \$3,967    | \$3,967    | \$3,967    | \$3,967    | \$3,967    | \$3,967    | 47,607       |
| Poles 76               | \$91         | \$8        | \$8        | \$8        | \$8        | \$8        | \$8        | \$8        | \$8        | \$8        | \$8        | \$8        | \$8        | 91           |
| Total Commercial MWh   | 4,202,940    | 463,584    | 379,151    | 367,571    | 302,198    | 264,660    | 233,077    | 251,461    | 293,928    | 335,988    | 401,011    | 435,357    | 474,954    | 4,202,940    |
| Total Commercial Rev   | \$585,835    | \$63,363   | \$52,549   | \$51,038   | \$42,652   | \$37,886   | \$33,820   | \$36,150   | \$41,598   | \$46,972   | \$55,323   | \$59,704   | \$64,781   | \$585,835    |

Industrial

| <u>Rates 76, 77</u>  | <u>Total</u> | <u>Jan</u> | <u>Feb</u> | <u>Mar</u> | <u>Apr</u> | <u>May</u> | <u>Jun</u> | <u>Jul</u> | <u>Aug</u> | <u>Sep</u> | <u>Oct</u> | <u>Nov</u> | <u>Dec</u> | <u>Total</u> |
|----------------------|--------------|------------|------------|------------|------------|------------|------------|------------|------------|------------|------------|------------|------------|--------------|
| 7000 Lumens MWh (K)  | 19,536       | 2,156      | 1,760      | 1,716      | 1,408      | 1,232      | 1,078      | 1,166      | 1,364      | 1,562      | 1,870      | 2,024      | 2,200      | 19,536       |
| 7000 Lumens \$       | \$2,682      | \$296      | \$242      | \$236      | \$193      | \$169      | \$148      | \$160      | \$187      | \$214      | \$257      | \$278      | \$302      | 2,682        |
| 20000 Lumens MWh (M) | 27,048       | 2,982      | 2,436      | 2,366      | 1,946      | 1,694      | 1,498      | 1,624      | 1,890      | 2,170      | 2,576      | 2,800      | 3,066      | 27,048       |
| 20000 Lumens \$      | \$2,703      | \$298      | \$243      | \$236      | \$194      | \$169      | \$150      | \$162      | \$189      | \$217      | \$257      | \$280      | \$306      | 2,703        |
| 55000 Lumens MWh (Q) | 4,620        | 508        | 417        | 404        | 332        | 290        | 256        | 277        | 323        | 370        | 441        | 479        | 523        | 4,620        |
| 55000 Lumens \$      | \$233        | \$26       | \$21       | \$20       | \$17       | \$15       | \$13       | \$14       | \$16       | \$19       | \$22       | \$24       | \$26       | 233          |
| 8500 Lumens MWh (I)  | 7,056        | 784        | 644        | 616        | 504        | 448        | 392        | 420        | 490        | 560        | 672        | 728        | 798        | 7,056        |
| 8500 Lumens \$       | \$1,500      | \$167      | \$137      | \$131      | \$107      | \$95       | \$83       | \$89       | \$104      | \$119      | \$143      | \$155      | \$170      | 1,500        |
| 23000 Lumens MWh (G) | 56,304       | 6,210      | 5,060      | 4,922      | 4,048      | 3,542      | 3,128      | 3,358      | 3,956      | 4,508      | 5,382      | 5,842      | 6,348      | 56,304       |
| 23000 Lumens \$      | \$8,048      | \$888      | \$723      | \$704      | \$579      | \$506      | \$447      | \$480      | \$565      | \$644      | \$769      | \$835      | \$907      | 8,048        |
| 14000 Lumens MWh (X) | 1,512        | 166        | 136        | 132        | 108        | 96         | 84         | 90         | 106        | 120        | 144        | 156        | 174        | 1,512        |
| 14000 Lumens \$      | \$246        | \$27       | \$22       | \$21       | \$18       | \$16       | \$14       | \$15       | \$17       | \$20       | \$23       | \$25       | \$28       | 246          |
| 45000 Lumens MWh (Z) | 151,200      | 16,650     | 13,650     | 13,200     | 10,875     | 9,525      | 8,400      | 9,075      | 10,575     | 12,075     | 14,400     | 15,675     | 17,100     | 151,200      |
| 45000 Lumens \$      | \$16,848     | \$1,855    | \$1,521    | \$1,471    | \$1,212    | \$1,061    | \$936      | \$1,011    | \$1,178    | \$1,346    | \$1,605    | \$1,747    | \$1,905    | 16,848       |
| 88000 Lumens MWh (U) | 4,410        | 485        | 398        | 385        | 317        | 277        | 245        | 264        | 309        | 353        | 421        | 457        | 499        | 4,410        |
| 88000 Lumens \$      | \$330        | \$36       | \$30       | \$29       | \$24       | \$21       | \$18       | \$20       | \$23       | \$26       | \$32       | \$34       | \$37       | 330          |
| Poles 77             | \$1,779      | \$148      | \$148      | \$148      | \$148      | \$148      | \$148      | \$148      | \$148      | \$148      | \$148      | \$148      | \$148      | 1,779        |
| Poles 76             | \$91         | \$8        | \$8        | \$8        | \$8        | \$8        | \$8        | \$8        | \$8        | \$8        | \$8        | \$8        | \$8        | 91           |
| Total Industrial MWh | 271,686      | 29,941     | 24,501     | 23,741     | 19,538     | 17,104     | 15,081     | 16,274     | 19,013     | 21,718     | 25,906     | 28,161     | 30,708     | 271,686      |
| Total Industrial Rev | \$34,460     | \$3,748    | \$3,095    | \$3,004    | \$2,499    | \$2,208    | \$1,965    | \$2,107    | \$2,437    | \$2,761    | \$3,264    | \$3,534    | \$3,839    | \$34,460     |



## Minnesota Power Gerdau Budget Details TEST YEAR 2020

|  | January                | February | March | April | May | June | July | August | September | October | November | December | Total |
|--|------------------------|----------|-------|-------|-----|------|------|--------|-----------|---------|----------|----------|-------|
| <b><u>Gerdau Ameristeel - Present Rates</u></b>  |                        |          |       |       |     |      |      |        |           |         |          |          |       |
| Firm Energy                                      |                        |          |       |       |     |      |      |        |           |         |          |          |       |
| Interruptible Energy                             |                        |          |       |       |     |      |      |        |           |         |          |          |       |
| Service/Cust Charge                              |                        |          |       |       |     |      |      |        |           |         |          |          |       |
| Firm Demand                                      |                        |          |       |       |     |      |      |        |           |         |          |          |       |
| Service Voltage Adjustment - Firm                |                        |          |       |       |     |      |      |        |           |         |          |          |       |
| Service Voltage Adjustment - Interruptible       |                        |          |       |       |     |      |      |        |           |         |          |          |       |
| Interruptible Demand                             |                        |          |       |       |     |      |      |        |           |         |          |          |       |
| Retail FAC                                       |                        |          |       |       |     |      |      |        |           |         |          |          |       |
| Retail SEA                                       |                        |          |       |       |     |      |      |        |           |         |          |          |       |
| Int. Discount                                    |                        |          |       |       |     |      |      |        |           |         |          |          |       |
| Renewable Resources Rider - Base Rates           |                        |          |       |       |     |      |      |        |           |         |          |          |       |
| Transmission Cost Recovery Rider - Base Rates    |                        |          |       |       |     |      |      |        |           |         |          |          |       |
| Boswell 4 Emissions Reduction Rider - Base Rates |                        |          |       |       |     |      |      |        |           |         |          |          |       |
| Excess ADIT Credit                               |                        |          |       |       |     |      |      |        |           |         |          |          |       |
| Renewable Resources Rider - Continuing           |                        |          |       |       |     |      |      |        |           |         |          |          |       |
| Transmission Cost Recovery Rider - Continuing    |                        |          |       |       |     |      |      |        |           |         |          |          |       |
| Boswell 4 Emissions Reduction Rider - Continuing |                        |          |       |       |     |      |      |        |           |         |          |          |       |
| Care Surcharge                                   |                        |          |       |       |     |      |      |        |           |         |          |          |       |
| CIP  |                        |          |       |       |     |      |      |        |           |         |          |          |       |
|  | TRADE SECRET DATA ENDS |          |       |       |     |      |      |        |           |         |          |          |       |
| <b><u>Gerdau Ameristeel - General Rates</u></b>  |                        |          |       |       |     |      |      |        |           |         |          |          |       |
| Customers  |                        |          |       |       |     |      |      |        |           |         |          |          |       |
| Firm MWh   |                        |          |       |       |     |      |      |        |           |         |          |          |       |
| Interruptible MWh                                |                        |          |       |       |     |      |      |        |           |         |          |          |       |
| kW billed firm                                   |                        |          |       |       |     |      |      |        |           |         |          |          |       |
| kW billed interruptible                          |                        |          |       |       |     |      |      |        |           |         |          |          |       |
|  | TRADE SECRET DATA ENDS |          |       |       |     |      |      |        |           |         |          |          |       |
|  | January                | February | March | April | May | June | July | August | September | October | November | December | Total |
| <b><u>Gerdau Ameristeel - Present Rates</u></b>  |                        |          |       |       |     |      |      |        |           |         |          |          |       |
| Firm Energy                                      |                        |          |       |       |     |      |      |        |           |         |          |          |       |
| Interruptible Energy                             |                        |          |       |       |     |      |      |        |           |         |          |          |       |
| Service/Cust Charge                              |                        |          |       |       |     |      |      |        |           |         |          |          |       |
| Firm Demand                                      |                        |          |       |       |     |      |      |        |           |         |          |          |       |
| Service Voltage Adjustment - Firm                |                        |          |       |       |     |      |      |        |           |         |          |          |       |
| Service Voltage Adjustment - Interruptible       |                        |          |       |       |     |      |      |        |           |         |          |          |       |
| Interruptible Demand                             |                        |          |       |       |     |      |      |        |           |         |          |          |       |
| Base Cost of Fuel                                |                        |          |       |       |     |      |      |        |           |         |          |          |       |
| Retail FAC                                       |                        |          |       |       |     |      |      |        |           |         |          |          |       |
| Retail SEA                                       |                        |          |       |       |     |      |      |        |           |         |          |          |       |
| Int. Discount                                    |                        |          |       |       |     |      |      |        |           |         |          |          |       |
| Excess ADIT Credit                               |                        |          |       |       |     |      |      |        |           |         |          |          |       |
| Renewable Resources Rider - Continuing           |                        |          |       |       |     |      |      |        |           |         |          |          |       |
| Transmission Cost Recovery Rider - Continuing    |                        |          |       |       |     |      |      |        |           |         |          |          |       |
| Boswell 4 Emissions Reduction Rider - Continuing |                        |          |       |       |     |      |      |        |           |         |          |          |       |
| CARE Surcharge                                   |                        |          |       |       |     |      |      |        |           |         |          |          |       |
| CIP  |                        |          |       |       |     |      |      |        |           |         |          |          |       |
|  | TRADE SECRET DATA ENDS |          |       |       |     |      |      |        |           |         |          |          |       |
| <b><u>Gerdau Ameristeel - General Rates</u></b>  |                        |          |       |       |     |      |      |        |           |         |          |          |       |
| Customers  |                        |          |       |       |     |      |      |        |           |         |          |          |       |
| Firm MWh   |                        |          |       |       |     |      |      |        |           |         |          |          |       |
| Interruptible MWh                                |                        |          |       |       |     |      |      |        |           |         |          |          |       |
| kW billed firm                                   |                        |          |       |       |     |      |      |        |           |         |          |          |       |
| kW billed interruptible                          |                        |          |       |       |     |      |      |        |           |         |          |          |       |
|  | TRADE SECRET DATA ENDS |          |       |       |     |      |      |        |           |         |          |          |       |

**Minnesota Power**  
**Minnesota Pipeline Budget Details**  
**TEST YEAR 2020**

**Minnesota Pipeline - Present Rates**

Firm Energy  
High Voltage Energy Discount  
Interruptible Energy  
Service/Cust Charge  
Firm Demand  
Service Voltage Adjustment - Firm  
Service Voltage Adjustment - Interruptible  
Interruptible Demand  
Retail FAC  
Retail SEA  
Int. Discount  
Renewable Resources Rider - Base Rates  
Transmission Cost Recovery Rider - Base Rates  
Boswell 4 Emissions Reduction Rider - Base Rates  
Excess ADIT Credit  
Renewable Resources Rider - Continuing  
Transmission Cost Recovery Rider - Continuing  
Boswell 4 Emissions Reduction Rider - Continuing  
Care Surcharge  
CIP

| January | February | March | April | May | June | July | August | September | October | November | December | Total |
|---------|----------|-------|-------|-----|------|------|--------|-----------|---------|----------|----------|-------|
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TRADE SECRET DATA ENDS

TRADE SECRET DATA BEGINS

Customers  
Firm MWh  
Interruptible MWh  
kW billed firm  
kW billed interruptible

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TRADE SECRET DATA ENDS

| January | February | March | April | May | June | July | August | September | October | November | December | Total |
|---------|----------|-------|-------|-----|------|------|--------|-----------|---------|----------|----------|-------|
|---------|----------|-------|-------|-----|------|------|--------|-----------|---------|----------|----------|-------|

**Minnesota Pipeline - General Rates**

Firm Energy  
High Voltage Energy Discount  
Interruptible Energy  
Service/Cust Charge  
Firm Demand  
Service Voltage Adjustment - Firm  
Service Voltage Adjustment - Interruptible  
Interruptible Demand  
Base Cost of Fuel  
Retail FAC  
Retail SEA  
Int. Discount  
Excess ADIT Credit  
Renewable Resources Rider - Continuing  
Transmission Cost Recovery Rider - Continuing  
Boswell 4 Emissions Reduction Rider - Continuing  
CARE Surcharge  
CIP

TRADE SECRET DATA BEGINS

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TRADE SECRET DATA ENDS

TRADE SECRET DATA BEGINS

Customers  
Firm MWh  
Interruptible MWh  
kW billed firm  
kW billed interruptible

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TRADE SECRET DATA ENDS



Minnesota Power  
Enbridge Budget Details  
TEST YEAR 2020

| January | February | March | April | May | June | July | August | September | October | November | December | Total |
|---------|----------|-------|-------|-----|------|------|--------|-----------|---------|----------|----------|-------|
|---------|----------|-------|-------|-----|------|------|--------|-----------|---------|----------|----------|-------|

Enbridge - Present Rates

Firm On-Peak Energy  
Firm Off-Peak Energy  
Service/Cust Charge  
Firm On-Peak Demand  
Firm Off-Peak Demand  
Service Voltage Adjustment  
Retail FAC  
Retail SEA  
Energy Discount Rate  
Renewable Resources Rider - Base Rates  
Transmission Cost Recovery Rider - Base Rates  
Boswell 4 Emissions Reduction Rider - Base Rates  
Excess ADIT Credit  
Renewable Resources Rider - Continuing  
Transmission Cost Recovery Rider - Continuing  
Boswell 4 Emissions Reduction Rider - Continuing  
Care Surcharge  
CCRC

TRADE SECRET DATA BEGINS

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TRADE SECRET DATA ENDS

TRADE SECRET DATA BEGINS

Customers  
Firm MWh  
On-Peak MWh  
Off-Peak MWh  
On-Peak kW billed firm  
Off-Peak kW billed firm  
Total kW Firm

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TRADE SECRET DATA ENDS

| January | February | March | April | May | June | July | August | September | October | November | December | Total |
|---------|----------|-------|-------|-----|------|------|--------|-----------|---------|----------|----------|-------|
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Enbridge - General Rates

Firm On-Peak Energy  
Firm Off-Peak Energy  
Service/Cust Charge  
Firm On-Peak Demand  
Firm Off-Peak Demand  
Service Voltage Adjustment - Firm  
Base Cost of Fuel  
Retail FAC  
Retail SEA  
Energy Discount Rate  
Excess ADIT Credit  
Renewable Resources Rider - Continuing  
Transmission Cost Recovery Rider - Continuing  
Boswell 4 Emissions Reduction Rider - Continuing  
CARE Surcharge  
CCRC

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TRADE SECRET DATA ENDS

TRADE SECRET DATA BEGINS

Customers  
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On-Peak MWh  
Off-Peak MWh  
On-Peak kW billed firm  
Off-Peak kW billed firm  
Total kW Firm

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TRADE SECRET DATA ENDS

# **2019 DISTRIBUTION PLANT STUDY FINAL REPORT**

**August 2019**



## **MINNESOTA POWER**

**Prepared by Rate Department  
in cooperation with  
Distribution Engineering & Operations**

## **EXECUTIVE SUMMARY**

In anticipation of future general retail and wholesale rate filings, the 2019 Distribution Plant Study was coordinated and prepared by the Rate Department with most of the analytical work being carried out by Distribution Engineering and Operations. The purpose of the study is to develop customer and demand classification factors which will be used by the class cost of service program in a general rate filing to allocate distribution plant account costs.

The scope of this study includes the distribution plant accounts designated by the Federal Energy Regulatory Commission's (FERC) Uniform System of Accounts, as follows:

- Account 364: Poles, Towers & Fixtures
- Account 365: Overhead Conductors & Devices
- Account 366: Underground Conduit
- Account 367: Underground Conductor and Devices
- Account 368: Line Transformers
- Account 369: Services

In contrast to other distribution plant accounts, the accounts covered by this study have both customer and demand related components which must be identified and classified to ensure that costs are properly allocated.

The development of the customer and demand classifications followed four basic steps, as follows:

1. Subtract 46 kV facilities from the distribution plant accounts. These assets are separately maintained within the accounts and, therefore, require no further analysis.
2. Identify the Major and Minor Distribution Plant.
3. Functionalize the Minor Distribution Plant into primary and secondary functions to reflect delivery voltage and use of facilities.

4. Classify the Major and Minor Distribution Plant into customer and demand components.

In classifying the customer and demand components in the fourth step, the customer component is defined and valued first. This value is then subtracted from the value of the Major and Minor Distribution Plant to arrive at the demand component. To define and value the customer component, a methodology termed “The Minimum – Size Method” was employed. This method is outlined in the Electric Utility Cost Allocation Manual as published by the National Association of Regulatory Utility Commissioners (NARUC) and is described as follows:

“the minimum-size method assumes that a minimum size distribution system can be built to serve the minimum loading requirements of the customer. The minimum-size method involves determining the minimum size pole, conductor, cable transformer and service that is currently installed by the utility. Normally, the average book cost for each piece of equipment determines the price of all installed units. Once determined for each plant account, the minimum size distribution system is classified as customer-related costs.”

The four basic steps in determining the customer and demand classifications as outlined above can be seen in the summary of the results of the study (Table 1). After subtracting the 46kV assets, the embedded 23 kV and 34.5 kV Major Primary assets were identified as, for example, \$18.7 million or 17.14% of Account 364. The remaining assets in this account were then split into primary (44.64%) and secondary (31.35%) functions. The \$48.7 million of assets functionalized as primary were then classified into the customer (36%) and demand (64%) components. Overall, about 35% of the Distribution Plant assets, excluding all Major Primary assets, were classified as customer related. The customer and demand classifications shown in Table 1 can be input into the class cost of service program to allocate distribution plant account costs. In keeping with standard industry practice, it is suggested the study be revisited and updated in five years.

Table 1  
Minnesota Power  
2019 Distribution Plant Study  
Summary of Results

| Plant                            | FERC Account | Function                           | Total System |        | Customer Classification |        |        | Demand Classification |         |         |
|----------------------------------|--------------|------------------------------------|--------------|--------|-------------------------|--------|--------|-----------------------|---------|---------|
|                                  |              |                                    | \$           | %      | \$                      | %      | %      | \$                    | %       | %       |
| Poles, Towers & Fixtures         | 364          | Major Primary (46 kV)              | \$7,492,970  | 6.87%  | 0                       | 0.00%  | 0.00%  | 7,492,970             | 100.00% | 100.00% |
|                                  |              | Major Primary (23 & 34 kV)         | 18,699,182   | 17.14% | 0                       | 0.00%  | 0.00%  | 18,699,182            | 100.00% | 100.00% |
|                                  |              | Primary                            | 48,704,100   | 44.64% | 17,731,137              | 36.41% | 36.41% | 30,972,963            | 63.59%  | 63.59%  |
|                                  |              | Secondary                          | 34,196,707   | 31.35% | 14,910,867              | 43.60% | 43.60% | 19,285,840            | 56.40%  | 56.40%  |
|                                  |              |                                    | 109,092,959  |        | 32,642,004              |        |        | 76,450,955            |         |         |
| Overhead Conductors & Devices    | 365          | Major Primary (46 kV)              | \$4,636,744  | 5.32%  | 0                       | 0.00%  | 0.00%  | 4,636,744             | 100.00% | 100.00% |
|                                  |              | Major Primary (23 & 34 kV)         | 21,305,320   | 24.46% | 0                       | 0.00%  | 0.00%  | 21,305,320            | 100.00% | 100.00% |
|                                  |              | Primary                            | 49,256,628   | 56.56% | 19,057,546              | 38.69% | 38.69% | 30,199,082            | 61.31%  | 61.31%  |
|                                  |              | Secondary                          | 11,888,550   | 13.65% | 7,872,390               | 66.22% | 66.22% | 4,016,160             | 33.78%  | 33.78%  |
|                                  |              |                                    | 87,087,242   |        | 26,929,936              |        |        | 60,157,306            |         |         |
| Underground Conduit              | 366          | Major Primary (23 & 34 kV)         | 0            | 0.00%  | 0                       | 0.00%  | 0.00%  | 0                     | 0.00%   | 0.00%   |
|                                  |              | Primary                            | 11,307,593   | 92.00% | 2,518,346               | 22.27% | 22.27% | 8,789,247             | 77.73%  | 77.73%  |
|                                  |              | Secondary                          | 983,269      | 8.00%  | 106,395                 | 10.82% | 10.82% | 876,874               | 89.18%  | 89.18%  |
|                                  |              |                                    | 12,290,862   |        | 2,624,741               |        |        | 9,666,121             |         |         |
| Underground Conductors & Devices | 367          | Major Primary (23 & 34 kV)         | 8,577,935    | 8.68%  | 0                       | 0.00%  | 0.00%  | 8,577,935             | 100.00% | 100.00% |
|                                  |              | Primary                            | 81,537,607   | 82.51% | 19,951,864              | 24.47% | 24.47% | 61,585,743            | 75.53%  | 75.53%  |
|                                  |              | Secondary                          | 8,704,747    | 8.81%  | 904,105                 | 10.39% | 10.39% | 7,800,642             | 89.61%  | 89.61%  |
|                                  |              |                                    | 98,820,289   |        | 20,855,970              |        |        | 77,964,319            |         |         |
| Line Transformers                | 368          | Major Primary (23 & 34 kV)         | 1,201,308    | 1.32%  | 0                       | 0.00%  | 0.00%  | 1,201,308             | 100.00% | 100.00% |
|                                  |              | Primary Overhead Transformers      | 3,988,327    | 4.39%  | 0                       | 0.00%  | 0.00%  | 3,988,327             | 100.00% | 100.00% |
|                                  |              | Secondary Overhead Transformers    | 43,217,957   | 47.52% | 12,434,433              | 28.77% | 28.77% | 30,783,524            | 71.23%  | 71.23%  |
|                                  |              | Primary Underground Transformers   | 956,463      | 1.05%  | 0                       | 0.00%  | 0.00%  | 956,463               | 100.00% | 100.00% |
|                                  |              | Secondary Underground Transformers | 41,576,620   | 45.72% | 21,004,270              | 50.52% | 50.52% | 20,572,350            | 49.48%  | 49.48%  |
|                                  |              |                                    | 90,940,675   |        | 33,438,703              |        |        | 57,501,972            |         |         |
| Services                         | 3691<br>3692 | Overhead Services                  | 6,367,858    | 34.50% | 3,422,693               | 53.75% | 53.75% | 2,945,165             | 46.25%  | 46.25%  |
|                                  |              | Underground Services               | 12,091,538   | 65.50% | 3,333,163               | 27.57% | 27.57% | 8,758,375             | 72.43%  | 72.43%  |
|                                  |              |                                    | 18,459,396   |        | 6,755,855               |        |        | 11,703,541            |         |         |

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## **INTRODUCTION**

In anticipation of future general retail and wholesale rate filings, the 2019 Distribution Plant Study was coordinated and prepared by the Rate Department with most of the analytical work being carried out by Distribution Engineering and Operations using 2018 data. The last study was published in 2012.

The purpose of the study is to develop customer and demand classification factors which will be used in a general rate filing by the class cost of service program to allocate distribution plant account costs. While the class cost of service program identifies all costs as energy-related, customer-related or demand-related, there are no energy-related costs associated with distribution plant. Therefore, this study is limited to classifying the customer- and demand-related costs.

The Federal Energy Regulatory Commission's (FERC) Uniform System of Accounts designates fourteen distribution plant accounts. Some of these accounts have either only customer-related costs or demand-related costs, and can therefore be directly classified. In contrast to those plant accounts, the accounts covered by this study have both customer- and demand-related components which must be identified and classified to ensure that costs are properly allocated. The scope of this study includes the distribution plant accounts designated by FERC and maintained in the company's property accounting Continuing Plant Records (CPR) as follows:

- Account 364: Poles, Towers & Fixtures
- Account 365: Overhead Conductors & Devices

- Account 366: Underground Conduit
- Account 367: Underground Conductor and Devices
- Account 368: Line Transformers
- Account 369: Services

The development of the customer and demand classifications followed four basic steps, as follows:

1. Subtract 46 kV facilities from the distribution plant accounts. These assets are separately maintained within the accounts and, therefore, require no further analysis.
2. Identify the Major and Minor Distribution Plant.
3. Functionalize the Minor Distribution Plant into primary and secondary functions to reflect delivery voltage and use of facilities.
4. Classify the Major and Minor Distribution Plant into customer and demand components.

These four steps are explained and documented in detail throughout the remainder of this report.

## **SEPARATION OF 46 kV FACILITIES AND MAJOR AND MINOR DISTRIBUTION PLANT**

### **DEFINITION**

Minnesota Power's Major Primary System consists of all 46kV distribution circuits and all 23 and 34.5 kV distribution circuits. The costs of the 46 kV facilities are maintained separately in the company's property accounting system. After subtracting these assets from the distribution plant accounts, no further analysis or treatment of the 46 kV assets were required in this study. The costs of the 23 and 34.5 kV portion of the Major Primary System are, however, embedded within the distribution plant accounts and are not directly identifiable and extractable. Therefore, extensive analytical work must be carried out to identify and extract the value of these assets in order to determine the value of the Minor Distribution Plant. As described in the next section, this study uses a combination of analysis techniques to extract the value of the 23 and 34.5 kV portion of the Major Primary System from the distribution plant accounts.

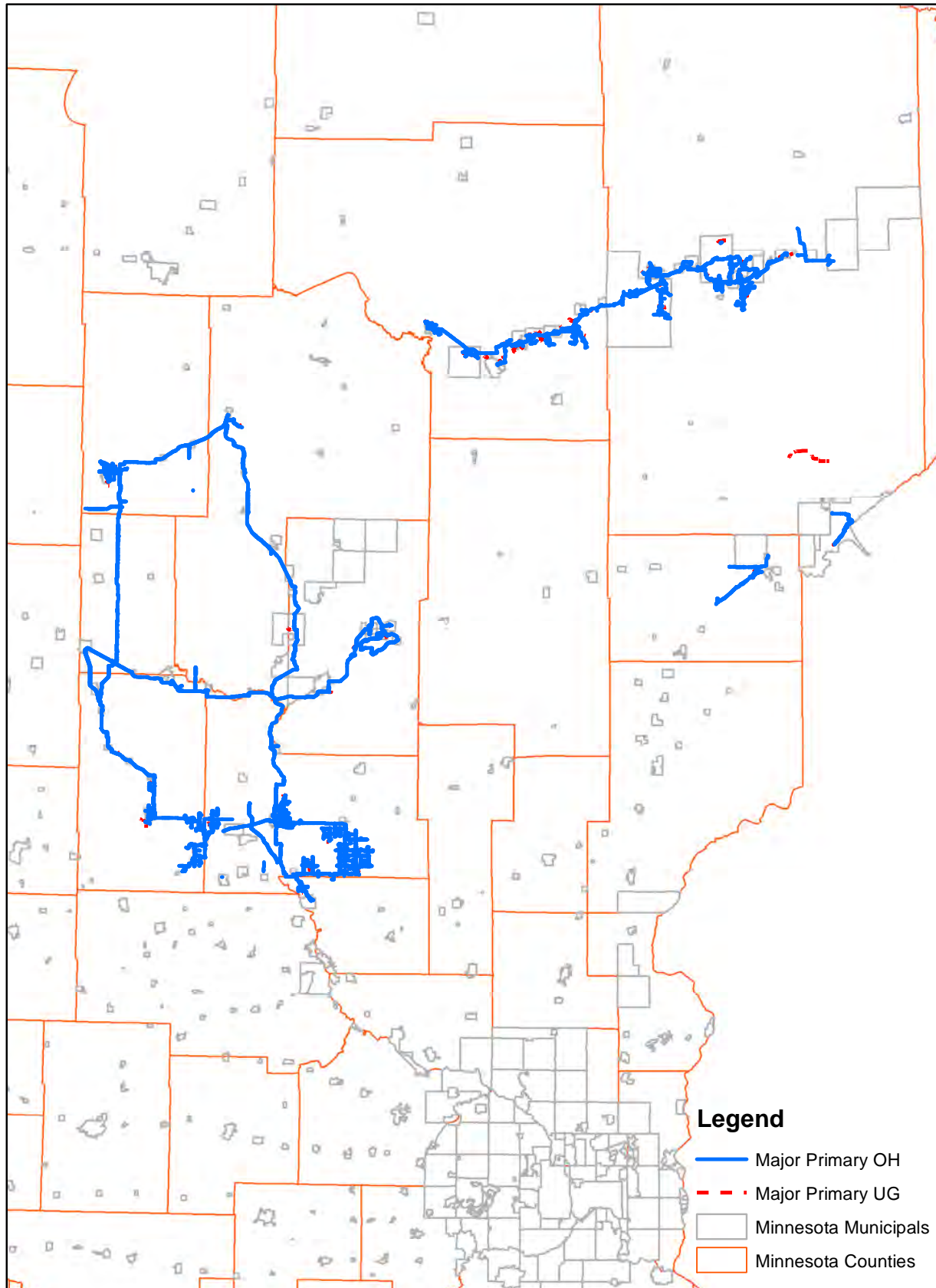
## **METHODOLOGY**

The mass distribution plant and its associated OIC (Original Installed Cost) as maintained by property accounting include all distribution lines assets regardless of function or voltage. It is therefore necessary to identify the 23 kV and 34.5 kV assets of the Major Primary System and map these assets to the property accounting records so that the value of this system can be determined. For this purpose, the following sources of data are used:

- Geographic Information System (GIS)
- Property Accounting Records
- Work Management System

The Geographic Information System (GIS) is the database / system where all information necessary to produce distribution maps is maintained. It records the geographic location and operational characteristics of many distribution items such as poles, cross-arms, wires, cutouts, arrestors, services, pedestals, and many others. It also tracks many operational characteristics for these items such as manufacturer, size, type, year-installed, phase, etc. As a database, this system allows for an efficient method of grouping, classifying, counting and analyzing these items within the distribution system.

## 2019 MAJOR PRIMARY SYSTEM OVERVIEW 23 & 34.5 kV



After identifying the circuits of the Major Primary System, the next step was to use property accounting records to identify the quantity, average unit cost and total value of assets installed by year into distribution plant. The assets are categorized by Plant Accounts and Continuing Property Record (CPR) codes.

Finally, the Work Management System contains inventory and work order estimation information. This information was used to develop estimated installation costs.

## **PLANT ACCOUNTS**

Of the twenty one plant accounts used by property accounting to categorize costs in distribution plant, only eight of those are within the scope of this study. Excluding 46 kV assets, these eight accounts have a total value of \$408,587,088. The assets of each of these accounts were reviewed to determine which accounts included assets related to the Major Primary System (Table 2). Only three accounts were determined not to be related to the Major Primary system. The remaining five accounts were then selected for further analysis to identify the embedded Major Primary assets. As described below, the value of these assets embedded within these five accounts was determined by analyzing the CPR codes and mapping them to the appropriate property accounting records.

| <b>Table 2</b><br><b>Minnesota Power</b><br><b>2019 Distribution Plant Study</b><br><b>Total Distribution Plant</b> |                                  |                            |                         |
|---|----------------------------------|----------------------------|-------------------------|
| FERC Account  | Plant Account Description        | Eligible For Major Primary | Total Plant (Excl 46kV) |
| 3640  | Poles, Towers & Fixtures         | Yes                        | \$101,599,990           |
| 3650  | Overhead Conductors & Devices    | Yes                        | \$82,328,334            |
| 3651  | Clearing                         | Yes                        | \$4,396,538             |
| 3660  | Underground Conduit              | No                         | \$12,290,862            |
| 3670  | Underground Conductors & Devices | Yes                        | \$98,754,592            |
| 3680  | Line Transformers                | Yes                        | \$90,757,376            |
| 3691  | Overhead Services                | No                         | \$6,367,858             |
| 3692  | Underground Services             | No                         | \$12,091,538            |
| Total   |                                  |                            | \$408,587,088           |

### **Plant Account 3640 – Poles, Towers and Fixtures**

The location and quantity of poles in the GIS is known to a very high degree of accuracy. This is accomplished through a number of field audits performed during the mapping process designed for quality assurance. The property accounting records for Plant Account 3640, CPR 5402 indicates a total of 144,481 poles in the distribution system with a total value of \$74,119,428. Of this, the GIS currently has information on 131,643 MP-owned poles in the distribution system.

The GIS reports a total of 15,769 poles used in the Major Primary System. The GIS quantities were used to apportion the cost from the property accounting records to the Major and Minor Primary systems. For Account 3640, the Major Primary System was valued at \$18,699,183. Subtracting this value from the Total Plant value yields a total value of \$82,900,808 for the Minor Distribution Plant (Table 3).

| <b>Table 3</b><br><b>Minnesota Power</b><br><b>2019 Distribution Plant Study</b><br><b>Plant Account 3640 - Poles, Towers &amp; Fixtures</b> |          |                           |                         |               |               |
|--|----------|---------------------------|-------------------------|---------------|---------------|
| FERC Account   | CPR Code | Plant Account Description | Total Plant (Excl 46kV) | Major Primary | Minor Primary |
| 3640   | 3601     | Guys - All Types          | \$15,778,324            | \$2,689,046   | \$13,089,278  |
| 3640   | 3801     | Cross Braces - All Sizes  | \$8,689                 | \$0           | \$8,689       |
| 3640   | 5402     | Pole - Wood All Sizes     | \$74,119,428            | \$13,188,568  | \$60,930,861  |
| 3640   | 5408     | Pole - Steel              | \$84,245                | \$0           | \$84,245      |
| 3640   | 5409     | Tower - Steel             | \$19,647                | \$0           | \$19,647      |
| 3640   | 5411     | Pole - Concrete           | \$7,276                 | \$0           | \$7,276       |
| 3640   | 5416     | Crossarm - Wood All Sizes | \$11,210,520            | \$2,689,250   | \$8,521,270   |
| 3640   | 5423     | Platform - All Sizes      | \$371,861               | \$132,319     | \$239,542     |
| 3640   | 5531     | Crossarm Assembly         | \$0                     | \$0           | \$0           |
| Total  |          |                           | \$101,599,990           | \$18,699,183  | \$82,900,808  |



### **Plant Account 3650 – Overhead Conductors and Devices**

The methodology described above for Account 3640 was also used for Account 3650. For Account 3650, the Major Primary System was valued at \$21,305,320. Subtracting this value from the Total Plant (excluding 46 kV) value yields a total value of \$61,023,015 for the Minor Distribution Plant (Table 4).

| <b>Table 4</b><br><b>Minnesota Power</b><br><b>2019 Distribution Plant Study</b><br><b>Plant Account 3650 - Overhead Conductors &amp; Devices</b> |          |                                      |                         |               |               |
|---|----------|--------------------------------------|-------------------------|---------------|---------------|
| FERC Account  | CPR Code | Plant Account Description            | Total Plant (Excl 46kV) | Major Primary | Minor Primary |
| 3650  | 0178     | Recloser                             | \$1,973,809             | \$253,940     | \$1,719,869   |
| 3650  | 0302     | Arrester                             | \$733,527               | \$392,274     | \$341,253     |
| 3650  | 0312     | Cutout - All Sizes                   | \$5,171,801             | \$507,202     | \$4,664,598   |
| 3650  | 0315     | Control Switch Oil - All             | \$35,803                | \$0           | \$35,803      |
| 3650  | 0903     | Control House                        | \$289                   | \$0           | \$289         |
| 3650  | 1800     | Neutral Isolator - 1800 Amp          | \$178,834               | \$20,001      | \$158,833     |
| 3650  | 1840     | Line Voltage Monitor - TVM           | \$7,420                 | \$653         | \$6,767       |
| 3650  | 1864     | Recloser - Auto Cntl 3Ph 25kV        | \$36,562                | \$0           | \$36,562      |
| 3650  | 3087     | Electronic Controls                  | \$67,129                | \$0           | \$67,129      |
| 3650  | 6901     | Switch 3P Manual Operated            | \$4,221,995             | \$2,032,364   | \$2,189,631   |
| 3650  | 6902     | Switch 3P Motor Operated             | \$556,455               | \$522,387     | \$34,069      |
| 3650  | 6911     | Switch Gang-Operated Loadbreak - All | \$43,458                | \$0           | \$43,458      |
| 3650  | 6920     | Switch Disconnect - All Sizes        | \$958,216               | \$234,231     | \$723,986     |
| 3650  | 6960     | Battery Storage                      | \$8,979                 | \$0           | \$8,979       |
| 3650  | 6961     | Battery Charger                      | \$16,145                | \$0           | \$16,145      |
| 3650  | 8118     | Wire - All Types                     | \$305                   | \$0           | \$305         |
| 3650  | 8160     | Wire - Primary                       | \$56,588,195            | \$17,342,268  | \$39,245,927  |
| 3650  | 8161     | Wire - Secondary                     | \$11,729,412            | \$0           | \$11,729,412  |
| Total   |          |                                      | \$82,328,334            | \$21,305,320  | \$61,023,015  |

### **Plant Account 3651 – Clearing Land and Rights-of-Way**

GIS data was also used to allocate the cost associated with clearing to the Major Primary System for Account 3651. Typical clearing practices are to clear Major Primary to a width of 60 feet, all other three phase primary lines to a width of 45 feet, and non-three phase primary lines to a width of 25 feet. Using the lengths of the different classes of conductor from GIS, Average Unit Installed Prices (AUP) cost multipliers were calculated for the Major Primary System. These factors were then applied as in the previous accounts to yield the value of the Major Primary System for this account (Table 5).

| <b>Table 5</b><br><b>Minnesota Power</b><br><b>2019 Distribution Plant Study</b><br><b>Plant Account 3651 - Clearing Land &amp; Rights-of-Way</b> |          |                           |                         |               |               |
|---|----------|---------------------------|-------------------------|---------------|---------------|
| FERC Account  | CPR Code | Plant Account Description | Total Plant (Excl 46kV) | Major Primary | Minor Primary |
| 3651  | 1900     | Clearing Land and R/W     | \$4,396,538             | \$1,544,698   | \$2,851,840   |
| Total   |          |                           | \$4,396,538             | \$1,544,698   | \$2,851,840   |

### **Plant Account 3660 – Underground Conduit**

As shown below, there are no Major Primary System costs associated with this account.

| <b>Table 6</b><br><b>Minnesota Power</b><br><b>2019 Distribution Plant Study</b><br><b>Plant Account 3660 - Underground Conduit</b> |          |                                  |                         |               |               |
|---|----------|----------------------------------|-------------------------|---------------|---------------|
| FERC Account  | CPR Code | Plant Account Description        | Total Plant (Excl 46kV) | Major Primary | Minor Primary |
| 3660  | 2702     | Conduit - All Sizes & Kinds      | \$11,034,161            | \$0           | \$11,034,161  |
| 3660  | 2751     | Manhole - Special No. 1054       | \$10,356                | \$0           | \$10,356      |
| 3660  | 2752     | Vault - Special                  | \$82,612                | \$0           | \$82,612      |
| 3660  | 2753     | Manhole - Park Point Pumping Sta | \$3,864                 | \$0           | \$3,864       |
| 3660  | 2754     | Manhole - All                    | \$1,159,869             | \$0           | \$1,159,869   |
| Total   |          |                                  | \$12,290,862            | \$0           | \$12,290,862  |

### **Plant Account 3670 – Underground Conductors and Devices**

The methodology described above for the previous accounts was also applied for Account 3670. For Account 3670, the Major Primary System was valued at \$8,557,936. Subtracting this value from the Total Plant (excluding 46 kV) value yields a total value of \$90,176,655 for the Minor Distribution Plant (Table 7).

| <b>Table 7</b><br><b>Minnesota Power</b><br><b>2019 Distribution Plant Study</b><br><b>Plant Account 3670 - Underground Conductors &amp; Devices</b> |          |                                      |                         |               |               |
|--|----------|--------------------------------------|-------------------------|---------------|---------------|
| FERC Account   | CPR Code | Plant Account Description            | Total Plant (Excl 46kV) | Major Primary | Minor Primary |
| 3670   | 0302     | Arrester                             | \$1,429,305             | \$226,751     | \$1,202,554   |
| 3670   | 0312     | Cutout - All Sizes                   | \$4,512,088             | \$438,149     | \$4,073,939   |
| 3670   | 0900     | Fence                                | \$4,366                 | \$0           | \$4,366       |
| 3670   | 1500     | Cable - All Sizes                    | \$43,673                | \$0           | \$43,673      |
| 3670   | 1541     | Cable - Sub 500 Kcmil 3C             | \$497,798               | \$0           | \$497,798     |
| 3670   | 1550     | Cable - Primary                      | \$75,546,706            | \$7,734,333   | \$67,812,372  |
| 3670   | 1560     | Cable - Secondary                    | \$6,567,466             | \$0           | \$6,567,466   |
| 3670   | 3087     | Electronic Controls                  | \$109,124               | \$0           | \$109,124     |
| 3670   | 6902     | Switch 3P Motor Operated             | \$53,642                | \$0           | \$53,642      |
| 3670   | 6911     | Switch Gang-Operated Loadbreak - All | \$39,605                | \$0           | \$39,605      |
| 3670   | 6920     | Switch Disconnect - All Sizes        | \$13,492                | \$0           | \$13,492      |
| 3670   | 6930     | Switch Oil 1P 5kV                    | \$178,155               | \$0           | \$178,155     |
| 3670   | 6940     | Switch Metal Encl Fused Inter        | \$857,314               | \$0           | \$857,314     |
| 3670   | 6945     | Switch Vacuum Sectionalizing Inter   | \$361,385               | \$0           | \$361,385     |
| 3670   | 6950     | Switchgear - Metal Enclosed          | \$1,998,224             | \$178,703     | \$1,819,521   |
| 3670   | 7824     | Junction Box - All Sizes             | \$51,863                | \$0           | \$51,863      |
| 3670   | 7830     | Pedestal - All                       | \$6,490,386             | \$0           | \$6,490,386   |
| Total  |          |                                      | \$98,754,592            | \$8,577,936   | \$90,176,655  |

### **Plant Account 3680 – Line Transformers**

For Account 3680, the Major Primary System was valued at \$1,200,266 using the same methodology previously described. Subtracting this value from the Total Plant (Excluding 46 kV) value yields a total value of \$89,357,111 for the Minor Distribution Plant (Table 8).

| <b>Table 8</b><br><b>Minnesota Power</b><br><b>2019 Distribution Plant Study</b><br><b>Plant Account 3680 - Line Transformers</b> |          |   |                         |               |               |
|---|----------|---|-------------------------|---------------|---------------|
| FERC Account  | CPR Code | Plant Account Description                 | Total Plant (Excl 46kV) | Major Primary | Minor Primary |
| 3680  | 0182     | Regulator                                 | \$2,191,944             | \$779,956     | \$1,411,989   |
| 3680  | 0192     | Switch - Regulator Bypass                 | \$387,408               | \$0           | \$387,408     |
| 3680  | 0237     | Driveway                                  | \$9,997                 | \$0           | \$9,997       |
| 3680  | 0280     | Yard Grading and Fill                     | \$17,268                | \$0           | \$17,268      |
| 3680  | 0302     | Arrester                                  | \$1,693,743             | \$0           | \$1,693,743   |
| 3680  | 0312     | Cutout - All Sizes                        | \$9,033,972             | \$0           | \$9,033,972   |
| 3680  | 0315     | Control Switch Oil - All                  | \$260,922               | \$48,732      | \$212,189     |
| 3680  | 0900     | Fence                                     | \$45,272                | \$0           | \$45,272      |
| 3680  | 1870     | Network Protector - All Sizes             | \$116,159               | \$0           | \$116,159     |
| 3680  | 6602     | Capacitor - Switched Bank                 | \$1,719,355             | \$321,125     | \$1,398,230   |
| 3680  | 6615     | Switch - Capacitor Control                | \$270,131               | \$50,453      | \$219,679     |
| 3680  | 7502     | Transformer Pole - 5kVA to 50kVA          | \$28,244,104            | \$0           | \$28,044,104  |
| 3680  | 7508     | Transformer Pole - 51kVA to 250kVA        | \$3,948,433             | \$0           | \$3,948,433   |
| 3680  | 7512     | Transformer Pole - 251kVA to 1000kVA      | \$381,737               | \$0           | \$381,737     |
| 3680  | 7516     | Transformer Pole - 1001kVA & Larger       | \$50,745                | \$0           | \$50,745      |
| 3680  | 7522     | Transformer Network - 1000kVA & Larger    | \$280,829               | \$0           | \$280,829     |
| 3680  | 7528     | Transformer Network - 1500kVA             | \$35,067                | \$0           | \$35,067      |
| 3680  | 7530     | Transformer - Mobile Line 100kVA          | \$41,799                | \$0           | \$41,799      |
| 3680  | 7602     | Transformer Padmount - 10kVA to 50kVA     | \$19,318,008            | \$0           | \$19,318,008  |
| 3680  | 7606     | Transformer Padmount - 51kVA to 167kVA    | \$3,133,334             | \$0           | \$3,133,334   |
| 3680  | 7608     | Transformer Padmount - 10kVA to 750kVA 3P | \$14,455,515            | \$0           | \$14,455,515  |
| 3680  | 7612     | Transformer Padmount - 751kVA & Larger 3P | \$5,079,305             | \$0           | \$5,079,305   |
| 3680  | 7650     | Transclosure Housing                      | \$42,329                | \$0           | \$42,329      |
| Total   |          |   | \$90,757,376            | \$1,200,266   | \$89,357,111  |

### **Plant Account 3691 and 3692 – Overhead and Underground Services**

As shown below, there are no Major Primary System costs associated with these accounts.

| <b>Table 9</b><br><b>Minnesota Power</b><br><b>2019 Distribution Plant Study</b><br><b>Plant Accounts 3691 &amp; 3692 - Overhead &amp; Underground Services</b> |          |                           |                         |               |               |
|---|----------|---------------------------|-------------------------|---------------|---------------|
| FERC Account  | CPR Code | Plant Account Description | Total Plant (Excl 46kV) | Major Primary | Minor Primary |
| 3691  | 8200     | Services - Overhead       | \$6,367,858             | \$0           | \$6,367,858   |
| 3692  | 8215     | Services - Underground    | \$12,091,538            | \$0           | \$12,091,538  |
| Total   |          |                           | \$18,459,396            | \$0           | \$18,459,396  |

## **SUMMARY OF DISTRIBUTION PLANT**

As summarized below, the Major Primary System was valued at \$51,327,403. Having identified, valued and subtracted these assets from the Total Plant (excluding 46 kV), the resulting Minor Primary Distribution quantities and values were then functionalized as described in the following section.

| <b>Table 10</b><br><b>Minnesota Power</b><br><b>2019 Distribution Plant Study</b><br><b>Summary of Distribution Plant by FERC Account</b> |                                  |                         |               |               |
|---|----------------------------------|-------------------------|---------------|---------------|
| FERC Account  | Plant Account Description        | Total Plant (Excl 46kV) | Major Primary | Minor Primary |
| 3640  | Poles, Towers & Fixtures         | \$101,599,990           | \$18,699,183  | \$82,900,808  |
| 3650  | Overhead Conductors & Devices    | \$82,328,334            | \$21,305,320  | \$61,023,015  |
| 3651  | Clearing                         | \$4,396,538             | \$1,544,698   | \$2,851,840   |
| 3660  | Underground Conduit              | \$12,290,862            | \$0           | \$12,290,862  |
| 3670  | Underground Conductors & Devices | \$98,754,592            | \$8,577,936   | \$90,446,655  |
| 3680  | Line Transformers                | \$90,757,376            | \$1,200,266   | \$89,357,111  |
| 3691  | Overhead Services                | \$6,367,858             | \$0           | \$6,367,858   |
| 3692  | Underground Services             | \$12,091,538            | \$0           | \$12,091,538  |
| Total   |                                  | \$408,587,088           | \$51,327,403  | \$357,329,687 |

## **FUNCTIONALIZATION OF MINOR PRIMARY DISTRIBUTION PLANT**

Once the costs associated with the Major Primary System were removed from the Total Plant (excluding 46kV), the remaining Minor Primary Distribution Plant was functionalized to either the Primary or Secondary function by Plant Account and CPR Code. In most cases, all of a Plant Account – CPR code combination could be directly assigned to its appropriate function. As two examples, primary wire was assigned to a primary function and secondary wire was assigned to a secondary function.

In a dozen cases, however, the Plant – CPR combination serve both primary and secondary functions. In these cases, a method for calculating the allocation between primary and secondary functions was defined and carried out by Distribution Engineering. An example is transformers. While most transformers are assigned to the secondary function, step transformers operate between primary circuits and should be assigned a primary function. In this case, GIS data was used to count the number of each type of transformer per Plant – CPR combination. The resulting ratio of step to total transformers became the factor to assign transformers to the primary function, and the ratio of all other transformers to total transformers became the factor to assign transformers to the secondary function. Table 11 summarizes the primary and secondary functional allocation factors of the distribution accounts by CPR code. The functional allocation factors were then multiplied against the costs in each Plant – CPR combination to arrive at the functionalized value of each Minor Primary Distribution Plant Account (Table 12).

| <b>Table 11</b><br><b>Minnesota Power</b><br><b>2019 Distribution Plant Study</b><br><b>Primary and Secondary Functional Allocation of Minor Primary Distribution Plant by CPR Code</b> |          |                                      |                       |           |              |          |   |                       |           |
|---|----------|--------------------------------------|-----------------------|-----------|--------------|----------|---|-----------------------|-----------|
| FERC Account  | CPR Code | Plant Account Description            | Functional Allocation |           | FERC Account | CPR Code | Plant Account Description                 | Functional Allocation |           |
|   |          |                                      | Primary               | Secondary |              |          |   | Primary               | Secondary |
| 3640  | 3601     | Guys - All Types                     | 0.51                  | 0.49      | 3670         | 1550     | Cable - Primary                           | 1.00                  | 0.00      |
| 3640  | 3801     | Cross Braces - All Sizes             | 1.00                  | 0.00      | 3670         | 1560     | Cable - Secondary                         | 0.00                  | 1.00      |
| 3640  | 5402     | Pole - Wood All Sizes                | 0.54                  | 0.46      | 3670         | 3087     | Electronic Controls                       | 1.00                  | 0.00      |
| 3640  | 5408     | Pole - Steel                         | 1.00                  | 0.00      | 3670         | 6902     | Switch 3P Motor Operated                  | 1.00                  | 0.00      |
| 3640  | 5409     | Tower - Steel                        | 1.00                  | 0.00      | 3670         | 6911     | Switch Gang-Operated Loadbreak - All      | 1.00                  | 0.00      |
| 3640  | 5411     | Pole - Concrete                      | 1.00                  | 0.00      | 3670         | 6920     | Switch Disconnect - All Sizes             | 1.00                  | 0.00      |
| 3640  | 5416     | Crossarm - Wood All Sizes            | 1.00                  | 0.00      | 3670         | 6930     | Switch Oil 1P 5kV                         | 1.00                  | 0.00      |
| 3640  | 5423     | Platform - All Sizes                 | 1.00                  | 0.00      | 3670         | 6940     | Switch Metal Encl Fused Inter             | 1.00                  | 0.00      |
| 3640  | 5531     | Crossarm Assembly                    | 1.00                  | 0.00      | 3670         | 6945     | Switch Vacuum Sectionalizing Inter        | 1.00                  | 0.00      |
| 3650  | 0178     | Recloser                             | 1.00                  | 0.00      | 3670         | 6950     | Switchgear - Metal Enclosed               | 1.00                  | 0.00      |
| 3650  | 0302     | Arrester                             | 1.00                  | 0.00      | 3670         | 7824     | Junction Box - All Sizes                  | 1.00                  | 0.00      |
| 3650  | 0312     | Cutout - All Sizes                   | 1.00                  | 0.00      | 3670         | 7830     | Pedestal - All                            | 0.69                  | 0.31      |
| 3650  | 0315     | Control Switch Oil - All             | 1.00                  | 0.00      | 3680         | 0182     | Regulator                                 | 1.00                  | 0.00      |
| 3650  | 0903     | Control House                        | 1.00                  | 0.00      | 3680         | 0192     | Switch - Regulator Bypass                 | 1.00                  | 0.00      |
| 3650  | 1800     | Neutral Isolator - 1800 Amp          | 0.00                  | 1.00      | 3680         | 0237     | Driveway                                  | 1.00                  | 0.00      |
| 3650  | 1840     | Line Voltage Monitor - TVM           | 1.00                  | 0.00      | 3680         | 0280     | Yard Grading and Fill                     | 1.00                  | 0.00      |
| 3650  | 1864     | Recloser - Auto Cntl 3Ph 25kV        | 1.00                  | 0.00      | 3680         | 0302     | Arrester                                  | 0.00                  | 1.00      |
| 3650  | 3087     | Electronic Controls                  | 1.00                  | 0.00      | 3680         | 0312     | Cutout - All Sizes                        | 0.00                  | 1.00      |
| 3650  | 6901     | Switch 3P Manual Operated            | 1.00                  | 0.00      | 3680         | 0315     | Control Switch Oil - All                  | 1.00                  | 0.00      |
| 3650  | 6902     | Switch 3P Motor Operated             | 1.00                  | 0.00      | 3680         | 0900     | Fence                                     | 1.00                  | 0.00      |
| 3650  | 6911     | Switch Gang-Operated Loadbreak - All | 1.00                  | 0.00      | 3680         | 1870     | Network Protector - All Sizes             | 0.00                  | 1.00      |
| 3650  | 6920     | Switch Disconnect - All Sizes        | 1.00                  | 0.00      | 3680         | 6602     | Capacitor - Switched Bank                 | 1.00                  | 0.00      |
| 3650  | 6960     | Battery Storage                      | 1.00                  | 0.00      | 3680         | 6615     | Switch - Capacitor Control                | 1.00                  | 0.00      |
| 3650  | 6961     | Battery Charger                      | 1.00                  | 0.00      | 3680         | 7502     | Transformer Pole - 5kVA to 50kVA          | 0.00                  | 1.00      |
| 3650  | 8118     | Wire - All Types                     | 0.00                  | 1.00      | 3680         | 7508     | Transformer Pole - 51kVA to 250kVA        | 0.04                  | 0.96      |
| 3650  | 8160     | Wire - Primary                       | 1.00                  | 0.00      | 3680         | 7512     | Transformer Pole - 251kVA to 1000kVA      | 0.38                  | 0.62      |
| 3650  | 8161     | Wire - Secondary                     | 0.00                  | 1.00      | 3680         | 7516     | Transformer Pole - 1001kVA & Larger       | 0.00                  | 1.00      |
| 3651  | 1900     | Clearing Land and R/W                | 1.00                  | 0.00      | 3680         | 7522     | Transformer Network - 1000kVA & Larger    | 0.00                  | 1.00      |
| 3660  | 2702     | Conduit - All Sizes & Kinds          | 0.92                  | 0.08      | 3680         | 7528     | Transformer Network - 1500kVA             | 0.00                  | 1.00      |
| 3660  | 2751     | Manhole - Special No. 1054           | 0.92                  | 0.08      | 3680         | 7530     | Transformer - Mobile Line 100kVA          | 1.00                  | 0.00      |
| 3660  | 2752     | Vault - Special                      | 0.92                  | 0.08      | 3680         | 7602     | Transformer Padmount - 10kVA to 50kVA     | 0.00                  | 1.00      |
| 3660  | 2753     | Manhole - Park Point Pumping Sta     | 0.92                  | 0.08      | 3680         | 7606     | Transformer Padmount - 51kVA to 167kVA    | 0.00                  | 1.00      |
| 3660  | 2754     | Manhole - All                        | 0.92                  | 0.08      | 3680         | 7608     | Transformer Padmount - 10kVA to 750kVA 3P | 0.00                  | 1.00      |
| 3670  | 0302     | Arrester                             | 1.00                  | 0.00      | 3680         | 7612     | Transformer Padmount - 751kVA & Larger 3P | 0.17                  | 0.83      |
| 3670  | 0312     | Cutout - All Sizes                   | 1.00                  | 0.00      | 3680         | 7650     | Transclosure Housing                      | 0.07                  | 0.93      |
| 3670  | 0900     | Fence                                | 1.00                  | 0.00      | 3691         | 8200     | Services - Overhead                       | 0.00                  | 1.00      |
| 3670  | 1500     | Cable - All Sizes                    | 0.00                  | 1.00      | 3692         | 8215     | Services - Underground                    | 0.00                  | 1.00      |
| 3670  | 1541     | Cable - Sub 500 Kcmil 3C             | 1.00                  | 0.00      |              |          |   |                       |           |



| <b>Table 12</b><br><b>Minnesota Power</b><br><b>2019 Distribution Plant Study</b><br><b>Summary of Minor Distribution Plant By Function</b> |               |               |               |
|---|---------------|---------------|---------------|
| FERC Account  | Minor Primary | Primary       | Secondary     |
| 3640  | \$82,900,808  | \$48,704,101  | \$34,196,707  |
| 3650  | \$61,023,015  | \$49,134,465  | \$11,888,550  |
| 3651  | \$2,851,840   | \$2,851,840   | \$0           |
| 3660  | \$12,290,862  | \$11,307,593  | \$983,269     |
| 3670  | \$90,176,655  | \$81,537,606  | \$8,639,049   |
| 3680 OH   | \$47,206,284  | \$3,988,327   | \$43,217,957  |
| 3680 UG   | \$42,533,083  | \$956,463     | \$41,576,620  |
| 3691  | \$6,367,858   | \$0           | \$6,367,858   |
| 3692  | \$18,459,396  | \$0           | \$18,459,396  |
| Total   |               | \$198,480,395 | \$165,329,406 |

## **CLASSIFICATION OF MAJOR & MINOR DISTRIBUTION PLANT**

In this fourth and final step in classifying the customer and demand components, the customer component is defined and valued first. This value is then subtracted from the value of the Major and Minor Distribution Plant to arrive at the demand component. To define and value the customer component, a methodology termed “The Minimum – Size Method” was employed. This method is outlined in the Electric Utility Cost Allocation Manual as published by the National Association of Regulatory Utility Commissioners (NARUC) and is defined as follows:

“The minimum-size method assumes that a minimum size distribution system can be built to serve the minimum loading requirements of the customer. The minimum-size method involves determining the minimum size pole, conductor, cable transformer and service that is currently installed by the utility. Normally, the average book cost for each piece of equipment determines the price of all installed units. Once determined for

each plant account, the minimum size distribution system is classified as customer-related costs.”

To define the minimum-size system, each account was examined to establish the minimum system facilities that are currently installed by Minnesota Power. Table 13 lists the minimum sizes of equipment currently installed which were selected to be used in valuing the minimum-sized system or the customer component of the Major and Minor Distribution Plant. Account 3660 – Underground Conduit and Account 3670 – Underground Conductors and Devices were treated jointly during this final step. It is extremely difficult to determine a functional split for conduit, so the results of Account 3670 were applied to Account 3660 as well. This is consistent not only with past Minnesota Power distribution plant studies, but also with the methodology outlined by NARUC.

| <b>Table 13</b><br><b>Minnesota Power</b><br><b>2019 Distribution Plant Study</b><br><b>Minimum Size Equipment Currently Installed</b> |          |                               |  |
|--|----------|-------------------------------|--|
| FERC Account   | CPR Code | Description                   | Minimum Size Equipment Currently Installed |
| 3640   | 5402     | Poles                         | 30' Class 7, Red Pine                      |
| 3650   | 8160     | Overhead Primary Wire         | #2 ACSR, Bare, 6/1 Strand                  |
| 3650   | 8161     | Overhead Secondary Wire       | #2 Al, Triplex, Bare Neutral               |
| 3660   | 2702     | Underground Conduit Primary   | *  |
| 3660   | 2702     | Underground Conduit Secondary | *  |
| 3670   | 1550     | Underground Primary Cable     | 1/0 Al, 15kV, 220 mil, EPR, Jacketed       |
| 3670   | 1560     | Underground Secondary Cable   | 2/0 Al, Triplex, Insulated Neutral         |
| 3680   | 7502     | Pole Mount Transformer        | 10kVA, 7.2kV - 120/240V                    |
| 3680   | 7602     | Padmount Transformer          | 15kVA, 7.2kV - 120/240V                    |
| 3691   | 8200     | Overhead Service              | #2 Al, Triplex, Bare Neutral               |
| 3692   | 8215     | Underground Service           | 2/0 Al, Triplex, Insulated Neutral         |

\*Plant 3660 minimum system values are the product of the Plant 3670 ratios (% of total) and the Plant 3660 Property Accounting values.

After defining the minimum size facilities, the GIS was used to establish the minimum system quantities for the Major and Minor Distribution Plant accounts. Using 2018 labor, material, vehicle, and overhead costs, Average Unit Installed Prices (AUP) were established for all the minimum size equipment defined above. With the minimum system quantities and AUP established, the minimum system value of each account was then calculated as shown in the example in Table 14.

| <b>Table 14</b><br><b>Minnesota Power</b><br><b>2019 Distribution Plant Study</b><br><b>Example of Minimum System Estimate for 1981 Pole Cost</b> |   |              |
|---|---|--------------|
| No.   | Description   | Units        |
| 1   | Number of Poles Booked in 1981 (CPR)  | 4,394        |
| 2   | Distribution Plant Quantity (CPR)   | 144,481      |
| 3   | Minimum System Quantity (GIS)   | 131,643      |
| 4   | Average Unit Installed Price for 30' Pole (2019 dollars)                            | \$576.28     |
| 5   | 1981 Handy-Whitman Index  | 216          |
| 6   | 2019 Handy-Whitman Index  | 616          |
| 7   | Total Minimum System Pole Cost for 1981 (aged dollars)<br>(1 / 2) (3) (4) (5 / 6) = | \$809,013.50 |

As shown above, the previously calculated total minimum system quantity was distributed by year based on property accounting records which were used to establish the total percentage of each item assigned to each year. The minimum system quantities by year were then valued in 2018 dollars according to the AUP. The value of the minimum system by year was then “aged” using the Handy-Whitman Index. The yearly values were then summed to arrive at the Minimum System values (Table 15).

**Table 15**

**Minnesota Power  
2019 Distribution Plant Study  
Minimum System Estimate by FERC Account**

| FERC Account | Function            | Minimum System Quantity (GIS) | Minimum System Estimate 2019 Dollars | Average Unit Installed Price 2019 Dollars | Minimum System Estimate Aged Dollars |
|--------------|---------------------|-------------------------------|--------------------------------------|---|--------------------------------------|
| 3640         | Primary & Secondary | 131,643                       | \$81,239,528                         | \$617.12                                  | \$32,642,004                         |
| 3650         | Primary             | 45,595,062                    | \$86,813,454                         | \$1.90                                    | \$19,057,546                         |
| 3650         | Secondary           | 6,798,714                     | \$25,813,270                         | \$3.80                                    | \$7,872,390                          |
| 3670         | Primary             | 8,606,000                     | \$41,953,966                         | \$4.87                                    | \$19,951,864                         |
| 3670         | Secondary           | 516,832                       | \$2,375,767                          | \$4.60                                    | \$904,105                            |
| 3680         | Overhead            | 33,546                        | \$43,056,626                         | \$1,283.51                                | \$12,434,433                         |
| 3680         | Underground         | 14,779                        | \$39,596,192                         | \$2,679.22                                | \$21,004,270                         |
| 3691         | Overhead            | 2,289,900                     | \$8,694,263                          | \$3.80                                    | \$3,422,699                          |
| 3692         | Underground         | 1,104,250                     | \$5,076,002                          | \$4.60                                    | \$3,333,163                          |

## **CONCLUSION**

The four basic steps in determining the customer and demand classifications as described in this report can be seen in the summary of the results of the study (Table 16). After subtracting the 46kV assets, the 23kV and 34.5 kV Major Primary system assets were identified as, for example, \$18.7 million or 17.14% of Account 364. The remaining assets in this account were then split into primary (44.64%) and secondary (31.35%) functions. The \$48.7 million of assets functionalized as primary were then classified into the customer component (36%) based on the minimum system methodology. The customer component was then subtracted from the Minor Primary Distribution Plant to yield the demand component (64%). Overall, about 35% of the Distribution Plant assets, excluding all Major Primary assets, were classified as customer-related.

The customer and demand classifications shown in Table 16 can be input into the class cost of service program to allocate distribution plant account costs. In keeping with standard industry practice, it is suggested the study be revisited and updated in five years.

Table 16  
Minnesota Power  
2019 Distribution Plant Study  
Summary of Results

| Plant                            | FERC Account | Function                           | Total System |        | Customer Classification |        | Demand Classification |         |
|----------------------------------|--------------|------------------------------------|--------------|--------|-------------------------|--------|-----------------------|---------|
|                                  |              |                                    | \$           | %      | \$                      | %      | \$                    | %       |
| Poles, Towers & Fixtures         | 364          | Major Primary (46 kV)              | \$7,492,970  | 6.87%  | 0                       | 0.00%  | 7,492,970             | 100.00% |
|                                  |              | Major Primary (23 & 34 kV)         | 18,699,182   | 17.14% | 0                       | 0.00%  | 18,699,182            | 100.00% |
|                                  |              | Primary                            | 48,704,100   | 44.64% | 17,731,137              | 36.41% | 30,972,963            | 63.59%  |
|                                  |              | Secondary                          | 34,196,707   | 31.35% | 14,910,867              | 43.60% | 19,285,840            | 56.40%  |
|                                  |              |                                    | 109,092,959  |        | 32,642,004              |        | 76,450,955            |         |
| Overhead Conductors & Devices    | 365          | Major Primary (46 kV)              | \$4,636,744  | 5.32%  | 0                       | 0.00%  | 4,636,744             | 100.00% |
|                                  |              | Major Primary (23 & 34 kV)         | 21,305,320   | 24.46% | 0                       | 0.00%  | 21,305,320            | 100.00% |
|                                  |              | Primary                            | 49,256,628   | 56.56% | 19,057,546              | 38.69% | 30,199,082            | 61.31%  |
|                                  |              | Secondary                          | 11,888,550   | 13.65% | 7,872,390               | 66.22% | 4,016,160             | 33.78%  |
|                                  |              |                                    | 87,087,242   |        | 26,929,936              |        | 60,157,306            |         |
| Underground Conduit              | 366          | Major Primary (23 & 34 kV)         | 0            | 0.00%  | 0                       | 0.00%  | 0                     | 0.00%   |
|                                  |              | Primary                            | 11,307,593   | 92.00% | 2,518,346               | 22.27% | 8,789,247             | 77.73%  |
|                                  |              | Secondary                          | 983,269      | 8.00%  | 106,395                 | 10.82% | 876,874               | 89.18%  |
|                                  |              |                                    | 12,290,862   |        | 2,624,741               |        | 9,666,121             |         |
| Underground Conductors & Devices | 367          | Major Primary (23 & 34 kV)         | 8,577,935    | 8.68%  | 0                       | 0.00%  | 8,577,935             | 100.00% |
|                                  |              | Primary                            | 81,537,607   | 82.51% | 19,951,864              | 24.47% | 61,585,743            | 75.53%  |
|                                  |              | Secondary                          | 8,704,747    | 8.81%  | 904,105                 | 10.39% | 7,800,642             | 89.61%  |
|                                  |              |                                    | 98,820,289   |        | 20,855,970              |        | 77,964,319            |         |
| Line Transformers                | 368          | Major Primary (23 & 34 kV)         | 1,201,308    | 1.32%  | 0                       | 0.00%  | 1,201,308             | 100.00% |
|                                  |              | Primary Overhead Transformers      | 3,988,327    | 4.39%  | 0                       | 0.00%  | 3,988,327             | 100.00% |
|                                  |              | Secondary Overhead Transformers    | 43,217,957   | 47.52% | 12,434,433              | 28.77% | 30,783,524            | 71.23%  |
|                                  |              | Primary Underground Transformers   | 956,463      | 1.05%  | 0                       | 0.00%  | 956,463               | 100.00% |
|                                  |              | Secondary Underground Transformers | 41,576,620   | 45.72% | 21,004,270              | 50.52% | 20,572,350            | 49.48%  |
|                                  |              |                                    | 90,940,675   |        | 33,438,703              |        | 57,501,972            |         |
| Services                         | 3691<br>3692 | Overhead Services                  | 6,367,858    | 34.50% | 3,422,693               | 53.75% | 2,945,165             | 46.25%  |
|                                  |              | Underground Services               | 12,091,538   | 65.50% | 3,333,163               | 27.57% | 8,758,375             | 72.43%  |
|                                  |              |                                    | 18,459,396   |        | 6,755,855               |        | 11,703,541            |         |

## **Minnesota Power Cash Working Capital Requirements & Lead Lag Study Summary for 2017**

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### **Introduction and Background**

The Minnesota Public Utilities Commission’s (Commission) June 14, 1982, Statement of Policy on Cash Working Capital recognizes the need for cash working capital and states:

“The Commission recognizes that cash working capital is a proper item to be included in rate base. Cash working capital represents an amount of money needed for the purpose of meeting current operating expenses incurred for the purpose of providing service prior to collecting revenues for the service provided. When investors supply these funds, they are entitled to earn a return on these advances. To the extent these funds are supplied by rate payers, they are entitled

## Minnesota Power Cash Working Capital Requirements & Lead Lag Study Summary for 2017

to have their contribution recognized as a rate base deduction. This is accomplished by including an appropriate cash working requirement in rate base.”

The Commission Policy Statement also states that the most precise method of determining the cash working capital requirement is to perform a lead-lag study, which the Commission desires utilities to use so the cash working capital allowance will accurately reflect past historical experience.

A lead-lag study attempts to measure the difference in time frames between the date service is rendered until the revenues for that service are received, and the date that costs of rendering service are incurred until cash is actually dispersed. Lead days refer to the days between rendering a service and receiving payment for that service. Lag days refer to the days between incurring expense and paying for it. Generally, the difference between these periods, expressed in terms of days, times the average daily operating expenses, produces the cash working capital required for those operating expenses.

### Summary of Results

| Report Section |  |                  | (A - D)           |
|----------------|--|------------------|-------------------|
|                | Cash Working Capital Lead Lag Inputs     | Expense Lag Days | Revenue Lead Days |
| <b>E</b>       | Personal Property Tax                    | 316.50           | 27.77             |
| <b>E</b>       | Property Taxes (Real Estate)             | 393.00           | 27.77             |
| <b>F</b>       | Social Security Tax                      | 0.00             | 27.77             |
| <b>F</b>       | Federal Unemployment Tax                 | 76.38            | 27.77             |
| <b>F</b>       | State Unemployment Tax                   | 76.38            | 27.77             |
| <b>G</b>       | Air Emission / Environmental Taxes       | 333.50           | 27.77             |
| <b>H</b>       | Federal Income Taxes                     | 38.50            | 27.77             |
| <b>H</b>       | State Income Taxes                       | 38.50            | 27.77             |
| <b>I</b>       | Fuel (Coal and Fuel Oil)                 | 16.82            | 27.77             |
| <b>J</b>       | Purchased Power - Square Butte           | 24.45            | 27.77             |
| <b>K</b>       | Purchased Power - MISO & Other Suppliers | 33.01            | 27.77             |
| <b>L</b>       | Payroll                                  | 14.00            | 27.77             |
| <b>M</b>       | All Other O&M                            | 17.11            | 27.77             |
| <b>N</b>       | Sales Tax Collection                     | 34.11            | 15.01             |
| <b>O</b>       | MN Wind Production Tax                   | 316.50           | 15.01             |
| <b>P</b>       | Payroll Withholding                      | 0.00             | 0.00              |



## **Minnesota Power Cash Working Capital Requirements & Lead Lag Study Summary for 2017**

### **Cash Working Capital Requirements – Revenue Lead Days:**

Revenue Lead Days is the estimated number of days between generation of electricity and collection of revenue from customers.

- A. **Summary** – Revenue Lead Days are calculated for the sum of three separate time periods: (1) Service Date to Read Date, (2) Meter Read Date to Billing Date, and (3) Bill Date to Collection (Cash Receipt) Date. Each of these is described in the sections below, and a summary is included in Excel spreadsheet “Revenue Lead Days 2017.xls.”
- B. **Service Date to Read Date** – broken out by percentages of revenue derived between weekly Taconite customers and other retail customers.

Taconites – Taconite customers receive estimated electric bills weekly. We assume service is provided 7 days a week and under normal conditions they are operating 24/7. Average time between service date and meter read date would be equal to 7 days / 2 or 3.50 days.

Non-Taconites – All other retail customers are generally billed monthly. We assume service is provided equally throughout the month. Average time between service date and meter read date would be equal to an average month (365 days / 12 months) / 2 = 15.21 days.

- C. **Meter Read Date to Billing Date** - broken out by percentage of total revenue among the five categories (Residential, Commercial, Public Street & Highway Lighting, Other Public Authorities, and Industrial) as determined by FERC Form 1 page 304.

Residential, Commercial, Public Street & Highway Lighting and Other Public Authorities:

#### Notes Regarding Process and Calculations:

- Lead Lag Study defined a number of days from Meter Read Date to Bill Date, and the focus in this section is mostly around this definition for non-Industrial revenue classes (i.e., all revenue classes excluding the Large Power customers that are paid with weekly payments). See Large Light and Power/Industrial point below.
- System and bill print process changes that happened in 2015 gave MP a new way to pull meter read and bill information from CC&B Database tables, instead of using the averages obtained from external Excel spreadsheets and schedules.
- Assumption on the working document “Working Capital Allowance 2012 – Days – Meter Reading Date to Billing Date” was “if all meters billed the next business day.” Meter Read Schedule is a different scheduled date than the Billing Schedule in CC&B. Meter reading period at the Bill Segment level includes a

## **Minnesota Power Cash Working Capital Requirements & Lead Lag Study Summary for 2017**

Start and End read date. The End read date can be three or more days behind the actual Bill/Complete.

- It is important to note that this meter/bill process has not changed. There has always been a several day lag between meter and bill – but a Bill, once generated, will be completed the same day and mailed out the following, in the majority of cases. Any changes in number of days between read and bill dates would be the difference in our definition for this study.
- When we query data, we will be looking at the date a Bill was Completed, in relation to the Bill Segment (or Segments, if multiple) Meter Read Date to determine number of days between.
- Lighting and Highway Lighting clarification. Type of Service has no associated Meter, or Meter Read Schedule. The Bill Segment End on the service would match the Bill Date – no lag.
- Biggest process changes since 2012 Lead-Lag Study:
  - a) We no longer hold a Bill to insert a Letter on the last night of the bill schedule. Reference previous text: “92% of all meters billed on the next business day and the remaining 8% with letters and notices billed on the last day of cycle.” Most customers will successfully bill the first day of the bill schedule window.
  - b) Data compiled from “CA Read, Bill & Cut Schedule” and “CSG Cost Spreadsheet” are no longer used. Number of Bills created and printed each day would be queried from CC&B tables to be used in compiling the data.
- Analytics team will be responsible for querying and compiling data for new averages requested by Rates. There will be a HUB ticket, assigned to the Customer Experience Analytics team.
- Large Light and Power/Industrial will be exempt from the query process performed.
- Change in days until due from Bill Date for Residential class, from 15 to 25, will not impact averaging as that is accounted for in another part of the study. Note - all other classes remain at 15, same as 2012 study.

### Notes Regarding Data Query and Results:

The results for 2017 data reflect number of days between meter read and billing date by class. Filename: LeadLag\_2017MetertoBillDays\_2019-06-26.xlsx

- Filtered out the SA Type E-IND-LP as these are the weekly billed services (Large Power/Taconites discussed above).
- Only included Frozen bills.
- Excluded any bills that were cancel rebilled.

Also note there are two sets of data:

- The first set, “All Frozen Bills,” reflects all frozen bills regardless of whether they were frozen by the system or a person.

## Minnesota Power Cash Working Capital Requirements & Lead Lag Study Summary for 2017

- The second set, “Frozen by System (excludes bills frozen by a person)” only includes bills that were frozen by the system. This is an attempt to exclude instances where there was a manual freezing such as back billing or bills that were held and frozen at a different time.

### Industrial Customers:

Industrial customers are broken out into three separate segments. They consist of Taconite, Other Large Power and Other Industrial customers. Taconite customers pay an estimated amount every week without being billed. Therefore, there are zero days between read date and bill date for Taconite Customers. Other Large Power customers are billed monthly. Since the number of Other Large Power customers was small, each customer’s billings for 2017 were analyzed and a weighted average was calculated. The Other Industrial customers’ calculation for days between read and bill dates is assumed to be the same as the residential and commercial customers.

- D. **Bill Date to Collection (Cash Receipt) Date** – amount of time between the day the bill is sent to the customer and the day payment is received. Calculated using standard days outstanding calculation based on the 13-month average of Account 14210 - Customer Accounts Receivable – Electric Service, with the following exceptions. Sales tax added to the bill is adjusted out since it is not part of the actual revenue, but is included on the billing. A separate calculation for the effect sales tax has on working capital is calculated.

### **Cash Working Capital Requirements – Expense Lag Days:**

Expense Lag Days – number of days between generation of electricity and payment for the services and materials needed to generate the electricity. This will vary depending upon the type of expense and the payment terms of vendors. The Accounting Department provided the 2017 calculations for purchased power, fuel expense), and all other O&M expenses.

Cash Working Capital – calculation equal to the average expense per day for the various expenses incurred in generating electricity multiplied by the difference in revenue lead days and expense lag days.

Calculations done in UI Regulatory software using input data described below.

- E. **Real Estate and Personal Property Taxes** – the cash working capital for the time between the use of the real estate and personal property to generate electric revenue and when cash payment is made. In Minnesota, taxes for Real Estate are paid in the following year in two installments in May and October. This results in a significantly large negative cash working capital adjustment.

**Minnesota Power**  
**Cash Working Capital Requirements**  
**& Lead Lag Study Summary for 2017**

Expense dollar amounts for 2017 come from FERC Form 1, page 263, column i, line 23 for Real Estate and line 19 for Personal Property Tax.

Real Estate taxes are paid half of property taxes on May 15 and half on October 15.

Lag Days are calculated using midpoint of the year ( $365/2 = 182.5$ ) plus 134 days for the first half tax payment and 287 days for the second half tax payment. It is assumed first and second half payments were equal.

Personal Property – pay prior years' tax on May 15 of the following year. Lag days calculated by taking midpoint of expense year ( $365/2 = 182.5$  days) plus 134 days into following year when payment was made. The calculation was prepared by MP's Tax Department.

- F. **Employer Payroll Taxes** – cash working capital for the period between when payroll tax expenses are incurred and when cash payment is made.

Payroll taxes are not incurred until the actual day of payment. For Federal unemployment tax and FICA (social security), the taxes are remitted the same day. For MN and WI, state unemployment taxes are remitted quarterly.

Expense dollar amounts for 2017 come from FERC Form 1, Page 263, and column i, line 2 for FICA, line 3 for Federal Unemployment, and line 8 for Minnesota Unemployment.

Lag days for FICA are zero; since they are paid the same day payroll is paid. State and federal unemployment taxes are paid quarterly, on the last day of the month following the end of the quarter. Lag days calculated by taking midpoint of each of the 4 quarters, adding the number of days in the following month of the quarter, and calculating the average of the four quarters. The calculation was done by MP's Human Resources Payroll Department.

- G. **Environmental Taxes** – cash working capital required for air quality emission tax expense.

Expense dollar amounts for 2017 come from FERC Form 1 Page 263, Line 10, Column i, for MN Air Quality Emissions. There were no Hazardous Waste Generation Taxes. Lag days calculated by taking midpoint of expense year ( $365/2 = 182.5$  days) plus 151 days from following year when payment was made on June 1, 2018. The calculation was prepared by MP's Tax Department.

- H. **Income Taxes** – cash working capital required for Federal and State income tax expenses.

Income from electric generation is produced on a daily basis, so the tax on it is incurred on a daily basis. Estimated tax payments are made quarterly.

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**Cash Working Capital Requirements**  
**& Lead Lag Study Summary for 2017**

Expense dollar amounts for 2017 come from FERC Form 1 Page 263, Line 1, column i, for Federal – Income expense or Page 114, Line 15, column c.

Lag days calculated by taking midpoint of each of the four quarters, and adding or subtracting the number of days, depending on payment date, and calculating the average of the four quarters. For the first quarter, 17 days were added since normal April 15 deadline was on a Saturday, payment due date is Monday April 17. All other quarterly payments due on the 15th of the last month of the quarter, instead of the following month, resulting in 15 days being subtracted from the quarterly midpoint for the second, third, and fourth quarters. The calculation was prepared by MP's Tax Department.

- I. **Fuel – Combined Coal & Fuel Oil** – cash working capital for purchases and shipment of coal and fuel oil used in electric generation.

Fuel is shipped and available for use prior to the payment of it. Each vendor has its own billing schedule and may bill on a monthly basis, a semi-monthly basis, or with each delivery.

Expense dollar amounts for 2017 come from FERC Form 1, Page 320, Line 5 for Fuel Expense and should exclude non-regulated Rapids Energy Center.

All fuel purchases post to either the accrued inventory account #23200 or the fuel inventory account #15110. Accounting downloaded from the CR for account 15110 because charges to 50100 are just an accounting entry and not by vendor.

A sample was taken from any vendor over 1% of total or > \$1,300,000 to get lag day calculation for individual vendors. The invoice samples were used to calculate weighted average for lag day calculation and are documented in the folder "Projects\rates\Lead Lag Study 2017\2017 Lead Lag Study from Accounting."

The sample was comprised of six vendors, and depending on the vendor one or more sample months of invoices were used to determine weighted average lag days. Most vendor information was not available in Maximo or Oracle so Accounting pulled the invoice copy from Oracle AP (see Brio report export file). The weighted average was calculated based on total cost and lag days per each vendor to determine total lag days for the expense. The calculation was prepared by MP's General Accounting department.

- J. **Purchased Power – Square Butte** – cash working capital for purchased power from Square Butte. Payments made monthly for power and semi-annually for debt service. Monthly payments paid via wire on or near the 20th of each month for the estimated

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**Cash Working Capital Requirements**  
**& Lead Lag Study Summary for 2017**

amount and true up of prior month's estimate. Semiannual payments made for debt service and additional payment made at year end.

Expense dollar amounts for 2017 come from FERC Form 1 Page 327 line 4, column m, for Square Butte's purchased power expense. It is included as part of the total purchased power on page 321, line 76.

Lag days calculated using weighted average for monthly payments and the semi-annual debt service payments. For each month the midpoint of the month less the days remaining in the month for the current month's lag days was used for the current month's purchase power. For the true up of prior month's purchased power, the midpoint of each month was used plus the number of days in the following month until payment was made. For debt service the midpoint of the 1st and 2nd half of the year were used plus the number of days in the month following until payment was made. For the debt service additional payment at year end, the midpoint of the year was used plus the number of days in the month following until payment was made.

- K. **Purchased Power – Other Suppliers** – cash working capital for purchased power for other suppliers, not including Square Butte.

Payment made monthly for prior month's purchased power. Most payments occur near the 20th of the following month, but some vendors vary. Expense by vendor was derived from the Powerplant Cost Repository by Accounting.

Expense dollar amounts for 2017 come from FERC Form 1, Page 321 line 76, less the Square Butte amount.

For purchased power, vendors have various payment terms and due dates that vary from 28.5 to 44.21 lag days.

For MISO purchased power, lag days are calculated using the midpoint of the week, since MISO is billed and paid weekly ( $7/2 = 3.5$ ), plus 25 days. A MISO statement is received 18 days after the last day of the weekly billing cycle and paid 7 days after the receipt of the statement. Smaller adjusting payments or discrepancies were not factored into the calculation.

Oliver Wind is billed on the 1st of the month and due 29<sup>th</sup> of every month. The 2017 invoices this averaged out to be 30 days after end of month; therefore, lag days are calculated using the average midpoint ( $365/12/2 = 15.21$ ) plus 29 days.

The calculation was prepared by MP's General Accounting department.

- L. **Payroll** – cash working capital for salaries and wages related to electric generation. All employees paid for two weeks of service one week later.

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**Cash Working Capital Requirements**  
**& Lead Lag Study Summary for 2017**

Expense dollar amounts for 2017 come from FERC Form 1 Page 355, Line 65.  
Lag days calculated using midpoint of two weeks service ( $14/2 = 7$  days) plus the 7 days lag time between end of service and actual payment.

The calculation was prepared by MP's Rate Department.

- M. **Other Operating & Maintenance Expenses** – cash working capital for all other operating & maintenance expenses not broken out separately above. The calculation was done by the Accounting Department.

Expense amount is determined by taking the total electric operation and maintenance expenses from FERC Form 1, Page 323, Line 198, less the payroll, purchased power, and fuel amounts.

Lag Days calculated using available accounts payable data for the various O&M accounts that have payables activity. Not all accounts under other O&M have payables activity, such as the overhead allocation of employee benefits, CIP expense, Duluth Franchise Fees, uncollectible accounts expense, and allocation of support services. A weighted average of the time between invoice date and payment date is used to calculate the lag days on the general ledger accounts with payables activity and applied to the remaining amount to expense for other O&M.

- N. **Sales Tax** – cash working capital for sales tax collected and remitted to the State of Minnesota; cities of Cloquet, Duluth, and Hermantown; and counties of St. Louis, Carlton, Cass, Crow Wing, Hubbard, Lake, Otter Tail, Pine, Todd, and Wadena. Monthly expenses are paid in the following month for all entities.

Lead days are equal to the number of days between billing date and collection date. The obligation to collect sales tax is incurred at the time of billing, and therefore revenue lead days are equal to the number of days between billing date and collection date. Total sales tax expense is equal to the total payments made to the various entities that were applied to Oracle Account #24100 in 2017.

Lag days are calculated using the midpoint of the number of days in the prior month (28, 30 or 31) divided by 2, plus the number of days until payment in the next month (typically 19 to 21 days), and calculating a weighted average.

The 2017 calculation was done by the Tax Department.

- O. **Minnesota Wind Production Tax** – cash working capital for wind production tax paid to the State of Minnesota.

Lead days are equal to the number of days between billing date and collection date.

**Minnesota Power**  
**Cash Working Capital Requirements**  
**& Lead Lag Study Summary for 2017**

Minnesota wind production tax is paid on May 15 of the following year. Lag Days are therefore calculated using midpoint of the year ( $365/2 = 182.5$ ) plus 134 days (January 1 through May 15).

Total Minnesota wind production tax is from FERC Form 1, Page 263, line 11, column i.

The 2017 calculation was done by the Tax Department.

- P. **Payroll Withholding** – cash working capital on withholdings taken from employee payroll.

Payroll withholding is remitted on the pay date, and it is technically employee money, resulting in no expense lag or revenue lead.

Notes:

The revenue lead days and expense lag days for Payroll Withholding are now both 0.00. Based on this and the current assumption that the money comes in from employee payroll and goes out to the payroll processor at the same time, the net lag days was determined to be zero.

In the past, MP held the Payroll Withholding money for a short time period, and that was the basis for the previous 0.84 expense lag days. Now the money is remitted to the state/federal government right away (or MP pays its taxes early, as required by the third party administrator (ADP) to get the taxes to the agency on time, which could technically be considered a negative lag day). Based on this, we feel comfortable calling it a 0.00 expense lag day. Therefore, since the lead and lag days are both zero for Payroll Withholding, we can eliminate Payroll Withholding from the lead-lag study and Cash Working Capital calculations.



**Minnesota Power**  
**Working Capital Allowance - 2017**  
**Calculation of Revenue Lead Days**

formula calculates  
linked to spreadsheet  
cell needs input value

|   |  |                            |
|---|--|----------------------------|
|   |  | <b><u>2017</u></b>         |
| <b>B. SERVICE PERIOD TO METER READING DATE:</b> |  |                            |
| Non Taconites (All other)                       | (365 days / 12 Months / 2)*(1-.4640) [1] | 8.15                       |
| Taconites (Weekly)                              | (7 days / 2) * .4640                     | 1.62                       |
|   |  | <u>9.78</u>                |
| <b>C. METER READING DATE TO BILLING DATE:</b>   |  |                            |
|   |  | 2.98 [2]                   |
| <b>D. BILLING DATE TO CASH RECEIPT DATE:</b>    |  |                            |
|   |  | <u>15.01</u> [3]           |
| <b>A. SUMMARY - REVENUE LEAD DAYS</b>           |  | <b><u><u>27.77</u></u></b> |

was 25.70 in 2012

|                                     |                             |                    |
|-------------------------------------|-----------------------------|--------------------|
|                                     |                             | <b><u>2017</u></b> |
| [1]                                 |                             |                    |
| Taconite Revenues (Weekly billings) | <u>314,182,487</u> = 0.4640 | 0.4640             |
| Total Revenues                      | 677,121,222                 |                    |

[2] Linked to spreadsheet Meter Read to Billing

[3] Linked to spreadsheet Billing to Cash Rec'd

Minnesota Power  
Working Capital Allowance - 2017  
C. DAYS - METER READING DATE TO BILLING DATE

formula calculates  
linked to spreadsheet  
cell needs input value

|                                       |             |         |   |
|---------------------------------------|-------------|---------|---|
|                                       | 2017        |         |   |
| 4400 Residential Sales                | 108,887,191 |         | From FERC Form 1 page 304 line 13, col c  |
| Revenue Adjustment [2]                | -341,368    |         | From FERC Form 1 page 304 line 10 col C   |
| Net of adjustment                     | 108,545,823 | 16.03%  |   |
| 4420 Commercial Sales                 | 119,507,547 |         | From FERC Form 1 page 304 line 25 col c   |
| Revenue Adjustment                    | 207,701     |         | From FERC Form 1 page 304 line 22 col c   |
| Net of adjustment                     | 119,715,248 | 17.68%  |   |
| 4430 Industrial Sales                 | 441,769,968 |         | From FERC Form 1 page 304 line 37 col c   |
| Revenue Adjustment                    | 131,778     |         | From FERC Form 1 page 304 line 35 col c   |
| Net of adjustment                     | 441,901,746 | 65.26%  |   |
| 4440 Public Street & Highway Lighting | 2,449,194   |         | From FERC Form 1 page 304.1 line 11 col c |
| Revenue Adjustment                    | 562         |         | From FERC Form 1 page 304.1 line 9 col c  |
| Net of adjustment                     | 2,449,756   | 0.36%   |   |
| 4450 Other Public Authorities         | 4,505,017   |         | From FERC Form 1 page 304.1 line 20 col c |
| Revenue Adjustment                    | 3,632       |         | From FERC Form 1 page 304.1 line 18 col c |
| Net of adjustment                     | 4,508,649   | 0.67%   |   |
| Total                                 | 677,121,222 | 100.00% |   |

|  | \$ Amount      | \$ Industrial | Industrial Revenue % | Component Industrial Percent | 1] |
|--|----------------|---------------|----------------------|------------------------------|----|
| Total Industrial                               |                |               |                      |                              |    |
| Taconites (Weekly)                             | \$ 314,182,487 | 0.7110        | 65.26%               | 46.40%                       |    |
| Rate 74 Other than Taconites (Large Power EOM) | 100,529,518    | 0.2275        | 65.26%               | 14.85%                       |    |
| Other Industrial (End of the month)            | 27,189,741     | 0.0615        | 65.26%               | 4.02%                        |    |
|  | \$ 441,901,746 |               |                      |                              |    |

| Category                                 | % of Revenue | Days [4] | Weighted Days                               |
|--|--------------|----------|---|
| Residential                              | 16.03%       | 5.40     | 0.87  |
| Commercial                               | 17.68%       | 6.10     | 1.08  |
| Public Street & Highway Lighting         | 0.36%        | 1.00     | 0.00  |
| Other Public Authorities                 | 0.67%        | 1.00     | 0.01  |
| Taconites (Weekly) [3]                   | 46.40%       | 0.00     | 0.00  |
| Rate Other than Taconites (End of Month) | 14.85%       | 6.50     | 0.97  |
| Other Industrial                         | 4.02%        | 1.41     | 0.06  |
|  | 100.00%      |          | 2.98 Days between Meter Read & Billing Date |

1] See Spreadsheet for 'Breakdown Rate 74'

Weighted average calculation based on revenue in each FERC account category.

[2] Revenue Adjustments are minor differences with CIS systems.

[3] Taconite Customers are billed on a weekly basis and trued up monthly. For the purposes of Meter Reading to Bill Date it is assumed to be zero days due to the frequency of their billings.

[4] From spreadsheet "LeadLag\_2017MeterToBillDays", table 2

Minnesota Power - 2017 Lead-Lag Study

**C. METER TO BILL DAYS**

1. **All Frozen Bills**

|          | 1/31/2017 | 2/28/2017 | 3/31/2017 | 4/30/2017 | 5/31/2017 | 6/30/2017 | 7/31/2017 | 8/31/2017 | 9/30/2017 | 10/31/2017 | 11/30/2017 | 12/31/2017 |
|----------|-----------|-----------|-----------|-----------|-----------|-----------|-----------|-----------|-----------|------------|------------|------------|
|          | # Days    | # Days    | # Days    | # Days    | # Days    | # Days    | # Days    | # Days    | # Days    | # Days     | # Days     | # Days     |
| COM      | 6.7       | 6.2       | 6.1       | 6.7       | 6.7       | 6.8       | 7         | 6.2       | 7.4       | 6.3        | 7.7        | 6.6        |
| IND      | 7         | 6.1       | 5.9       | 6.7       | 6.1       | 6.7       | 7.4       | 6.2       | 7.5       | 6.7        | 6.4        | 6.7        |
| LIGHT    | 1.4       | 1.6       | 1.2       | 1.2       | 1.2       | 1.3       | 1.2       | 1.2       | 1.3       | 1.2        | 1.3        | 1.3        |
| MUNI-PMP | 10.7      | 8.8       | 8.6       | 10        | 8.4       | 10.3      | 10.4      | 20        | 11.8      | 9.6        | 10         | 9.7        |
| RES      | 5.6       | 5.3       | 5.2       | 5.8       | 5.3       | 5.8       | 6         | 5.3       | 6.3       | 5.4        | 5.4        | 5.3        |

|          | 2017 # Days |
|----------|-------------|
| COM      | 6.7         |
| IND      | 6.6         |
| LIGHT    | 1.3         |
| MUNI-PMP | 10.7        |
| RES      | 5.6         |

2. **Frozen by System (excludes bill frozen by a person)**

|          | 1/31/2017 | 2/28/2017 | 3/31/2017 | 4/30/2017 | 5/31/2017 | 6/30/2017 | 7/31/2017 | 8/31/2017 | 9/30/2017 | 10/31/2017 | 11/30/2017 | 12/31/2017 |
|----------|-----------|-----------|-----------|-----------|-----------|-----------|-----------|-----------|-----------|------------|------------|------------|
|          | # Days    | # Days    | # Days    | # Days    | # Days    | # Days    | # Days    | # Days    | # Days    | # Days     | # Days     | # Days     |
| COM      | 6.3       | 6         | 5.9       | 5         | 5.9       | 6.4       | 6.8       | 6.1       | 6.9       | 6.1        | 6.1        | 6.2        |
| IND      | 6.4       | 6.3       | 5.9       | 6.8       | 5.7       | 6.8       | 7.3       | 6.1       | 7.1       | 6.9        | 6.4        | 6.8        |
| LIGHT    | 1.2       | 1.5       | 1.3       | -2.4      | 0.7       | 1.6       | 1.7       | 1.5       | 0.9       | 1.5        | 1.3        | 1.3        |
| MUNI-PMP | 9.2       | 8.8       | 8.6       | -35       | 8.5       | 9.8       | 9.5       | 11.5      | 11.8      | 9.7        | 8.7        | 9.7        |
| RES      | 5.5       | 5.2       | 5.1       | 5.3       | 5.2       | 5.7       | 6         | 5.3       | 6.3       | 5.3        | 5.3        | 5.2        |

|          | 2017 # Days |
|----------|-------------|
| COM      | 6.1         |
| IND      | 6.5         |
| LIGHT    | 1           |
| MUNI-PMP | 3.3         |
| RES      | 5.4         |

**Minnesota Power**  
**Working Capital Allowance - 2017**  
**D. DAYS - BILLING DATE TO CASH RECEIPT DATE (DSO)**

formula calculates

linked to spreadsheet or cell

cell needs input value

**Average Daily Balance (1421) Accounts Receivable** Amount  
39,068,469 [3]

**times 365 days** 14,259,991,147

**2017 Revenues** 949,911,690

14,259,991,147 / 949,911,690

**15.01 Days - Billing Date to Cash Receipt Date**  
[4]

**2017 Operating Revenues [1]**

**Electric Revenues**

| Account                        | Amount             |
|--------------------------------|--------------------|
| 4400 Residential               | 108,887,191        |
| 4420 Commercial                | 119,507,547        |
| 4430 Industrial                | 441,769,968        |
| 4440 Public Street Lighting    | 2,449,194          |
| 4450 Other Public Authorities  | 4,505,017          |
| 4470 Sales for Resale          | 272,727,586        |
| <b>Total Electric Revenues</b> | <b>949,846,503</b> |
| 4510 Misc. Service Revenue     | 65,187             |
|                                | <b>949,911,690</b> |
| <b>Less: Resale [2]</b>        | <b>949,911,690</b> |

[1] Source -FERC Form 1 page 300 Sales of Electricity

[2] The 2006 working capital study deducted for Municipal Revenue but during the course of the 2012 update it was determine that in the retail rate case working capital schedule all individual components are total company. Allocation factors are used to get jurisdictional level for retail and wholesale. By adjusting here it double counts the jurisdictional split between retail and wholesale customers. SJC 9/5/13.

[3] Linked to spreadsheet AVG Retail Acct Rec

[4] For reference purpose only, 2012 Billing Date to Cash Receipts = 15.17 Days.

**Minnesota Power**  
**E. REAL ESTATE AND PERSONAL PROPERTY TAX EXPENSE**  
**Lag Day Schedule**

| Real & Personal<br>Property | Date to<br>be Paid | Regulated Taxes Accrued in 2017 |                   | Total             |
|-----------------------------|--------------------|---------------------------------|-------------------|-------------------|
|                             |                    | Real Estate                     | Personal Property |                   |
| First Half                  | 5/15/2018          | 11,097,371                      | 17,733,083        | 28,830,454        |
| Second Half                 | 10/15/2018         | 11,097,371                      | 0                 | 11,097,371        |
|                             |                    | <b>22,194,741</b>               | <b>17,733,083</b> | <b>39,927,824</b> |

From FERC Form 1 Page 263, lines 23 (RE) and 19 (PP) column i

**Real Estate Taxes**

|          |                                   |                   |                      |
|----------|-----------------------------------|-------------------|----------------------|
| 1st Half | $365 / 2 = 182.5 + 134 = 316.5$ x | 11,097,371        | 3,512,317,763        |
| 2nd Half | $365 / 2 = 182.5 + 287 = 469.5$ x | 11,097,371        | 5,210,215,450        |
|          |                                   | <b>22,194,741</b> | <b>8,722,533,213</b> |

$8,722,533,213 / 22,194,741 =$  **393.0 Days**

**Personal Property Taxes**

$365 / 2 = 182.5 + 134 =$  **316.5 Days**

Jan 1 to May 15 = 134 days      134  
Jan 1 to Oct 15 = 287 days      287

|                          | <u>Expense \$</u> | <u>Lead Days</u> | <u>Lag Days</u> | <u>Working Capital</u> |
|--------------------------|-------------------|------------------|-----------------|------------------------|
| <b>Real Estate</b>       | 22,194,741        | 15.01            | 393.00          | (22,984,631)           |
| <b>Personal Property</b> | 17,733,083        | 15.01            | 316.50          | (14,647,527)           |
|                          | <b>39,927,824</b> |                  |                 | <b>(37,632,157)</b>    |

**Minnesota Power 2017**  
**F. EMPLOYER PAYROLL TAXES PAYMENT SCHEDULE**

| <u>Quarter</u> | <u>Days<br/>in Quarter</u> | <u>Midpoint</u> | <u>Days<br/>until paid</u> | <u>Lag Days</u> |                  |
|----------------|----------------------------|-----------------|----------------------------|-----------------|------------------|
| 1Q             | 90                         | 45.00           | 30                         | 75.00           |                  |
| 2Q             | 91                         | 45.50           | 31                         | 76.50           |                  |
| 3Q             | 92                         | 46.00           | 31                         | 77.00           |                  |
| 4Q             | 92                         | 46.00           | 31                         | 77.00           |                  |
|                |                            |                 |                            | 76.38           | Average Lag Days |

| <u>Expense Description</u> | <u>Expense \$</u> | <u>Lead Day</u> | <u>Lag Day</u> | <u>Working Capital [1]</u> |
|----------------------------|-------------------|-----------------|----------------|----------------------------|
| Social Security            | 5,649,410         | 27.77           | 0              | 428,645                    |
| Federal Unemployment       | 36,687            | 27.77           | 76.38          | (4,872)                    |
| State Unemployment         | 106,263           | 27.77           | 76.38          | (14,112)                   |
|                            |                   |                 |                | 409,661                    |

Payments made on April 30, July 31, October 31 and January 31  
for Unemployment per Payroll in Human Resources Department.  
Social Security paid on same day as payroll.

Employer Payroll Tax Expense Amounts from FERC Form 1 page 263,  
column i, lines 2, 3 and 8.

**Minnesota Power**  
**G. ENVIRONMENTAL AND HAZARDOUS WASTE TAX**  
**Lag Day Schedule**

**ENVIRONMENTAL TAX**

| <b>Days from<br/>Midpoint to<br/>End of<br/>Year<br/>( a )</b> | <b>End of<br/>year<br/>( c )</b> | <b>Due<br/>Date<br/>( e )</b> | <b>Days Fully<br/>Accrued to<br/>Payment/Due Date<br/>( f )</b> | <b>Total<br/>Lag<br/>( g )<br/>( a )+( f )</b> |
|--|----------------------------------|-------------------------------|---|--|
| 182.5  | 12/31/2017                       | 6/1/2018                      | 151   | 333.5  |

Environmental Air Emissions \$ 1,415,649 From 2017 FERC Form 1, Page 263, line 10, column i

| <b><u>Description</u></b> | <b><u>Expense \$</u></b> | <b><u>Lead Days</u></b> | <b><u>Lag Days</u></b> | <b><u>Working Capital</u></b><br><b>= B / 365 * (C - D)</b> |
|---------------------------|--------------------------|-------------------------|------------------------|---|
| Hazardous                 | 0                        |                         | -                      | -   |
| Environmental             | 1,415,649                | 15.01                   | 333.5                  | (1,235,260)   |

**HAZARDOUS WASTE TAX**

The Hazardous Waste Tax is classified with Other in Distribution of Taxes. There are no taxes of this type classified with the Electric Operation.

**Minnesota Power**  
**H. INCOME TAX EXPENSE**  
**Lag Day Schedule**

| Federal Income Tax |  |                          |                       |                            |  |                                |                                   |
|--------------------|--|--------------------------|-----------------------|----------------------------|--|--------------------------------|-----------------------------------|
| Quarter<br>(a)     | Days from<br>Midpoint to<br>End of<br>Quarter<br>(b) | End of<br>Quarter<br>(c) | Portion<br>Due<br>(d) | Due<br>Date *<br>(e)       | Days Fully<br>Accrued to<br>Due Date<br>(f)<br>(e)-(c) | Total<br>Lag<br>(g)<br>(b)+(f) | Weighted<br>Lag<br>(h)<br>(d)*(g) |
| 1st                | 45.5   | 31-Mar                   | 25.0%                 | Monday, April 17, 2017     | 17   | 62.5                           | 15.63                             |
| 2nd                | 45.5   | 30-Jun                   | 25.0%                 | Thursday, June 15, 2017    | -15  | 30.5                           | 7.63                              |
| 3rd                | 46.0   | 30-Sep                   | 25.0%                 | Friday, September 15, 2017 | -15  | 31.0                           | 7.75                              |
| 4th                | 46.0   | 31-Dec                   | 25.0%                 | Friday, December 15, 2017  | -16  | 30.0                           | 7.50                              |
|                    |  |                          |                       |                            |  |                                | <b>38.50</b>                      |

Federal Income Tax \$ (380) From 2017/Q4 FERC Form 1 Page 263 line 1 column i

\* If the 15th falls on a weekend, due date defaults to the following Monday

| State Income Tax - MN & WI |  |                          |                       |                            |  |                                |                                   |
|----------------------------|--|--------------------------|-----------------------|----------------------------|--|--------------------------------|-----------------------------------|
| Quarter<br>(a)             | Days from<br>Midpoint to<br>End of<br>Quarter<br>(b) | End of<br>Quarter<br>(c) | Portion<br>Due<br>(d) | Due<br>Date<br>(e)         | Days Fully<br>Accrued to<br>Due Date<br>(f)<br>(e)-(c) | Total<br>Lag<br>(g)<br>(b)+(f) | Weighted<br>Lag<br>(h)<br>(d)*(g) |
| 1st                        | 45.5   | 31-Mar                   | 25.0%                 | Monday, April 17, 2017     | 17   | 62.5                           | 15.63                             |
| 2nd                        | 45.5   | 30-Jun                   | 25.0%                 | Thursday, June 15, 2017    | -15  | 30.5                           | 7.63                              |
| 3rd                        | 46.0   | 30-Sep                   | 25.0%                 | Friday, September 15, 2017 | -15  | 31.0                           | 7.75                              |
| 4th                        | 46.0   | 31-Dec                   | 25.0%                 | Friday, December 15, 2017  | -16  | 30.0                           | 7.50                              |
|                            |  |                          |                       |                            |  |                                | <b>38.50</b>                      |

Minnesota Income Tax \$ (26,747) From 2017/Q4 FERC Form 1 Page 263 line 7 column i

Wisconsin Income Tax \$ 8,318 From 2017/Q4 FERC Form 1 Page 263 line 14 column i

\$ (18,429)

| <u>Income Taxes</u> | <u>Expense \$</u> | <u>Lead Days</u> | <u>Lag Days</u> | <u>Working Capital</u> |
|---------------------|-------------------|------------------|-----------------|------------------------|
| State               | (18,429)          | 15.01            | 38.50           | 1,186                  |
| Federal             | (380)             | 15.01            | 38.50           | 24                     |
| Total Income Taxes  | (18,809)          |                  |                 | 1,210                  |

= C / 365 \* (D - E)



**Minnesota Power**  
**I. 2017 FUEL EXPENSE LAG DAY CALCULATION**  
**Account 15110**

Coal and Fuel Oil (see 15110 download from cr tab)

[TRADE SECRET DATA BEGINS...

| Vendor Name   | [TRADE SECRET<br>DATA BEGINS...] | Total<br>(see 15110 download tab) | Large Fuel Vendor | Lag Days<br>(see tabs)        | Weighted<br>Total<br>(calc D*C) |                               |
|---|----------------------------------|-----------------------------------|-------------------|-------------------------------|---------------------------------|-------------------------------|
| Arch Coal Sales                                     |                                  |                                   |                   | 10.89                         |                                 |                               |
| Best Oil Company                                    |                                  |                                   |                   | 0                             |                                 |                               |
| BNSF Railway Company                                |                                  |                                   |                   | 16.25                         |                                 |                               |
| Cloud Peak Energy                                   |                                  |                                   |                   | 18.30                         |                                 |                               |
| Decker Coal Company                                 |                                  |                                   |                   | 33.40                         |                                 |                               |
| Peabody Coal Sales                                  |                                  |                                   |                   | 20.40                         |                                 |                               |
| Grand Total   |                                  | 122,895,040.62                    | 122,586,693.53    | ...                           | 2,048,587,396.35                | ...                           |
|   |                                  |                                   |                   | ...TRADE SECRET<br>DATA ENDS] |                                 | ...TRADE SECRET DATA ENDS]    |
| <b>Coal and Fuel Oil</b>                            |                                  | 2,048,587,396                     | /                 | 122,586,694                   | =                               | <b>16.71 W. Avg. Lag Days</b> |
| <b>Natural Gas (see separate excel spreadsheet)</b> |                                  | 22,848,733                        | /                 | 574,304                       | =                               | <b>39.79 W. Avg. Lag Days</b> |
| <b>Combined</b>                                     |                                  | 2,071,436,129                     | /                 | 123,160,998                   | =                               | <b>16.82 W. Avg. Lag Days</b> |

Downloaded from the CR for account 15110, because charges to 50100 is just an accounting entry and not by vendor payment.

Take sampling of invoices for any vendor over 1% of total or &gt; \$1,300,000 to get lag day calculation for individual vendors.

Use sampling to calculate weighted average for lag day calculation, see individual vendor tabs.

Coal Expense - 2017

|  |   | CT | Loc  | Exp            |
|--|---|----|------|----------------|
| Coal (amount expensed, close to 15110 charges) | 133,200,458.00  |    | 7120 | 111 9,471,032  |
|  |   |    | 7120 | 112 8,979,856  |
|  |   |    | 7120 | 113 48,530,828 |
|  |   |    | 7120 | 114 66,218,742 |
| Hibbard  | (all charges for Hibbard go to CT 7180 (pass-through). At the end of the month,         |    |      |                |
| Wood (about 17 vendors)                        | 3,953,160.00 it is determined how much was for MP generation and an entry is made to    |    |      |                |
| Gas  | 27,387.00 transfer that portion to CT that was used with a credit to the 7180 CT.       |    |      |                |
| Coal   | 450,404.00 Only \$161,000 of the of the \$4,400,000 in pass-through costs are generated |    |      |                |
|  | for MP. As a result, we have not included Hibbard wood, gas, or coal in our lag study.  |    |      |                |
|  | 4,430,951.00  |    |      |                |

50300 (purchased steam - sappi)  
(account is included in O&M amounts)

\\P\Projects\rates\Lead\_Lag\_Study\_2017-Report\_Documents\I-Fuel Lead Lag - 2017.xlsx]Summary Fuel 2017

For expense, MP books the monthly budget, the adjustment from the previous month and an adjustment to the current month budget which is provided by Square Butte. Also book an expense amount for interest and principal amount that is owed to Square Butte. Semi-annual MP pays Square Butte our portion of the debt amounts. In July just pay interest on three issues while in January pay interest plus our portion of the principal amount on one issue.

**K. OTHER PURCHASED POWER - 2017**

(lag days calc does not include Square Butte)

|                                     |      |   |  | 1                            | 2               | 3           | 4           | 5                 | 6                   | Payment Terms<br>(# of days)   |
|-------------------------------------|------|---|--|------------------------------|-----------------|-------------|-------------|-------------------|---------------------|--|
|                                     |      |   |  | from detail tab              |                 |             | (input)     |                   |                     | (reviewed by Energy Pricing for terms of contract - did not use actual paid date)                          |
|                                     |      |   |  |                              | Cost<br>per day | Avg<br>Days | Pay<br>Days | Total<br>Lag Days | Weighted<br>Expense |  |
|                                     |      |   |  |                              | 1/365           | 365/12/2    |             | 3+4               | 5/2                 |  |
| 55500                               | 0000 | AP Invoices                                   | CARGILL                                      | [TRADE SECRET DATA BEGINS... |                 |             | 15.21       | 20.00             | 35.21               | Billed 1st of month and due the 20th of every month  |
| 55500                               | 0000 | AP Invoices                                   | EDF TRADING NORTH AMERICA LLC                |                              |                 |             | 15.21       | 20.00             | 35.21               | Billed 1st of month and due the 20th of every month  |
| 55500                               | 0000 | AP Invoices                                   | FPL ENERGY OLIVER WIND II LLC                |                              |                 |             | 15.21       | 29.00             | 44.21               | Billed 1st of month and due the 29th of every month  |
| 55500                               | 0000 | AP Invoices                                   | FPL ENERGY OLIVER WIND LLC                   |                              |                 |             | 15.21       | 29.00             | 44.21               | Billed 1st of month and due the 29th of every month  |
| 55500                               | 0000 | AP Invoices                                   | GREAT RIVER ENERGY                           |                              |                 |             | 15.21       | 15.00             | 30.21               | Net 15 days per contract (on invoice)  |
| 55500                               | 0000 | AP Invoices                                   | INTERCONTINENTAL EXCHANGE                    |                              |                 |             | 15.21       | 29.00             | 44.21               | Billed 1st of month and due the 29th of every month  |
| 55500                               | 0000 | AP Invoices                                   | LAURENTIAN ENERGY AUTHORITY                  |                              |                 |             | 15.21       | 15.00             | 30.21               | Billed 15th of month and due the end of month  |
| 55500                               | 0000 | AP Invoices                                   | MANITOBA HYDRO                               |                              |                 |             | 15.21       | 20.00             | 35.21               | Billed 1st of month and due the 20th of every month  |
| 55500                               | 0000 | AP Invoices                                   | MIDCONTINENT INDEPENDENT SYSTEM OPERATOR INC |                              |                 |             | 3.50        | 25.00             | 28.50               | Paid weekly every Tues. Statement received 18 days after last billed date for week and paid one week later |
| 55500                               | 0000 | AP Invoices                                   | MINNKOTA POWER COOPERATIVE INCORPORATED      |                              |                 |             | 15.21       | 20.00             | 35.21               | Due the 20th per Hillary and the Naema tariff agreement  |
| 55500                               | 0000 | AP Invoices                                   | NEXTERA ENERGY RESOURCES LLC                 |                              |                 |             | 15.21       | 20.00             | 35.21               |  |
| 55500                               | 0000 | AP Invoices                                   | SHELL ENERGY NORTH AMERICA (US) LP           |                              |                 |             | 15.21       | 20.00             | 35.21               | Billed 1st of month and due the 20th of every month  |
| 55500                               | 0000 | AP Invoices                                   | SUPERIOR WATER LIGHT AND POWER               |                              |                 |             | 15.21       | 20.00             | 35.21               | due 20 days after billing  |
| 55500                               | 0000 | AP Invoices                                   | TRANSALTA ENERGY MARKETING (US) INCORPORATED |                              |                 |             | 15.21       | 20.00             | 35.21               | Billed 1st of month and due the 20th of every month  |
| 55500                               | 0000 | AP Invoices                                   | WING RIVER LLC                               |                              |                 |             | 15.21       | 10.00             | 25.21               | days after   |
|                                     |      |   | IMO (Ontario)                                |                              |                 |             | 15.21       | 16.00             | 31.21               | days later   |
|                                     |      |   | Windsense                                    |                              |                 |             | 15.21       | 20.00             | 35.21               |  |
|                                     |      |   | Solar Garden                                 |                              |                 |             | 15.21       | 20.00             | 35.21               |  |
|                                     |      |   | Silver Bay-cis                               |                              |                 |             | 15.21       | 20.00             | 35.21               | Billed 1st of month and due the 20th of every month  |
|                                     |      |   | Minnkota (CIS credit)                        |                              |                 |             | 15.21       | 20.00             | 35.21               |  |
|                                     |      |   | SAPPI-cis                                    |                              |                 |             | 15.21       | 20.00             | 35.21               |  |
|                                     |      |   | AEP Energy                                   |                              |                 |             | 15.21       | 20.00             | 35.21               | Billed 1st of month and due the 20th of every month  |
|                                     |      |   | NextEra Energy                               |                              |                 |             | 15.21       | 20.00             | 35.21               | Billed 1st of month and due the 20th of every month  |
|                                     |      |   | misc wind customers cis                      |                              |                 |             | 15.21       | 20.00             | 35.21               |  |
| MISO Day 2 55500.0001-0086          |      |   |  |                              |                 |             | 3.50        | 25.00             | 28.50               | Paid weekly every Tues. Statement received 18 days after last billed date for week and paid one week later |
| ...TRADE SECRET DATA ENDS[          |      |   |  |                              | 159,792,092     | 437,787     |             | 33.01             | 14,451,238          |  |
|                                     |      |   |  |                              |                 | (A)         |             | (B/A)             | (B)                 |  |
| Square Butte 55500.0087             |      | matches FERC Form 1, Page 327, Line 4, col. m |  |                              | 75,728,650      |             |             |                   |                     | ...TRADE SECRET DATA ENDS[   |
|                                     |      |   |  |                              | 235,520,742     |             |             |                   |                     |  |
| FERC page 321 (555) Purchased Power |      |   |  |                              | 235,520,741     |             |             |                   |                     |  |
| Check:                              |      |   |  |                              |                 | 1           |             |                   |                     |  |

Minnesota Power - 2017 Lead-Lag Study

**L. PAYROLL EXPENSE**

| Payroll               | 2017<br>Total | Lag  | Percent | Weighted<br>Lag |
|-----------------------|---------------|------|---------|-----------------|
| Total - FERC page 355 | 85,084,375    |      |         |                 |
| Less Results Sharing  | -             |      |         |                 |
| Bi-Weekly             | 85,084,375    | 14.0 | 100%    | 14.0            |

**Parameters/Assumptions**

Bi-Weekly - 7 days (1/2 X 14 days) + 7 days after end of pay period

100% of payroll is on a bi-weekly pay period

**Source Documents**

Total payroll from FERC Form 1 Page 355 Line 65

Minnesota Power - 2017 Lead-Lag Study

**M. OTHER O&M EXPENSE**

**2017 Lead Lag Study Results**

| Acct   | Data               | Total                | Lag Days     |
|--|--------------------|----------------------|--------------|
| <b>Steam Power Generation</b>                        | Sum of Amount Paid | 27,647,829           |              |
| (FERC 50000 - 51400)                                 | Sum of Weighted \$ | 656,080,850          | 23.73        |
| <b>Hydraulic Power Generation</b>                    | Sum of Amount Paid | 1,418,415            |              |
| (FERC 53500-54520 )                                  | Sum of Weighted \$ | 35,939,710           | 25.34        |
| <b>Other Power Generation</b>                        | Sum of Amount Paid | 5,553,819            |              |
| (FERC 54600-55400)                                   | Sum of Weighted \$ | 126,829,692          | 22.84        |
| <b>Other Power Supply Expenses</b>                   | Sum of Amount Paid | 236,745,461          |              |
| (FERC 55600-55700)                                   | Sum of Weighted \$ | 3,426,786,511        | 14.47        |
| <b>Transmission Expenses</b>                         | Sum of Amount Paid | 78,643,722           |              |
| (FERC 56000-57300 )                                  | Sum of Weighted \$ | 1,659,358,492        | 21.10        |
| <b>Distribution Expenses</b>                         | Sum of Amount Paid | 8,691,602            |              |
| (FERC 58000-59800 )                                  | Sum of Weighted \$ | 217,807,378          | 25.06        |
| <b>Customer Accounts Expenses</b>                    | Sum of Amount Paid | 1,704,778            |              |
| (FERC 90100-90500)                                   | Sum of Weighted \$ | 47,300,524           | 27.75        |
| <b>Customer Service &amp; Informational Expenses</b> | Sum of Amount Paid | 461,324              |              |
| (FERC 90700-91000 )                                  | Sum of Weighted \$ | 10,325,346           | 22.38        |
| <b>Sales Expenses</b>                                | Sum of Amount Paid | 181,952              |              |
| (FERC 91100-91600)                                   | Sum of Weighted \$ | 5,132,337            | 28.21        |
| <b>Administrative and General Expenses</b>           | Sum of Amount Paid | 14,864,438           |              |
| (FERC 92000-92599 )                                  | Sum of Weighted \$ | 340,887,876          | 22.93        |
| <b>Human Resources Use Only</b>                      | Sum of Amount Paid | 24,075,294           |              |
| (FERC 92600-93500 )                                  | Sum of Weighted \$ | 316,203,923          | 13.13        |
| <b>Total Sum of Amount Paid</b>                      |                    | <b>399,988,635</b>   |              |
| <b>Total Sum of Weighted \$</b>                      |                    | <b>6,842,652,640</b> | <b>17.11</b> |

All data derived from PowerPlant Cost Repository for accounts with O&M Payable Activity  
Representative sample of invoice activity to get average lag days for other O&M.

Assumptions

15 days for Expense Reports

Any invoice with specified terms follows the terms due date

Immediate pay is calculated as accounted date less invoice date

Invoices with zero or negative number of days was adjusted to 1 day

Searched for outliers (over 60 days and over \$100,000) that could have an impact on results

Minnesota Power  
N. SALES TAX  
Calculation of Lag Days  
For Payments Made in 2017

| Date Paid  | MN            | Duluth     | St. Louis County | Wadena County | Sales Tax Carlton County | Hubbard County | Cloquet   | Todd County | Cass County | Crow Wing County |
|------------|---------------|------------|------------------|---------------|--------------------------|----------------|-----------|-------------|-------------|------------------|
| 1/20/2017  | 1,222,615.78  | 50,261.95  | 43,156.60        | 906.94        | 6,375.02                 | 2,486.61       | 3,146.74  | 3,831.82    | 3,794.87    | 4,045.63         |
| 2/21/2017  | 1,395,665.81  | 58,246.52  | 50,230.82        | 1,007.29      | 7,664.11                 | 2,771.70       | 3,710.64  | 4,489.00    | 4,633.81    | 4,902.99         |
| 3/20/2017  | 1,308,288.09  | 55,063.51  | 46,988.04        | 923.30        | 7,314.70                 | 2,661.00       | 3,469.04  | 4,348.07    | 4,216.57    | 4,523.93         |
| 4/20/2017  | 1,194,952.40  | 49,078.95  | 42,559.03        | 854.08        | 6,313.74                 | 2,363.69       | 3,078.66  | 3,809.24    | 4,732.36    | 3,866.03         |
| 5/22/2017  | 1,165,157.25  | 48,465.42  | 42,149.16        | 797.11        | 6,568.79                 | 2,291.90       | 3,279.11  | 3,931.48    | 2,564.95    | 4,051.27         |
| 6/20/2017  | 1,061,977.32  | 42,024.08  | 37,490.85        | 735.07        | 5,757.19                 | 2,152.41       | 2,885.70  | 3,388.19    | 3,267.01    | 3,628.76         |
| 6/27/2017  | 993,000.00    | 0.00       | 0.00             | 0.00          | 0.00                     | 0.00           | 0.00      | 0.00        | 0.00        | 0.00             |
| 7/20/2017  | 136,631.62    | 45,685.01  | 38,788.21        | 828.67        | 6,266.66                 | 2,435.44       | 3,009.05  | 3,801.51    | 3,979.34    | 4,220.36         |
| 8/21/2017  | 1,188,718.39  | 48,215.90  | 39,998.90        | 935.68        | 6,340.28                 | 2,672.34       | 3,189.80  | 4,111.48    | 4,494.44    | 4,954.83         |
| 9/20/2017  | 1,204,430.48  | 48,967.43  | 39,484.50        | 821.34        | 6,488.22                 | 2,574.42       | 3,270.90  | 4,359.79    | 4,489.60    | 5,008.96         |
| 10/20/2017 | 1,201,875.38  | 49,747.99  | 40,788.02        | 817.68        | 6,625.88                 | 2,571.60       | 3,359.72  | 4,245.17    | 4,210.33    | 4,748.75         |
| 11/20/2017 | 1,134,540.90  | 48,121.62  | 39,337.68        | 778.74        | 6,311.00                 | 2,334.28       | 3,183.54  | 3,874.29    | 3,671.87    | 4,216.75         |
| 12/20/2017 | 1,197,165.15  | 49,326.34  | 41,506.90        | 894.14        | 8,007.00                 | 2,601.51       | 3,203.57  | 4,011.19    | 4,037.30    | 4,216.56         |
|            | 14,405,018.57 | 593,204.72 | 502,478.71       | 10,300.04     | 80,032.59                | 29,916.90      | 38,786.47 | 48,201.23   | 48,092.45   | 52,384.82        |
|            | -             | -          | -                | -             | -                        | -              | -         | -           | -           | -                |

| Date Paid  | Pine County | Lake County | Hermantown | Otter Tail County | Total                      | Month Pmt Related To | Month Pmt Related to midpoint | Following days in next month | Total Lag Days | Weighted Amount             |
|------------|-------------|-------------|------------|-------------------|----------------------------|----------------------|-------------------------------|------------------------------|----------------|-----------------------------|
| 1/20/2017  | 0.00        | 0.00        | 5,953.35   | 31.04             | 1,346,606.35               | Dec                  | 15.5                          | 20.0                         | 35.50          | 47,804,525.43               |
| 2/21/2017  | 1,455.16    | 0.00        | 7,425.59   | 32.56             | 1,542,236.00               | Jan                  | 15.5                          | 21.0                         | 36.50          | 56,291,614.00               |
| 3/20/2017  | 2,432.30    | 0.00        | 6,882.33   | 32.16             | 1,447,143.04               | Feb                  | 14.0                          | 20.0                         | 34.00          | 49,202,863.36               |
| 4/20/2017  | 2,172.04    | 0.00        | 6,276.31   | 30.09             | 1,320,086.62               | Mar                  | 15.5                          | 20.0                         | 35.50          | 46,863,075.01               |
| 5/22/2017  | 2,122.44    | 194.56      | 6,345.93   | 28.75             | 1,287,948.12               | Apr                  | 15.0                          | 22.0                         | 37.00          | 47,654,080.44               |
| 6/20/2017  | 1,897.59    | 906.63      | 5,440.35   | 26.91             | 1,171,578.06               | May                  | 15.5                          | 20.0                         | 35.50          | 41,591,021.13               |
| 6/27/2017  | 0.00        | 0.00        | 0.00       | 0.00              | 993,000.00                 | Jun                  | 15.0                          | -3.0                         | 12.00          | 11,916,000.00               |
| 7/20/2017  | 2,233.51    | 1,353.22    | 5,931.82   | 32.37             | 255,196.79                 | Jun                  | 15.0                          | 20.0                         | 35.00          | 8,931,887.65                |
| 8/21/2017  | 2,393.03    | 1,161.21    | 5,905.61   | 35.76             | 1,313,127.65               | Jul                  | 15.5                          | 21.0                         | 36.50          | 47,929,159.23               |
| 9/20/2017  | 2,369.32    | 1,138.02    | 6,038.17   | 30.80             | 1,329,471.95               | Aug                  | 15.5                          | 20.0                         | 35.50          | 47,196,254.23               |
| 10/20/2017 | 2,347.99    | 1,226.42    | 7,748.29   | 31.36             | 1,330,344.58               | Sep                  | 15.0                          | 20.0                         | 35.00          | 46,562,060.30               |
| 11/20/2017 | 2,218.31    | 1,185.10    | 6,081.08   | 27.95             | 1,255,883.11               | Oct                  | 15.5                          | 20.0                         | 35.50          | 44,583,850.41               |
| 12/20/2017 | 2,453.42    | 1,253.79    | 5,189.99   | 29.35             | 1,323,896.21               | Nov                  | 15.0                          | 20.0                         | 35.00          | 46,336,367.35               |
|            | 24,095.11   | 8,418.95    | 75,218.82  | 369.10            | 15,916,518.48 <sup>①</sup> |                      |                               |                              |                | 542,862,758.52 <sup>②</sup> |
|            | -           | -           | -          | -                 | -                          |                      |                               |                              |                |                             |

<sup>②</sup> 542,862,758.52 / <sup>①</sup> 15,916,518.48 = <sup>③</sup> 34.11

Computation of Net Days

|   |               |                    |
|---|---------------|--------------------|
| Billing Date to Cash Receipt Date (Fixed) |               | 15.01              |
| Lag Days                                  |               | <sup>③</sup> 34.11 |
| Net Days                                  |               | (19.10)            |
| Expense                                   | 15,916,518.48 | /                  |
| Net Days                                  | 365           | =                  |
| Average Excess Cash                       |               | 43,606.90          |
|   |               | (19.10)            |
|   |               | (832,755.66)       |

Note: The formulas above are not rounded

Note-1: For sales tax accounts related to electric service collections, do not include use tax

**Minnesota Power**  
**O. MN WIND PRODUCTION TAX**  
**Lag Day Schedule**

| <b>MN Wind<br/>Production Tax</b> | <b>Date to<br/>be Paid</b>            | <b>Wind Production Taxes Accrued in 2017</b>                  | <b>Total</b>                                   |
|-----------------------------------|---------------------------------------|---|--|
| Paid in Full                      | 5/15/2018                             |   | 67,917   |
| MN Wind Production Tax            |                                       | \$ <b>67,917</b> From FERC Form 1 Page 263, line 11, column i |  |
| <b>MN Wind Production Tax</b>     |                                       | $365 / 2 = 182.5 + 134 =$                                     | <b>316.5 Days</b>                              |
| Jan 1 to May 15 =                 | 134 days                              |   |  |
| <b>MN Wind Production Tax</b>     | <u>Expense \$</u><br>67,917<br>67,917 | <u>Lead Days</u><br>15.01                                     | <u>Lag Days</u><br>316.50                      |
|                                   |                                       |   | <u>Working Capital</u><br>(56,099)<br>(56,099) |

PUBLIC DOCUMENT  
TRADE SECRET DATA EXCISED



June 29, 2018

**VIA E-FILING**

Ms. Anne Sell  
Department of Commerce  
85 7<sup>th</sup> Place East, Suite 280  
St. Paul, MN 55101-2198

**RE:** Minnesota Power's 2018 Annual Electric Utility Forecast Report  
Docket No.: E-999/PR-18-11

Dear Ms. Sell:

Minnesota laws and reporting rules governing electric utilities require that electric utilities with Minnesota service areas submit to the Minnesota Department of Commerce an annual report. This report is to be submitted by July 1 of each year. Attached is a copy of Minnesota Power's 2018 Annual Electric Utility Forecast Report that contains all of the forms and information necessary to meet this requirement.

**Trade Secret information is included in the "ELEC\_68\_2017\_LargeCustomer.xlsx" and "ELEC\_68\_2017\_Forecast.xlsx" Excel workbooks, as well as the Methodology document.**

Minnesota Power has excised material from the public version of the attached report documents as they identify and contain confidential, competitive information regarding Minnesota Power's methods, techniques and process for supplying electric service to its customers. The energy usage by specific customers and generation by fuel type has been consistently treated as Trade Secret in individual filings before the Minnesota Public Utilities Commission. Minnesota Power follows strict internal procedures to maintain the privacy of this information. The public disclosure of this information would have severe competitive implications for customers and Minnesota Power.

Minnesota Power is providing this justification for the information excised from the attached report and why the information should remain trade secret under Minn. Stat. 13.37. Minnesota Power respectfully requests the opportunity to provide additional justification in the event of a challenge to the Trade Secret designation provided herein.

The following documents have been uploaded to the MN Dept of Commerce and Public Utilities Commission eDockets/eFiling system using Docket Number 18-11: ELEC\_68\_2017.xlsx, ELEC\_68\_2017\_Forecast.xlsx, ELEC\_68\_2017\_LargeCustomer.xlsx,

30 West Superior Street | Duluth, Minnesota 55802-2093 | 218-279-5000 | [www.mnpower.com](http://www.mnpower.com)

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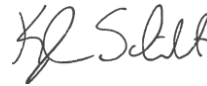
METHOD18.pdf, ELEC\_68\_2017\_Attachments.xlsx, MP\_System\_Map.pdf, EIA-861\_2017.pdf, and MP\_Ratebook.pdf.

If you need additional paper copies or have any questions, please feel free to contact either one of us.

Sincerely,



Benjamin Levine  
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BL/KS:sr

Attach.

cc: Julie Pierce  
David Moeller  
Lori Hoyum

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## **Introduction**

The utility customer load forecast is the initial step in electric utility planning. Capacity and energy resource commitments are based on forecasts of energy consumption, and seasonal peak demand requirements. Minnesota Power's forecast process combines sound econometric methodology and data from reputable sources to produce a reasonable long-term outlook suitable for planning.

Minnesota Power (or the Company) is committed to continuous forecast process improvement, process transparency, forecast accuracy, and gaining customer insight. This 2018 forecast methodology document demonstrates Minnesota Power's continued efforts to meet these goals through comprehensive documentation, implementation of more systematic and replicable processes, and thorough analysis of results.

A history of increasing accuracy in load forecasting also speaks to the Company's commitment to innovate and enhance its forecast processes. Since 2000, year-ahead forecast error has decreased by an average 0.05 percent per-year; current-year forecast error has decreased at an average rate of 0.1 percent per-year.<sup>1</sup> Minnesota Power owes its record of forecast accuracy to a combination of close contact with customers, continuous validation of forecast model inputs, and steady improvements in statistical analytic capabilities.

The three scenarios and two sensitivities developed for the 2018 Annual Forecast Report (AFR 2018) address the unique potential for local additions or losses to the Resale and Industrial customer classes, including the development of substantial mining operations in the region. The two sensitivities conducted on the Base Case outlook demonstrates a proactive evaluation of future electric vehicle, roof-top solar, and extreme weather impacts to the Company's system. This approach to forecasting can then be integrated into the Company's proactive and flexible planning to better inform the critical electric resource decisions ahead. Minnesota Power's forecasting approach helps keep the potential demand and energy outcomes transparent and robust.

## **2018 Forecast Results Overview**

This year, Minnesota Power has identified the "Moderate" scenario as its expected case outlook and has submitted this in its 2018 Annual Electric Utility Report filing. This scenario differs in its assumptions from last year's submittal, but the resulting long-term (post-2020) forecast is similar.

The AFR 2018 outlook includes additional sales to Silver Bay Power Company per Minnesota Power's 50 MW 24/7 sale agreement with Cliffs Natural Resources, but does not include any substantial load additions for a new mining customer's facility in Nashwauk, Minnesota. The "Moderate" scenario projects about 69 MW<sup>2</sup> of system load growth by 2030.

---

<sup>1</sup> Both error figures are Mean Absolute Percent Error (MAPE) of the energy sales forecast, and were calculated excluding the recessionary years of 2009 and 2010, in which there are significant and unpredictable fluctuations in large industrial loads. The year-ahead error also excludes 2015 and 2016 due to mining industry downturn.

<sup>2</sup> 69 MW = 2030 Winter Peak (1,862 MW) – 2017 Winter Peak (1,793 MW).

Table 1 below shows the Moderate scenario forecast for annual energy sales and seasonal peak demand. Annual energy sales are projected to grow at a 0.8 percent per year rate (on average) from 2017 through 2032. Summer and Winter peak demand are projected to grow at average annual rates of 0.6 percent and 0.3 percent (respectively).

**Table 1: Moderate Scenario Energy Sales and Seasonal System Peak Demand Outlook**

| Total Energy Sales |            |            | System Peak Demand |             |            |      |             |            |
|--------------------|------------|------------|--------------------|-------------|------------|------|-------------|------------|
|                    | MWh        | Y/Y Growth |                    | Summer (MW) | Y/Y Growth |      | Winter (MW) | Y/Y Growth |
| 2007               | 10,680,509 |            | 2007               | 1,758       |            | 2007 | 1,763       |            |
| 2008               | 10,839,446 | 1.5%       | 2008               | 1,699       | -3.3%      | 2008 | 1,719       | -2.5%      |
| 2009               | 8,065,090  | -25.6%     | 2009               | 1,350       | -20.6%     | 2009 | 1,545       | -10.1%     |
| 2010               | 10,417,422 | 29.2%      | 2010               | 1,732       | 28.3%      | 2010 | 1,789       | 15.7%      |
| 2011               | 10,988,200 | 5.5%       | 2011               | 1,746       | 0.8%       | 2011 | 1,780       | -0.5%      |
| 2012               | 11,107,358 | 1.1%       | 2012               | 1,790       | 2.5%       | 2012 | 1,774       | -0.3%      |
| 2013               | 10,985,809 | -1.1%      | 2013               | 1,782       | -0.5%      | 2013 | 1,751       | -1.3%      |
| 2014               | 11,038,979 | 0.5%       | 2014               | 1,805       | 1.3%       | 2014 | 1,821       | 4.0%       |
| 2015               | 10,059,466 | -8.9%      | 2015               | 1,597       | -11.5%     | 2015 | 1,554       | -14.6%     |
| 2016               | 9,830,788  | -2.3%      | 2016               | 1,609       | 0.8%       | 2016 | 1,692       | 8.9%       |
| 2017               | 10,654,217 | 8.4%       | 2017               | 1,689       | 4.9%       | 2017 | 1,793       | 5.9%       |
| 2018               | 10,789,642 | 1.3%       | 2018               | 1,714       | 1.5%       | 2018 | 1,736       | -3.2%      |
| 2019               | 10,664,585 | -1.2%      | 2019               | 1,682       | -1.8%      | 2019 | 1,740       | 0.2%       |
| 2020               | 11,117,568 | 4.2%       | 2020               | 1,715       | 2.0%       | 2020 | 1,751       | 0.6%       |
| 2021               | 11,287,165 | 1.5%       | 2021               | 1,748       | 1.9%       | 2021 | 1,793       | 2.4%       |
| 2022               | 11,420,036 | 1.2%       | 2022               | 1,760       | 0.7%       | 2022 | 1,798       | 0.3%       |
| 2023               | 11,474,695 | 0.5%       | 2023               | 1,770       | 0.6%       | 2023 | 1,804       | 0.3%       |
| 2024               | 11,553,363 | 0.7%       | 2024               | 1,778       | 0.4%       | 2024 | 1,811       | 0.4%       |
| 2025               | 11,551,968 | 0.0%       | 2025               | 1,782       | 0.3%       | 2025 | 1,818       | 0.4%       |
| 2026               | 11,603,186 | 0.4%       | 2026               | 1,789       | 0.4%       | 2026 | 1,826       | 0.5%       |
| 2027               | 11,662,985 | 0.5%       | 2027               | 1,798       | 0.5%       | 2027 | 1,835       | 0.5%       |
| 2028               | 11,763,028 | 0.9%       | 2028               | 1,807       | 0.5%       | 2028 | 1,844       | 0.5%       |
| 2029               | 11,795,567 | 0.3%       | 2029               | 1,816       | 0.5%       | 2029 | 1,853       | 0.5%       |
| 2030               | 11,864,692 | 0.6%       | 2030               | 1,825       | 0.5%       | 2030 | 1,862       | 0.5%       |
| 2031               | 11,934,320 | 0.6%       | 2031               | 1,835       | 0.5%       | 2031 | 1,871       | 0.5%       |
| 2032               | 12,037,300 | 0.9%       | 2032               | 1,844       | 0.5%       | 2032 | 1,879       | 0.5%       |

Minnesota Power remains a Winter peaking utility and will continue to expect an approximate 36 MW difference in this seasonal profile. Figures 1 and 2 below show the projected energy sales and system peak demand (respectively) under the AFR 2018 Moderate Scenario (expected case outlook) compared to the most recent load forecast used in the Company's Energy *Forward* Resource Package (EFRP)<sup>3</sup>.

<sup>3</sup> MPUC Docket No. E015/AI-17-568

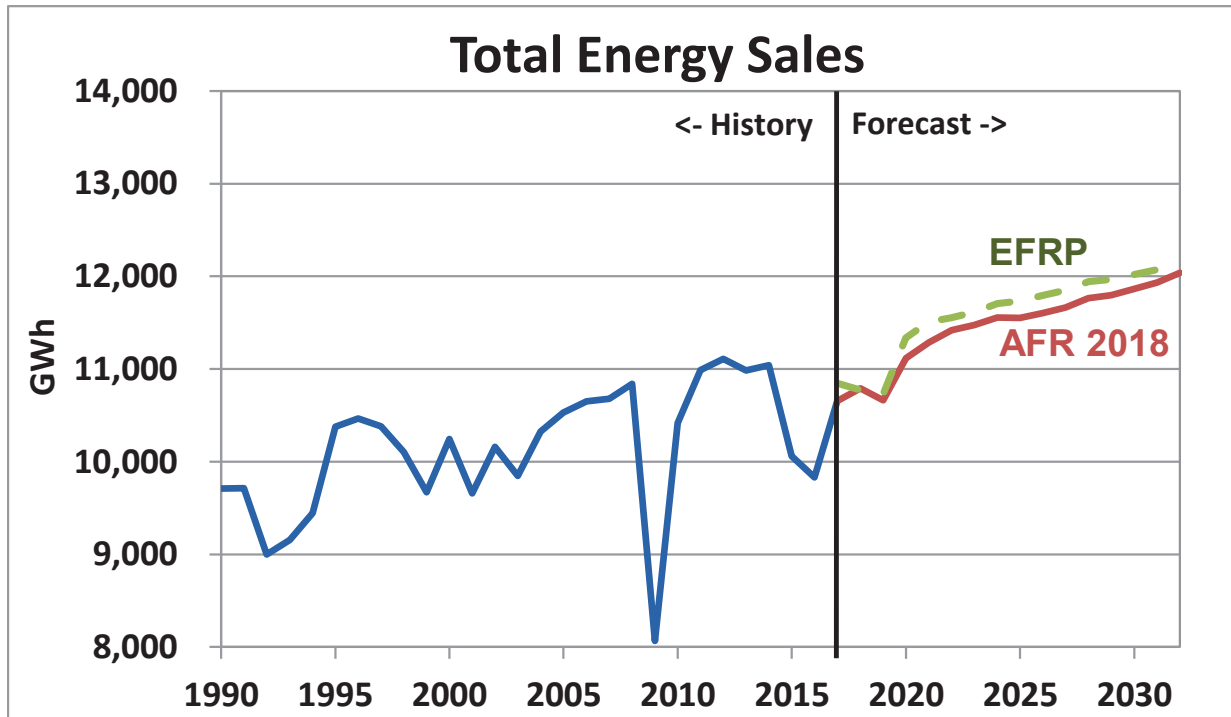


Figure 1: Moderate Scenario Energy Sales Outlook

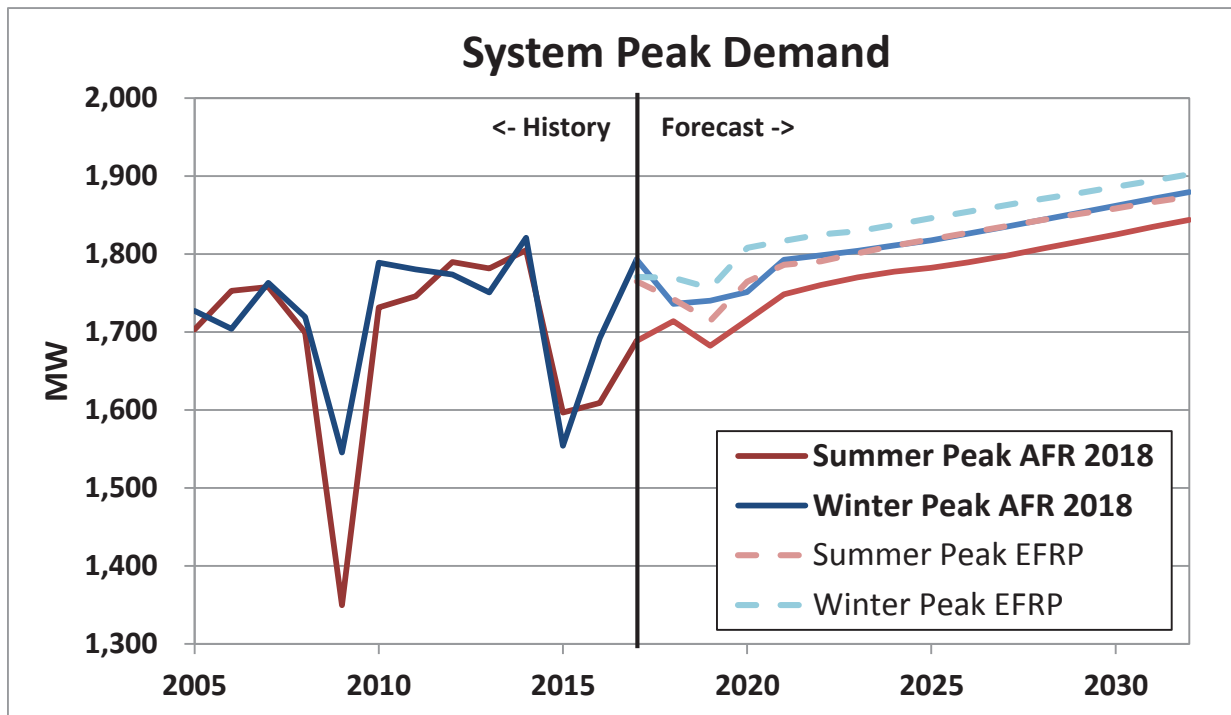


Figure 2: Moderate Scenario Peak Demand Outlook

## **Document Structure**

This report details the construction of the energy sales and demand forecast for Minnesota Power for the 2018-2032 timeframe. Each section is designed to convey the report requirements per Minn. Rules Chapter 7610, and give insight into the Company's forecasting process and results.

Section 1: Forecast Methodology, Data Inputs, and Assumptions details the development of customer count, peak demand, and energy sales forecasts. This section contains a step-by-step description of Minnesota Power's forecasting process and details the development of databases and models.

Other information included in Section 1:

- Descriptions of all forecast models used in the development of this year's forecasts, including:
  - Model specifications
  - Model statistics
  - Resulting forecast's growth rates
  - A discussion of each model's econometric merits and potential issues, as well as an explanation/justification of each variable
- Additional steps taken in 2018 to improve the forecast process and product
- Strengths and weaknesses of Minnesota Power's methodology
- All data inputs and sources, including an overview of key economic assumptions
- A description of all changes made to the forecast database since last year's forecast
- A discussion of Minnesota Power's sensitivity to Large Industrial customer contracts
- Minnesota Power's confidence in the forecast

Section 2: Forecast Results presents the three forecast scenarios Minnesota Power developed for the AFR 2018 forecast. Each scenario's forecast is the product of a robust econometric modeling process and careful consideration of potential industrial and resale customer load developments. These Industrial and Resale assumptions were organized into scenarios based on the criteria outlined below:

**Moderate Scenario (AFR 2018 Expected Case):** includes additional loads served by Minnesota Power and its wholesale customers that are likely but not yet certain. This scenario's assumptions were formed through close communication with customers on their planned expansions and utilize any publicly-communicated schedules from prospective customers.

**High Scenario:** includes assumptions identical to those in Moderate except the High scenario assumes the start of a new industrial facility in Nashwauk occurs in the forecast timeframe. Additionally, the scenario includes an assumption for displaced production at another facility due to the new industrial facility in Nashwauk. This scenario demonstrates the sensitivity of Minnesota Power's demand and energy outlook to the timing of this prospective industrial facility's start-up.

**Low Scenario:** includes assumptions identical to those in Moderate except the start of a new industrial facility on the Iron Range does not occur in the forecast timeframe and a current large

industrial facility ceases operations. This scenario demonstrates the sensitivity of Minnesota Power's demand and energy outlook to the timing of this prospective industrial facility's start-up.

This section also includes several sensitivities to identify the range of possible outcomes due to non-economic factors such as extreme weather and emerging technologies like roof-top solar and electric vehicles.

Section 3: Other Information presents other report information required by Minnesota law and cross-references the specific requirements to specific sections in this document.

## **1. Forecast Methodology, Inputs, and Assumptions**

### **A. Overall Framework**

Minnesota Power's forecast models are the result of an analytical econometric methodology, extensive database organization, and quality economic indicators. Forecast models are structural, defined by the mathematical relationship between the forecast quantities and explanatory factors. The forecast models assume a normal distribution and are "50/50"; given the inputs, there is a 50 percent probability that a realized actual will be less than forecast and a 50 percent probability that the realized actual will be more than forecast.

The Minnesota Power forecast process involves several interrelated steps: 1) data gathering, 2) data preparation and development, 3) specification search, 4) forecast determination, 5) initial review and verification, and 6) internal company review and approval. The steps of the forecast process are sequential; although, because of the research dimension, the process involves feedback loops between steps 2 and 3. The process is diagrammed in Figure 3 below and discussed in more detail in Section B.

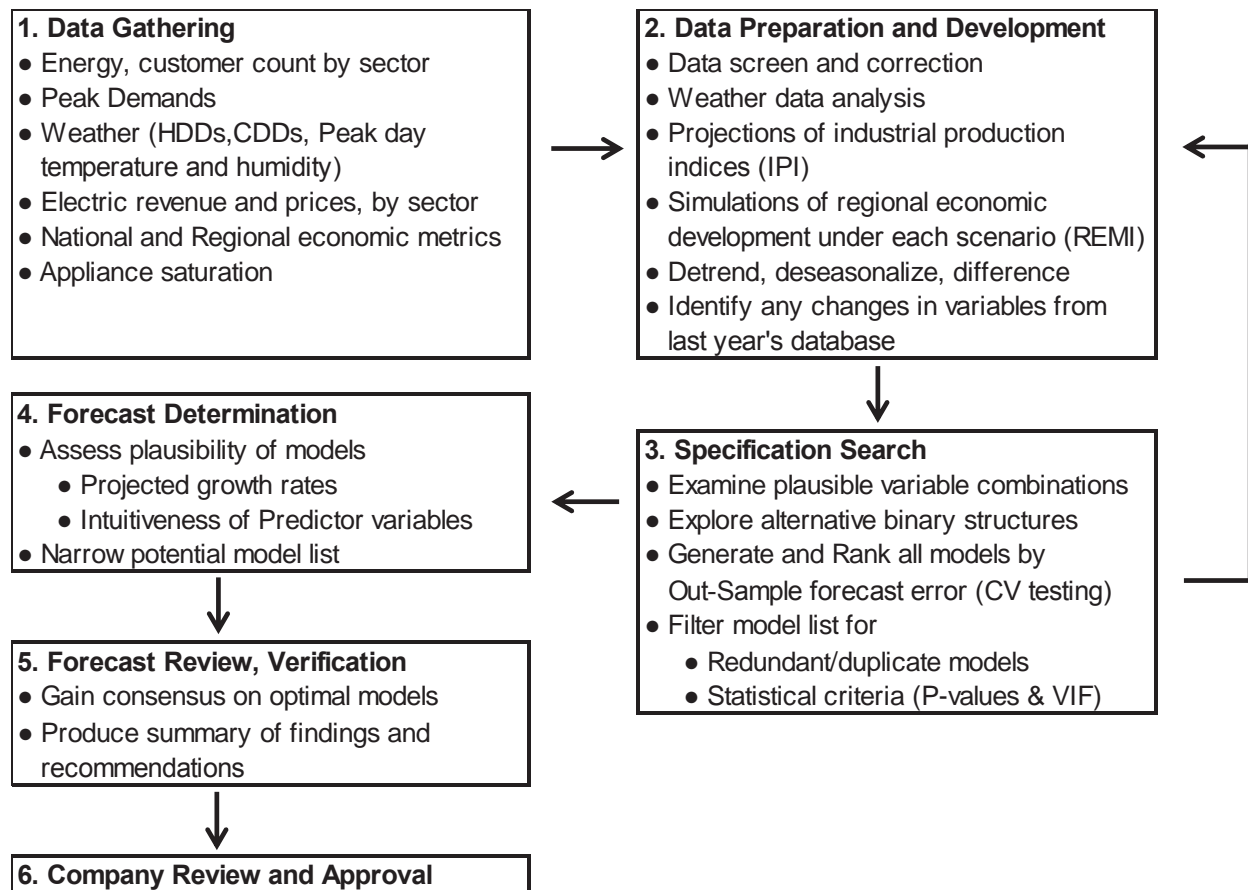


Figure 3: Minnesota Power's Forecast Process

## B. Minnesota Power's Forecast Process

### i. Process Description

1. Data Gathering involves updating or adding to the forecast database. The data used in estimation can be broadly categorized as follows:
  - *Historical quantities of the variables to be forecast*, which consists of energy sales and customer counts for Minnesota Power's defined customer classes, energy sales, and peak demand.
  - *Regional Demographic and Economic data*:
    - *Duluth Metropolitan Statistical Area (MSA)* consists of population, households, sector-specific employment, income metrics, regional product, and other local indicators.
    - *Aggregate 13-County Minnesota Power service territory (13-Co)* consists of population, Gross Regional Product (a Regional Gross Domestic Product (GDP) metric), sector-specific employment, and income metrics.
    - *Individual 13-County Minnesota Power service territory (13-Co)* consists of sector-specific employment and income metrics for each individual County.



- *Indicators of National economic activity* such as the Industrial Production Indexes (IPI) or Macroeconomic indicators such as U.S. GDP or Unemployment.
- *Weather and related data* including heating degree days (HDD), cooling degree days (CDD), temperature, humidity, dew point, and wind speed.
- *Appliance saturation data* including air-conditioning and electric space heating.
- *Electricity and Alternative Fuel prices*, which includes the price of electricity, natural gas, and heating oil by sector for the Minnesota Power service territory.

After gathering these data, Minnesota Power compares all series to the previous year's database to identify any changes. The cause of any change to the historical data should be explained and justified. This is explained further in Section C: *Inputs and Sources*.

2. *Data Preparation and Development* involves adjusting raw data inputs and then reviewing the data through diagnostic testing. The purpose of this step is to develop consistently defined and formatted data series for use in regression analysis. Adjustments made to specific raw data inputs are described in the "Inputs and Source" section of this document. General data preparation techniques such as *Data Transformation* and *Interpolation* are described in the *Specific Analytical Techniques* section of this document.
3. *Specification Search* involves selecting an appropriate set of variables that serve as explanatory factors for the customer count, energy sales, and peak demand series being modeled.<sup>4</sup> Minnesota Power does this through a formalized modeling and documentation process involving the following steps:
  - *Parameter and Criteria Definition* – During this step the forecaster manually enters the parameters for model generation and the criteria for filtering unacceptable models. This includes identifying the trend and binary variable structure to be used, number of explanatory variables for testing (typically 2 or 3) and the maximum values for acceptable variance inflation factors (VIF) and P-values.<sup>5</sup>
  - *Exhaustive Search* – Identifies all possible combinations of economic variables. There are generally between 20,000 and 200,000 possible combinations of predictor variables for each *Search* run. For each of the five customer count models and eight energy models, there were between four and twenty six different binary variable structures tested – and each required a separate *Search* run. In total, there were about 400 *Search* runs producing roughly 2.6 million models.
  - *Model Generation* – Constructs an ordinary least squares (OLS) regression model for each of the combinations identified in the *Exhaustive Search* step.

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<sup>4</sup> Specific analytical techniques applied during this step are detailed in Section D.

<sup>5</sup> To state simply, Variance Inflation Factors identify the presence of multicollinearity and P-values measure the significance of a variable. The definitions of these metrics are explained in greater detail in the *Specific Analytical Techniques* section.

- *Ranking* – Conducts Cross-Validation (CV) on all generated models and ranks them according to the models’ Out-Sample Forecast Error (Root Mean Square Error). Cross-Validation/Out-Sample testing identifies how well the forecast model can be expected to actually perform, and avoids the bias associated with model assessment based on “In-Sample” forecast error (traditional Mean Absolute Percent Error, Mean Percent Error) or goodness-of-fit (Adjusted-R<sup>2</sup>).
- *Filter for Redundant Models* – removes a model from the ranked list if it contains the same economic variable combination<sup>6</sup> as another, statistically superior model.
- *Filtering for Statistical Criteria* – removes a model from the ranked list if it does not meet predefined statistical criteria (HAC-adjusted P-Values<sup>7</sup>, VIF)

After filtering for redundancies and statistical criteria, each of the five customer count models and eight energy models produced between 700 and 110,000 plausible models (about 585,000 in total). Minnesota Power then reviews the top 50-200 models for each dependent variable.<sup>8</sup>

All models generated as part of the *Specification Search* step of AFR 2018 are archived for later review.

4. *Forecast Determination* narrows the list of potential models via a thorough review. Minnesota Power evaluates and compares model statistics, plausibility of the models’ outputs (i.e. the forecast), and model structure (binary or time-trend variables). This step involves the utilization of objective metrics as far as is possible to inform judgment on the part of the forecaster.

The forecast determination process begins by identifying the apparent statistically-superior model. If this model’s forecast growth rate is implausible or predictor variables are unintuitive, Minnesota Power moves on to the second most statistically-superior model. This process continues until the Company identifies a plausible and statistically-sound model. This model is then selected as a preferred or preliminary AFR model for the specified dependent variable (class customer count, class energy sales, or system peak demand).

However, the difference in statistical quality among top models is usually negligible and there are reasons to dismiss the top-ranked model in favor of a lower ranking model. For example, a second place model that has a weather variable structure that allows for accurate after-the-fact weather normalization is ideal, and worth a negligible loss in apparent statistical quality.

This step narrows the model list further; from 50-200 to just two or three select models for each dependent variable.

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<sup>6</sup> Although the model contains the same combination of economic variables, it may vary in that it is a differenced or level form of the variable.

<sup>7</sup> More on Heteroskedasticity and Autocorrelation Consistent (HAC) adjustment in the *Specific analytical Techniques* section.

<sup>8</sup> Models are ranked by a two-year Out-sample Root-Mean-Squared Error (RMSE).

5. Forecast Review and Verification produces a list containing a single, preliminary model for each of the dependent series. During this step, analysts compare and debate the quality of models to reach a consensus around a final set of optimal models. Where a consensus cannot be immediately reached because two models may be highly comparable in statistical quality and plausibility of outputs, out-sample forecast accuracy determines the model put forward for *Company Review and Approval*.
6. Company Review and Approval involves internally vetting all forecasts to ensure that consistent use of forecast information was employed and that the forecasts are reasonable.

## ii. Specific Analytical Techniques

Data Transformation Schema for Economic Variables: Transformations are used to maintain consistency of definition in a variable series and identify different potential relationships between predictor variables and the dependent variable. Minnesota Power uses several data transformations in data development: constant-dollar deflating/inflating, per-day conversion, de-trending/de-seasonalizing, first difference, and exponential.

- *Constant-dollar Deflating/Inflating* - is the process of deflating/inflating all dollar-denominated series to the same base year to maintain consistency of definition. Minnesota Power utilized 2009 as its base year in the 2018 forecast. The 2009 base year is the current standard among public and private data providers such as IHS Global Insight and the Bureau of Economic Analysis (BEA).
- *Per-day Conversion* – divides monthly billed energy use or monthly Heating/Cooling Degree Days by the number of days in the specified month. This transformation normalizes for the effect of varying days-per-month on a monthly aggregate like energy use or Heating/Cooling Degree Days. This results in consistently defined series that are more appropriate for linear regression modeling.
- *De-trend and De-seasonalize* – is the process of removing the historical trend/seasonality from a data series. This reduces the potential for the spurious, or *false*, correlation that often results from mistaking similarity of *trends* with similarity of *variation* between a predictor and the dependent variable.
- *First Difference* – changes the definition of the series from *level* (e.g. the number of customers in a month) to *change* (e.g. the customers gained or lost from one month to the next) by subtracting the previous value from the current. The *first difference* transformation reduces the series to only *variation* (change) so there is no potential to mistake similarity of *trend* with similarity of *variation*.
- *Exponential* – is the application of an exponent to the series; either squaring or cubing the series. This transformation of raw data was only applied to the temperature variables in the Peak Demand model, so the non-linear relationship of load to temperature could be more accurately quantified.

The Company has discontinued use of natural log and first difference of natural log transformations as well as lead/lag transformations for transparency and ease of model interpretation. The addition of these transformations to past reports was exploratory. Minnesota Power forecasters have found these transformations add minimal predictive value, but make resulting model specifications difficult to interpret and difficult to compare year-to-year changes in model inputs.

*Interpolation Technique* – Minnesota Power collects and utilizes raw monthly-frequency data whenever possible. However, some data series are not available at a monthly-frequency (e.g. U.S. GDP is only available in quarterly and annual frequencies). Interpolation allows annual or quarterly data to be used in monthly-frequency regression modeling by converting it to a monthly variable.

The specific interpolation function utilized in Minnesota Power’s 2018 forecast process is known as a “Cubic Spline” interpolation. This technique is widely used because it produces a smooth monthly series by constraining the first and second derivatives of the variable to be continuous on the entire time interval.

The spline interpolation procedure was conducted in Statistical Analysis System (SAS) using the “Proc Expand” command with the method specified as “Spline” and the observed as “Middle.” The “Middle” specification denotes that an annual-to-monthly interpolation should assume the annual value as June, and July through May should be interpolated points. Quarterly-to-monthly interpolation should assume Quarter 1 as February, Quarter 2 as May, Quarter 3 as August, and Quarter 4 as November; all other months are interpolated points. The cubic spline interpolation function is in piecewise cubic polynomial form:<sup>9</sup>

$$Y_i(t) = a_i + b_i t + c_i t^2 + d_i t^3$$

Where:  $0 \leq t \leq 1$   
 $i = 1, 2, \dots, n - 1$   
 $Y_i = i^{th}$  piece of the spline  
 $a_i, b_i, c_i$  and  $d_i$  are estimated polynomial coefficients

The cubic spline method of interpolation has been in use since the Company’s AFR 2014 and was an improvement over previously-utilized interpolation methods.

*Modeling Techniques* – Most of the 30 dependent variables are modeled using a trend variable to explain general, underlying growth and one or two de-trended or differenced economic/demographic variables to explain any economically-driven divergence from this trend. This approach to regression modeling reduces the potential for an independent variable to be erroneously identified as significant due to spurious, or *false*, correlation.

As a rule, all models are OLS, which are simple, transparent, explainable, and produce optimal estimates of the coefficients. All input variables’ coefficients must be significant at a 90 percent confidence level (as indicated by a HAC-adjusted P-value less than 10 percent) and the VIF of each variable’s coefficient must be less than five (indicating minimal multicollinearity). A

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<sup>9</sup> <http://mathworld.wolfram.com/CubicSpline.html>.

constant, trend, or binary variable with a P-value greater than 10 percent or VIF greater than five may be retained if it is critical to the model structure.

- Test for multicollinearity using VIFs (Variance Inflation Factors) - multicollinearity is generally unacceptable in the final models but is assessed in the context of other variables and model statistics. The VIF of a variable is a measurement of its correlation with every other variable in the model whereas a correlation matrix would only identify the correlation of two variables to each other at each point in the matrix. Thus, VIFs are superior to a correlation matrix as a method of identifying multicollinearity. VIFs are assessed according to these criteria:
  - VIF less than 3 is optimal - correlation with the remaining variables is less than 82 percent.
  - VIF of 3-5 is acceptable, but is assessed in context with other diagnostics.
  - VIF of 5-10 is generally unacceptable, but is assessed in context with other diagnostics. A VIF > 5 implies correlation with remaining variables is greater than 90 percent.
  - VIF greater than 10 is unacceptable correlation for any economic variable. In this case the correlation with the remaining variables is greater than 95 percent.

VIFs on all economic and demographic variables in all models are well within acceptable limits. Minnesota Power considers high VIFs on certain binaries variables inconsequential since the cause of this correlation is clear; it's interacting with the intercept, weather variables, or other binaries. Because these binaries are important to the structure of the model, they are not excluded in the same way an economic variable would be if found to have high multicollinearity with other variables.

- Heteroscedasticity and Autocorrelation Consistent (HAC) - adjusts the standard errors of regression coefficients to correct t-statistics and P-values for biases resulting from autocorrelation and/or heteroscedasticity. Minnesota Power computes the HAC-adjusted P-values using a common HAC specification.<sup>10</sup> These HAC-adjusted P-values are used to determine inclusion/exclusion in the model. Coefficients themselves are not affected by this adjustment.

The AFR 2018 HAC-adjustment procedure simultaneously corrects P-values for both autocorrelation and heteroscedasticity. This automated adjustment streamlines model testing and selection, and produces a more robust final forecast.

Models that meet the above criteria, have plausible outputs (forecasts), and have intuitive econometric interpretations are put forward as potential final models for review during the *Forecast Determination* and *Forecast Review and Verification* steps (AFR 2018 Forecast Process pg. 9).

Once forecast models are verified and finalized, they form the basis of the “econometrically-determined” outlook for energy sales, peak demand, and customer count. Assumptions for future

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<sup>10</sup> Developed using Andrews (1991).

load additions/losses and/or adjustments to account for recent customer expansions are applied to the econometric outlook to produce Minnesota Power's final energy sales, peak demand, and customer count outlook.

*Leveraging Binary Variables to Account for Recent Trends* – Several of Minnesota Power's largest industrial and resale customers are in a time of significant change, and an accurate load forecast depends on properly identifying and accounting for these changes.

In AFR 2014, Minnesota Power began adjusting historical sales series to “back-out” recent large customer load additions to avoid double-counting customer usage in the forecast timeframe; once (partially) embedded in the econometric projection, and again through a post-regression load adjustment.

This approach is appropriate when the load addition/loss is quantifiable (e.g. a new customer, or a new customer-owned generator), but shouldn't be used when the load addition/loss cannot be accurately quantified (an existing customer's recent expansion); adjusting raw historical sales data with an estimate would just introduce additional uncertainty to the estimate.

Minnesota Power continues to adjust historical series for known/measurable recent load additions, and has supplemented this approach with the use of binaries and trend variables that account for large changes in load that cannot be precisely quantified (such as a customer expansion that's not metered separately).

The variables denote and account for a structural shift in a dependent variable (historical sales), and are then terminated at the start of the forecast timeframe to effectively “back out” this recent change so it can be accurately quantified and explicitly applied through a post-regression adjustment to the econometric series.

*Polynomial temperature specification for peak demand* – the AFR 2018 peak demand model uses a third-degree (cubed) temperature series alongside an un-adjusted temperature series to capture the non-linear relationship of load to temperature. The two variables (cubed and un-adjusted) create a polynomial temperature specification.

This approach was first used in AFR 2016 and was a change from prior AFRs that leveraged either a monthly interaction specification or a spline-type (temperature range) specification. These previous approaches model the effect of temperature on demand, and identify the non-continuous or non-linear relationship of load to temperature, but neither approach is the simplest solution.

A polynomial temperature specification is continuous/not segmented, so it can always be leveraged for weather-normalization. This specification is much simpler and commonly used in demand modeling. The Company has avoided using this specification in the past, believing that the coefficients associated with the spline-segments efficiently and clearly conveyed information about load's response to weather in a specific temperature range. However, the testing of after-the-fact weather-normalization has convinced Minnesota Power Load Forecasting that a Polynomial specification is superior.



*Modeled Peak Demand using hour-specific weather observations* – Whereas past AFR modeled peak demand using monthly HDD/CDD or daily high/low temperatures, AFR 2017 and AFR 2018 model peak demand as a function of the weather observations specific to the hour in which the peak occurred. The Company identified the historical peak date/times and queried an hourly weather observation dataset to identify the hourly temperature, humidity, and wind-chill coincident with the system peak. In theory, the temperature at the time of the peak should be more closely related with the load than a daily high or low temperature (for example). The Company has witnessed improved model statistics using this approach in both AFR 2017.

### **iii. Methodological Adjustments for AFR 2018**

Minnesota Power is continuously improving its forecast methodologies to better model and predict customer energy requirements, and for the last decade there have been numerous and substantial improvements with each annual forecast. The Company examined and tested several potential enhancements for this year's AFR, and chose to implement four notable enhancements in methodology or modeling practices.

*Energy Requirements Modeling* – Instead of modeling just the energy *delivered* to the mining and paper sectors, the Company chose to model total customer *energy requirements*, inclusive of the customer's own generation. The customer generation is then subtracted from the forecast series.

There are two interrelated reasons the Company opted to model a more consistently-defined "energy requirements" series instead of the "energy sales" series used in past AFR forecasts:

1. Improved Predictability – Whereas a monthly "energy sales" series fluctuates with the performance of customer owned generation, or may change sharply with a customer's acquisition/idling of generating capacity, an "energy requirements" series only varies with the customer's production schedule and therefore can be modeled accurately using an Industrial Production Index or other economic indicator.
2. Clear and transparent identification of customer generation assumptions – The Company's stated forecasting policy is: when possible, leave historical sales series unadjusted and use binaries to account for sharp changes in sales due to customer owned generation. However, recent changes in customer generating capabilities have *coincided* with significant tumult in both the iron and paper sectors caused by economic conditions. A binary variable cannot separate and measure these two recent and indistinct impacts, and as a result, the forecast would be poorly defined and unusable.

By modeling and forecasting an "energy requirements" series, the Company can be confident in the definition of the regression results, and then adjust the results as needed for predicted customer generation and any major load additions or losses.

*Load Requirements Modeling* - Instead of modeling just *delivered* load, the Company chose to model and forecast total *system load*, which includes customer generation used to serve customer load. The projected customer generation is then subtracted from the forecast series. The reasons for modeling the system load instead of delivered load are the same as for energy; given recent industry tumult and volatility in customer generation, modeling system-level load requirements requires fewer assumptions, the modeling is more exact, and regression results are clearly defined.

*Minnesota Iron Industrial Production Index* – this scaled version of Minnesota iron production more closely correlates with historical sales to the Company’s mining customers and compensates for a recent changes in the mining industry’s composition; namely, the closure of a sizeable iron mine in northern Michigan.

For nearly a decade, the Company has used the national-level iron IPI as an indicator of national iron/steel product demand given and, specifically, Minnesota iron demand. Figure 4 below shows Minnesota Iron has consistently comprised about 75 percent of overall US iron product, and had a clear, constant relationship to the US Index of Industrial Production. When modeling and forecasting energy sales to mining customers, the regression models have inherently assumed/inferred that Minnesota Power’s mining customers will continue to comprise about 75% of the national product in the forecast timeframe.

This is no longer an adequate assumption given recent changes in the mining industry’s composition. Minnesota Iron now comprises about 83 percent of US product. The closure of a sizable iron mine in northern Michigan has necessarily reduced overall US iron production but this has no negative affect on Minnesota mines; as shown in Figure 4 below, the two series have diverged.

Continued use of a national-level iron IPI would lead the energy sales model to follow the national trend and significantly under-forecast sales to mining customers. To resolve this issue, the Company developed a Minnesota Iron IPI. The development of this series is discussed in the “AFR 2018 Forecast Database Inputs” section.

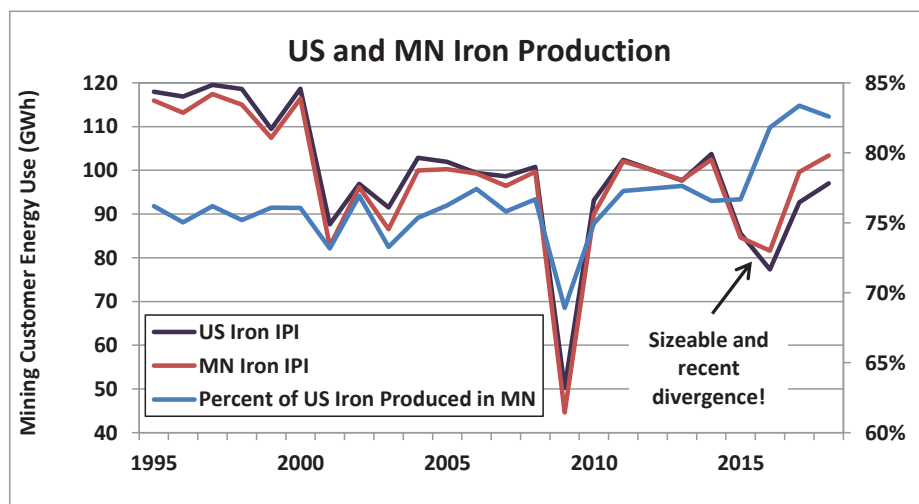


Figure 4: Minnesota and US Iron Production



The observable change in the relationship of U.S. to Minnesota iron production would have been recent enough in the AFR 2017 Mining and Metals model that it couldn't have had a notable impact on the forecast; there were only a few months of observed divergence between Minnesota production and U.S. production, but it's possible some under-forecasting could have occurred given the economic outlook at the time.

In contrast to the AFR 2017 historical timeframe (1/1990-3/2017), the AFR 2018 historical timeframe (1/1990-3/2018) contains a non-negligible period in which U.S. product does not correspond to Minnesota iron mining customers' energy use in its historically "normal" way. This divergence must be addressed but is too recent, and therefore has too few observations, to accurately and confidently denote with a binary variable. In the future, the Company will examine the use of a binary to account for the structural shift in relation of Minnesota production and U.S. production since this approach is simpler.

*Modeling Resale Customers Individually* – In past AFRs, the Company's 17 resale customers were modeled in aggregate as a single "resale" series using a single regression model. In AFR 2018, the Company separately modeled each resale customer individually using the same specification search process and modeling criteria as in its retail classes. This approach produces more detailed results and insights on the characteristics of each customer's system. Further, the Company expects this granular approach to result in greater forecast accuracy as each municipal customer can be modeled using more localized weather and/or economic/demographic conditions. Seasonality and other muni customer specific traits can also be clearly identified and accounted for, whereas modeling an aggregate resale energy sales series may obscure these finer details.

#### **iv. Treatment of Demand-Side Management (DSM), Conservation Improvement Programs (CIP), and Distributed Generation (DG)**

DSM programs represent activities that a utility undertakes to change the configuration or magnitude of the load shape of individual customers or a class of customers.

Minnesota Power has engaged in several different types of DSM:

- *Conservation* - Conservation results in a reduction in total electric energy consumed by a customer and the potential to reduce both on-peak and off-peak demand. Conservation generally results in a reduction in the overall rate of growth of electric energy demand. Conservation, in the context of Minnesota Power conservation programs,<sup>11</sup> may also include process efficiency, which results in the potential to reduce the total electric energy consumed by a customer as well as to decrease on-peak and/or off-peak demand. Process efficiency reduces the overall growth rate of electric demand because it results in greater production, through more efficient equipment or processes, from a facility for the same energy inputs. If the facility failed to implement process efficiency projects, more electric

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<sup>11</sup>Minnesota Power's Power of One program is made available to home and business customers. Refer to on-line conservation resources at <http://www.mnpower.com/EnergyConservation> for more information.

energy would be required to meet production requirements. Process efficiency generally results in avoided energy production and capacity additions over the long-term.

- *Peak Shaving* - Peak shaving reduces peak demand without affecting off-peak demand. Minnesota Power's dual-fuel load control and Large Power (LP) interruptible programs are peak shaving programs for economic and emergency conditions.
- *Load Shifting* - Electric demand is shifted from on-peak to off-peak hours. In 2014, Minnesota Power initiated a Time-of-Day (TOD) Rate Pilot and in 2015 extended the program<sup>12</sup>. Under this rate, customers pay more for usage during on-peak hours and critical peak pricing events, and receive a discount for usage during off-peak hours. The goal of this pilot is to gauge customer interest in new rate offerings that incentivize load shifting and to further inform decisions about broader program implementation and infrastructure investment.

Minnesota Power excluded any exogenous DSM/CIP data adjustment to the energy sales and demand forecasts. The impact of conservation and DSM/CIP programs are present in the historical data upon which all AFR 2018 models were constructed, and are therefore implicit in the forecasts. An exogenous adjustment on top of the embedded impacts may double count the effects of conservation and misstate energy consumption.

Minnesota Power excluded any exogenous data adjustments for DG to the energy sales and demand forecasts. Current penetration rates of both residential and commercial DG solar are very low, and, as such, DG has only a nominal impact on energy sales. As DG penetration rates increase and reliable estimates of future DG are made available, it may become possible/necessary to account for this transition in the load forecast.

## **v. Methodological Strengths and Weaknesses**

The Company's forecast process combines econometric modeling with a sensible approach to modifying model outputs for assumed changes in large customer loads. An econometric approach, utilizing regression modeling, is optimal for estimating a baseline projection with a given economic outlook. However, a fully econometric process would not imply any of the substantial industrial expansions that are likely in the Minnesota Power service territory. A combined "econometric/large customer load addition" approach produces the most reasonable forecast.

The Company's econometric modeling process has two key strengths; it is both highly replicable, and adept at narrowing the list of potential models to only those that are most likely to produce quality results which allows more time for in-depth statistical testing and critical review of each model.

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<sup>12</sup> Details of the program extension can be found under Docket Number E015/M-12-233 filed on March 25, 2018.

That said, there are some weaknesses to a combined “econometric/large customer load addition” approach. For instance, there is some subjectivity in the perceived likelihood of individual large customer load addition/losses since their magnitude or timing is difficult to estimate in a probabilistic way. To minimize subjectivity on the part of Minnesota Power, the Company utilizes information that has been publicly communicated by prospective customers in its scenario planning.

Minnesota Power is highly sensitive to large industrial customer decisions as large taconite, paper, and pipeline customers represent more than half of Minnesota Power’s system demand and energy sales at any given point in time. The Company addresses this potential for error by maintaining close contact with existing and potential customers to identify their plans, and then creating a range of plausible scenarios to address the uncertainty.

### **C. Inputs and Sources**

Minnesota Power draws on a number of external data sources and vendors for its indicator variables. Each year, the forecast database is updated with the most current economic and demographic data available. This involves an update of the entire historical timeframe since these data are frequently revised. Special attention is given to identifying any changes from previous years’ data and data sources. Changes from last year’s database are clarified later in this section.

#### **i. AFR 2018 Forecast Database Inputs**

##### Weather

Weather data for Duluth, Minnesota was collected for historical periods from the National Oceanic and Atmospheric Administration (NOAA) and from Weather Underground (WU).<sup>13</sup> Minnesota Power utilizes Monthly HDDs and CDDs in energy sales forecasting and peak-day weather conditions in peak demand forecasting.

Monthly total HDD and CDD are sourced from NOAA. The monthly total HDD and CDD values are normalized for the number of days in a month by dividing the monthly HDD or CDD count by the number of days in the month. This result in the “per-day” series HDDpd and CDDpd. For example:

The “per-day” value of 46.1 HDDpd in January 1990 was calculated as follows:

Duluth Minnesota’s HDD count for January 1990 (1428) is divided by the number of days in January (31) to produce an HDDpd value of 46.1.

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<sup>13</sup> <http://www.wunderground.com/>.

Normalizing the series by transforming to a per-day unit allows for a more accurate estimate of the weather's impact on energy sales. The forecast assumes a 20-year historical average for each month (Apr 1998 – Mar 2018). For example, January's forecast assumption is an average of Jan-99, Jan-00,..., Jan-18.

Temperature, humidity, and wind-chill data used to model peak demand are derived from Schneider Electric. In previous forecasts, the Company has leveraged either NOAA or WU for daily or monthly-frequency values. The 2018 AFR forecast database features weather observations that are specific to the historical peak hour – i.e. the temperature, humidity, and wind-chill at the time of the peak. This closer alignment between the peak demands and the weather that induced them should produce a more accurate estimate of weather-sensitivity and a more accurate forecast of future peak demand.

Development of the historical weather series begins by establishing the date and time of historical monthly peaks. Weather observations for these date/times is then gathered and organized into a monthly-frequency weather series.

Calculating a 20-year historical average of peak-time weather for use as a forecast assumption requires recorded peak dates for the timeframe prior to the establishment of the current electronic database (1998-1999). Minnesota Power uses the Federal Energy Regulatory Commission (FERC) Form 1 to identify the dates for peaks prior to 1999 and then gathers the corresponding weather data. Forecast assumptions for peak-day weather can be calculated from the completed 20-year history.

A Temperature-Humidity Index (THI)<sup>14</sup> is utilized to take into account the effect of heat and, when applicable, humidity on summer peaks. The THI is only applicable when temperatures exceed 75 degrees. A Wind-chill (WC) index<sup>15</sup> was also utilized to capture the cold temperatures and, when applicable, the cooling effects of wind speed.

### IHS Global Insight

IHS Global Insight is the singular source for all economic and demographic outlooks used in Minnesota Power's load forecast<sup>16</sup>. A single source for National, Metropolitan Statistical Area (MSA), and County-level outlooks ensures internal consistency of forecast assumptions.

IHS Global Insights data development process begins with producing a national-level forecast. County-level and MSA data for Northeast Minnesota is then calculated through a "Top-down/Bottom-up" approach; the Minnesota Power area economy is modeled independently, considering unique local conditions, and is then linked to the national economy to ensure consistency across the national, regional, state, and MSA levels.

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<sup>14</sup> [http://www.wpc.ncep.noaa.gov/html/heatindex\\_equation.shtml](http://www.wpc.ncep.noaa.gov/html/heatindex_equation.shtml).

<sup>15</sup> <http://www.nws.noaa.gov/os/windchill/index.shtml>.

<sup>16</sup> With the exception of two series that are derived from REMI: Population and GRP for the 13-County Planning Region.

Since 2009, Minnesota Power has utilized IHS Global Insight estimates of historical and forecast economic activity in Northeast Minnesota as key inputs to energy and customer count models. Recent years' forecast processes have featured an expansion of IHS Global Insight data use, and AFR 2018 continues this trend towards greater granularity and constancy.

AFR 2014 featured the adoption of IHS Global Insight's national-level economic indicators as inputs to Industrial Production Index (IPI) modeling process. IHS Global Insight provided access to more national-level variables than the previous source<sup>17</sup> and allowed Minnesota Power to expand its IPI forecast database. The data source change also maintained consistency of assumption in all areas of Minnesota Power's forecast process and among all levels of geographic granularity.

In both AFR 2015 and AFR 2016, the Company expanded the forecast database to include more geographically-granular indicators to add predictive power by more-closely aligning with the area containing Minnesota Power's customer base. AFR 2015 featured the addition of Duluth Metropolitan Statistical Area (Duluth MSA)<sup>18</sup> economic indicators, and the AFR 2016 database was expanded to include economic indicators for all *individual* counties in the 13-County Planning Area in addition to the 13-County Planning Area Aggregate.<sup>19</sup> This expanded the number of economic/demographic predictor variables from 78 (in AFR 2015 database) to 454 (in the AFR 2016, 2017 and AFR 2018 databases).

IHS Global Insight utilizes the most current historical data available from public data sources, which is updated frequently. These updates flow through IHS Global Insight's process to ultimately effect the historical series used in Minnesota Power's forecast database. Thus, the historical regional employment and income data has changed from last year's database.

The frequency of the raw Duluth MSA and National-level economic data is quarterly, and interpolation to a monthly frequency is necessary for use in Minnesota Power's monthly forecasting process. The interpolation method used is described in the *Specific Analytical Techniques* section.

#### Regional Economic Models, Inc. (REMI)

Minnesota Power subscribes to the latest REMI Policy Insight version (PI+) for northeastern Minnesota. This input/output econometric simulation software combines a national economic outlook<sup>20</sup> with specified regional economic conditions to produce a forecast for a 13-County Planning Area such as employment by sector, population, economic output by sector, and gross regional product (GRP).

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<sup>17</sup> Blue Chip Economic Indicators.

<sup>18</sup> The Duluth MSA is defined as St. Louis and Carlton counties in Minnesota, and Douglas County in Wisconsin.

<sup>19</sup> Minnesota Power's 13 County Planning Area is defined as: Carlton, Cass, Crow Wing, Hubbard, Itasca, Koochiching, Lake, Morrison, Pine, Saint Louis, Todd, and Wadena counties in Minnesota, and Douglas County Wisconsin.

<sup>20</sup> Prior to simulation, REMI is calibrated to the IHS Global Insight National Economic Outlook.

For AFR 2018, REMI was used to quantify the indirect economic effects of known and expected changes in regional employment (i.e. expansions and layoffs/closures) to produce an expected economic outlook for the region.

IHS Global Insight economic indicators for both 13-County Planning Area and the Duluth MSA are calibrated using the results of REMI's economic simulations. As the REMI outlook is adjusted for alternative planning scenarios, the monthly employment and income outlooks are changed accordingly.

Some indicators such as population and GRP are not provided by IHS Global Insight for the 13-County Planning area. These series are derived directly from REMI outputs, and are of annual frequency. Interpolation to a monthly frequency is necessary for use in Minnesota Power's monthly forecasting process. The interpolation method used is described in the *Specific Analytical Techniques* section.

Like IHS Global Insight, REMI relies on data from public sources that is subject to revision. These revised data inputs result in revised historical values for the economic and demographic indicators used in Minnesota Power's database.

#### Indexes of Industrial Production (IPI series)

The indexes of industrial production are measures of sector-specific production in a given month relative to a base year, 2012 in this case (that is, 2012 = 100). The indexes exhibit a high degree of correlation with Minnesota Power's historical industrial energy sales and are therefore ideal for forecasting future energy sales to the class.

The historical national-level IPI data were obtained from the Board of Governors of the Federal Reserve. The historical data is regularly revised to incorporate better data, better methods, and to update the base year. To capture these revisions, Minnesota Power updates the entire historical data series each year. These revisions are explained on the Federal Reserve's website.<sup>21</sup>

Forecasts for each national-level IPI were developed from the projections of national-level economic indicators from IHS Global Insight, and are therefore consistent with all other AFR 2018 forecast assumptions. These macroeconomic drivers are used to model and forecast the national-level IPI series.

The historical Minnesota iron IPI was developed using actual iron ore production data from the U.S. Geological Survey website (USGS).<sup>22</sup> The projected Minnesota iron IPI was developed by scaling the national-level Iron IPI forecast using an assumption of the industry's composition going forward. Minnesota now comprises about 83% of US product, so the Minnesota iron IPI equals the national-level IPI x 0.83. The entire historical and forecast Minnesota iron IPI was then indexed to 2012 for consistency with past AFR, the other IPI series used in AFR 2018, and the U.S. Federal Reserve's current standard index year.

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<sup>21</sup> <http://www.federalreserve.gov/releases/g17/revisions/Current/g17rev.pdf>.

<sup>22</sup> [https://minerals.usgs.gov/minerals/pubs/commodity/iron\\_ore/](https://minerals.usgs.gov/minerals/pubs/commodity/iron_ore/)



Note that Minnesota Power de-trends all input variables prior to modeling and opted to utilize an already de-seasonalized series from the external source rather than applying its own de-seasonalizing function. Both the seasonally-adjusted and unadjusted series are available from the Board of Governors of the Federal Reserve. The 2018 forecast database utilizes the seasonally adjusted historical indexes.

### Energy Prices

Estimates of future Minnesota Power rate changes are incorporated into the average electric price forecasts as generally indicative of the intention and anticipation of changes in the Company's rate structure and prices.

Average energy prices, history and forecast data, are from the Department of Energy (DOE) and Energy Information Administration (EIA). The fuel types considered are electricity and natural gas. End-use class energy price data is categorized by DOE/EIA into residential, commercial, and industrial. DOE's Annual Energy Outlook (AEO) is used for the forecast period. DOE provides historical energy price data for Minnesota, forecast energy price data for the West North Central (WNC) region, and the national total. Minnesota Power's historical average electric price data are from the Company's FERC Form 1 and represent annual class revenue divided by annual class energy. All energy prices are deflated by the 2009 base year GDP implicit price deflator (IPD).

### Appliance Saturation

Residential appliance saturation rates have been used as key determinants of residential energy use. Minnesota Power leverages customer survey data, EIA survey data, and key economic indicators to approximate the level of historical and forecast appliance ownership. Historical Central Air Conditioning, Electric Space Heat, and Electric Water Heat ownership rates were constructed from survey respondents' answers regarding age of appliances, dwelling age, etc. Forecasts of appliance saturation rates are produced by modeling the historical series using economic and demographic indicator variables such as Duluth MSA Housing Starts.

## **ii. Adjustments to Raw Energy Use and Customer Count Data**

Minnesota Power made a limited number of adjustments to internally developed data for AFR 2018, which fall into three general categories:

1. Adjustments to raw customer count data for billing anomalies
2. Adjustments to raw sales and peak demand data for large load additions and losses
3. Adjustments to convert sales data into overall energy requirements data

***Adjustments to raw customer count and energy sales data for billing anomalies*** – Minnesota Power's historical customer count and energy sales data contain a number of anomalous or missing observations that can affect modeling and resulting forecasts.

Employing a binary variable during modeling or adjusting the raw data prior to modeling are two common techniques used to avoid biasing models with anomalous observations. Prior to the AFR 2014 process, Minnesota Power used both techniques, but their application was not entirely consistent. The Company's current database and modeling policy is as follows:

Where there is a systemic shift (e.g. seasonal billing in residential customers count), Minnesota Power does not adjust the raw data and instead utilizes a binary variable in modeling. When there are less than 3 consecutive anomalous observations, Minnesota Power adjusts the raw data prior to regression using straight-line interpolation. In general, an observation was considered anomalous if it varied by more than 0.5 percent from a straight-line-interpolated value.

The 2018 customer count and energy sales database contains 179 monthly points (about 2.1 percent of all monthly points) that have been adjusted in this way.

*Adjustments to raw sales and peak demand data to account for large load additions and losses*  
– All adjustments to the historical database are described below in detail and organized by sector. The impact of this methodological change on the forecast for each customer class is discussed in the *Model Documentation* section.

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**TRADE SECRET ENDS**

*Notes on Adjustments to historical series:*

- When assessing the ability of economic variables to reflect the above mentioned structural breaks, Minnesota Power identified those instances when the raw energy sales series could be modeled more accurately than the adjusted series; in these cases when the economic data explains the change, the use of the raw sales series is appropriate. When the adjusted series can be modeled more accurately than the raw series, then it's evident that the economic data cannot adequately explain the shift and the adjusted historical sales series should be utilized. However, it should be noted that it is the Company's preference to use binary variables in these instances when the relationship between variables has changed by some measurable constant. This technique utilizes the raw data series (unadjusted) as a result.

- When recent load additions or losses can be accurately quantified, they are removed from the historical sales and peak series prior to modeling and a post-regression adjustment is used to account for the load addition or loss in the forecast timeframe. When it is not possible to accurately quantify this recent change (e.g. if a customer is served by a municipal customer and their usage data is not accessible by Minnesota Power), then no adjustment is made to the historical data. In this case, a post-regression adjustment is still applied to account for the load addition in the forecast timeframe. When it's evident that this load addition or loss is reflected in the econometric forecast or the change can be modeled with a binary variable, Minnesota Power will cease the application of a specific post-regression adjustment.

### iii. Changes to Forecast Database

Regarding externally derived data, Minnesota Power noted several changes between the AFR 2018 forecast database and the AFR 2017 database. Several changes concern adjustments to the historical dependent series (energy use, customer count, peak) and are explained in the previous section on “*Adjustments to raw sales and peak demand data to account for large load additions and losses.*” Another notable change in the forecast database is the definition of the Iron IPI; whereas last year's AFR used a US-level IPI, AFR 2018 uses an index of iron production specific to Minnesota, so these variables differ in their definition and historical/forecast values.

Regarding, regional economic indicators, all changes were fairly minor and are explainable and plausible. Minnesota Power is confident in moving forward with the database updates. Table 2 shows the series that were utilized in both the AFR 2017 and the AFR 2018 forecasts. The table shows the percent difference of the last full historical year common to both databases (2016), and identifies the percent difference in a forecast year (2020) for comparison.

**Table 2: Changes to Forecast Database**

| Economic and Demographic Variables                   | Changes to Database<br>2017 to 2018 | Percent difference in<br>variable in 2016 | Percent difference in<br>variable by 2020 |
|--|-------------------------------------|---|---|
| MP Area Total Non-Farm Employment                    | Change #1                           | -0.2%                                     | 0.8%                                      |
| MP Area Employment in Education & Health             | Change #1                           | 0.0%                                      | 1.9%                                      |
| MP Area Employment in Government                     | Change #1                           | -1.5%                                     | -1.1%                                     |
| MP Area Employment in Trade/Transp/Utilities         | Change #1                           | -0.3%                                     | 0.8%                                      |
| MP Area Employment in Other Services                 | Change #1                           | 3.2%                                      | -1.9%                                     |
| MP Area Employment in Information Services           | Change #1                           | 1.6%                                      | -9.0%                                     |
| MP Area Employment in Financial Services             | Change #1                           | 0.9%                                      | 4.3%                                      |
| MP Area Employment in Manufacturing                  | Change #1                           | -0.1%                                     | 0.8%                                      |
| MP Area Non-Wage Personal Income                     | Change #1                           | 0.4%                                      | -0.9%                                     |
| MP Area Gross Regional Product                       | Change #1                           | 0.4%                                      | 1.0%                                      |
| MP Area Population                                   | Change #1                           | -1.4%                                     | -2.8%                                     |
| MP Area Income per Capita                            | Change #1                           | 0.6%                                      | 0.5%                                      |
|  |                                     |   |   |
| Duluth MSA Total Non-Farm Employment                 | Change #2                           | 0.6%                                      | 0.9%                                      |
| Duluth MSA Employment in Education & Health          | Change #2                           | -0.2%                                     | 1.4%                                      |
| Duluth MSA Employment in Manufacturing               | Change #2                           | 0.4%                                      | 2.3%                                      |
| Duluth MSA Real Gross Metro Product                  | Change #2                           | 5.7%                                      | 5.2%                                      |
| Duluth MSA Population                                | Change #2                           | 0.1%                                      | 0.7%                                      |
| Duluth MSA Disposable Total Personal Income          | Change #2                           | -0.2%                                     | -0.1%                                     |
| Duluth MSA Housing Starts                            | Change #2                           | 188.4%                                    | 2.4%                                      |
|  |                                     |   |   |
| St. Louis County Total Non-Farm Employment           | Change #3                           | 0.6%                                      | 1.8%                                      |
| St. Louis County Employment in Government            | Change #3                           | 0.2%                                      | 3.1%                                      |
| St. Louis County Employment in Education and Health  | Change #3                           | -0.2%                                     | 2.4%                                      |
| St. Louis County Employment in Manufacturing         | Change #3                           | 0.4%                                      | 3.1%                                      |
| St. Louis County Employment in Information Services  | Change #3                           | 1.9%                                      | -9.0%                                     |
| St. Louis County Employment in Leisure & Hospitality | Change #3                           | 1.3%                                      | 5.5%                                      |
| St. Louis County Employment in Financial Services    | Change #3                           | 0.4%                                      | 3.4%                                      |
| St. Louis County Non-Wage Personal Income            | Change #3                           | 0.7%                                      | 2.0%                                      |
|  |                                     |   |   |
| Industrial Production Index: Iron Ore Mining         | Change #4                           | 3.5%                                      | 7.3%                                      |
| Industrial Production Index: Paper                   | Change #4                           | 1.5%                                      | 0.1%                                      |

*Change #1 (Minnesota Power Area Employment, Regional Product, & Population Metrics)* – When aggregated to annual values, the employment and regional product series for the Minnesota Power 13-County area show upward movement from the AFR 2017 historical data. The outlooks for each series have been updated to reflect the most current outlook by IHS Global Insight.

*Change #2 (Duluth MSA Employment, Metro Product, & Population Metrics)* – Most Duluth MSA variables are slightly higher than in the AFR 2017 database. The Disposable Total Personal Income series is the only Duluth MSA variable to have decreased from last year's database, and this decrease is extremely small, just 0.1 percent difference. AFR 2017's Housing Starts preliminary value for 2016 has since been revised by IHS Global Insight to reflect a much higher (674 vs. 234) actual number. Similar to the 13-County metrics above, the outlooks for each series have been updated to reflect the most current outlook by IHS Global Insight.

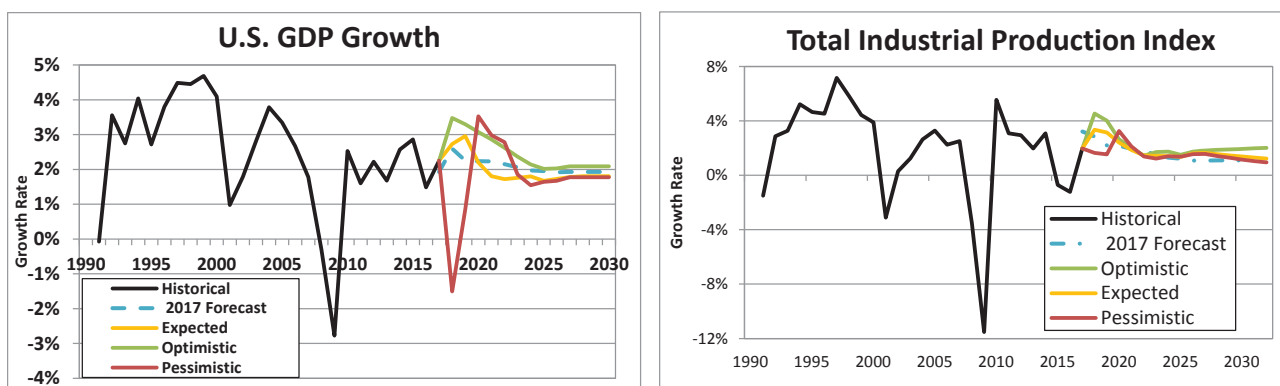
Change #3 (St. Louis County Employment/Personal Income Metrics) – nearly all employment and income variables (employment Information Services is the only exception) for St. Louis County have increased relative to the AFR 2017 historical data. The historical data and projections for each series have been updated to reflect the most current data available from IHS Global Insight.

Change #4 (Industrial Production Indexes) – As noted in the *Inputs and Sources* section, historical IPI series were downloaded from the Federal Reserve Board’s Data Download Program. The iron IPI in the 2018 database is a Minnesota-only definition using the methodology described in the “AFR 2018 Inputs and Sources” section, so this will differ from the AFR 2017 national level iron IPI. It should be noted that the base year (2012 = 100) for all IPI is the same as last year’s projection.

## D. Overview of Key Inputs/Assumptions

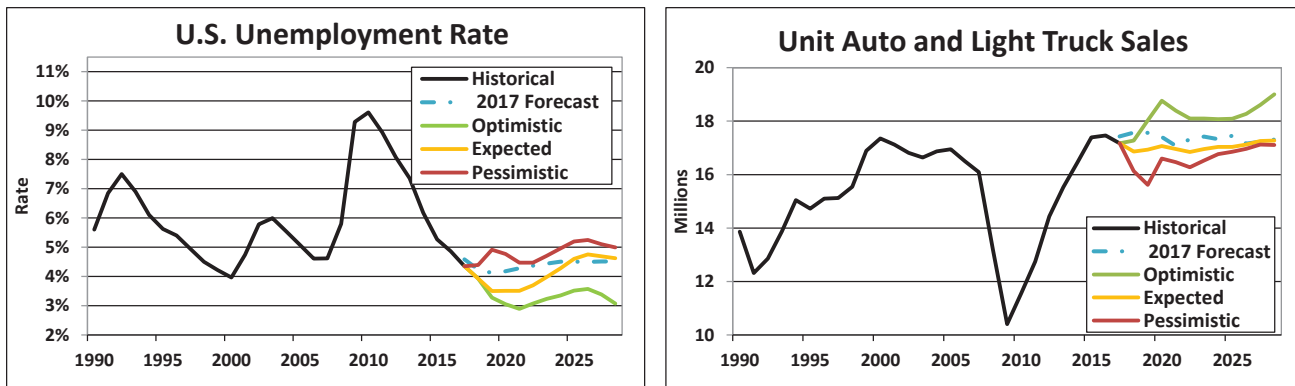
### i. National Economic Assumptions

The national economic outlook is derived from IHS Global Insight and serves as the basis for Minnesota Power’s regional economic model simulations. Some of the key outputs of the national economic forecast are GDP, IPI, unemployment rates, and auto sales. These variables are shown in Figures 5-8 below, for the Expected, Optimistic, and Pessimistic cases.



Figures 5 and 6: National Economic Outlook (GDP and Industrial Production)

The Expected case (yellow) macroeconomic outlook serves as the underlying assumption for Moderate all scenarios in AFR 2018. In the Expected case, U.S. GDP and IPI growth average 1.9 and 1.8 percent per year from 2018-2032 respectively.

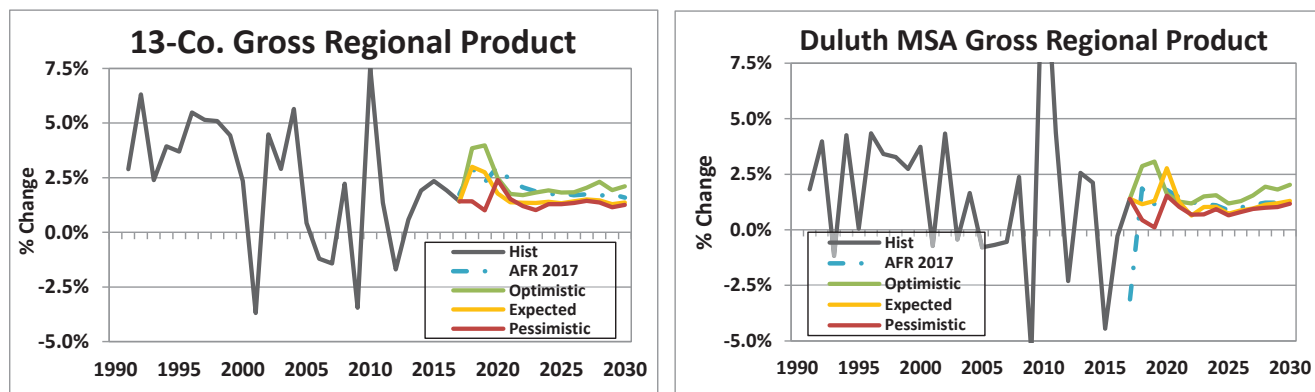


Figures 7 and 8: National Economic Outlook (Unemployment Rate and Auto Sales)

Figure 7 shows the unemployment rates in the three national outlooks all fluctuate slightly in the first few years of the forecast timeframe before reaching long term labor market stability consistent with the assumed rate of GDP growth. Assumptions of unit auto and light truck sales in Figure 8 show similar pattern in the forecast timeframe with moderate improvement in the short-term and stabilization in the long-term.

## ii. Regional Economic Assumptions

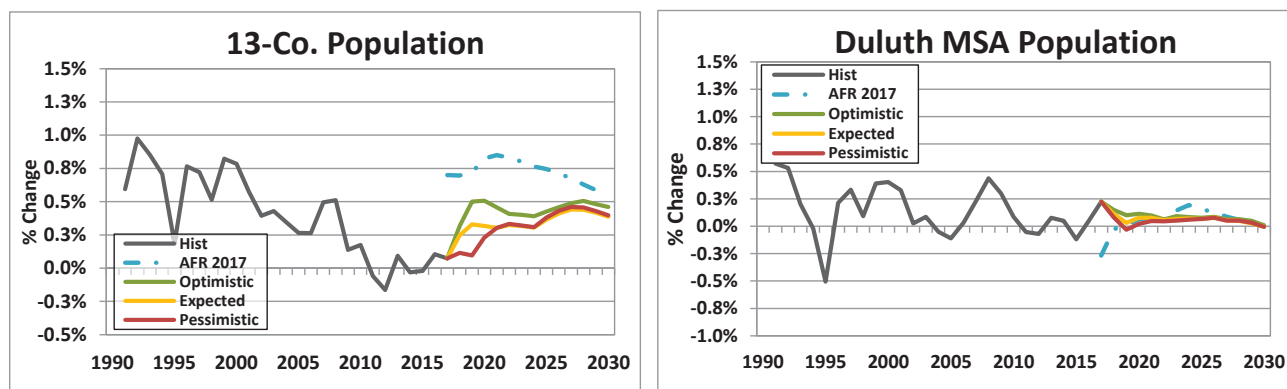
The Regional Economic Model provided by REMI is calibrated to the geographic area additively defined as 13 counties, 12 counties in Minnesota (Carlton, Cass, Crow Wing, Hubbard, Itasca, Koochiching, Lake, Morrison, Pine, Saint Louis, Todd, and Wadena) and one county in Wisconsin (Douglas). This is referred to as the “13-County Planning Area.” Minnesota Power expanded its database to include economic and demographic indicators at the Metropolitan Statistical Area level (this includes St. Louis and Carlton counties in Minnesota and Douglas County Wisconsin). The graphs below show alternative economic outlooks for both regions based on the high and low outlooks for the nation. The regional economic outlooks are further specified by incorporating scenario-specific inputs into REMI, as described in Section 1.C. Figures 9 and 10 compare the historical and projected growth rate of both regions’ product.



Figures 9 and 10: Regional Economic Outlooks (13-County Product and Duluth MSA Product)

The 13-County Planning Area’s Gross Regional Product averages 1.6 percent per year growth in the forecast timeframe whereas the Duluth MSA product averages just 1.2 percent per year in the

forecast timeframe. Population growth rates show a similar trend: the 13-County Planning Area grows at about 0.4 percent in the forecast timeframe and the Duluth MSA area population grows at just 0.06 percent per year. The difference in the two regions' historical and projected growth, shown below in Figures 11 and 12, demonstrates why Minnesota Power expanded its database to include both Duluth MSA and the 13 county regional data.



Figures 11 and 12: Regional Economic Outlooks (13-County Population and Duluth MSA Population)

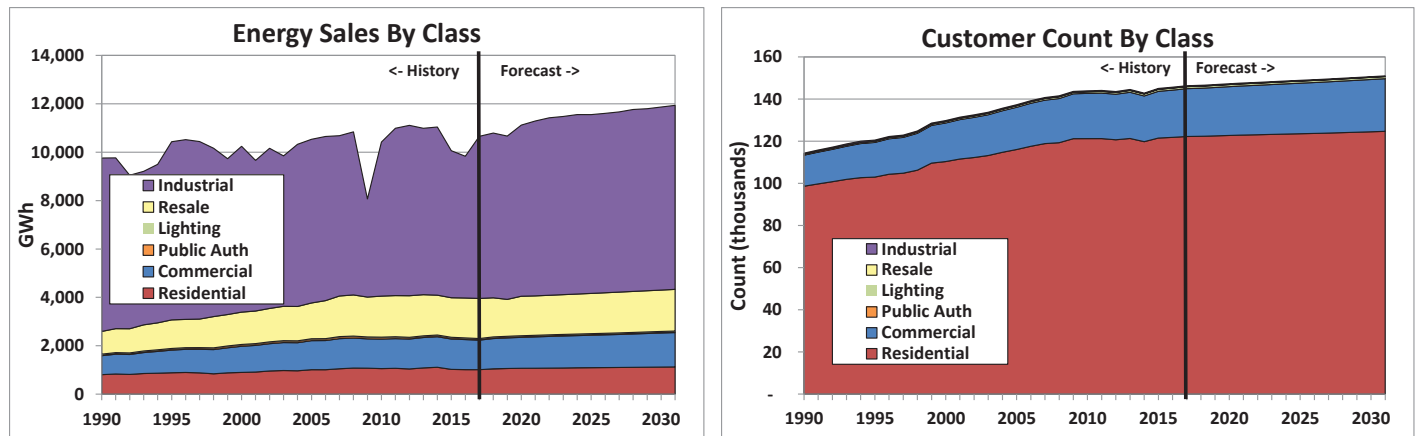
## A. Econometric Model Documentation

This section presents the statistical detail of all models utilized in the development of the AFR 2018 forecast. The model's structure, key diagnostic statistics, forecast results, and a discussion of the model are provided for added transparency.

Models are shown with each variable's coefficient, t-statistic, P-value, and VIF. A graph displays the historical series, growth rates for timeframes of interest, and compares this year's forecast to last year's forecast. A table shows a more focused view of the forecast with a shorter historical timeframe to examine year-over-year growth rates. Key diagnostic statistics for the OLS model are shown in a table in the bottom left corner of each page. Specific diagnostic criteria and modeling techniques discussed in this section are described in detail in Section B. Minnesota Power's Forecast Process under the heading *Specific Analytical Techniques*.

Minnesota Power offers a discussion of the modeling approach, econometric interpretations of key variables, and potential model issues for each model. This portion of the model documentation also compares this year's model with last year's model and notes any interesting findings or insights gained.

All forecast values shown in this section are the 2018 expected case "Moderate" scenario. The forecast values shown in the chart and tables for each model combine the econometric output with specific load, energy, and customers count additions. The total energy sales outlook is shown below (left) with the total customer count outlook (right).



Figures 13 and 14: Moderate Scenario Projection of Energy Sales and Customer Count by Class

Minnesota Power did not develop a model to forecast Sales for Resale customer count. Minnesota Power currently has 17 resale customers, each of which has signed a service agreement. The loss or gain of a resale customer is therefore better accounted for by reviewing these agreements and communicating with customers. Econometric models are not appropriate for estimating future resale customer counts.



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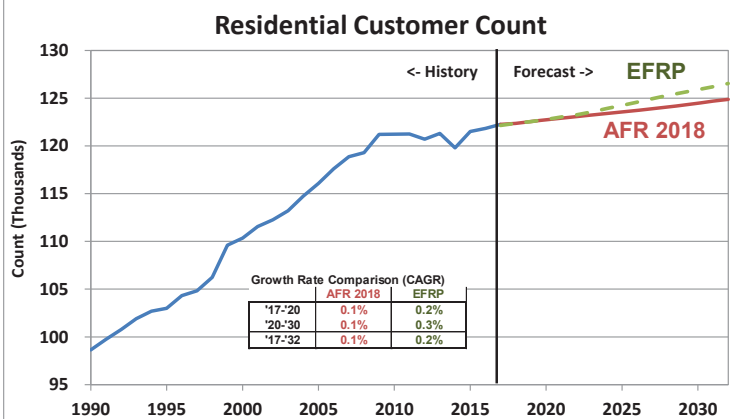
# Residential Customer Count - Moderate Scenario

Estimation Start/End: 1/1990 - 3/2018  
Unit Modeled/Forecast: Monthly Customer Count

| Variable        | Model Specifications |         |             |      |
|-----------------|----------------------|---------|-------------|------|
|                 | Coefficient          | P-Value | HAC-P-Value | VIF  |
| CONST           | 90,269.57            | 0.00%   | 0.00%       |      |
| Time_Trend      | 96.03                | 0.00%   | 0.00%       |      |
| Bill_Res_1      | (2,130.71)           | 0.00%   | 0.00%       |      |
| Bill_Res_2      | (3,309.51)           | 0.00%   | 0.00%       |      |
| Bi_2011         | (1,545.70)           | 0.00%   | 0.00%       |      |
| Bi_2012_2032    | 17,356.74            | 0.00%   | 0.00%       |      |
| Trend_2012_2032 | (74.84)              | 0.00%   | 0.00%       |      |
| MSA_MFG_t       | 279.89               | 0.00%   | 4.38%       | 2.20 |
| EduH_StLou_t    | 0.26                 | 0.00%   | 2.62%       | 4.50 |

| Residential Customer Count |         |            |
|----------------------------|---------|------------|
| Year                       | Count   | Y/Y Growth |
| 2007                       | 118,870 |            |
| 2008                       | 119,300 | 0.4%       |
| 2009                       | 121,217 | 1.6%       |
| 2010                       | 121,235 | 0.0%       |
| 2011                       | 121,251 | 0.0%       |
| 2012                       | 120,697 | -0.5%      |
| 2013                       | 121,314 | 0.5%       |
| 2014                       | 119,789 | -1.3%      |
| 2015                       | 121,515 | 1.4%       |
| 2016                       | 121,836 | 0.3%       |
| 2017                       | 122,253 | 0.3%       |
| 2018                       | 122,353 | 0.1%       |
| 2019                       | 122,540 | 0.2%       |
| 2020                       | 122,751 | 0.2%       |
| 2021                       | 122,926 | 0.1%       |
| 2022                       | 123,074 | 0.1%       |
| 2023                       | 123,241 | 0.1%       |
| 2024                       | 123,414 | 0.1%       |
| 2025                       | 123,554 | 0.1%       |
| 2026                       | 123,717 | 0.1%       |
| 2027                       | 123,889 | 0.1%       |
| 2028                       | 124,073 | 0.1%       |
| 2029                       | 124,280 | 0.2%       |
| 2030                       | 124,490 | 0.2%       |
| 2031                       | 124,688 | 0.2%       |
| 2032                       | 124,872 | 0.1%       |

| Model Statistics   | Magnitude |
|--------------------|-----------|
| Adjusted R^2       | 99.8%     |
| AIC                | 11.94     |
| SIC                | 12.04     |
| Degrees of Freedom | 330       |
| Durban-Watson      | 0.8       |
| MAPE               | 0.27%     |
| In-Sample RMSE     | 386       |
| Out-of-Sample RMSE | 593       |



## Model Discussion

The AFR 2018 forecast of residential customer count is very similar to the EFRP (AFR 2017) outlook. The forecast annual growth rate declined by about 0.2% from AFR 2017, and the AFR 2018 projected customer count is about 1,400 customers (1%) lower than the AFR 2017 outlook by 2030.

Key economic drivers of customer growth include Employment in the Manufacturing sector (MSA) and Education & Health employment (St. Louis County). This differs from last year's model which utilized Total Non-Farm Employment (St. Louis County) in addition to Education & Health employment. Nearly all of the top models for residential customer count contained Employment in the Education and Health sector, and this variable has been a staple of AFR residential count models for several years.

Minnesota Power's econometric interpretation of the key drivers is as follows: For each new Manufacturing employee, the customer count should increase by about 0.280. For each job added to the Education & Health sector, the customer count should increase by about 0.259. These impacts are in addition to a general upward trend over time. These variables are plausible and intuitive.

Education and Health sector accounts for 27% of St. Louis County employment and has been a strong driver of overall employment growth in the area. From 2000 to 2017, the county has seen Education & Health employment grow by 10,500 jobs (almost 60%). However, this sector is only projected to add another 3,600 jobs by 2030. The Manufacturing sector accounts for 6% of MSA employment and has decreased by about 2,700 jobs from 2000 to 2017.

A combination of binary variables for 2011 and 2012-2032, as well as a trend variable denoting the 2012-2032 timeframe shift the level and trend of the estimate to align with recent customer growth. These variables also effectively shift the first forecast year (2018) to align with the last historical year (2017). Without these corrective binary variables, a small but growing divergence between actual and predicted customer growth in the late historical timeframe suggests the economic indicators alone would overstate customer count. The 2018 forecast values from models without corrective binary variables would project an increase of about 1,360 customers from 2017 to 2018 (a 1.1% increase). The corrective binary variables shift the forecast down to avoid an improbable increase in customer count.

Two binary variables (Bill\_Res) account for seasonal billing between 1994 and 2001. Due to accounting practices, during this timeframe the recorded customer counts from November to May are 2,000-6,000 lower than from June to October. Previous years' residential customer count models also utilized these variables.

This year's model is highly comparable to last year's in terms of statistical quality. The Adjusted R-Squared indicates there's a high goodness-of-fit, and the low SIC indicates a highly parsimonious model. The HAC-Adjusted P-values ("HAC-P-Value") suggests all variables' coefficients are significant. In-sample and Out-sample error metrics have improved over last year: In-sample MAPE is 0.27% vs. 0.31% in the 2017 model, and Out-sample RMSE is 593 vs. 731 in the 2017 model. The low Variance Inflation Factors (VIF) of each economic variable proves there is no significant multicollinearity among non-binary, non-trend variables.

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## Commercial Customer Count - Moderate Scenario

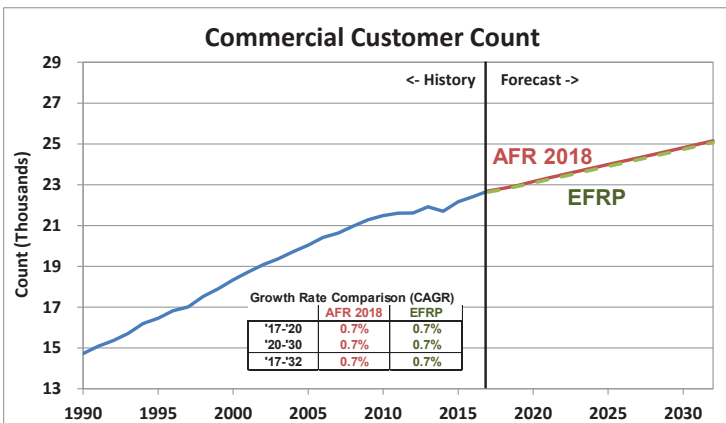
Estimation Start/End: 1/1990 - 3/2018  
Unit Modeled/Forecast: Monthly Customer Count

| Variable        | Model Specifications |         |             |      |
|-----------------|----------------------|---------|-------------|------|
|                 | Coefficient          | P-Value | HAC-P-Value | VIF  |
| CONST           | 13,481.46            | 0.00%   | 0.00%       |      |
| Time_Trend      | 28.39                | 0.00%   | 0.00%       |      |
| Bi_2010_2032    | 3,279.26             | 0.00%   | 0.00%       |      |
| Trend_2010_2032 | (13.83)              | 0.00%   | 0.00%       |      |
| Info_13_t       | 0.13                 | 0.00%   | 0.00%       | 2.30 |
| Fin_StLou_t     | 0.16                 | 0.00%   | 0.02%       | 2.80 |

Commercial Customer Count

| Count | YY Growth |
|-------|-----------|
| 2007  | 20,630    |
| 2008  | 20,969    |
| 2009  | 21,287    |
| 2010  | 21,491    |
| 2011  | 21,603    |
| 2012  | 21,614    |
| 2013  | 21,915    |
| 2014  | 21,697    |
| 2015  | 22,170    |
| 2016  | 22,420    |
| 2017  | 22,695    |
| 2018  | 22,822    |
| 2019  | 22,973    |
| 2020  | 23,155    |
| 2021  | 23,331    |
| 2022  | 23,495    |
| 2023  | 23,662    |
| 2024  | 23,826    |
| 2025  | 23,991    |
| 2026  | 24,153    |
| 2027  | 24,317    |
| 2028  | 24,481    |
| 2029  | 24,647    |
| 2030  | 24,817    |
| 2031  | 24,986    |
| 2032  | 25,154    |

| Model Statistics   | Magnitude |
|--------------------|-----------|
| Adjusted R^2       | 99.8%     |
| AIC                | 9.18      |
| SIC                | 9.24      |
| Degrees of Freedom | 333       |
| Durban-Watson      | 1.4       |
| MAPE               | 0.34%     |
| In-Sample RMSE     | 97        |
| Out-of-Sample RMSE | 101       |



### Model Discussion

The AFR 2018 forecast of commercial customer count is very similar to the EFRP (AFR 2017) outlook. The forecast annual growth rate is the same in both AFR 2017 and the AFR 2018 (0.7% per year), and the projected customer count is just 85 customers (0.3%) higher than the AFR 2017 outlook by 2030.

Key economic drivers of customer growth include Employment in the Information (13-County) and Financial Services sectors (St. Louis County). This model differs slightly from last year's model which was driven by Employment in the Information (St. Louis County) and Other Services sectors (13-County). The Commercial customer count model has contained Employment in the Information sector for several years now.

Minnesota Power's econometric interpretation of the key drivers is as follows: For each job added to the Information sector, the customer count should increase by about 0.12. For each job added to the Financial Services sector, the customer count should increase by about 0.16. These impacts are in addition to a general upward trend over time. These variables are plausible and intuitive.

A combination of a binary variable for 2010-2032 and trend variable denoting the 2010-2032 timeframe shift the level and trend of the estimate to align with recent customer growth. These variables effectively shift the first forecast year (2018) to align with the last historical year (2017). Without this corrective binary variable, a small but growing divergence between actual and predicted customer growth suggests the economic indicators alone would overstate customer count, and the 2018 forecast value confirms this. Without these binary variables, the model would project an increase of about 550 customers from 2017 to 2018 (a 2.4% increase).

This year's model is highly comparable to last year's in terms of statistical quality. The Adjusted R-Squared indicates there's a high goodness-of-fit, and the low SIC indicates a highly parsimonious model. The HAC-Adjusted P-values ("HAC-P-Value") suggests all variables' coefficients are significant. In-sample and Out-sample error metrics are nearly identical: In-sample MAPE is 0.34% vs. 0.33% in the 2017 model, and Out-sample RMSE is 101 vs. 97 in the 2017 model. The low Variance Inflation Factors (VIF) of each economic variable proves there is no significant multicollinearity among non-binary, non-trend variables.

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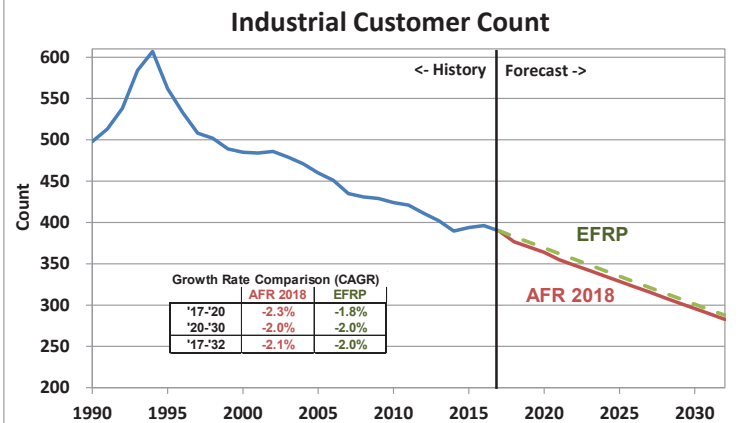
## Industrial Customer Count - Moderate Scenario

Estimation Start/End: 2/1990 - 3/2018  
Unit Modeled/Forecast: Monthly Customer Count

| Variable        | Model Specifications |         |             |      |
|-----------------|----------------------|---------|-------------|------|
|                 | Coefficient          | P-Value | HAC-P-Value | VIF  |
| CONST           | 566.04               | 0.00%   | 0.00%       |      |
| Time_Trend      | (0.57)               | 0.00%   | 0.00%       |      |
| Bi_2016_2032    | 11.07                | 3.18%   | 4.39%       |      |
| TotNonF_13_diff | 0.002                | 22.54%  | 3.19%       | 1.00 |

| Industrial Customer Count |       |            |
|---------------------------|-------|------------|
| Year                      | Count | Y/Y Growth |
| 2007                      | 435   |            |
| 2008                      | 431   | -0.9%      |
| 2009                      | 429   | -0.5%      |
| 2010                      | 424   | -1.2%      |
| 2011                      | 421   | -0.7%      |
| 2012                      | 411   | -2.4%      |
| 2013                      | 402   | -2.2%      |
| 2014                      | 390   | -3.1%      |
| 2015                      | 394   | 1.0%       |
| 2016                      | 396   | 0.6%       |
| 2017                      | 390   | -1.6%      |
| 2018                      | 377   | -3.4%      |
| 2019                      | 370   | -1.7%      |
| 2020                      | 364   | -1.8%      |
| 2021                      | 355   | -2.5%      |
| 2022                      | 348   | -1.9%      |
| 2023                      | 342   | -1.8%      |
| 2024                      | 335   | -1.9%      |
| 2025                      | 329   | -2.0%      |
| 2026                      | 322   | -2.0%      |
| 2027                      | 316   | -2.0%      |
| 2028                      | 309   | -2.1%      |
| 2029                      | 302   | -2.2%      |
| 2030                      | 296   | -2.1%      |
| 2031                      | 289   | -2.3%      |
| 2032                      | 283   | -2.3%      |

| Model Statistics   | Magnitude |
|--------------------|-----------|
| Adjusted R^2       | 85.4%     |
| AIC                | 6.24      |
| SIC                | 6.29      |
| Degrees of Freedom | 334       |
| Durban-Watson      | 0.1       |
| MAPE               | 2.49%     |
| In-Sample RMSE     | 23        |
| Out-of-Sample RMSE | 28        |



### Model Discussion

The AFR 2018 forecast of Industrial customer count growth is a bit lower than the EFRP (AFR 2017) outlook, but the econometric model is fairly similar. The key economic driver of customer count is Total Non-Farm Employment (13-County). The AFR 2017 model for industrial customer count was also driven by Total Non-Farm Employment (13-County).

Minnesota Power's econometric interpretation of the key driver is as follows: As Total Non-Farm Employment in the month-to-month change in 13-County region increases by 1,000 the customer count should increase by 2. These impacts are in addition to a general downward trend over time, as indicated by the negatively signed trend variable.

Similar to EFRP, this year's model features a binary variable "Bi\_2016\_2032" to denote a very recent unexpected, but likely temporary halt in the overall negative trend of industrial customer count. This binary variable simply shifts the forecast to align with recent history, and without this binary variable the outlook for 2018 would reflect an implausibly large one-year decrease from 2017 counts.

This year's model is comparable to EFRP's in terms of statistical quality. The Adjusted R-Squared indicates there's moderate goodness-of-fit, and the low SIC indicates a highly parsimonious model. The HAC-Adjusted P-values ("HAC-P-Value") suggests all variables' coefficients are significant. In-sample and Out-sample error metrics are nearly identical: In-sample MAPE is 2.49% vs. 2.55% in the EFRP model, and Out-sample RMSE is 27.6 vs. 28.1 in the EFRP model. The low Variance Inflation Factor (VIF) of the economic variable proves there is no significant multicollinearity among non-binary, non-trend variables.

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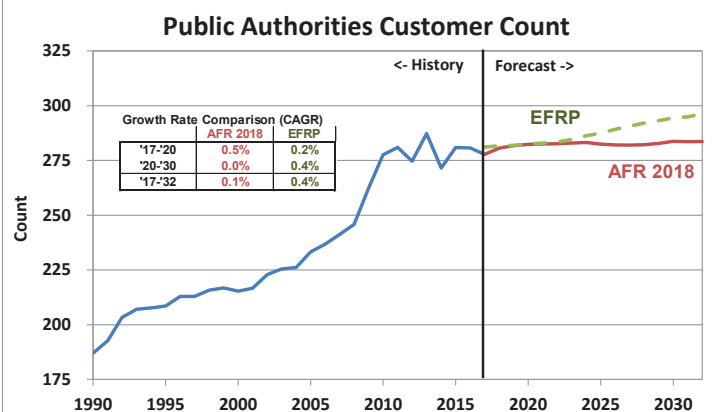
Public Authorities Customer Count - Moderate Scenario

Estimation Start/End: 1/1990 - 3/2018  
Unit Modeled/Forecast: Monthly Customer Count

| Variable         | Model Specifications |         |             |      |
|------------------|----------------------|---------|-------------|------|
|                  | Coefficient          | P-Value | HAC-P-Value | VIF  |
| CONST            | (26.30)              | 8.68%   | 49.60%      |      |
| Time_Trend       | 0.19                 | 0.00%   | 0.00%       |      |
| Bi_7_2009        | 25.67                | 0.00%   | 0.00%       |      |
| Bi_2011_2032     | 8.30                 | 0.00%   | 0.03%       |      |
| MSA_Edu_Health_t | 5.43                 | 0.00%   | 0.00%       | 1.70 |
| Gov_13_t         | 0.002                | 0.00%   | 0.50%       | 1.30 |

| Public Auth. Customer Count |       |            |
|-----------------------------|-------|------------|
| Year                        | Count | Y/Y Growth |
| 2007                        | 241   |            |
| 2008                        | 246   | 1.9%       |
| 2009                        | 262   | 6.7%       |
| 2010                        | 278   | 5.8%       |
| 2011                        | 281   | 1.2%       |
| 2012                        | 275   | -2.3%      |
| 2013                        | 287   | 4.6%       |
| 2014                        | 272   | -5.5%      |
| 2015                        | 281   | 3.4%       |
| 2016                        | 281   | -0.1%      |
| 2017                        | 278   | -1.0%      |
| 2018                        | 281   | 1.0%       |
| 2019                        | 282   | 0.4%       |
| 2020                        | 282   | 0.2%       |
| 2021                        | 283   | 0.1%       |
| 2022                        | 283   | 0.0%       |
| 2023                        | 283   | 0.1%       |
| 2024                        | 283   | 0.1%       |
| 2025                        | 282   | -0.3%      |
| 2026                        | 282   | -0.1%      |
| 2027                        | 282   | 0.0%       |
| 2028                        | 282   | 0.1%       |
| 2029                        | 283   | 0.2%       |
| 2030                        | 284   | 0.3%       |
| 2031                        | 284   | -0.1%      |
| 2032                        | 284   | 0.0%       |

| Model Statistics        | Magnitude |
|-------------------------|-----------|
| Adjusted R <sup>2</sup> | 98.2%     |
| AIC                     | 2.93      |
| SIC                     | 3.00      |
| Degrees of Freedom      | 333       |
| Durban-Watson           | 0.6       |
| MAPE                    | 1.51%     |
| In-Sample RMSE          | 4.3       |
| Out-of-Sample RMSE      | 6.1       |



Model Discussion

The AFR 2018 forecast of Public Authorities customer count growth is lower than EFRP (AFR 2017) forecast. Key economic drivers of customer growth include Employment in the Education & Health sector (Duluth MSA) and Public sector employment (13-County). Last year's model also used both of these variables.

Minnesota Power's econometric interpretation of the key drivers is as follows: For every 1,000 jobs added in the Education & Health sector at the Duluth MSA level, the customer count should increase by about 5.4. For every 1,000 jobs added in the Public sector (13-County), the customer count should increase by 1.8. These impacts are in addition to a general upward trend over time.

A binary variable starting in July-2009 accounts for a step-change or "systematic shift" in the historical accounting data. The corrective binary variables shift the forecast up slightly to avoid improbable decreases in customer counts, but do not impact the forecast trajectory; this is determined by the economic variables. A binary variable "Bi\_2011\_2032" is necessary to align the immediate forecast years with recent historical levels.

This year's model is highly comparable to last year's in terms of statistical quality. The Adjusted R-Squared indicates there's a high goodness-of-fit, and the low SIC indicates a highly parsimonious model. The HAC-Adjusted P-values ("HAC-P-Value") suggests all variables' coefficients' (except the intercept) are significant. In-sample and Out-sample error metrics are nearly identical: In-sample MAPE is 1.51% vs. 1.53% in the 2017 model, and Out-sample RMSE is 6.1 vs. 6.1 in the 2017 model. The low Variance Inflation Factors (VIF) of each economic variable proves there is no significant multicollinearity among non-binary, non-trend variables.

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## Street Lighting Customer Count - Moderate Scenario

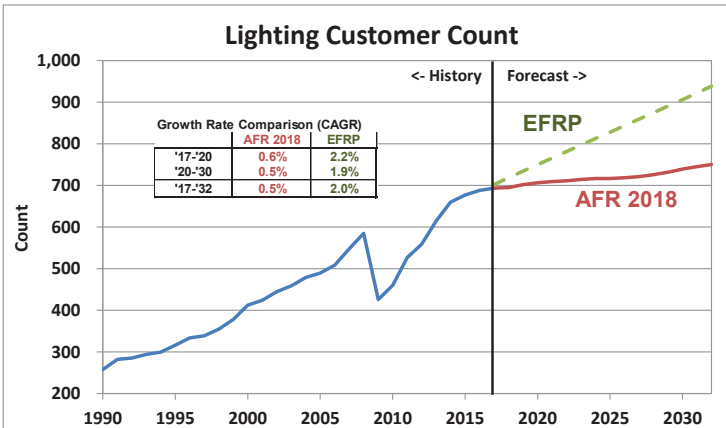
Estimation Start/End: 1/1990 - 3/2018  
Unit Modeled/Forecast: Monthly Customer Count

| Variable           | Model Specifications |         |             |      |
|--------------------|----------------------|---------|-------------|------|
|                    | Coefficient          | P-Value | HAC-P-Value | VIF  |
| CONST              | (342.37)             | 0.00%   | 0.00%       |      |
| Time_Trend         | 1.39                 | 0.00%   | 0.00%       |      |
| Bi_Light_7_2009    | (891.97)             | 0.00%   | 0.00%       |      |
| Trend_Light_7_2009 | 3.05                 | 0.00%   | 0.00%       |      |
| Bi_2016_2032       | 1,049.00             | 0.00%   | 0.00%       |      |
| Trend_2016_2032    | (3.42)               | 0.00%   | 0.00%       |      |
| NonWPI_StLou_t     | 0.04                 | 0.00%   | 0.40%       | 2.30 |
| MSA_Edu_Health_t   | 19.551               | 0.00%   | 0.00%       | 2.60 |

### Lighting Customer Count

| Count | Y/Y Growth |
|-------|------------|
| 2007  | 548        |
| 2008  | 585        |
| 2009  | 426        |
| 2010  | 460        |
| 2011  | 527        |
| 2012  | 559        |
| 2013  | 615        |
| 2014  | 660        |
| 2015  | 677        |
| 2016  | 688        |
| 2017  | 693        |
| 2018  | 695        |
| 2019  | 702        |
| 2020  | 706        |
| 2021  | 709        |
| 2022  | 711        |
| 2023  | 714        |
| 2024  | 717        |
| 2025  | 717        |
| 2026  | 718        |
| 2027  | 721        |
| 2028  | 726        |
| 2029  | 732        |
| 2030  | 739        |
| 2031  | 745        |
| 2032  | 750        |

| Model Statistics   | Magnitude |
|--------------------|-----------|
| Adjusted R^2       | 99.2%     |
| AIC                | 4.95      |
| SIC                | 5.04      |
| Degrees of Freedom | 331       |
| Durban-Watson      | 0.2       |
| MAPE               | 1.83%     |
| In-Sample RMSE     | 12        |
| Out-of-Sample RMSE | 17        |



### Model Discussion

The AFR 2018 forecast of Street Lighting customer count growth is lower than the EFRP (AFR 2017) outlook. The key drivers of customer growth include Non-Wage Personal Income (St. Louis County) and Employment in the Education & Health sector (Duluth MSA). Last year's model contained only one economic variable: Public Sector Employment (13-County).

Minnesota Power's econometric interpretation of the key drivers is as follows: For each \$1 Billion increase in Non-Wage Personal Income (St. Louis County), street lighting customer count is estimated to increase by about 36. As Duluth MSA employment in Education & Health increases by 1,000, street lighting customer count should increase by about 20 customers. These impacts are in addition to a general upward trend over time.

A combination of a binary and trend variable starting in July-2009 account for a step-change or "systematic shift" in the historical accounting data.

A combination of a binary variable for 2016-2032 and trend variable denoting the 2016-2032 timeframe shift the level and trend of the estimate to align with recent customer growth. These variables effectively shift the first forecast year (2018) to align with the last historical year (2017). Without this corrective binary variable, a small but growing divergence between actual and predicted customer growth suggests the economic indicators alone would overstate customer count, and the 2018 forecast value confirms this. Without these binary variables, the model would project an increase of about 50 customers from 2017 to 2018 (a 7.3% increase).

This year's model is comparable to last year's in terms of statistical quality. The Adjusted R-Squared indicates there's a quality goodness-of-fit, and the low SIC indicates a highly parsimonious model. The HAC-Adjusted P-values ("HAC-P-Value") suggests all variables' coefficients are significant. In-sample and Out-sample error metrics are significantly better: In-sample MAPE is 1.83% vs. 5.03% in the EFRP model, and Out-sample RMSE is 17 vs. 38 in the EFRP model. The low Variance Inflation Factor (VIF) of the economic variable proves there is no significant multicollinearity among non-binary, non-trend variables.

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## Residential Energy Use - Moderate Scenario

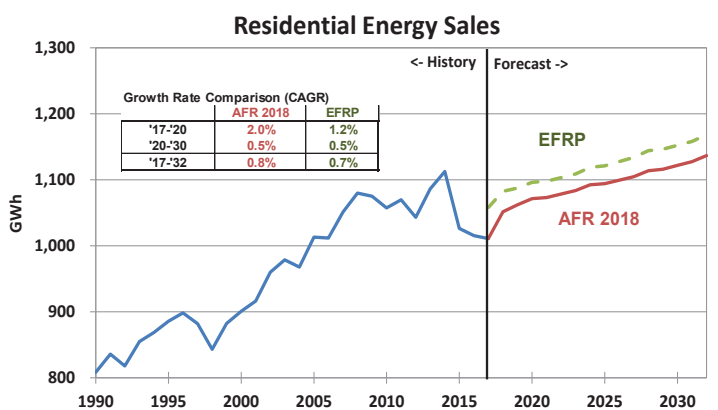
Estimation Start/End: 1/1990 - 3/2018  
Unit Modeled/Forecast: Monthly Per-Customer, Per-Day Use (KWh)

| Variable     | Model Specifications |         |             |      |
|--------------|----------------------|---------|-------------|------|
|              | Coefficient          | P-Value | HAC-P-Value | VIF  |
| CONST        | 16.80                | 0.00%   | 0.00%       |      |
| Time_Trend   | 0.01                 | 0.00%   | 0.00%       |      |
| Bi_Mar       | (2.68)               | 0.00%   | 0.00%       |      |
| Bi_Nov       | (3.11)               | 0.00%   | 0.00%       |      |
| Trend_Feb    | (0.01)               | 0.00%   | 0.01%       |      |
| Trend_Apr    | (0.02)               | 0.00%   | 0.00%       |      |
| Trend_May    | (0.02)               | 0.00%   | 0.00%       |      |
| Trend_Jun    | (0.01)               | 0.00%   | 0.00%       |      |
| Trend_Sep    | (0.01)               | 0.00%   | 0.00%       |      |
| Trend_Oct    | (0.02)               | 0.00%   | 0.00%       |      |
| Bi_2014_2032 | (0.90)               | 0.57%   | 0.94%       |      |
| Dul_HDDpd    | 0.22                 | 0.00%   | 0.00%       | 2.90 |
| Dul_CDDpd    | 0.51                 | 0.00%   | 0.00%       | 2.60 |

### Residential Energy Sales

|      | MWh       | Y/Y Growth |
|------|-----------|------------|
| 2007 | 1,051,453 |            |
| 2008 | 1,079,837 | 2.7%       |
| 2009 | 1,075,116 | -0.4%      |
| 2010 | 1,057,476 | -1.6%      |
| 2011 | 1,069,856 | 1.2%       |
| 2012 | 1,043,281 | -2.5%      |
| 2013 | 1,086,481 | 4.1%       |
| 2014 | 1,112,579 | 2.4%       |
| 2015 | 1,026,454 | -7.7%      |
| 2016 | 1,015,465 | -1.1%      |
| 2017 | 1,010,955 | -0.4%      |
| 2018 | 1,051,661 | 4.0%       |
| 2019 | 1,062,297 | 1.0%       |
| 2020 | 1,071,459 | 0.9%       |
| 2021 | 1,073,306 | 0.2%       |
| 2022 | 1,078,428 | 0.5%       |
| 2023 | 1,083,725 | 0.5%       |
| 2024 | 1,092,630 | 0.8%       |
| 2025 | 1,094,177 | 0.1%       |
| 2026 | 1,099,463 | 0.5%       |
| 2027 | 1,104,844 | 0.5%       |
| 2028 | 1,113,933 | 0.8%       |
| 2029 | 1,116,062 | 0.2%       |
| 2030 | 1,121,819 | 0.5%       |
| 2031 | 1,127,488 | 0.5%       |
| 2032 | 1,136,670 | 0.8%       |

| Model Statistics   | Magnitude |
|--------------------|-----------|
| Adjusted R^2       | 87.2%     |
| AIC                | 1.05      |
| SIC                | 1.20      |
| Degrees of Freedom | 326       |
| Durban-Watson      | 2.1       |
| MAPE               | 5.33%     |
| In-Sample RMSE     | 1.7       |
| Out-of-Sample RMSE | 1.7       |



### Model Discussion

The AFR 2018 forecast of Residential energy use is very similar to the EFRP (AFR 2017) outlook. The graph shown above combines the output of the use-per-customer per day model with the outputs of the customer count model to show total energy sales to Residential customers.

Like the AFR 2017 residential per-customer use model, this year's model uses no economic variables; only weather and seasonal binaries to predict Residential customer use. Economic and demographic variables were tested in parallel during the modeling process, but in the few instances where economic variables appeared to be significant predictors of per-customer energy use, they created improbable forecasts.

The AFR 2018 and AFR 2017 models are very similar, and both use simple monthly HDD and CDD (per-day) specification. Simplifying the weather variable definition in both respects did not seem to negatively affect model statistics or output. This approach guarantees accurate after-the-fact weather-normalization and was applied in all other weather-sensitive models as well.

In past AFR, the residential usage model occasionally leveraged seasonal trend variables to identify any usage patterns that were evolving independent of weather and economic conditions. These variables were explored during the Specification Search step, and while some were found to be significant, the variables were not used. The seasonal trend variables add some predictive value, but are difficult to define and thus difficult to determine whether their significance is coincidental, or if their role in the model is intuitive.

This year's model is comparable to last year's in terms of statistical quality. The Adjusted R-Squared indicates there's a quality goodness-of-fit, and the low SIC indicates a highly parsimonious model. The HAC-Adjusted P-values ("HAC-P-Value") suggests all variables' coefficients are significant. In-sample and Out-sample error metrics are similar: In-sample MAPE is 5.33% vs. 5.87% in the 2017 model, and Out-sample RMSE is 1.7 vs. 1.9 in the 2017 model. The low Variance Inflation Factors (VIF) of each economic variable proves there is no significant multicollinearity among non-binary, non-trend variables.

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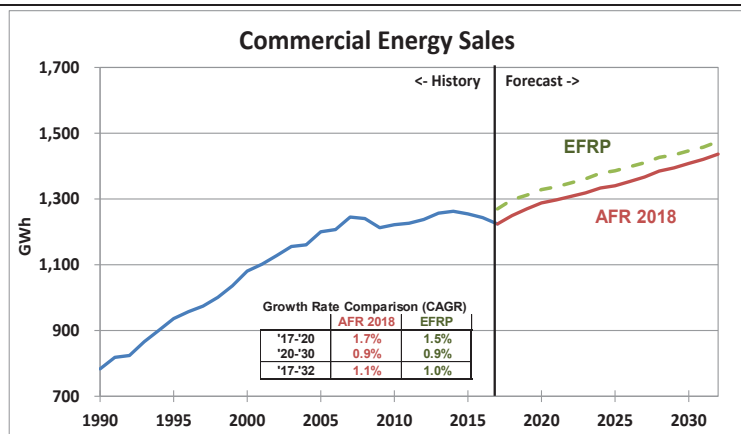
## Commercial Energy Use - Moderate Scenario

Estimation Start/End: 1/1990 - 3/2018  
Unit Modeled/Forecast: Monthly Per-Customer, Per-Day Use (KWh)

| Variable            | Model Specifications |         |             |      |
|---------------------|----------------------|---------|-------------|------|
|                     | Coefficient          | P-Value | HAC-P-Value | VIF  |
| CONST               | (171.02)             | 0.42%   | 0.00%       |      |
| Time_Trend          | 0.03                 | 1.32%   | 0.00%       |      |
| Bi_2009_2032        | (5.74)               | 4.51%   | 0.01%       |      |
| Bi_Jan              | (8.66)               | 0.01%   | 0.02%       |      |
| Bi_Apr              | (9.91)               | 0.00%   | 0.00%       |      |
| Bi_Jul              | 6.16                 | 3.59%   | 4.40%       |      |
| Bi_Aug              | 16.50                | 0.00%   | 0.00%       |      |
| Bi_Sep              | 13.12                | 0.00%   | 0.00%       |      |
| Bi_Oct              | (7.82)               | 0.01%   | 0.03%       |      |
| Bi_Nov              | (10.21)              | 0.00%   | 0.00%       |      |
| Dul_HDDpd           | 0.59                 | 0.00%   | 0.00%       | 2.60 |
| Dul_CDDpd_Seas      | 3.93                 | 0.00%   | 0.00%       | 3.20 |
| MSA_TotNonfarm_13_t | 0.22                 | 30.42%  | 6.47%       | 2.70 |
| Pop_13_t            | 0.51                 | 0.00%   | 0.00%       | 1.90 |

| Commercial Energy Sales |           |            |
|-------------------------|-----------|------------|
|                         | MWh       | Y/Y Growth |
| 2007                    | 1,244,930 |            |
| 2008                    | 1,240,324 | -0.4%      |
| 2009                    | 1,212,778 | -2.2%      |
| 2010                    | 1,221,754 | 0.7%       |
| 2011                    | 1,226,174 | 0.4%       |
| 2012                    | 1,237,386 | 0.9%       |
| 2013                    | 1,256,540 | 1.5%       |
| 2014                    | 1,262,464 | 0.5%       |
| 2015                    | 1,254,681 | -0.6%      |
| 2016                    | 1,243,045 | -0.9%      |
| 2017                    | 1,223,786 | -1.5%      |
| 2018                    | 1,249,190 | 2.1%       |
| 2019                    | 1,269,570 | 1.6%       |
| 2020                    | 1,287,763 | 1.4%       |
| 2021                    | 1,296,850 | 0.7%       |
| 2022                    | 1,307,767 | 0.8%       |
| 2023                    | 1,318,719 | 0.8%       |
| 2024                    | 1,333,063 | 1.1%       |
| 2025                    | 1,340,148 | 0.5%       |
| 2026                    | 1,352,735 | 0.9%       |
| 2027                    | 1,366,531 | 1.0%       |
| 2028                    | 1,384,625 | 1.3%       |
| 2029                    | 1,394,242 | 0.7%       |
| 2030                    | 1,407,701 | 1.0%       |
| 2031                    | 1,420,158 | 0.9%       |
| 2032                    | 1,436,086 | 1.1%       |

| Model Statistics   | Magnitude |
|--------------------|-----------|
| Adjusted R^2       | 56.3%     |
| AIC                | 4.52      |
| SIC                | 4.68      |
| Degrees of Freedom | 325       |
| Durban-Watson      | 2.7       |
| MAPE               | 4.73%     |
| In-Sample RMSE     | 9.4       |
| Out-of-Sample RMSE | 9.7       |



### Model Discussion

The AFR 2018 forecast of Commercial energy use is very close to the EFRP (AFR 2017) estimate. The graph shown above combines the output of the use-per-customer per-day model with the outputs of the customer count model.

Key drivers of this year's commercial energy use model are Total Non-Farm Employment (MSA) and Population (13-County). AFR 2017 used Total Non-Farm Employment (13-County) and Public Sector Employment (13-County). Minnesota Power's econometric interpretation of the key drivers is as follows: For every 1,000 Non-Farm jobs added in the Duluth MSA, monthly Commercial use-per-customer should increase by about 6.65 kWh. As the area's Population increases by 1,000, monthly Commercial use-per customer should increase by about 15.58 kWh.

This year's model is comparable to last year's in terms of statistical quality. The Adjusted R-Squared of 56% indicates there's just a moderate traditional "goodness-of-fit", but this was the case last year as well (Adjusted R-Squared was 57%) and the Company does not consider the R-Squared an indicator of predictive quality. Minnesota Power's object metric is the Out-Sample Root Mean Square Error.

The HAC-Adjusted P-values ("HAC-P-Value") suggests all variables' coefficients' are significant. In-sample and Out-sample error metrics are nearly identical: In-sample MAPE is 4.73% vs. 4.71% in the 2017 model, and Out-sample RMSE is 9.66 vs. 9.64 in the 2017 model. The low Variance Inflation Factors (VIF) of each economic variable proves there is no significant multicollinearity among non-binary, non-trend variables.

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## Mining and Metals Energy Use - Moderate Scenario

Estimation Start/End: 1/1996 - 3/2018  
Unit Modeled/Forecast: Monthly Per-Day Use (MWh)

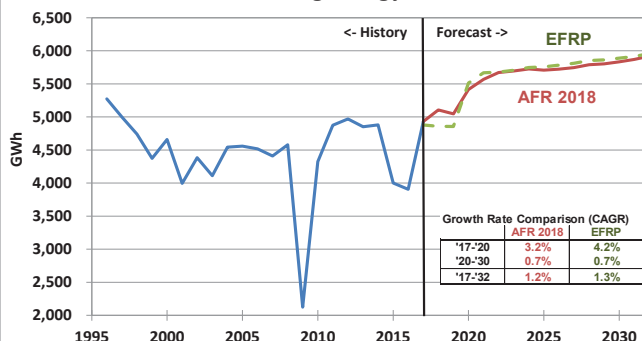
| Variable       | Model Specifications |         |             |      |
|----------------|----------------------|---------|-------------|------|
|                | Coefficient          | P-Value | HAC-P-Value | VIF  |
| CONST          | 556.75               | 70.33%  | 75.81%      |      |
| Time_Trend     | (2.42)               | 3.19%   | 14.38%      |      |
| Bi_Mine_15_17  | (1,255.52)           | 0.00%   | 0.06%       |      |
| Bi_Mine1       | 2,119.21             | 0.00%   | 0.00%       |      |
| Bi_Mine2       | (15.19)              | 0.65%   | 0.30%       |      |
| Bi_Mine3       | (311.91)             | 9.60%   | 18.00%      |      |
| Bi_Mine4       | (1,655.31)           | 0.00%   | 0.00%       |      |
| MSA_Real_GMP_t | 0.39                 | 0.61%   | 2.75%       | 2.10 |
| Iron_IPI_t     | 97.54                | 0.00%   | 0.00%       | 3.10 |

### Mining and Metals Energy Sales

| MWh  | Y/Y Growth |
|------|------------|
| 2007 | 4,408,337  |
| 2008 | 4,579,234  |
| 2009 | 2,124,675  |
| 2010 | 4,324,450  |
| 2011 | 4,874,331  |
| 2012 | 4,968,517  |
| 2013 | 4,851,094  |
| 2014 | 4,879,520  |
| 2015 | 4,000,557  |
| 2016 | 3,906,570  |
| 2017 | 4,930,188  |
| 2018 | 5,105,464  |
| 2019 | 5,047,984  |
| 2020 | 5,415,506  |
| 2021 | 5,567,732  |
| 2022 | 5,670,700  |
| 2023 | 5,695,274  |
| 2024 | 5,725,351  |
| 2025 | 5,708,524  |
| 2026 | 5,723,396  |
| 2027 | 5,745,195  |
| 2028 | 5,788,775  |
| 2029 | 5,802,267  |
| 2030 | 5,833,861  |
| 2031 | 5,868,154  |
| 2032 | 5,917,644  |

| Model Statistics        | Magnitude |
|-------------------------|-----------|
| Adjusted R <sup>2</sup> | 93.1%     |
| AIC                     | 12.97     |
| SIC                     | 13.09     |
| Degrees of Freedom      | 258       |
| Durban-Watson           | 1.5       |
| MAPE                    | 4.26%     |
| In-Sample RMSE          | 644       |
| Out-of-Sample RMSE      | 691       |

## Mining Energy Sales



### Model Discussion

The AFR 2018 outlook for Mining and Metals energy use is similar to the EFRP (AFR 2017) projection. The graph and table show the total sales forecast for this class, which combines the output of the econometric forecast with load additions.

The AFR 2018 model varies slightly from EFRP's model, in that it includes a local economic indicator – Real Gross Metro Product (MSA) – as well as the Minnesota-only (MN) Industrial Production Index (IPI) for Iron as drivers (further details discussed in the AFR 2018 Forecast Database Inputs section). The econometric interpretation of economic variables are as follows: As the Real Gross Metro Product (MSA) increases by \$1 Billion, Minnesota Power's Mining and Metals customers' should increase monthly use by about 12,000 MWh. For each 1-unit increase in the MN IPI for Iron, Minnesota Power's Mining and Metals customers' should increase monthly use by about 2,970 MWh, vs. last year's impact of about 2,313 MWh of energy sales increase for the National-level IPI for Iron.

This year's model incorporates a similar set of binary variables to control for known or suspected definitional changes in the historical Mining Energy Sales series. These variables have been added with the goal of avoiding bias in the IPI's coefficient for these past definitional changes in the Mining and Metals sales series.

The "Bi\_Mine\_15\_17" binary variable denotes a timeframe from May-2015 to Feb-2017, when a large Mining customer was idle. The variable accounts for a change in relationship between Minnesota Power Mining customer energy use and the MN IPI, and allow for a more exact estimation of the relationship during the current paradigm.

"Bi\_Mine1" and "Bi\_Mine2" are binary and trend variables (respectively) that denote the timeframe from 1996-2001, when a large Mining customer ended operations. The two variables account for a change in relationship between Minnesota Power Mining customer energy and the MN IPI, and allow for a more exact estimation of the relationship during the current paradigm.

The "Bi\_Mine3" binary variable denotes a period from late 2013 to early 2015 when the model would systematically over-forecast potential summer peak monthly energy use by about 8%. This is, again, possibly due to a change in the regular relationship between Mining customer usage and MN IPI. Minnesota Power acknowledges that while the HAC-P-Value on this binary is slightly higher than 0.1, but the Company opted to retain the variable since its unadjusted P-Value is still significant at the 90% level (0.096), the variables' inclusion reduced overall model errors, and this minimizes the model's structural difference from AFR 2017.

The "Bi\_Mine4" binary variable denotes the recession period from early 2009 to early 2010 where the model would systematically over-forecast monthly energy use by about 31%. This variable accounts for a possible change in the regular relationship between Mining customer usage and the MN IPI.

This year's model is comparable to last year's in terms of statistical quality. The Adjusted R-Squared indicates there's a quality goodness-of-fit, and the low SIC indicates a highly parsimonious model. The P-values suggests all variables' coefficients' (except the intercept) are significant. In-sample and Out-sample error metrics are similar: In-sample MAPE is 4.26% vs. 4.9% in the EFRP model, and Out-sample RMSE is 691 vs. 779 in the EFRP model. The low Variance Inflation Factor (VIF) of the economic variable proves there is no significant multicollinearity among non-binary, non-trend variables.



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# Paper and Wood Products Energy Use - Moderate Scenario

Estimation Start/End: 1/1996 - 3/2018  
Unit Modeled/Forecast: Monthly Per-Day Use (MWh)

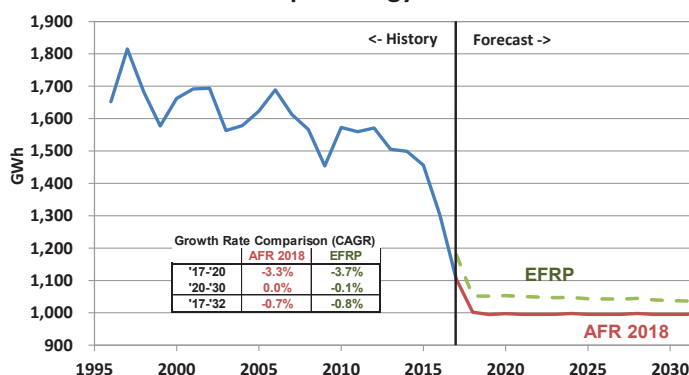
| Variable       | Model Specifications |         |             |      |
|----------------|----------------------|---------|-------------|------|
|                | Coefficient          | P-Value | HAC-P-Value | VIF  |
| CONST          | 5,962.32             | 0.00%   | 0.00%       |      |
| Bi_Feb         | 125.17               | 4.94%   | 3.81%       |      |
| Bi_Mar         | 148.51               | 2.00%   | 1.16%       |      |
| Bi_Jun         | 181.25               | 0.54%   | 0.00%       |      |
| Bi_Aug         | 312.92               | 0.00%   | 0.00%       |      |
| Bi_Sep         | 237.15               | 0.03%   | 0.10%       |      |
| Bi_Oct         | 267.43               | 0.01%   | 0.00%       |      |
| Bi_Nov         | 236.42               | 0.03%   | 0.01%       |      |
| Bi_Paper_17_18 | (445.99)             | 0.17%   | 0.00%       |      |
| Paper_IPI_diff | 22.45                | 8.92%   | 6.43%       | 1.00 |

## Paper/Wood Energy Sales

|      | MWh       | Y/Y Growth |
|------|-----------|------------|
| 2007 | 1,612,560 |            |
| 2008 | 1,566,402 | -2.9%      |
| 2009 | 1,453,928 | -7.2%      |
| 2010 | 1,572,565 | 8.2%       |
| 2011 | 1,559,519 | -0.8%      |
| 2012 | 1,570,852 | 0.7%       |
| 2013 | 1,505,113 | -4.2%      |
| 2014 | 1,498,810 | -0.4%      |
| 2015 | 1,456,091 | -2.9%      |
| 2016 | 1,302,920 | -10.5%     |
| 2017 | 1,104,160 | -15.3%     |
| 2018 | 1,001,960 | -9.3%      |
| 2019 | 994,765   | -0.7%      |
| 2020 | 997,671   | 0.3%       |
| 2021 | 994,959   | -0.3%      |
| 2022 | 994,968   | 0.0%       |
| 2023 | 995,033   | 0.0%       |
| 2024 | 997,841   | 0.3%       |
| 2025 | 994,990   | -0.3%      |
| 2026 | 995,092   | 0.0%       |
| 2027 | 995,260   | 0.0%       |
| 2028 | 997,987   | 0.3%       |
| 2029 | 995,260   | -0.3%      |
| 2030 | 995,261   | 0.0%       |
| 2031 | 995,261   | 0.0%       |
| 2032 | 999,153   | 0.4%       |

| Model Statistics   | Magnitude |
|--------------------|-----------|
| Adjusted R^2       | 16.6%     |
| AIC                | 11.28     |
| SIC                | 11.41     |
| Degrees of Freedom | 257       |
| Durban-Watson      | 1.0       |
| MAPE               | 3.56%     |
| In-Sample RMSE     | 276       |
| Out-of-Sample RMSE | 284       |

## Paper Energy Sales



## Model Discussion

The AFR 2018 outlook for Paper and Wood Products energy requirements is lower than the EFRP (AFR 2017, adjusted for updated customer outlook) projection. The graph and table show the total sales forecast for this class, which combines the output of the econometric forecast with load additions. Load addition/loss assumptions have also been updated to reflect recent operational changes by customers that affect their energy requirements.

The AFR 2018 model uses just the Industrial Production Index (IPI) for Paper. Last year's model also used the IPI, along with employment in the Trade Transportation and Utilities sector (13-County).

Minnesota Power's econometric interpretation of the key drivers is as follows: As the month-to-month change in the Paper IPI increases by 1, monthly Paper and Wood customer use increases by about 680 MWh.

The "Bi\_Paper\_17\_18" binary variable denotes a recent step-change decrease in sales to paper customers due to a specific paper machine shutdown. This is not a situation in which pre-regression adjustments to the historical series would be appropriate. These variables terminate at the beginning of the forecast timeframe, producing an econometric forecast that's at a pre-machine-shutdown level. Post-regression load adjustments are then applied to reduce the outlook in the amount of the paper machine's likely demand.

This year's model is comparable to last year's in terms of statistical quality. The Adjusted R-Squared indicates there's reasonable goodness-of-fit, but error metrics show this is a fairly accurate model: In-sample MAPE is 3.56% vs. 4.4% in the EFRP model, and Out-sample RMSE is 284 vs. 256 in the EFRP model.

A low SIC indicates a highly parsimonious model. The low Variance Inflation Factors (VIF) of each economic variable proves there is no significant multicollinearity among non-binary, non-trend variables. HAC-Adjusted P-values ("HAC-P-Value") suggests all variables' coefficients' are significant.

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# Pipelines and Other Industrial Energy Use - Moderate Scenario

Estimation Start/End: 1/1996 - 3/2018  
Unit Modeled/Forecast: Monthly Per-Day Use (MWh)

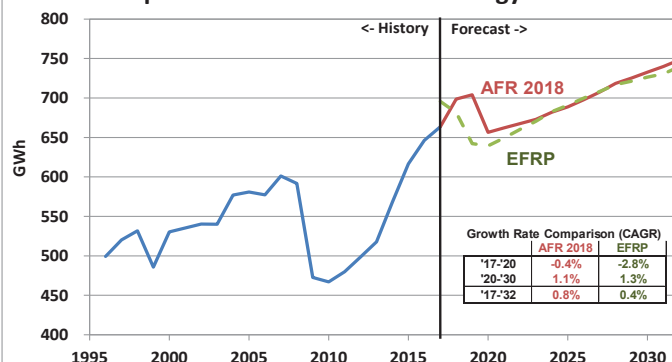
| Variable    | Model Specifications |         |             |      |
|-------------|----------------------|---------|-------------|------|
|             | Coefficient          | P-Value | HAC-P-Value | VIF  |
| CONST       | (5,154.42)           | 0.06%   | 0.17%       |      |
| Time_Trend  | 0.92                 | 0.00%   | 0.00%       |      |
| Bi_13_18    | (4,136.03)           | 0.00%   | 0.00%       |      |
| Trend_13_18 | 14.71                | 0.00%   | 0.00%       |      |
| MFG_StLou_t | 0.17                 | 0.00%   | 0.00%       | 2.00 |
| Pop_13_t    | 10.00                | 0.04%   | 0.11%       | 4.80 |

## Other Industrial Energy Sales

|      | MWh     | Y/Y Growth |
|------|---------|------------|
| 2007 | 601,155 |            |
| 2008 | 591,697 | -1.6%      |
| 2009 | 472,749 | -20.1%     |
| 2010 | 467,065 | -1.2%      |
| 2011 | 479,798 | 2.7%       |
| 2012 | 498,474 | 3.9%       |
| 2013 | 517,786 | 3.9%       |
| 2014 | 568,206 | 9.7%       |
| 2015 | 616,625 | 8.5%       |
| 2016 | 646,339 | 4.8%       |
| 2017 | 663,444 | 2.6%       |
| 2018 | 698,693 | 5.3%       |
| 2019 | 704,161 | 0.8%       |
| 2020 | 656,488 | -6.8%      |
| 2021 | 662,205 | 0.9%       |
| 2022 | 667,500 | 0.8%       |
| 2023 | 672,947 | 0.8%       |
| 2024 | 681,877 | 1.3%       |
| 2025 | 688,768 | 1.0%       |
| 2026 | 697,795 | 1.3%       |
| 2027 | 707,407 | 1.4%       |
| 2028 | 718,444 | 1.6%       |
| 2029 | 725,277 | 1.0%       |
| 2030 | 732,785 | 1.0%       |
| 2031 | 739,951 | 1.0%       |
| 2032 | 748,368 | 1.1%       |

| Model Statistics   | Magnitude |
|--------------------|-----------|
| Adjusted R^2       | 62.3%     |
| AIC                | 9.51      |
| SIC                | 9.59      |
| Degrees of Freedom | 261       |
| Durban-Watson      | 1.5       |
| MAPE               | 6.14%     |
| In-Sample RMSE     | 115       |
| Out-of-Sample RMSE | 128       |

## Pipelines & Other Industrial Energy Sales



## Model Discussion

The outlook for Pipelines and Other Industrial energy sales is very similar to the EFRP (AFR 2017) projection. The graph and table show the total sales forecast for this class, which combines the output of the econometric forecast with load additions/losses.

The AFR 2018 econometric model for Pipelines and Other Industrial uses the same economic drivers as last year's model: Employment in Manufacturing (St. Louis County) and Population (13-County). The AFR 2018 model differs from the EFRP model in that it utilizes a time-trend variable.

Minnesota Power's econometric interpretation of the key drivers is as follows: As St. Louis County's Manufacturing Employment increases by 1,000, Other Industrial monthly energy usage increases by about 5,075 MWh. As the area's Population increases by 1,000, Other Industrial's monthly energy usage increases by about 305 MWh. These impacts are in addition to a general upward trend over time.

Both AFR 2018 and EFRP models feature two key structural variables: a binary ("Bi\_13\_18") and a trend variable ("Trend\_13\_18") denoting the period from late 2013 to the end of the estimation timeframe. During this timeframe a large Pipeline customer began adding substantial load, and drove the majority of the energy use increase in the customer class. The binary and trend variables effectively "back-out" this recent load addition, so this customer's expected energy use can be addressed in isolation through a post-regression load addition, and avoid double-counting.

The ability to address this Pipeline customer's expected usage directly and exactly in the forecast timeframe is especially important in the AFR 2018 forecast; there is a high likelihood that this recently-added pumping load will be short-lived due to pumping capacity additions elsewhere on the system. This shift is evident in the graph above; usage by Pipeline and Other Industrial customers drops sharply from 2019 to 2020 as added pumping capacity outside Minnesota Power's territory relieves the pumps served by a specific retail pumping customer.

This year's model is similar to last year's in terms of statistical quality. The Adjusted R-Squared indicates there's a reasonable goodness-of-fit, and the low SIC indicates a highly parsimonious model. In-sample and Out-sample error metrics are fairly similar to the EFRP model: In-sample MAPE has decreased to 6.14% from 6.97% in the EFRP model, and Out-sample RMSE has decreased to 128 from 147 in the EFRP model. The low Variance Inflation Factors (VIF) of each economic variable proves there is no significant multicollinearity among non-binary, non-trend variables.

The HAC-Adjusted P-values ("HAC-P-Value") suggests all variables' coefficients' are significant.

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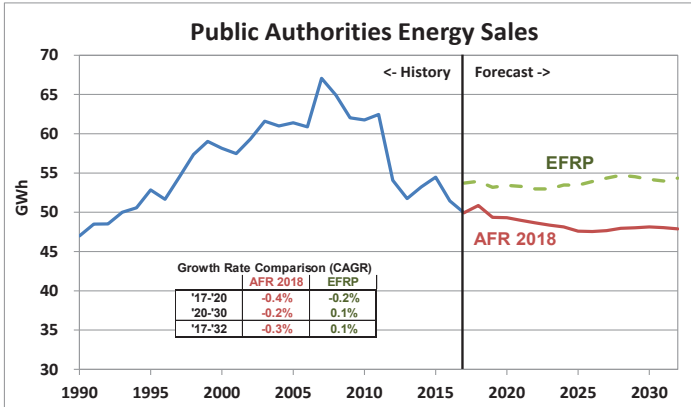
Public Authorities Energy Use - Moderate Scenario

Estimation Start/End: 1/1990 - 3/2018  
Unit Modeled/Forecast: Monthly Per-Day Use (MWh)

| Variable   | Model Specifications |         |             |      |
|------------|----------------------|---------|-------------|------|
|            | Coefficient          | P-Value | HAC-P-Value | VIF  |
| CONST      | (983.20)             | 0.00%   | 0.00%       |      |
| Time_Trend | 0.05                 | 0.00%   | 0.00%       |      |
| Bi_Jan     | (8.71)               | 4.35%   | 2.18%       |      |
| Bi_May     | (9.53)               | 1.82%   | 5.06%       |      |
| Bi_Nov     | (9.33)               | 1.73%   | 1.36%       |      |
| Bi_2014    | (30.45)              | 0.00%   | 0.42%       |      |
| Dul_HDDpd  | 0.19                 | 1.96%   | 1.97%       | 2.20 |
| Dul_CDDpd  | 3.55                 | 0.18%   | 1.50%       | 1.80 |
| EduH_13_t  | 0.00                 | 2.11%   | 0.13%       | 1.50 |
| Pop_13_t   | 1.91                 | 0.00%   | 0.00%       | 1.50 |

| Public Auth. Energy Sales |        |            |
|---------------------------|--------|------------|
|                           | MWh    | Y/Y Growth |
| 2007                      | 67,066 |            |
| 2008                      | 64,912 | -3.2%      |
| 2009                      | 62,036 | -4.4%      |
| 2010                      | 61,768 | -0.4%      |
| 2011                      | 62,458 | 1.1%       |
| 2012                      | 54,074 | -13.4%     |
| 2013                      | 51,736 | -4.3%      |
| 2014                      | 53,236 | 2.9%       |
| 2015                      | 54,470 | 2.3%       |
| 2016                      | 51,455 | -5.5%      |
| 2017                      | 49,945 | -2.9%      |
| 2018                      | 50,867 | 1.8%       |
| 2019                      | 49,356 | -3.0%      |
| 2020                      | 49,303 | -0.1%      |
| 2021                      | 48,979 | -0.7%      |
| 2022                      | 48,660 | -0.7%      |
| 2023                      | 48,369 | -0.6%      |
| 2024                      | 48,126 | -0.5%      |
| 2025                      | 47,603 | -1.1%      |
| 2026                      | 47,559 | -0.1%      |
| 2027                      | 47,651 | 0.2%       |
| 2028                      | 47,955 | 0.6%       |
| 2029                      | 48,015 | 0.1%       |
| 2030                      | 48,128 | 0.2%       |
| 2031                      | 48,052 | -0.2%      |
| 2032                      | 47,896 | -0.3%      |

| Model Statistics        | Magnitude |
|-------------------------|-----------|
| Adjusted R <sup>2</sup> | 42.2%     |
| AIC                     | 5.93      |
| SIC                     | 6.04      |
| Degrees of Freedom      | 329       |
| Durban-Watson           | 2.4       |
| MAPE                    | 9.70%     |
| In-Sample RMSE          | 19        |
| Out-of-Sample RMSE      | 20        |



Model Discussion

The AFR 2018 outlook for Public Authorities energy use is lower than the EFRP (AFR 2017) forecast. Key drivers of this year's energy use model are Education and Health sector employment (13-County) and Population (13-County). EFRP also used area Education and Health employment, along with and Gross Regional Product (13-County).

Minnesota Power's econometric interpretation of the key driver is as follows: For every 1,000 job increase in the Education & Health sector, monthly Public Authority usage should increase by about 70 MWh. As area population increases by 1,000 people, Public Authorities usage should increase by about 60 MWh.

The AFR 2018 Public Authorities model uses a single binary variable ("Bi\_2014") to denote a period in 2014 with irregularly low sales that aren't attributable to weather or economics. Without this corrective binary, the model would over-forecast 2014 sales by about 20%.

This year's model is similar to last year's in terms of statistical quality. The Adjusted R-Squared indicates there's moderate goodness-of-fit, and the low SIC indicates a highly parsimonious model. In-sample and Out-sample error metrics are very similar: In-sample MAPE is 9.70% vs. 9.97% in the EFRP model, and Out-sample RMSE has decreased to 20 from 21 in the EFRP model. The low Variance Inflation Factors (VIF) of each economic variable proves there is no significant multicollinearity among non-binary, non-trend variables.

The HAC-Adjusted P-values ("HAC-P-Value") suggests all variables' coefficients are significant.

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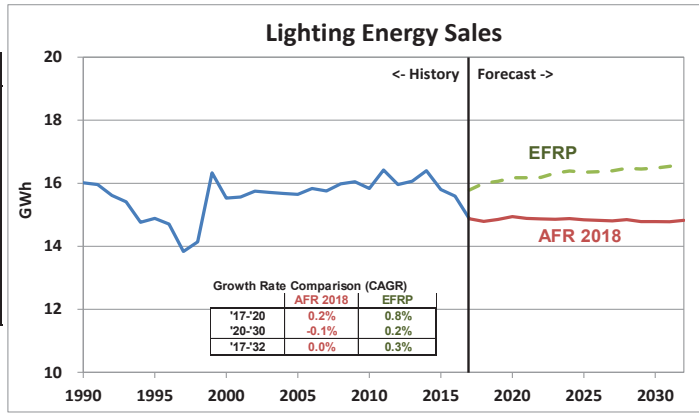
# Street Lighting Energy Use - Moderate Scenario

Estimation Start/End: 1/1990 - 3/2018  
Unit Modeled/Forecast: Monthly Per-Day Use (MWh)

| Variable     | Model Specifications |         |             |      |
|--------------|----------------------|---------|-------------|------|
|              | Coefficient          | P-Value | HAC P-Value | VIF  |
| CONST        | 40.05                | 0.00%   | 0.00%       |      |
| Time_Trend   | 0.01                 | 0.26%   | 0.36%       |      |
| Bi_Jan       | 2.70                 | 1.33%   | 0.47%       |      |
| Bi_Feb       | (2.66)               | 1.48%   | 0.14%       |      |
| Bi_Mar       | (9.77)               | 0.00%   | 0.00%       |      |
| Bi_Apr       | (15.00)              | 0.00%   | 0.00%       |      |
| Bi_May       | (21.03)              | 0.00%   | 0.00%       |      |
| Bi_Jun       | (24.47)              | 0.00%   | 0.00%       |      |
| Bi_Jul       | (23.69)              | 0.00%   | 0.00%       |      |
| Bi_Aug       | (19.89)              | 0.00%   | 0.00%       |      |
| Bi_Sep       | (11.97)              | 0.00%   | 0.00%       |      |
| Bi_Oct       | (8.47)               | 0.00%   | 0.00%       |      |
| Bi_Nov       | (2.98)               | 0.68%   | 0.00%       |      |
| Bi_2017_2032 | (2.35)               | 7.24%   | 6.56%       |      |
| NonWPI_13_t  | 0.00                 | 8.40%   | 2.65%       | 1.30 |

| Lighting Energy Sales |        |            |
|-----------------------|--------|------------|
|                       | MWh    | Y/Y Growth |
| 2007                  | 15,752 |            |
| 2008                  | 15,983 | 1.5%       |
| 2009                  | 16,049 | 0.4%       |
| 2010                  | 15,833 | -1.3%      |
| 2011                  | 16,420 | 3.7%       |
| 2012                  | 15,955 | -2.8%      |
| 2013                  | 16,066 | 0.7%       |
| 2014                  | 16,400 | 2.1%       |
| 2015                  | 15,801 | -3.7%      |
| 2016                  | 15,588 | -1.4%      |
| 2017                  | 15,784 | 1.3%       |
| 2018                  | 15,999 | 1.4%       |
| 2019                  | 16,065 | 0.4%       |
| 2020                  | 16,175 | 0.7%       |
| 2021                  | 16,177 | 0.0%       |
| 2022                  | 16,186 | 0.1%       |
| 2023                  | 16,320 | 0.8%       |
| 2024                  | 16,390 | 0.4%       |
| 2025                  | 16,350 | -0.2%      |
| 2026                  | 16,366 | 0.1%       |
| 2027                  | 16,396 | 0.2%       |
| 2028                  | 16,473 | 0.5%       |
| 2029                  | 16,451 | -0.1%      |
| 2030                  | 16,482 | 0.2%       |
| 2031                  | 16,537 | 0.3%       |

| Model Statistics   | Magnitude |
|--------------------|-----------|
| Adjusted R^2       | 83.1%     |
| AIC                | 2.86      |
| SIC                | 3.03      |
| Degrees of Freedom | 324       |
| Durban-Watson      | 1.7       |
| MAPE               | 5.02%     |
| In-Sample RMSE     | 4.1       |
| Out-of-Sample RMSE | 4.2       |



## Model Discussion

The outlook for energy use by Street Lighting customer is lower than the EFRP (AFR 2017) forecast, but the model utilizes similar economic variables as drivers. Both the AFR 2018 and the EFRP Lighting per-day use models use Non-Wage Personal Income – 13-County and St. Louis County respectively – Population (MSA) as a key economic/demographic indicator. The EFRP model incorporated Population (MSA) in addition to Non-Wage Personal Income.

Minnesota Power's econometric interpretation of the key drivers is as follows: As area Non-Wage Personal Income increases by \$1 Billion, monthly Lighting usage should increase by about 44 MWh.

"Bi\_2017\_2032" is a binary variable denoting the 2017-2032 timeframe and shifts the level of estimated energy use to align with recent history. Without this binary series, the first forecast year (2018) would show a 310 MWh (2.1 %) increase in lighting energy sales instead of continuing the recent trend of year-over-year decreases.

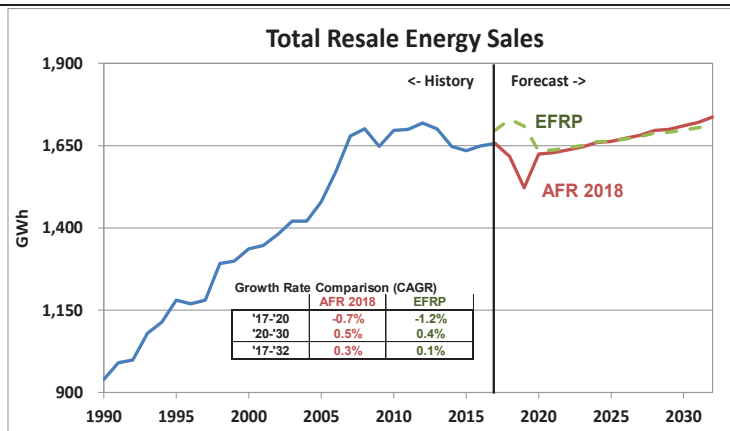
This year's model is comparable to last year's in terms of statistical quality. The Adjusted R-Squared indicates there's high goodness-of-fit, and the low SIC indicates a highly parsimonious model. In-sample and Out-sample error metrics are nearly identical to the EFRP model: In-sample MAPE is 5.0% vs. 5.0% in the EFRP model, and Out-sample RMSE is 4.2 vs. 4.2 in the 2017 model. The low Variance Inflation Factors (VIF) of each economic variable proves there is no significant multicollinearity among non-binary, non-trend variables.

The HAC-Adjusted P-values ("HAC-P-Value") suggests all variables' coefficients are significant.

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Total Resale Energy Use - Moderate Scenario

| Resale Energy Sales |           |            |
|---------------------|-----------|------------|
|                     | MWh       | Y/Y Growth |
| 2007                | 1,679,267 |            |
| 2008                | 1,701,057 | 1.3%       |
| 2009                | 1,647,759 | -3.1%      |
| 2010                | 1,696,511 | 3.0%       |
| 2011                | 1,699,644 | 0.2%       |
| 2012                | 1,718,819 | 1.1%       |
| 2013                | 1,700,993 | -1.0%      |
| 2014                | 1,647,763 | -3.1%      |
| 2015                | 1,634,786 | -0.8%      |
| 2016                | 1,649,406 | 0.9%       |
| 2017                | 1,656,865 | 0.5%       |
| 2018                | 1,617,020 | -2.4%      |
| 2019                | 1,521,600 | -5.9%      |
| 2020                | 1,624,437 | -0.1%      |
| 2021                | 1,628,249 | 0.2%       |
| 2022                | 1,637,142 | -0.2%      |
| 2023                | 1,645,774 | 0.5%       |
| 2024                | 1,659,598 | 1.8%       |
| 2025                | 1,662,922 | 0.2%       |
| 2026                | 1,672,322 | 0.6%       |
| 2027                | 1,681,292 | 0.5%       |
| 2028                | 1,696,466 | 0.9%       |
| 2029                | 1,699,661 | 0.2%       |
| 2030                | 1,710,355 | 0.6%       |
| 2031                | 1,720,476 | 0.6%       |
| 2032                | 1,736,659 | 0.9%       |



**Model Discussion**

The graph above shows a comparison of the 17 aggregated ("bottom-up" approach) municipal customer models from AFR 2018 to AFR 2017's Total Resale outlook ("top-down" approach). Please note: since Minnesota Power created individual municipal customer outlooks for AFR 2018 there are no model statistics for the overall outlook shown in the graph above. Individual municipal customer model statistics and discussion can be found on their respective Trade-Secret designated pages.

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**TRADE SECRET ENDS]**

MINNESOTA POWER  
2018 ANNUAL FORECAST REPORT

System Peak Demand - Moderate Growth

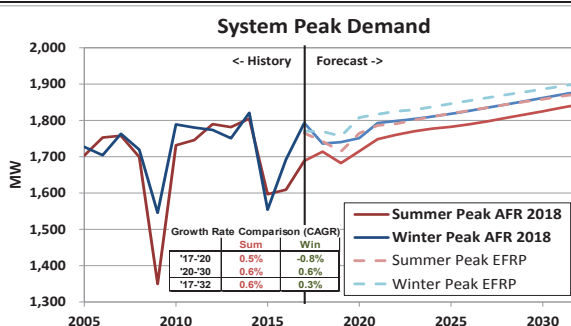
Estimation Start/End: 6/1999 - 3/2018  
Unit Modeled/Forecast: Monthly Peak Demand

| Variable                          | Model Specifications |         |             |       |
|-----------------------------------|----------------------|---------|-------------|-------|
|                                   | Coefficient          | P-Value | HAC-P-Value | VIF   |
| CONST                             | 362.33               | 0.00%   | 0.00%       |       |
| Time Trend                        | 0.35                 | 0.00%   | 0.00%       | 1.23  |
| Weather-Normalized_Energy-per-day | 0.04                 | 0.00%   | 0.00%       | 2.72  |
| Summer-Peak Binary                | 25.53                | 0.45%   | 0.47%       | 1.41  |
| Winter-Peak Binary                | 22.64                | 1.94%   | 0.23%       | 1.66  |
| Wind-Chill_Temp-Humid_Index       | (1.24)               | 0.00%   | 0.00%       | 11.53 |
| Wind-Chill_Temp-Humid_Index_3     | 0.00                 | 0.00%   | 0.00%       | 8.42  |
| Bi_2009                           | (26.66)              | 5.91%   | 9.51%       | 2.13  |
| Bi_2015                           | (19.08)              | 4.87%   | 4.05%       | 1.50  |
| Jan_W-N_Energy-per-day            | (0.00)               | 2.32%   | 2.68%       | 1.86  |
| Feb_W-N_Energy-per-day            | (0.00)               | 0.15%   | 0.02%       | 1.62  |
| Mar_W-N_Energy-per-day            | (0.00)               | 0.64%   | 0.36%       | 1.22  |

System Peak Demand

| Summer (MW) Y/Y Growth |       | Winter (MW) Y/Y Growth |       |
|------------------------|-------|------------------------|-------|
| 2007                   | 1,758 | 2007                   | 1,763 |
| 2008                   | 1,699 | 2008                   | 1,719 |
| 2009                   | 1,350 | 2009                   | 1,645 |
| 2010                   | 1,732 | 2010                   | 1,789 |
| 2011                   | 1,746 | 2011                   | 1,780 |
| 2012                   | 1,790 | 2012                   | 1,774 |
| 2013                   | 1,782 | 2013                   | 1,751 |
| 2014                   | 1,805 | 2014                   | 1,821 |
| 2015                   | 1,597 | 2015                   | 1,854 |
| 2016                   | 1,609 | 2016                   | 1,692 |
| 2017                   | 1,689 | 2017                   | 1,793 |
| 2018                   | 1,714 | 2018                   | 1,736 |
| 2019                   | 1,682 | 2019                   | 1,740 |
| 2020                   | 1,715 | 2020                   | 1,751 |
| 2021                   | 1,748 | 2021                   | 1,793 |
| 2022                   | 1,760 | 2022                   | 1,798 |
| 2023                   | 1,770 | 2023                   | 1,804 |
| 2024                   | 1,778 | 2024                   | 1,811 |
| 2025                   | 1,782 | 2025                   | 1,818 |
| 2026                   | 1,789 | 2026                   | 1,826 |
| 2027                   | 1,798 | 2027                   | 1,835 |
| 2028                   | 1,807 | 2028                   | 1,844 |
| 2029                   | 1,816 | 2029                   | 1,853 |
| 2030                   | 1,825 | 2030                   | 1,862 |
| 2031                   | 1,835 | 2031                   | 1,871 |
| 2032                   | 1,844 | 2032                   | 1,879 |

| Model Statistics        | Magnitude |
|-------------------------|-----------|
| Adjusted R <sup>2</sup> | 92.6%     |
| AIC                     | 6.93      |
| SIC                     | 7.11      |
| Degrees of Freedom      | 214       |
| Durban-Watson           | 1.7       |
| MAPE                    | 1.51%     |
| In-Sample RMSE          | 31        |
| Out-of-Sample RMSE      | 33        |



Model Discussion

The long-run outlook for Minnesota Power's system peak is lower than the 2017 outlook primarily due to the change in projected sales to Paper customers.

Minnesota Power continued the modeling methodology established in AFR 2014 that more accurately accounts for recent changes in the customer class composition. Historical demand is adjusted to remove recent large customer load additions, so they can be more accurately and directly accounted for in the forecast time frame. This avoids the potential for double-counting customer load. Adjustments to the historical peak demand data are detailed in the "Adjustments to Raw Data" section.

Minnesota Power also adjusted the peak definition used for modeling. Instead of modeling just delivered load, the Company chose to model total system load, which includes customer generation. The customer generation is then subtracted from the forecast series. The reasons for modeling the system load instead of delivered load are the same as for energy; it requires fewer assumptions, and the regression modeling is more exact.

Temperature variables play a critical role in peak demand modeling, and the definition and structure of these variables is important for interpreting the results. Both the 2018 and 2017 AFR use a third-degree polynomial specification on a Temperature Humidity and Wind-Chill Index (THWCI). Similar to last year, the AFR 2018 peak demand is modeled as a function of the weather observations specific to the hour in which the peak occurred.

A polynomial temperature specification was selected in the AFR 2017 and again in the AFR 2018 because using a spline specification in after-the fact weather-normalization can be problematic. It's sometimes impossible to calculate the weather impact in months like May or September that may lack extreme enough weather to fit into either spline-segment (THI/High-temp or Wind-Chill/Low-temp). A polynomial temperature specification is continuous, not segmented, so it can always be leveraged for weather-normalization. This methodological/variable specification change is discussed further in the Specific Analytical Techniques section.

The 2018 AFR peak demand model utilized two binaries to indicate the month of the system's historical summer and winter peaks, and assumed this peak in July/January (respectively) throughout the forecast timeframe. Summer peaks typically occur in either July or August, historical winter peaks have occurred in November, December, February, but are most likely in January. This broad distribution appears to dilute the model's measured seasonality and may understate both the summer and winter peak demand figures. The utilization of these peak binaries focuses the seasonal peaks – which may have occurred in August or July, or December or January – into the months of July and January. This ensures seasonal peaks are not under forecast as a result of historical diversity in the timing of those seasonal peaks.

The model also includes two binaries ("Bi\_2009" and "Bi\_2015") denoting periods of economic downturn for Minnesota Power's large industrial customers, resulting in abnormally low usage. During these periods the normal relationship of Peak to Energy was affected by the idling of large, high load factor customers. These binaries effectively remove these downturn periods from consideration in the regression model and allow for more accurate estimation of model coefficients under more normal economic conditions.

This year's model is comparable to last year's in terms of statistical quality. The Adjusted R-Squared indicates there's high goodness-of-fit, and the low SIC indicates a highly parsimonious model. In-sample and Out-sample error metrics are lower than in the 2017 model: In-sample MAPE has decreased to 1.51% from 1.96% in the 2017 model, and Out-sample RMSE has decreased to 33 from 37 in the 2017 model. The Variance Inflation Factors (VIF) on the two weather terms suggests they are highly correlated with each other. This is expected; the two variables are related by a power of 3 (one is the cubed-root of the other). This is not indicative of any negative underlying issues concerning multicollinearity.

The HAC-Adjusted P-values ("HAC-P-Value") suggests all variables' coefficients are significant.

## B. Confidence in Forecast & Historical Accuracy

Minnesota Power has a strong record of accurate forecasting and consistent improvements in forecast accuracy over time. Excluding the mining downturn years (2015 and 2016), each successive AFR has reduced its energy sales forecast error by about .05% over the prior year (on average).

Figures 15-17 show Minnesota Power's past AFR forecast accuracy for aggregate energy use, Summer Peak, and Winter Peak demand. The bottom values in each column (**Bold**) represent the forecast accuracy in the current year, or the year it was produced. For example, the lower right value of 1.8 percent is the difference between the forecast produced in 2017 (AFR 2017) and the 2017 year-end actual. Similarly, the cell just above the current year accuracy (**Bold, Italic**) represents the accuracy of the forecast in the year immediately after its formulation. For example, AFR 2015 (formulated in 2015) forecast of 2016 was 5.9 percent (581 GWh) above the actual (due to effects of Mining downturn).

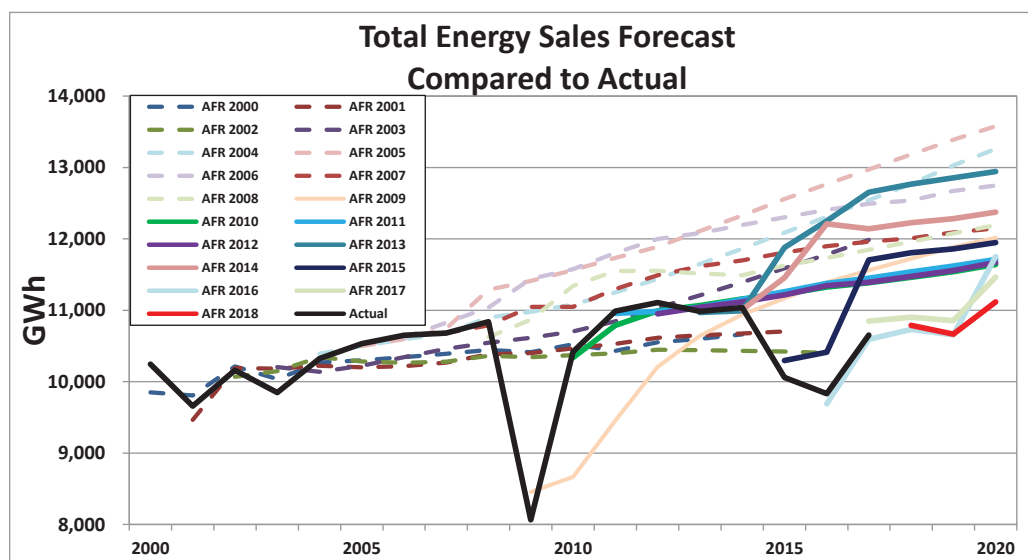


Figure 15: AFR Energy Sales Forecast Accuracy

| Total Energy Sales Forecast Error |          |       |       |       |      |       |       |       |       |       |       |        |        |       |       |       |       |       | Average      | Avg. Error |       |
|-----------------------------------|----------|-------|-------|-------|------|-------|-------|-------|-------|-------|-------|--------|--------|-------|-------|-------|-------|-------|--------------|------------|-------|
| Forecast                          | 2000     | 2001  | 2002  | 2003  | 2004 | 2005  | 2006  | 2007  | 2008  | 2009  | 2010  | 2011   | 2012   | 2013  | 2014  | 2015  | 2016  | 2017  | Error of AFR | Year-Ahead |       |
|                                   | AFR 2000 | -3.9% | 1.5%  | 0.5%  | 1.9% | -0.6% | -2.2% | -2.9% | -2.7% | -3.7% | 29.1% | 1.0%   | -5.1%  | -5.0% | -3.5% | -3.4% |       |       |              | 0.1%       | 1.5%  |
|                                   | AFR 2001 |       | -2.0% | 0.3%  | 3.4% | -1.0% | -3.1% | -4.1% | -3.9% | -4.2% | 29.0% | 0.5%   | -4.2%  | -4.4% | -3.1% | -3.3% | 6.4%  |       |              | 0.4%       | 0.3%  |
|                                   | AFR 2002 |       |       | -0.9% | 3.1% | 0.2%  | -2.4% | -3.6% | -3.8% | -4.4% | 28.2% | -0.4%  | -5.4%  | -5.9% | -5.0% | -5.5% | 3.6%  | 5.8%  |              | 0.2%       | 3.1%  |
|                                   | AFR 2003 |       |       |       | 3.6% | -1.8% | -2.9% | -2.9% | -2.1% | -2.7% | 31.6% | 2.8%   | -1.3%  | -0.6% | 2.0%  | 3.2%  | 15.2% | 19.8% | 12.5%        | 5.1%       | 1.8%  |
|                                   | AFR 2004 |       |       |       |      | 0.6%  | -0.3% | -0.5% | 0.0%  | 0.6%  | 36.1% | 6.4%   | 2.4%   | 3.0%  | 6.0%  | 7.5%  | 20.1% | 25.2% | 17.7%        | 8.9%       | 0.3%  |
|                                   | AFR 2005 |       |       |       |      |       | -0.3% | -0.5% | 0.6%  | 4.1%  | 41.5% | 11.0%  | 6.8%   | 7.0%  | 10.2% | 11.7% | 24.8% | 29.9% | 21.8%        | 13.0%      | 0.5%  |
|                                   | AFR 2006 |       |       |       |      |       |       | -0.3% | 1.4%  | 1.8%  | 41.8% | 11.1%  | 7.4%   | 8.0%  | 10.0% | 10.5% | 22.3% | 26.2% | 17.2%        | 13.1%      | 1.4%  |
|                                   | AFR 2007 |       |       |       |      |       |       |       | 0.0%  | -0.5% | 37.0% | 6.0%   | 2.8%   | 3.4%  | 5.7%  | 6.0%  | 17.4% | 21.0% | 12.3%        | 10.1%      | 0.5%  |
|                                   | AFR 2008 |       |       |       |      |       |       |       |       | -2.0% | 34.8% | 8.9%   | 5.1%   | 4.0%  | 4.8%  | 4.1%  | 15.6% | 19.3% | 11.2%        | 10.6%      | 34.8% |
|                                   | AFR 2009 |       |       |       |      |       |       |       |       |       | 4.8%  | -16.8% | -13.9% | -8.1% | -3.1% | -0.9% | 11.0% | 15.9% | 8.5%         | -0.3%      | 16.8% |
|                                   | AFR 2010 |       |       |       |      |       |       |       |       |       |       | -0.8%  | -1.8%  | -1.0% | 0.7%  | 1.1%  | 11.6% | 15.2% | 6.9%         | 4.0%       | 1.8%  |
|                                   | AFR 2011 |       |       |       |      |       |       |       |       |       |       |        | -0.3%  | -1.1% | 0.5%  | 1.0%  | 11.9% | 15.7% | 7.5%         | 5.0%       | 1.1%  |
|                                   | AFR 2012 |       |       |       |      |       |       |       |       |       |       |        |        | -1.4% | 0.5%  | 0.7%  | 11.5% | 15.4% | 6.9%         | 5.6%       | 0.5%  |
|                                   | AFR 2013 |       |       |       |      |       |       |       |       |       |       |        |        |       | -0.2% | -0.4% | 18.1% | 24.6% | 18.7%        | 12.2%      | 0.4%  |
|                                   | AFR 2014 |       |       |       |      |       |       |       |       |       |       |        |        |       |       | -0.3% | 13.9% | 24.2% | 13.9%        | 12.9%      | 13.9% |
|                                   | AFR 2015 |       |       |       |      |       |       |       |       |       |       |        |        |       |       |       | 2.4%  | 5.9%  | 9.9%         | 6.0%       | 5.9%  |
| AFR 2016                          |          |       |       |       |      |       |       |       |       |       |       |        |        |       |       |       | -1.4% | -0.6% | -1.0%        | 0.6%       |       |
| AFR 2017                          |          |       |       |       |      |       |       |       |       |       |       |        |        |       |       |       |       | 1.8%  |              | 1.8%       |       |

N.n%

= Year-Ahead Forecast

Avg Year-Ahead Error = 2.2%

Avg Year-Ahead Error (No Downturns) = -0.9%

N.n%

= Current Year Forecast

Avg Current Year Error = 0.0%

N.n%

= 5 Year-Ahead Forecast

Avg 5 Year Error = 6.4%

Avg 5 Year Error (No Downturns) = 0.3%



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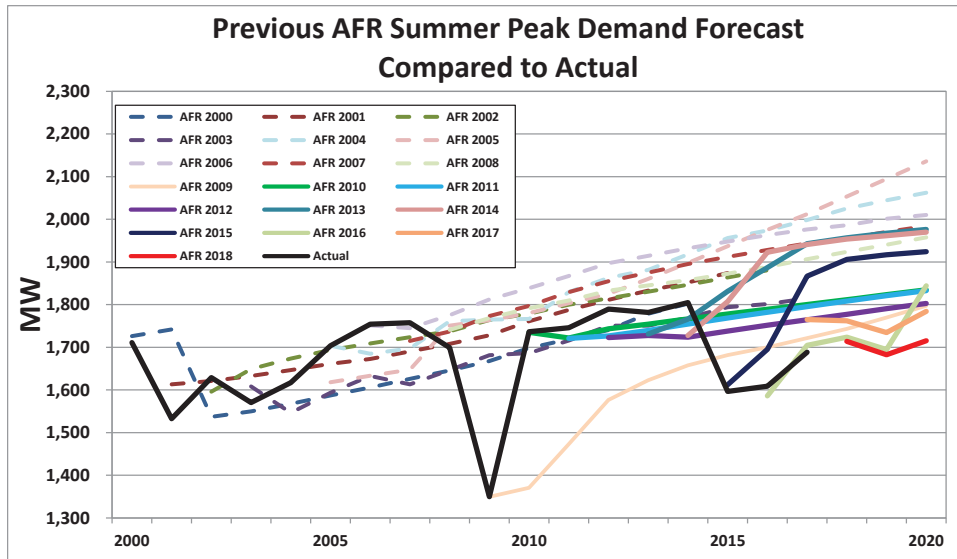


Figure 16: AFR Summer Peak Demand Forecast Accuracy

| Summer System Peak Error     |      |       |       |       |       |       |       |       |       |       |        |        |        |       |       |       |       |       | Average                                     | Avg. Error |
|------------------------------|------|-------|-------|-------|-------|-------|-------|-------|-------|-------|--------|--------|--------|-------|-------|-------|-------|-------|---|------------|
| Forecast                     | 2000 | 2001  | 2002  | 2003  | 2004  | 2005  | 2006  | 2007  | 2008  | 2009  | 2010   | 2011   | 2012   | 2013  | 2014  | 2015  | 2016  | 2017  | Error of AFR                                | Year-Ahead |
|                              | 0.9% | 13.7% | -5.6% | -1.3% | -3.1% | -6.8% | -8.5% | -7.5% | -3.1% | 23.6% | -2.2%  | -1.6%  | -2.8%  | -0.2% | -0.1% |       |       |       | -0.3%                                       | 13.7%      |
|                              |      | 5.2%  | -0.5% | 4.0%  | 1.8%  | -2.5% | -4.6% | -3.8% | 0.5%  | 28.0% | 1.4%   | 2.4%   | 1.2%   | 2.9%  | 2.6%  | 17.4% |       |       | 3.7%  | 0.5%       |
|                              |      |       | -2.0% | 5.0%  | 3.5%  | -0.6% | -2.6% | -1.9% | 2.3%  | 30.7% | 2.4%   | 3.1%   | 1.4%   | 2.7%  | 2.3%  | 16.7% | 16.9% |       | 5.3%  | 5.0%       |
|                              |      |       |       | 2.4%  | -4.4% | -6.4% | -6.9% | -8.2% | -3.1% | 24.6% | -2.9%  | -1.7%  | -2.2%  | -1.7% | -2.0% | 12.4% | 12.0% | 7.5%  | 1.3%  | 4.4%       |
|                              |      |       |       |       | 0.0%  | 0.0%  | -3.9% | -3.5% | 3.7%  | 30.8% | 1.7%   | 4.8%   | 4.1%   | 5.6%  | 6.3%  | 22.5% | 22.7% | 18.4% | 8.1%  | 0.0%       |
|                              |      |       |       |       |       | -5.0% | -6.9% | -6.3% | 3.1%  | 30.7% | 2.5%   | 3.3%   | 2.0%   | 4.4%  | 5.2%  | 21.3% | 22.8% | 19.2% | 7.4%  | 6.9%       |
|                              |      |       |       |       |       |       | -0.2% | -0.7% | 4.5%  | 34.3% | 5.9%   | 7.0%   | 6.0%   | 7.5%  | 7.0%  | 22.0% | 22.0% | 17.1% | 11.0%                                       | 0.7%       |
|                              |      |       |       |       |       |       |       | -2.4% | 2.2%  | 31.4% | 3.5%   | 4.8%   | 3.6%   | 5.2%  | 5.0%  | 19.8% | 19.8% | 15.1% | 9.8%  | 2.2%       |
|                              |      |       |       |       |       |       |       |       | 2.5%  | 31.0% | 3.2%   | 3.7%   | 2.4%   | 3.6%  | 2.9%  | 17.3% | 17.4% | 12.9% | 9.7%  | 31.0%      |
|                              |      |       |       |       |       |       |       |       |       | 0.0%  | -21.1% | -15.6% | -11.9% | -8.9% | -8.2% | 5.3%  | 5.7%  | 1.9%  | -5.9%                                       | 21.1%      |
|                              |      |       |       |       |       |       |       |       |       |       | -0.1%  | -1.4%  | -2.6%  | -1.5% | -2.1% | 11.3% | 11.2% | 6.6%  | 2.7%  | 1.4%       |
|                              |      |       |       |       |       |       |       |       |       |       |        | -1.5%  | -3.5%  | -2.4% | -2.8% | 10.8% | 10.8% | 6.3%  | 2.5%  | 3.5%       |
|                              |      |       |       |       |       |       |       |       |       |       |        |        | -3.7%  | -3.0% | -4.5% | 8.8%  | 8.9%  | 4.5%  | 1.8%  | 3.0%       |
|                              |      |       |       |       |       |       |       |       |       |       |        |        |        | -2.8% | -2.1% | 14.7% | 17.3% | 15.1% | 8.4%  | 2.1%       |
|                              |      |       |       |       |       |       |       |       |       |       |        |        |        |       | -4.3% | 13.2% | 19.5% | 14.9% | 10.8%                                       | 13.2%      |
|                              |      |       |       |       |       |       |       |       |       |       |        |        |        |       |       | 1.0%  | 5.4%  | 10.6% | 5.6%  | 5.4%       |
|                              |      |       |       |       |       |       |       |       |       |       |        |        |        |       |       |       | -1.4% | 0.9%  | -0.2%                                       | 0.9%       |
|                              |      |       |       |       |       |       |       |       |       |       |        |        |        |       |       |       |       | 4.5%  | 4.5%  |            |
| N.n% = Year-Ahead Forecast   |      |       |       |       |       |       |       |       |       |       |        |        |        |       |       |       |       |       | Avg Year-Ahead Error = 1.6%                 |            |
|                              |      |       |       |       |       |       |       |       |       |       |        |        |        |       |       |       |       |       | Avg Year-Ahead Error (No Downturns) = -2.1% |            |
| N.n% = Current Year Forecast |      |       |       |       |       |       |       |       |       |       |        |        |        |       |       |       |       |       | Avg Current Year Error = -0.4%              |            |
| N.n% = 5 Year-Ahead Forecast |      |       |       |       |       |       |       |       |       |       |        |        |        |       |       |       |       |       | Avg 5 Year Error = 3.8%                     |            |
|                              |      |       |       |       |       |       |       |       |       |       |        |        |        |       |       |       |       |       | Avg 5 Year Error (No Downturns) = 0.7%      |            |

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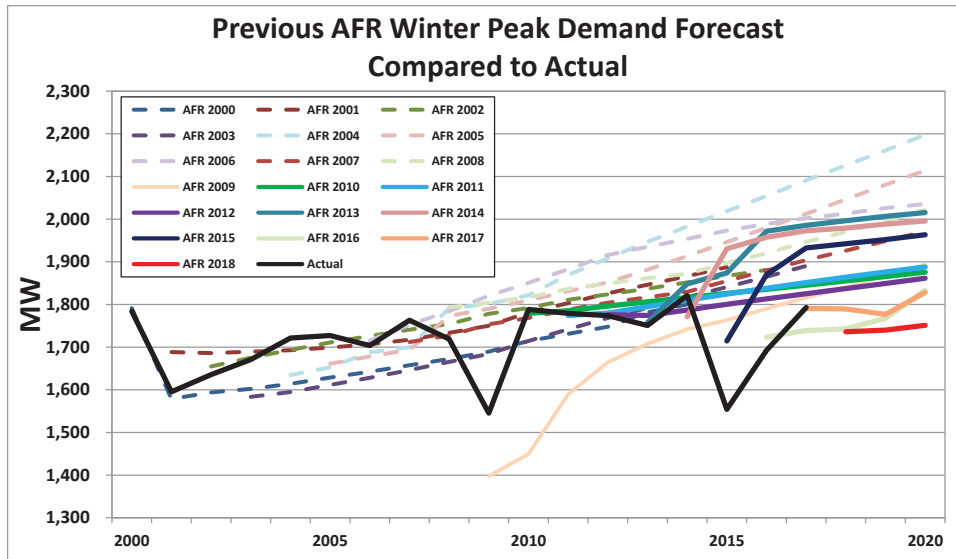


Figure 17: AFR Winter Peak Demand Forecast Accuracy

| Winter System Peak Error     |          |      |       |       |       |       |       |       |       |       |       |        |        |       |       |       |       |       | Average Error of AFR                        | Avg. Error Year-Ahead |       |
|------------------------------|----------|------|-------|-------|-------|-------|-------|-------|-------|-------|-------|--------|--------|-------|-------|-------|-------|-------|---|-----------------------|-------|
| Forecast                     | 2000     | 2001 | 2002  | 2003  | 2004  | 2005  | 2006  | 2007  | 2008  | 2009  | 2010  | 2011   | 2012   | 2013  | 2014  | 2015  | 2016  | 2017  |   |                       |       |
|                              | AFR 2000 | 0.4% | -1.0% | -2.6% | -4.1% | -6.2% | -5.7% | -3.6% | -6.0% | -2.7% | 9.3%  | -4.1%  | -2.7%  | -1.5% | 1.8%  | -1.1% |       |       |   | -2.0%                 | 1.0%  |
|                              | AFR 2001 |      | 5.8%  | 3.1%  | 1.1%  | -1.6% | -1.6% | 0.2%  | -2.6% | 0.8%  | 13.3% | -0.4%  | 1.4%   | 2.9%  | 5.5%  | 2.5%  | 21.4% |       |   | 3.4%                  | 3.1%  |
|                              | AFR 2002 |      |       | 1.1%  | 0.2%  | -1.6% | -0.9% | 1.3%  | -1.3% | 2.0%  | 15.1% | 0.2%   | 1.8%   | 2.8%  | 4.9%  | 1.7%  | 20.1% | 11.2% |   | 3.9%                  | 0.2%  |
|                              | AFR 2003 |      |       |       | -5.2% | -7.4% | -6.7% | -4.4% | -6.6% | -3.1% | 9.0%  | -4.1%  | -2.1%  | -0.3% | 2.4%  | -0.2% | 18.4% | 10.2% | 5.5%  | 0.3%                  | 7.4%  |
|                              | AFR 2004 |      |       |       |       | -5.0% | -4.3% | -0.9% | -3.6% | 4.2%  | 16.6% | 1.9%   | 5.1%   | 7.6%  | 11.2% | 8.9%  | 29.9% | 21.4% | 16.6%                                       | 7.8%                  | 4.3%  |
|                              | AFR 2005 |      |       |       |       |       | -3.8% | -1.5% | -3.9% | 3.2%  | 15.8% | 1.2%   | 2.9%   | 4.4%  | 7.5%  | 5.1%  | 25.2% | 17.0% | 12.2%                                       | 6.6%                  | 1.5%  |
|                              | AFR 2006 |      |       |       |       |       |       | 0.7%  | -0.6% | 3.8%  | 17.8% | 3.5%   | 5.8%   | 8.0%  | 10.5% | 7.3%  | 27.0% | 17.5% | 11.7%                                       | 9.4%                  | 0.6%  |
|                              | AFR 2007 |      |       |       |       |       |       |       | -2.9% | 0.5%  | 13.5% | -1.1%  | 0.5%   | 1.7%  | 3.8%  | 0.5%  | 19.4% | 11.1% | 6.2%  | 4.8%                  | 0.5%  |
|                              | AFR 2008 |      |       |       |       |       |       |       |       | 4.3%  | 16.8% | 1.6%   | 3.2%   | 4.2%  | 6.3%  | 2.8%  | 22.1% | 13.5% | 8.6%  | 8.3%                  | 16.8% |
|                              | AFR 2009 |      |       |       |       |       |       |       |       |       | -9.6% | -18.9% | -10.6% | -6.2% | -2.4% | -4.3% | 13.4% | 5.8%  | 1.3%  | -3.5%                 | 18.9% |
|                              | AFR 2010 |      |       |       |       |       |       |       |       |       |       | -0.5%  | 0.4%   | 1.3%  | 3.2%  | -0.2% | 17.5% | 8.5%  | 2.9%  | 4.1%                  | 0.4%  |
|                              | AFR 2011 |      |       |       |       |       |       |       |       |       |       |        | -0.3%  | 0.3%  | 2.5%  | -0.6% | 17.4% | 8.6%  | 3.3%  | 4.5%                  | 0.3%  |
|                              | AFR 2012 |      |       |       |       |       |       |       |       |       |       |        |        | 0.1%  | 1.3%  | -1.9% | 15.8% | 7.1%  | 1.8%  | 4.1%                  | 1.3%  |
|                              | AFR 2013 |      |       |       |       |       |       |       |       |       |       |        |        |       | 0.4%  | 1.5%  | 20.5% | 16.5% | 10.7%                                       | 9.9%                  | 1.5%  |
|                              | AFR 2014 |      |       |       |       |       |       |       |       |       |       |        |        |       |       | -2.7% | 24.2% | 15.7% | 10.0%                                       | 11.8%                 | 24.2% |
|                              | AFR 2015 |      |       |       |       |       |       |       |       |       |       |        |        |       |       |       | 10.3% | 10.5% | 7.8%  | 9.5%                  | 10.5% |
| AFR 2016                     |          |      |       |       |       |       |       |       |       |       |       |        |        |       |       |       | 1.8%  | -3.0% | -0.6%                                       | 3.0%                  |       |
| AFR 2017                     |          |      |       |       |       |       |       |       |       |       |       |        |        |       |       |       |       | -0.1% |   |                       |       |
| N.n% = Year-Ahead Forecast   |          |      |       |       |       |       |       |       |       |       |       |        |        |       |       |       |       |       | Avg Year-Ahead Error = 1.3%                 |                       |       |
|                              |          |      |       |       |       |       |       |       |       |       |       |        |        |       |       |       |       |       | Avg Year-Ahead Error (No Downturns) = -1.3% |                       |       |
| N.n% = Current Year Forecast |          |      |       |       |       |       |       |       |       |       |       |        |        |       |       |       |       |       | Avg Current Year Error = -0.3%              |                       |       |
| N.n% = 5 Year-Ahead Forecast |          |      |       |       |       |       |       |       |       |       |       |        |        |       |       |       |       |       | Avg 5 Year Error = 3.5%                     |                       |       |
|                              |          |      |       |       |       |       |       |       |       |       |       |        |        |       |       |       |       |       | Avg 5 Year Error (No Downturns) = 1.0%      |                       |       |

## **2. AFR 2018 Forecast and Alternative Scenarios**

### **A. Forecast Scenario Descriptions**

Minnesota Power developed several scenarios for system peak demand and energy forecasts. All scenarios assume some direct load additions and/or losses from specific Industrial customers, served directly by Minnesota Power or through a wholesale customer.

#### **Moderate Demand and Energy Scenario**

This scenario includes changes in customer operations that are not certain, but have a high likelihood of occurring. This high likelihood is characterized by formal communication from the customer, plus one or more of the following:

- An Electric Service Agreement is either executed or is in negotiation;
- The change in operation is supported by customer actions, such as construction or investment that will result in additional power requirements;
- A timeframe for the operation and resulting power.

Moderate scenario assumes additional load from a number of new and existing customers. Most notably, this scenario accounts for a new industrial facility on the Iron Range; the facility is expected to reach full demand in mid-2021.

The scenario assumes a moderate, or “expected,” rate of national economic growth as the basis for the regional economic model.

The Moderate scenario results in compound annual energy sales and peak demand growth of 0.8 percent and 0.6 percent, respectively, from 2017 through 2032.

#### **High Demand and Energy Scenario**

This scenario is identical to the Moderate scenario except it also includes the assumed start-up of the new industrial facility in the City of Nashwauk in mid-2020. This new industrial facility is assumed to displace some production at current facilities, so the net load and energy sales growth is moderated.

The scenario assumes a moderate, or “expected,” rate of national economic growth as the basis for the regional economic model.

The High scenario results in compound annual energy sales and peak demand growth of 1.2 percent and 1.1 percent, respectively, from 2017 through 2032.

## **Low Demand and Energy Scenario**

This scenario is identical to the Moderate scenario except in two assumptions: 1) it assumes does not include the start-up of a new industrial facility on the Iron Range, and 2) the Low Demand and Energy scenario assumes closure of a large industrial facility in 2025.

The scenario assumes a moderate, or “expected,” rate of national economic growth as the basis for the regional economic model.

The Low scenario results in compound annual energy sales and peak demand growth of 0.4 percent and 0.2 percent, respectively, from 2017 through 2032.

## **B. Other Adjustments to Econometric Forecast**

Each of Minnesota Power’s forecast scenarios is the summation of the econometric model results and arithmetic adjustments for impacts which cannot be accurately modeled. These exogenous impacts are documented as separate seasonal peak and energy adjustments in all of the specific scenario tables. These adjustments fall into the following categories:

1. **Net Load/Energy Added:** are exogenous adjustments for load added due to new customers or expansion by existing customers, and lost load due to closure or loss of contract. This adjustment includes all load added or lost on the system, regardless of how that load is met; “Net Load/Energy Added” accounts for any change in load at the system level. To preserve customer confidentiality, the seasonal demand and energy impacts are netted to a single value before being applied to the econometric values. Adjustments made for recent customer additions (as discussed in sections on *Methodological Improvements* and *Data Revisions Since Previous AFR*) are also included in this value.
2. **Customer Generation:** is the demand on Minnesota Power system that is met by customer owned generation. The Company’s current forecasting process involves modeling historical system level load and total energy requirements, so the resulting econometric series inherently includes some level of customer generation which must be “backed-out” to arrive at a projection of delivered demand or energy sales. This is a change from previous AFR which modeled a “delivered load” or “energy sales” series. This methodological update is outlined in the section on “Methodological Adjustments in AFR 2018”

In previous iterations of the AFR, the forecast assumptions for customer generation were determined by averaging the historical customer generation coincident with the monthly peak over a 12-year historical timeframe. The result was a set of 12 distinct monthly values for each month of the year. Typically, this would result in an estimate of winter peak-coincident customer generation that’s about 4 or 5 MW higher than the summer-peak coincident figure.

This approach is no longer tenable given recent tumult in both the iron and paper sectors, and the transitions in customer generating capability; it's unclear what, if any, seasonality might be present in the current paradigm. As such, the Company did not develop seasonal assumptions, and both summer and winter peaks assume the same level of customer generation.

The Customer Generation adjustments to peak and energy forecasts are still based on historical levels of customer generation and are still adjusted for expected changes in the operation or ownership of generating assets that would affect deliveries to customers.

3. **Dual Fuel:** Minnesota Power has a robust Dual Fuel program for residential and commercial customers. Dual Fuel impacts are accounted for in the forecast in the same way as conservation. The impacts of historical interruptions are assumed to be inherent in the forecast since curtailments affected historical monthly peak demand. Post-regression adjustments for dual fuel would produce an artificially low peak demand forecast. Minnesota Power will account for dual fuel interruption as a resource and not as an adjustment to the load forecast.

## C. Peak Demand and Energy Outlooks by Scenario

### i. Moderate Scenario – AFR Expected Case

#### Peak Forecast (MW)

|      | Econometric |       | + Net Load Added |      | = MP System Peak |       |        | - Customer Gen. |     | = Delivered Load |       |      |
|------|-------------|-------|------------------|------|------------------|-------|--------|-----------------|-----|------------------|-------|------|
|      | Sum         | Win   | Sum              | Win  | Sum              | Win   | Annual | Sum             | Win | Sum              | Win   |      |
| 2000 |             |       |                  |      | 1,711            | 1,784 | 1,784  | 242             | 281 | 1,469            | 1,503 | 2000 |
| 2001 |             |       |                  |      | 1,533            | 1,595 | 1,595  | 150             | 175 | 1,383            | 1,421 | 2001 |
| 2002 |             |       |                  |      | 1,629            | 1,636 | 1,636  | 165             | 180 | 1,464            | 1,456 | 2002 |
| 2003 |             |       |                  |      | 1,570            | 1,671 | 1,671  | 163             | 175 | 1,408            | 1,496 | 2003 |
| 2004 |             |       |                  |      | 1,617            | 1,721 | 1,721  | 168             | 189 | 1,449            | 1,533 | 2004 |
| 2005 |             |       |                  |      | 1,703            | 1,727 | 1,727  | 169             | 172 | 1,535            | 1,555 | 2005 |
| 2006 |             |       |                  |      | 1,753            | 1,704 | 1,753  | 169             | 170 | 1,584            | 1,534 | 2006 |
| 2007 |             |       |                  |      | 1,758            | 1,763 | 1,763  | 176             | 179 | 1,582            | 1,584 | 2007 |
| 2008 |             |       |                  |      | 1,699            | 1,719 | 1,719  | 147             | 145 | 1,552            | 1,575 | 2008 |
| 2009 |             |       |                  |      | 1,350            | 1,545 | 1,545  | 150             | 176 | 1,200            | 1,369 | 2009 |
| 2010 |             |       |                  |      | 1,732            | 1,789 | 1,789  | 140             | 190 | 1,591            | 1,599 | 2010 |
| 2011 |             |       |                  |      | 1,746            | 1,780 | 1,780  | 173             | 150 | 1,573            | 1,630 | 2011 |
| 2012 |             |       |                  |      | 1,790            | 1,774 | 1,790  | 187             | 169 | 1,603            | 1,605 | 2012 |
| 2013 |             |       |                  |      | 1,782            | 1,751 | 1,782  | 136             | 162 | 1,645            | 1,589 | 2013 |
| 2014 |             |       |                  |      | 1,805            | 1,821 | 1,821  | 184             | 184 | 1,620            | 1,637 | 2014 |
| 2015 |             |       |                  |      | 1,597            | 1,554 | 1,597  | 141             | 114 | 1,455            | 1,440 | 2015 |
| 2016 |             |       |                  |      | 1,609            | 1,692 | 1,692  | 183             | 173 | 1,426            | 1,520 | 2016 |
| 2017 |             |       |                  |      | 1,689            | 1,793 | 1,793  | 150             | 196 | 1,538            | 1,597 | 2017 |
| 2018 | 1,720       | 1,749 | (7)              | (13) | 1,714            | 1,736 | 1,736  | 148             | 148 | 1,566            | 1,588 | 2018 |
| 2019 | 1,723       | 1,766 | (41)             | (26) | 1,682            | 1,740 | 1,740  | 148             | 118 | 1,534            | 1,622 | 2019 |
| 2020 | 1,741       | 1,774 | (26)             | (23) | 1,715            | 1,751 | 1,751  | 118             | 118 | 1,597            | 1,633 | 2020 |
| 2021 | 1,741       | 1,774 | 7                | 19   | 1,748            | 1,793 | 1,793  | 118             | 118 | 1,630            | 1,674 | 2021 |
| 2022 | 1,741       | 1,779 | 19               | 19   | 1,760            | 1,798 | 1,798  | 118             | 118 | 1,642            | 1,680 | 2022 |
| 2023 | 1,751       | 1,785 | 19               | 19   | 1,770            | 1,804 | 1,804  | 118             | 118 | 1,652            | 1,686 | 2023 |
| 2024 | 1,759       | 1,792 | 19               | 19   | 1,778            | 1,811 | 1,811  | 118             | 118 | 1,660            | 1,693 | 2024 |
| 2025 | 1,763       | 1,799 | 19               | 19   | 1,782            | 1,818 | 1,818  | 118             | 118 | 1,664            | 1,700 | 2025 |
| 2026 | 1,770       | 1,807 | 19               | 19   | 1,789            | 1,826 | 1,826  | 118             | 118 | 1,671            | 1,708 | 2026 |
| 2027 | 1,779       | 1,816 | 19               | 19   | 1,798            | 1,835 | 1,835  | 118             | 118 | 1,680            | 1,717 | 2027 |
| 2028 | 1,788       | 1,825 | 19               | 19   | 1,807            | 1,844 | 1,844  | 118             | 118 | 1,689            | 1,726 | 2028 |
| 2029 | 1,797       | 1,834 | 19               | 19   | 1,816            | 1,853 | 1,853  | 118             | 118 | 1,698            | 1,735 | 2029 |
| 2030 | 1,806       | 1,843 | 19               | 19   | 1,825            | 1,862 | 1,862  | 118             | 118 | 1,707            | 1,744 | 2030 |
| 2031 | 1,816       | 1,852 | 19               | 19   | 1,835            | 1,871 | 1,871  | 118             | 118 | 1,717            | 1,753 | 2031 |
| 2032 | 1,825       | 1,861 | 19               | 19   | 1,844            | 1,879 | 1,879  | 118             | 118 | 1,726            | 1,761 | 2032 |

#### Energy Sales Forecast (MWh)

|      | Econometric |  | + Net Energy Added |  | = System Energy Use |  | - Customer Gen. |  | = MP Delivered Energy |       | MP System |             |      |
|------|-------------|--|--------------------|--|---------------------|--|-----------------|--|-----------------------|-------|-----------|-------------|------|
|      |             |  |                    |  |                     |  |                 |  |                       |       | Peak      | Load Factor |      |
| 2000 |             |  |                    |  |                     |  |                 |  | 10,245,420            |       |           |             |      |
| 2001 |             |  |                    |  |                     |  |                 |  | 9,658,073             |       |           |             |      |
| 2002 |             |  |                    |  | 11,348,001          |  | 1,187,858       |  | 10,160,143            | 1,636 | 0.79      |             | 2002 |
| 2003 |             |  |                    |  | 11,078,929          |  | 1,232,635       |  | 9,846,294             | 1,671 | 0.76      |             | 2003 |
| 2004 |             |  |                    |  | 11,592,140          |  | 1,267,728       |  | 10,324,412            | 1,721 | 0.77      |             | 2004 |
| 2005 |             |  |                    |  | 11,790,167          |  | 1,258,895       |  | 10,531,272            | 1,727 | 0.78      |             | 2005 |
| 2006 |             |  |                    |  | 11,844,171          |  | 1,195,070       |  | 10,649,101            | 1,753 | 0.77      |             | 2006 |
| 2007 |             |  |                    |  | 11,933,479          |  | 1,252,965       |  | 10,680,514            | 1,763 | 0.77      |             | 2007 |
| 2008 |             |  |                    |  | 12,115,604          |  | 1,276,158       |  | 10,839,446            | 1,719 | 0.80      |             | 2008 |
| 2009 |             |  |                    |  | 9,173,102           |  | 1,108,014       |  | 8,065,088             | 1,545 | 0.68      |             | 2009 |
| 2010 |             |  |                    |  | 11,716,706          |  | 1,299,292       |  | 10,417,414            | 1,789 | 0.75      |             | 2010 |
| 2011 |             |  |                    |  | 12,410,307          |  | 1,422,107       |  | 10,988,200            | 1,780 | 0.80      |             | 2011 |
| 2012 |             |  |                    |  | 12,307,674          |  | 1,200,317       |  | 11,107,357            | 1,790 | 0.79      |             | 2012 |
| 2013 |             |  |                    |  | 12,170,948          |  | 1,185,139       |  | 10,985,809            | 1,782 | 0.78      |             | 2013 |
| 2014 |             |  |                    |  | 12,326,943          |  | 1,287,965       |  | 11,038,979            | 1,821 | 0.77      |             | 2014 |
| 2015 |             |  |                    |  | 11,286,687          |  | 1,227,221       |  | 10,059,466            | 1,597 | 0.81      |             | 2015 |
| 2016 |             |  |                    |  | 10,905,574          |  | 1,074,786       |  | 9,830,788             | 1,692 | 0.74      |             | 2016 |
| 2017 |             |  |                    |  | 11,870,111          |  | 1,215,894       |  | 10,654,217            | 1,793 | 0.76      |             | 2017 |
| 2018 | 12,028,005  |  | (35,159)           |  | 11,992,846          |  | 1,203,204       |  | 10,789,642            | 1,736 | 0.79      |             | 2018 |
| 2019 | 12,005,348  |  | (137,559)          |  | 11,867,789          |  | 1,203,204       |  | 10,664,585            | 1,740 | 0.78      |             | 2019 |
| 2020 | 12,174,813  |  | (114,265)          |  | 12,060,549          |  | 942,981         |  | 11,117,568            | 1,751 | 0.79      |             | 2020 |
| 2021 | 12,142,055  |  | 85,514             |  | 12,227,569          |  | 940,404         |  | 11,287,165            | 1,793 | 0.78      |             | 2021 |
| 2022 | 12,124,650  |  | 235,791            |  | 12,360,440          |  | 940,404         |  | 11,420,036            | 1,798 | 0.78      |             | 2022 |
| 2023 | 12,177,141  |  | 237,958            |  | 12,415,099          |  | 940,404         |  | 11,474,695            | 1,804 | 0.79      |             | 2023 |
| 2024 | 12,254,529  |  | 241,814            |  | 12,496,343          |  | 942,981         |  | 11,553,363            | 1,811 | 0.79      |             | 2024 |
| 2025 | 12,250,509  |  | 241,864            |  | 12,492,373          |  | 940,404         |  | 11,551,968            | 1,818 | 0.78      |             | 2025 |
| 2026 | 12,298,461  |  | 245,130            |  | 12,543,590          |  | 940,404         |  | 11,603,186            | 1,826 | 0.78      |             | 2026 |
| 2027 | 12,356,503  |  | 246,887            |  | 12,603,389          |  | 940,404         |  | 11,662,985            | 1,835 | 0.78      |             | 2027 |
| 2028 | 12,456,370  |  | 249,639            |  | 12,706,009          |  | 942,981         |  | 11,763,028            | 1,844 | 0.79      |             | 2028 |
| 2029 | 12,486,329  |  | 249,642            |  | 12,735,971          |  | 940,404         |  | 11,795,567            | 1,853 | 0.78      |             | 2029 |
| 2030 | 12,553,108  |  | 251,989            |  | 12,805,096          |  | 940,404         |  | 11,864,692            | 1,862 | 0.79      |             | 2030 |
| 2031 | 12,621,315  |  | 253,409            |  | 12,874,724          |  | 940,404         |  | 11,934,320            | 1,871 | 0.79      |             | 2031 |
| 2032 | 12,722,764  |  | 257,517            |  | 12,980,281          |  | 942,981         |  | 12,037,300            | 1,879 | 0.79      |             | 2032 |

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**Customer Count Forecast by Class**

| Year | Residential | Commercial | Industrial | Street Lighting | Public Authorities | Resale | Total   |
|------|-------------|------------|------------|-----------------|--------------------|--------|---------|
| 2005 | 116,072     | 20,040     | 460        | 490             | 233                | 18     | 137,313 |
| 2006 | 117,596     | 20,419     | 451        | 509             | 237                | 18     | 139,229 |
| 2007 | 118,870     | 20,630     | 435        | 548             | 241                | 18     | 140,742 |
| 2008 | 119,300     | 20,969     | 431        | 585             | 246                | 18     | 141,549 |
| 2009 | 121,217     | 21,287     | 429        | 426             | 262                | 18     | 143,639 |
| 2010 | 121,235     | 21,491     | 424        | 460             | 278                | 18     | 143,906 |
| 2011 | 121,251     | 21,603     | 421        | 527             | 281                | 18     | 144,101 |
| 2012 | 120,697     | 21,614     | 411        | 559             | 275                | 18     | 143,573 |
| 2013 | 121,314     | 21,915     | 402        | 615             | 287                | 18     | 144,551 |
| 2014 | 119,789     | 21,697     | 390        | 660             | 272                | 17     | 142,824 |
| 2015 | 121,515     | 22,170     | 394        | 677             | 281                | 17     | 145,054 |
| 2016 | 121,836     | 22,420     | 396        | 688             | 281                | 17     | 145,638 |
| 2017 | 122,253     | 22,695     | 390        | 693             | 278                | 17     | 146,326 |
| 2018 | 122,353     | 22,822     | 377        | 695             | 281                | 17     | 146,545 |
| 2019 | 122,540     | 22,973     | 370        | 702             | 282                | 17     | 146,883 |
| 2020 | 122,751     | 23,155     | 364        | 706             | 282                | 16     | 147,274 |
| 2021 | 122,926     | 23,331     | 355        | 709             | 283                | 16     | 147,619 |
| 2022 | 123,074     | 23,495     | 348        | 711             | 283                | 16     | 147,927 |
| 2023 | 123,241     | 23,662     | 342        | 714             | 283                | 16     | 148,257 |
| 2024 | 123,414     | 23,828     | 335        | 717             | 283                | 16     | 148,593 |
| 2025 | 123,554     | 23,991     | 329        | 717             | 282                | 16     | 148,889 |
| 2026 | 123,717     | 24,153     | 322        | 718             | 282                | 16     | 149,209 |
| 2027 | 123,889     | 24,317     | 316        | 721             | 282                | 16     | 149,541 |
| 2028 | 124,073     | 24,481     | 309        | 726             | 282                | 16     | 149,887 |
| 2029 | 124,280     | 24,647     | 302        | 732             | 283                | 16     | 150,260 |
| 2030 | 124,490     | 24,817     | 296        | 739             | 284                | 16     | 150,641 |
| 2031 | 124,688     | 24,986     | 289        | 745             | 284                | 16     | 151,008 |
| 2032 | 124,872     | 25,154     | 283        | 750             | 284                | 16     | 151,358 |

**Energy Sales Forecast (MWh) by Customer Class**

| Year | Residential | Commercial | Industrial | Street Lighting | Public Authorities | Resale    | Total      |
|------|-------------|------------|------------|-----------------|--------------------|-----------|------------|
| 2005 | 1,013,156   | 1,200,075  | 6,761,669  | 15,646          | 61,396             | 1,479,329 | 10,531,271 |
| 2006 | 1,011,699   | 1,206,607  | 6,782,975  | 15,831          | 60,882             | 1,571,107 | 10,649,101 |
| 2007 | 1,051,453   | 1,244,930  | 6,622,051  | 15,752          | 67,056             | 1,679,267 | 10,680,509 |
| 2008 | 1,079,837   | 1,240,324  | 6,737,333  | 15,983          | 64,912             | 1,701,057 | 10,839,446 |
| 2009 | 1,075,116   | 1,212,778  | 4,051,352  | 16,049          | 62,036             | 1,647,759 | 8,065,090  |
| 2010 | 1,057,476   | 1,221,754  | 6,364,080  | 15,833          | 61,768             | 1,696,511 | 10,417,422 |
| 2011 | 1,069,856   | 1,226,174  | 6,913,648  | 16,420          | 62,458             | 1,699,644 | 10,988,200 |
| 2012 | 1,043,281   | 1,237,386  | 7,037,843  | 15,955          | 54,074             | 1,718,819 | 11,107,358 |
| 2013 | 1,086,481   | 1,256,540  | 6,873,992  | 16,066          | 51,736             | 1,700,993 | 10,985,809 |
| 2014 | 1,112,579   | 1,262,464  | 6,946,536  | 16,400          | 53,236             | 1,647,763 | 11,038,979 |
| 2015 | 1,026,454   | 1,254,681  | 6,073,273  | 15,801          | 54,470             | 1,634,786 | 10,059,466 |
| 2016 | 1,015,465   | 1,243,045  | 5,855,829  | 15,588          | 51,455             | 1,649,406 | 9,830,788  |
| 2017 | 1,010,955   | 1,223,786  | 6,697,793  | 14,873          | 49,945             | 1,656,865 | 10,654,217 |
| 2018 | 1,051,661   | 1,249,190  | 6,806,116  | 14,787          | 50,867             | 1,617,020 | 10,789,642 |
| 2019 | 1,062,297   | 1,269,570  | 6,746,910  | 14,852          | 49,356             | 1,521,600 | 10,664,585 |
| 2020 | 1,071,459   | 1,287,763  | 7,069,665  | 14,941          | 49,303             | 1,624,437 | 11,117,568 |
| 2021 | 1,073,306   | 1,296,850  | 7,224,896  | 14,885          | 48,979             | 1,628,249 | 11,287,165 |
| 2022 | 1,078,428   | 1,307,767  | 7,333,168  | 14,870          | 48,660             | 1,637,142 | 11,420,036 |
| 2023 | 1,083,725   | 1,318,719  | 7,363,254  | 14,854          | 48,369             | 1,645,774 | 11,474,695 |
| 2024 | 1,092,630   | 1,333,063  | 7,405,069  | 14,876          | 48,126             | 1,659,598 | 11,553,363 |
| 2025 | 1,094,177   | 1,340,148  | 7,392,282  | 14,837          | 47,603             | 1,662,922 | 11,551,968 |
| 2026 | 1,099,463   | 1,352,735  | 7,416,283  | 14,824          | 47,559             | 1,672,322 | 11,603,186 |
| 2027 | 1,104,844   | 1,366,531  | 7,447,862  | 14,805          | 47,651             | 1,681,292 | 11,662,985 |
| 2028 | 1,113,933   | 1,384,625  | 7,505,205  | 14,844          | 47,955             | 1,696,466 | 11,763,028 |
| 2029 | 1,116,062   | 1,394,242  | 7,522,804  | 14,782          | 48,015             | 1,699,661 | 11,795,567 |
| 2030 | 1,121,819   | 1,407,701  | 7,561,907  | 14,781          | 48,128             | 1,710,355 | 11,864,692 |
| 2031 | 1,127,488   | 1,420,158  | 7,603,366  | 14,780          | 48,052             | 1,720,476 | 11,934,320 |
| 2032 | 1,136,670   | 1,436,086  | 7,665,166  | 14,823          | 47,896             | 1,736,659 | 12,037,300 |

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**ii. High Scenario**  
**Peak Forecast (MW)**

| Econometric |       | + Net Load Added |      | = MP System Peak |       |       | - Customer Gen. |     | = Delivered Load |             |
|-------------|-------|------------------|------|------------------|-------|-------|-----------------|-----|------------------|-------------|
|             | Sum   | Win              | Sum  | Win              | Sum   | Win   | Annual          | Sum | Win              |             |
| 2000        |       |                  |      |                  | 1,711 | 1,784 | 1,784           | 242 | 281              | 1,469 1,503 |
| 2001        |       |                  |      |                  | 1,533 | 1,595 | 1,595           | 150 | 175              | 1,383 1,421 |
| 2002        |       |                  |      |                  | 1,629 | 1,636 | 1,636           | 165 | 180              | 1,464 1,456 |
| 2003        |       |                  |      |                  | 1,570 | 1,671 | 1,671           | 163 | 175              | 1,408 1,496 |
| 2004        |       |                  |      |                  | 1,617 | 1,721 | 1,721           | 168 | 189              | 1,449 1,533 |
| 2005        |       |                  |      |                  | 1,703 | 1,727 | 1,727           | 169 | 172              | 1,535 1,555 |
| 2006        |       |                  |      |                  | 1,753 | 1,704 | 1,753           | 169 | 170              | 1,584 1,534 |
| 2007        |       |                  |      |                  | 1,758 | 1,763 | 1,763           | 176 | 179              | 1,582 1,584 |
| 2008        |       |                  |      |                  | 1,699 | 1,719 | 1,719           | 147 | 145              | 1,552 1,575 |
| 2009        |       |                  |      |                  | 1,350 | 1,545 | 1,545           | 150 | 176              | 1,200 1,369 |
| 2010        |       |                  |      |                  | 1,732 | 1,789 | 1,789           | 140 | 190              | 1,591 1,599 |
| 2011        |       |                  |      |                  | 1,746 | 1,780 | 1,780           | 173 | 150              | 1,573 1,630 |
| 2012        |       |                  |      |                  | 1,790 | 1,774 | 1,790           | 187 | 169              | 1,603 1,605 |
| 2013        |       |                  |      |                  | 1,782 | 1,751 | 1,782           | 136 | 162              | 1,645 1,589 |
| 2014        |       |                  |      |                  | 1,805 | 1,821 | 1,821           | 184 | 184              | 1,620 1,637 |
| 2015        |       |                  |      |                  | 1,597 | 1,554 | 1,597           | 141 | 114              | 1,455 1,440 |
| 2016        |       |                  |      |                  | 1,609 | 1,692 | 1,692           | 183 | 173              | 1,426 1,520 |
| 2017        |       |                  |      |                  | 1,689 | 1,793 | 1,793           | 150 | 196              | 1,538 1,597 |
| 2018        | 1,720 | 1,749            | (7)  | (13)             | 1,714 | 1,736 | 1,736           | 148 | 148              | 1,566 1,588 |
| 2019        | 1,723 | 1,766            | (41) | (21)             | 1,682 | 1,745 | 1,745           | 148 | 118              | 1,534 1,627 |
| 2020        | 1,741 | 1,774            | (21) | 21               | 1,721 | 1,795 | 1,795           | 118 | 118              | 1,603 1,677 |
| 2021        | 1,741 | 1,774            | 51   | 81               | 1,792 | 1,854 | 1,854           | 118 | 118              | 1,674 1,736 |
| 2022        | 1,741 | 1,779            | 81   | 108              | 1,822 | 1,887 | 1,887           | 118 | 118              | 1,704 1,769 |
| 2023        | 1,751 | 1,785            | 108  | 108              | 1,859 | 1,893 | 1,893           | 118 | 118              | 1,741 1,775 |
| 2024        | 1,759 | 1,792            | 108  | 108              | 1,867 | 1,900 | 1,900           | 118 | 118              | 1,749 1,782 |
| 2025        | 1,763 | 1,799            | 108  | 108              | 1,871 | 1,907 | 1,907           | 118 | 118              | 1,753 1,789 |
| 2026        | 1,770 | 1,807            | 108  | 108              | 1,878 | 1,915 | 1,915           | 118 | 118              | 1,760 1,797 |
| 2027        | 1,779 | 1,816            | 108  | 108              | 1,887 | 1,924 | 1,924           | 118 | 118              | 1,769 1,806 |
| 2028        | 1,788 | 1,825            | 108  | 108              | 1,896 | 1,933 | 1,933           | 118 | 118              | 1,778 1,815 |
| 2029        | 1,797 | 1,834            | 108  | 108              | 1,905 | 1,942 | 1,942           | 118 | 118              | 1,787 1,824 |
| 2030        | 1,806 | 1,843            | 108  | 108              | 1,914 | 1,951 | 1,951           | 118 | 118              | 1,796 1,833 |
| 2031        | 1,816 | 1,852            | 108  | 108              | 1,924 | 1,960 | 1,960           | 118 | 118              | 1,806 1,842 |
| 2032        | 1,825 | 1,861            | 108  | 108              | 1,933 | 1,968 | 1,968           | 118 | 118              | 1,815 1,850 |

**Energy Sales Forecast (MWh)**

| Econometric |            | + Net Energy Added |  | = System Energy Use |  | - Customer Gen. |  | = MP Delivered Energy |       | MP System |             |
|-------------|------------|--------------------|--|---------------------|--|-----------------|--|-----------------------|-------|-----------|-------------|
|             |            |                    |  |                     |  |                 |  |                       |       | Peak      | Load Factor |
| 2000        |            |                    |  |                     |  |                 |  | 10,245,420            |       |           |             |
| 2001        |            |                    |  |                     |  |                 |  | 9,658,073             |       |           |             |
| 2002        |            |                    |  | 11,348,001          |  | 1,187,858       |  | 10,160,143            | 1,636 | 0.79      | 2002        |
| 2003        |            |                    |  | 11,078,929          |  | 1,232,635       |  | 9,846,294             | 1,671 | 0.76      | 2003        |
| 2004        |            |                    |  | 11,592,140          |  | 1,267,728       |  | 10,324,412            | 1,721 | 0.77      | 2004        |
| 2005        |            |                    |  | 11,790,167          |  | 1,258,895       |  | 10,531,272            | 1,727 | 0.78      | 2005        |
| 2006        |            |                    |  | 11,844,171          |  | 1,195,070       |  | 10,649,101            | 1,753 | 0.77      | 2006        |
| 2007        |            |                    |  | 11,933,479          |  | 1,252,965       |  | 10,680,514            | 1,763 | 0.77      | 2007        |
| 2008        |            |                    |  | 12,115,604          |  | 1,276,158       |  | 10,839,446            | 1,719 | 0.80      | 2008        |
| 2009        |            |                    |  | 9,173,102           |  | 1,108,014       |  | 8,065,088             | 1,545 | 0.68      | 2009        |
| 2010        |            |                    |  | 11,716,706          |  | 1,299,292       |  | 10,417,414            | 1,789 | 0.75      | 2010        |
| 2011        |            |                    |  | 12,410,307          |  | 1,422,107       |  | 10,988,200            | 1,780 | 0.80      | 2011        |
| 2012        |            |                    |  | 12,307,674          |  | 1,200,317       |  | 11,107,357            | 1,790 | 0.79      | 2012        |
| 2013        |            |                    |  | 12,170,948          |  | 1,185,139       |  | 10,985,809            | 1,782 | 0.78      | 2013        |
| 2014        |            |                    |  | 12,326,943          |  | 1,287,965       |  | 11,038,979            | 1,821 | 0.77      | 2014        |
| 2015        |            |                    |  | 11,286,687          |  | 1,227,221       |  | 10,059,466            | 1,597 | 0.81      | 2015        |
| 2016        |            |                    |  | 10,905,574          |  | 1,074,786       |  | 9,830,788             | 1,692 | 0.74      | 2016        |
| 2017        |            |                    |  | 11,870,111          |  | 1,215,894       |  | 10,654,217            | 1,793 | 0.76      | 2017        |
| 2018        | 12,028,005 | (35,159)           |  | 11,992,846          |  | 1,203,204       |  | 10,789,642            | 1,736 | 0.79      | 2018        |
| 2019        | 12,005,348 | (137,559)          |  | 11,867,789          |  | 1,203,204       |  | 10,664,585            | 1,745 | 0.78      | 2019        |
| 2020        | 12,174,813 | (128,560)          |  | 12,046,254          |  | 942,981         |  | 11,103,273            | 1,795 | 0.77      | 2020        |
| 2021        | 12,142,055 | 386,115            |  | 12,528,170          |  | 940,404         |  | 11,587,766            | 1,854 | 0.77      | 2021        |
| 2022        | 12,124,650 | 695,944            |  | 12,820,594          |  | 940,404         |  | 11,880,190            | 1,887 | 0.78      | 2022        |
| 2023        | 12,177,141 | 904,811            |  | 13,081,952          |  | 940,404         |  | 12,141,548            | 1,893 | 0.79      | 2023        |
| 2024        | 12,254,529 | 910,495            |  | 13,165,024          |  | 942,981         |  | 12,222,043            | 1,900 | 0.79      | 2024        |
| 2025        | 12,250,509 | 908,717            |  | 13,159,226          |  | 940,404         |  | 12,218,822            | 1,907 | 0.79      | 2025        |
| 2026        | 12,298,461 | 911,983            |  | 13,210,444          |  | 940,404         |  | 12,270,040            | 1,915 | 0.79      | 2026        |
| 2027        | 12,356,503 | 913,740            |  | 13,270,243          |  | 940,404         |  | 12,329,838            | 1,924 | 0.79      | 2027        |
| 2028        | 12,456,370 | 918,319            |  | 13,374,689          |  | 942,981         |  | 12,431,708            | 1,933 | 0.79      | 2028        |
| 2029        | 12,486,329 | 916,496            |  | 13,402,824          |  | 940,404         |  | 12,462,420            | 1,942 | 0.79      | 2029        |
| 2030        | 12,553,108 | 918,842            |  | 13,471,950          |  | 940,404         |  | 12,531,546            | 1,951 | 0.79      | 2030        |
| 2031        | 12,621,315 | 920,262            |  | 13,541,577          |  | 940,404         |  | 12,601,173            | 1,960 | 0.79      | 2031        |
| 2032        | 12,722,764 | 926,198            |  | 13,648,961          |  | 942,981         |  | 12,705,981            | 1,968 | 0.79      | 2032        |



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iii. Low Scenario

Peak Forecast (MW)

| Econometric |       |       | + | Net Load Added |      | = | MP System Peak |       |        | - | Customer Gen. |     | = | Delivered Load |       |      |
|-------------|-------|-------|---|----------------|------|---|----------------|-------|--------|---|---------------|-----|---|----------------|-------|------|
|             | Sum   | Win   |   | Sum            | Win  |   | Sum            | Win   | Annual |   | Sum           | Win |   | Sum            | Win   |      |
| 2000        |       |       |   |                |      |   | 1,711          | 1,784 | 1,784  |   | 242           | 281 |   | 1,469          | 1,503 | 2000 |
| 2001        |       |       |   |                |      |   | 1,533          | 1,595 | 1,595  |   | 150           | 175 |   | 1,383          | 1,421 | 2001 |
| 2002        |       |       |   |                |      |   | 1,629          | 1,636 | 1,636  |   | 165           | 180 |   | 1,464          | 1,456 | 2002 |
| 2003        |       |       |   |                |      |   | 1,570          | 1,671 | 1,671  |   | 163           | 175 |   | 1,408          | 1,496 | 2003 |
| 2004        |       |       |   |                |      |   | 1,617          | 1,721 | 1,721  |   | 168           | 189 |   | 1,449          | 1,533 | 2004 |
| 2005        |       |       |   |                |      |   | 1,703          | 1,727 | 1,727  |   | 169           | 172 |   | 1,535          | 1,555 | 2005 |
| 2006        |       |       |   |                |      |   | 1,753          | 1,704 | 1,753  |   | 169           | 170 |   | 1,584          | 1,534 | 2006 |
| 2007        |       |       |   |                |      |   | 1,758          | 1,763 | 1,763  |   | 176           | 179 |   | 1,582          | 1,584 | 2007 |
| 2008        |       |       |   |                |      |   | 1,699          | 1,719 | 1,719  |   | 147           | 145 |   | 1,552          | 1,575 | 2008 |
| 2009        |       |       |   |                |      |   | 1,350          | 1,545 | 1,545  |   | 150           | 176 |   | 1,200          | 1,369 | 2009 |
| 2010        |       |       |   |                |      |   | 1,732          | 1,789 | 1,789  |   | 140           | 190 |   | 1,591          | 1,599 | 2010 |
| 2011        |       |       |   |                |      |   | 1,746          | 1,780 | 1,780  |   | 173           | 150 |   | 1,573          | 1,630 | 2011 |
| 2012        |       |       |   |                |      |   | 1,790          | 1,774 | 1,790  |   | 187           | 169 |   | 1,603          | 1,605 | 2012 |
| 2013        |       |       |   |                |      |   | 1,782          | 1,751 | 1,782  |   | 136           | 162 |   | 1,645          | 1,589 | 2013 |
| 2014        |       |       |   |                |      |   | 1,805          | 1,821 | 1,821  |   | 184           | 184 |   | 1,620          | 1,637 | 2014 |
| 2015        |       |       |   |                |      |   | 1,597          | 1,554 | 1,597  |   | 141           | 114 |   | 1,455          | 1,440 | 2015 |
| 2016        |       |       |   |                |      |   | 1,609          | 1,692 | 1,692  |   | 183           | 173 |   | 1,426          | 1,520 | 2016 |
| 2017        |       |       |   |                |      |   | 1,689          | 1,793 | 1,793  |   | 150           | 196 |   | 1,538          | 1,597 | 2017 |
| 2018        | 1,720 | 1,749 |   | (7)            | (13) |   | 1,714          | 1,736 | 1,736  |   | 148           | 148 |   | 1,566          | 1,588 | 2018 |
| 2019        | 1,723 | 1,766 |   | (41)           | (26) |   | 1,682          | 1,740 | 1,740  |   | 148           | 118 |   | 1,534          | 1,622 | 2019 |
| 2020        | 1,741 | 1,774 |   | (26)           | (26) |   | 1,715          | 1,748 | 1,748  |   | 118           | 118 |   | 1,597          | 1,630 | 2020 |
| 2021        | 1,741 | 1,774 |   | (26)           | (26) |   | 1,715          | 1,748 | 1,748  |   | 118           | 118 |   | 1,597          | 1,629 | 2021 |
| 2022        | 1,741 | 1,779 |   | (26)           | (26) |   | 1,715          | 1,753 | 1,753  |   | 118           | 118 |   | 1,597          | 1,635 | 2022 |
| 2023        | 1,751 | 1,785 |   | (26)           | (26) |   | 1,725          | 1,759 | 1,759  |   | 118           | 118 |   | 1,607          | 1,641 | 2023 |
| 2024        | 1,759 | 1,767 |   | (26)           | (26) |   | 1,733          | 1,741 | 1,741  |   | 118           | 118 |   | 1,615          | 1,623 | 2024 |
| 2025        | 1,763 | 1,799 |   | (74)           | (74) |   | 1,690          | 1,725 | 1,725  |   | 118           | 118 |   | 1,571          | 1,607 | 2025 |
| 2026        | 1,770 | 1,807 |   | (74)           | (74) |   | 1,697          | 1,734 | 1,734  |   | 118           | 118 |   | 1,579          | 1,616 | 2026 |
| 2027        | 1,779 | 1,816 |   | (74)           | (74) |   | 1,705          | 1,742 | 1,742  |   | 118           | 118 |   | 1,587          | 1,624 | 2027 |
| 2028        | 1,788 | 1,825 |   | (74)           | (74) |   | 1,714          | 1,751 | 1,751  |   | 118           | 118 |   | 1,596          | 1,633 | 2028 |
| 2029        | 1,797 | 1,834 |   | (74)           | (74) |   | 1,723          | 1,760 | 1,760  |   | 118           | 118 |   | 1,605          | 1,642 | 2029 |
| 2030        | 1,806 | 1,843 |   | (74)           | (74) |   | 1,732          | 1,769 | 1,769  |   | 118           | 118 |   | 1,614          | 1,651 | 2030 |
| 2031        | 1,816 | 1,852 |   | (74)           | (74) |   | 1,742          | 1,778 | 1,778  |   | 118           | 118 |   | 1,624          | 1,660 | 2031 |
| 2032        | 1,825 | 1,861 |   | (74)           | (74) |   | 1,751          | 1,787 | 1,787  |   | 118           | 118 |   | 1,633          | 1,669 | 2032 |

Energy Sales Forecast (MWh)

| Econometric |            | + Net Energy Added |  | = System Energy Use |  | - Customer Gen. |  | = MP Delivered Energy |       | MP System |             |
|-------------|------------|--------------------|--|---------------------|--|-----------------|--|-----------------------|-------|-----------|-------------|
|             |            |                    |  |                     |  |                 |  |                       |       | Peak      | Load Factor |
| 2000        |            |                    |  |                     |  |                 |  | 10,245,420            |       |           |             |
| 2001        |            |                    |  |                     |  |                 |  | 9,658,073             |       |           |             |
| 2002        |            |                    |  | 11,348,001          |  | 1,187,858       |  | 10,160,143            | 1,636 | 0.79      | 2002        |
| 2003        |            |                    |  | 11,078,929          |  | 1,232,635       |  | 9,846,294             | 1,671 | 0.76      | 2003        |
| 2004        |            |                    |  | 11,592,140          |  | 1,267,728       |  | 10,324,412            | 1,721 | 0.77      | 2004        |
| 2005        |            |                    |  | 11,790,167          |  | 1,258,895       |  | 10,531,272            | 1,727 | 0.78      | 2005        |
| 2006        |            |                    |  | 11,844,171          |  | 1,195,070       |  | 10,649,101            | 1,753 | 0.77      | 2006        |
| 2007        |            |                    |  | 11,933,479          |  | 1,252,965       |  | 10,680,514            | 1,763 | 0.77      | 2007        |
| 2008        |            |                    |  | 12,115,604          |  | 1,276,158       |  | 10,839,446            | 1,719 | 0.80      | 2008        |
| 2009        |            |                    |  | 9,173,102           |  | 1,108,014       |  | 8,065,088             | 1,545 | 0.68      | 2009        |
| 2010        |            |                    |  | 11,716,706          |  | 1,299,292       |  | 10,417,414            | 1,789 | 0.75      | 2010        |
| 2011        |            |                    |  | 12,410,307          |  | 1,422,107       |  | 10,988,200            | 1,780 | 0.80      | 2011        |
| 2012        |            |                    |  | 12,307,674          |  | 1,200,317       |  | 11,107,357            | 1,790 | 0.79      | 2012        |
| 2013        |            |                    |  | 12,170,948          |  | 1,185,139       |  | 10,985,809            | 1,782 | 0.78      | 2013        |
| 2014        |            |                    |  | 12,326,943          |  | 1,287,965       |  | 11,038,979            | 1,821 | 0.77      | 2014        |
| 2015        |            |                    |  | 11,286,687          |  | 1,227,221       |  | 10,059,466            | 1,597 | 0.81      | 2015        |
| 2016        |            |                    |  | 10,905,574          |  | 1,074,786       |  | 9,830,788             | 1,692 | 0.74      | 2016        |
| 2017        |            |                    |  | 11,870,111          |  | 1,215,894       |  | 10,654,217            | 1,793 | 0.76      | 2017        |
| 2018        | 12,028,005 | (35,159)           |  | 11,992,846          |  | 1,203,204       |  | 10,789,642            | 1,736 | 0.79      | 2018        |
| 2019        | 12,005,348 | (137,559)          |  | 11,867,789          |  | 1,203,204       |  | 10,664,585            | 1,740 | 0.78      | 2019        |
| 2020        | 12,174,813 | (114,265)          |  | 12,060,549          |  | 942,981         |  | 11,117,568            | 1,748 | 0.79      | 2020        |
| 2021        | 12,142,055 | (113,489)          |  | 12,028,566          |  | 940,404         |  | 11,088,162            | 1,748 | 0.79      | 2021        |
| 2022        | 12,124,650 | (111,105)          |  | 12,013,544          |  | 940,404         |  | 11,073,140            | 1,753 | 0.78      | 2022        |
| 2023        | 12,177,141 | (108,938)          |  | 12,068,203          |  | 940,404         |  | 11,127,799            | 1,759 | 0.78      | 2023        |
| 2024        | 12,254,529 | (106,032)          |  | 12,148,497          |  | 942,981         |  | 11,205,516            | 1,741 | 0.80      | 2024        |
| 2025        | 12,250,509 | (502,221)          |  | 11,748,288          |  | 940,404         |  | 10,807,883            | 1,725 | 0.78      | 2025        |
| 2026        | 12,298,461 | (498,955)          |  | 11,799,505          |  | 940,404         |  | 10,859,101            | 1,734 | 0.78      | 2026        |
| 2027        | 12,356,503 | (497,198)          |  | 11,859,304          |  | 940,404         |  | 10,918,900            | 1,742 | 0.78      | 2027        |
| 2028        | 12,456,370 | (496,485)          |  | 11,959,885          |  | 942,981         |  | 11,016,904            | 1,751 | 0.78      | 2028        |
| 2029        | 12,486,329 | (494,443)          |  | 11,991,886          |  | 940,404         |  | 11,051,482            | 1,760 | 0.78      | 2029        |
| 2030        | 12,553,108 | (492,096)          |  | 12,061,011          |  | 940,404         |  | 11,120,607            | 1,769 | 0.78      | 2030        |
| 2031        | 12,621,315 | (490,676)          |  | 12,130,639          |  | 940,404         |  | 11,190,235            | 1,778 | 0.78      | 2031        |
| 2032        | 12,722,764 | (488,606)          |  | 12,234,157          |  | 942,981         |  | 11,291,177            | 1,787 | 0.78      | 2032        |

## **Sensitivities**

Minnesota Power conducts tests to identify the sensitivity of the forecast to changes in weather and large customer operation. The forecast sensitivities were developed for customer counts, energy sales, and seasonal peak demand models to demonstrate a range of outcomes resulting from these changes.

The following Base Case sensitivities and alternative forecast methods have been conducted on the AFR 2018 forecasts:

- Extreme Weather – Historical extremes are assumed instead of a 20 year average
- Solar+Electric Vehicle – Impact of potential residential solar installations and electric vehicle purchases on Minnesota Power's forecast based on realistic, increasing growth rates for both technologies

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**Extreme Weather  
Peak Forecast (MW)**

|      | Econometric |       | + Net Load Added |      | = MP System Peak |       |        | - Customer Gen. |     | = Delivered Load |       |      |
|------|-------------|-------|------------------|------|------------------|-------|--------|-----------------|-----|------------------|-------|------|
|      | Sum         | Win   | Sum              | Win  | Sum              | Win   | Annual | Sum             | Win | Sum              | Win   |      |
| 2000 |             |       |                  |      | 1,711            | 1,784 | 1,784  | 242             | 281 | 1,469            | 1,503 | 2000 |
| 2001 |             |       |                  |      | 1,533            | 1,595 | 1,595  | 150             | 175 | 1,383            | 1,421 | 2001 |
| 2002 |             |       |                  |      | 1,629            | 1,636 | 1,636  | 165             | 180 | 1,464            | 1,456 | 2002 |
| 2003 |             |       |                  |      | 1,570            | 1,671 | 1,671  | 163             | 175 | 1,408            | 1,496 | 2003 |
| 2004 |             |       |                  |      | 1,617            | 1,721 | 1,721  | 168             | 189 | 1,449            | 1,533 | 2004 |
| 2005 |             |       |                  |      | 1,703            | 1,727 | 1,727  | 169             | 172 | 1,535            | 1,555 | 2005 |
| 2006 |             |       |                  |      | 1,753            | 1,704 | 1,753  | 169             | 170 | 1,584            | 1,534 | 2006 |
| 2007 |             |       |                  |      | 1,758            | 1,763 | 1,763  | 176             | 179 | 1,582            | 1,584 | 2007 |
| 2008 |             |       |                  |      | 1,699            | 1,719 | 1,719  | 147             | 145 | 1,552            | 1,575 | 2008 |
| 2009 |             |       |                  |      | 1,350            | 1,545 | 1,545  | 150             | 176 | 1,200            | 1,369 | 2009 |
| 2010 |             |       |                  |      | 1,732            | 1,789 | 1,789  | 140             | 190 | 1,591            | 1,599 | 2010 |
| 2011 |             |       |                  |      | 1,746            | 1,780 | 1,780  | 173             | 150 | 1,573            | 1,630 | 2011 |
| 2012 |             |       |                  |      | 1,790            | 1,774 | 1,790  | 187             | 169 | 1,603            | 1,605 | 2012 |
| 2013 |             |       |                  |      | 1,782            | 1,751 | 1,782  | 136             | 162 | 1,645            | 1,589 | 2013 |
| 2014 |             |       |                  |      | 1,805            | 1,821 | 1,821  | 184             | 184 | 1,620            | 1,637 | 2014 |
| 2015 |             |       |                  |      | 1,597            | 1,554 | 1,597  | 141             | 114 | 1,455            | 1,440 | 2015 |
| 2016 |             |       |                  |      | 1,609            | 1,692 | 1,692  | 183             | 173 | 1,426            | 1,520 | 2016 |
| 2017 |             |       |                  |      | 1,689            | 1,793 | 1,793  | 150             | 196 | 1,538            | 1,597 | 2017 |
| 2018 | 1,757       | 1,761 | (7)              | (13) | 1,751            | 1,749 | 1,751  | 148             | 148 | 1,603            | 1,601 | 2018 |
| 2019 | 1,760       | 1,779 | (41)             | (26) | 1,719            | 1,753 | 1,753  | 148             | 118 | 1,571            | 1,635 | 2019 |
| 2020 | 1,778       | 1,787 | (26)             | (23) | 1,752            | 1,764 | 1,764  | 118             | 118 | 1,634            | 1,646 | 2020 |
| 2021 | 1,777       | 1,786 | 7                | 19   | 1,785            | 1,805 | 1,805  | 118             | 118 | 1,667            | 1,687 | 2021 |
| 2022 | 1,778       | 1,792 | 19               | 19   | 1,797            | 1,811 | 1,811  | 118             | 118 | 1,679            | 1,693 | 2022 |
| 2023 | 1,788       | 1,798 | 19               | 19   | 1,807            | 1,817 | 1,817  | 118             | 118 | 1,689            | 1,699 | 2023 |
| 2024 | 1,795       | 1,805 | 19               | 19   | 1,814            | 1,824 | 1,824  | 118             | 118 | 1,696            | 1,706 | 2024 |
| 2025 | 1,800       | 1,812 | 19               | 19   | 1,819            | 1,830 | 1,830  | 118             | 118 | 1,701            | 1,712 | 2025 |
| 2026 | 1,807       | 1,820 | 19               | 19   | 1,826            | 1,839 | 1,839  | 118             | 118 | 1,708            | 1,721 | 2026 |
| 2027 | 1,815       | 1,829 | 19               | 19   | 1,834            | 1,848 | 1,848  | 118             | 118 | 1,716            | 1,730 | 2027 |
| 2028 | 1,825       | 1,838 | 19               | 19   | 1,843            | 1,856 | 1,856  | 118             | 118 | 1,725            | 1,738 | 2028 |
| 2029 | 1,834       | 1,847 | 19               | 19   | 1,853            | 1,866 | 1,866  | 118             | 118 | 1,735            | 1,747 | 2029 |
| 2030 | 1,843       | 1,856 | 19               | 19   | 1,862            | 1,875 | 1,875  | 118             | 118 | 1,744            | 1,757 | 2030 |
| 2031 | 1,852       | 1,865 | 19               | 19   | 1,871            | 1,884 | 1,884  | 118             | 118 | 1,753            | 1,766 | 2031 |
| 2032 | 1,861       | 1,873 | 19               | 19   | 1,880            | 1,892 | 1,892  | 118             | 118 | 1,762            | 1,774 | 2032 |

**Energy Sales Forecast (MWh)**

|      | Econometric |  | + Net Energy Added |  | = System Energy Use |  | - Customer Gen. |  | = MP Delivered Energy |  | MP System |             |      |
|------|-------------|--|--------------------|--|---------------------|--|-----------------|--|-----------------------|--|-----------|-------------|------|
|      |             |  |                    |  |                     |  |                 |  |                       |  | Peak      | Load Factor |      |
| 2000 |             |  |                    |  |                     |  |                 |  | 10,245,420            |  |           |             |      |
| 2001 |             |  |                    |  |                     |  |                 |  | 9,658,073             |  |           |             |      |
| 2002 |             |  |                    |  | 11,348,001          |  | 1,187,858       |  | 10,160,143            |  | 1,636     | 0.79        | 2002 |
| 2003 |             |  |                    |  | 11,078,929          |  | 1,232,635       |  | 9,846,294             |  | 1,671     | 0.76        | 2003 |
| 2004 |             |  |                    |  | 11,592,140          |  | 1,267,728       |  | 10,324,412            |  | 1,721     | 0.77        | 2004 |
| 2005 |             |  |                    |  | 11,790,167          |  | 1,258,895       |  | 10,531,272            |  | 1,727     | 0.78        | 2005 |
| 2006 |             |  |                    |  | 11,844,171          |  | 1,195,070       |  | 10,649,101            |  | 1,753     | 0.77        | 2006 |
| 2007 |             |  |                    |  | 11,933,479          |  | 1,252,965       |  | 10,680,514            |  | 1,763     | 0.77        | 2007 |
| 2008 |             |  |                    |  | 12,115,604          |  | 1,276,158       |  | 10,839,446            |  | 1,719     | 0.80        | 2008 |
| 2009 |             |  |                    |  | 9,173,102           |  | 1,108,014       |  | 8,065,088             |  | 1,545     | 0.68        | 2009 |
| 2010 |             |  |                    |  | 11,716,706          |  | 1,299,292       |  | 10,417,414            |  | 1,789     | 0.75        | 2010 |
| 2011 |             |  |                    |  | 12,410,307          |  | 1,422,107       |  | 10,988,200            |  | 1,780     | 0.80        | 2011 |
| 2012 |             |  |                    |  | 12,307,674          |  | 1,200,317       |  | 11,107,357            |  | 1,790     | 0.79        | 2012 |
| 2013 |             |  |                    |  | 12,170,948          |  | 1,185,139       |  | 10,985,809            |  | 1,782     | 0.78        | 2013 |
| 2014 |             |  |                    |  | 12,326,943          |  | 1,287,965       |  | 11,038,979            |  | 1,821     | 0.77        | 2014 |
| 2015 |             |  |                    |  | 11,286,687          |  | 1,227,221       |  | 10,059,466            |  | 1,597     | 0.81        | 2015 |
| 2016 |             |  |                    |  | 10,905,574          |  | 1,074,786       |  | 9,830,788             |  | 1,692     | 0.74        | 2016 |
| 2017 |             |  |                    |  | 11,870,111          |  | 1,215,894       |  | 10,654,217            |  | 1,793     | 0.76        | 2017 |
| 2018 | 12,182,131  |  | (35,159)           |  | 12,146,972          |  | 1,203,204       |  | 10,943,768            |  | 1,751     | 0.79        | 2018 |
| 2019 | 12,203,191  |  | (137,559)          |  | 12,065,631          |  | 1,203,204       |  | 10,862,427            |  | 1,753     | 0.79        | 2019 |
| 2020 | 12,373,654  |  | (127,383)          |  | 12,246,271          |  | 942,981         |  | 11,303,290            |  | 1,764     | 0.79        | 2020 |
| 2021 | 12,340,860  |  | 72,410             |  | 12,413,271          |  | 940,404         |  | 11,472,866            |  | 1,805     | 0.78        | 2021 |
| 2022 | 12,323,858  |  | 222,687            |  | 12,546,545          |  | 940,404         |  | 11,606,141            |  | 1,811     | 0.79        | 2022 |
| 2023 | 12,376,787  |  | 224,854            |  | 12,601,641          |  | 940,404         |  | 11,661,237            |  | 1,817     | 0.79        | 2023 |
| 2024 | 12,455,100  |  | 228,696            |  | 12,683,795          |  | 942,981         |  | 11,740,815            |  | 1,824     | 0.79        | 2024 |
| 2025 | 12,450,984  |  | 228,760            |  | 12,679,744          |  | 940,404         |  | 11,739,340            |  | 1,830     | 0.79        | 2025 |
| 2026 | 12,499,354  |  | 232,026            |  | 12,731,380          |  | 940,404         |  | 11,790,976            |  | 1,839     | 0.79        | 2026 |
| 2027 | 12,557,823  |  | 233,783            |  | 12,791,605          |  | 940,404         |  | 11,851,201            |  | 1,848     | 0.79        | 2027 |
| 2028 | 12,658,626  |  | 236,520            |  | 12,895,146          |  | 942,981         |  | 11,952,165            |  | 1,856     | 0.79        | 2028 |
| 2029 | 12,688,544  |  | 236,538            |  | 12,925,082          |  | 940,404         |  | 11,984,678            |  | 1,866     | 0.79        | 2029 |
| 2030 | 12,755,785  |  | 238,885            |  | 12,994,670          |  | 940,404         |  | 12,054,266            |  | 1,875     | 0.79        | 2030 |
| 2031 | 12,824,451  |  | 240,305            |  | 13,064,756          |  | 940,404         |  | 12,124,351            |  | 1,884     | 0.79        | 2031 |
| 2032 | 12,926,849  |  | 244,399            |  | 13,171,248          |  | 942,981         |  | 12,228,267            |  | 1,892     | 0.79        | 2032 |

MINNESOTA POWER  
2018 ANNUAL FORECAST REPORT

# Solar and Electric Vehicle

## Peak Forecast (MW)

|      | Econometric |       | + Net Load Added |      | + Innovation Impacts |     | = MP System Peak |       |        | - Customer Gen. |     | = Delivered Load |       |      |
|------|-------------|-------|------------------|------|----------------------|-----|------------------|-------|--------|-----------------|-----|------------------|-------|------|
|      | Sum         | Win   | Sum              | Win  | Sum                  | Win | Sum              | Win   | Annual | Sum             | Win | Sum              | Win   |      |
| 2000 |             |       |                  |      |                      |     | 1,711            | 1,784 | 1,784  | 242             | 281 | 1,469            | 1,503 | 2000 |
| 2001 |             |       |                  |      |                      |     | 1,533            | 1,595 | 1,595  | 150             | 175 | 1,383            | 1,421 | 2001 |
| 2002 |             |       |                  |      |                      |     | 1,629            | 1,636 | 1,636  | 165             | 180 | 1,464            | 1,456 | 2002 |
| 2003 |             |       |                  |      |                      |     | 1,570            | 1,671 | 1,671  | 163             | 175 | 1,408            | 1,496 | 2003 |
| 2004 |             |       |                  |      |                      |     | 1,617            | 1,721 | 1,721  | 168             | 189 | 1,449            | 1,533 | 2004 |
| 2005 |             |       |                  |      |                      |     | 1,703            | 1,727 | 1,727  | 169             | 172 | 1,535            | 1,555 | 2005 |
| 2006 |             |       |                  |      |                      |     | 1,753            | 1,704 | 1,753  | 169             | 170 | 1,584            | 1,534 | 2006 |
| 2007 |             |       |                  |      |                      |     | 1,758            | 1,763 | 1,763  | 176             | 179 | 1,582            | 1,584 | 2007 |
| 2008 |             |       |                  |      |                      |     | 1,699            | 1,719 | 1,719  | 147             | 145 | 1,552            | 1,575 | 2008 |
| 2009 |             |       |                  |      |                      |     | 1,350            | 1,545 | 1,545  | 150             | 176 | 1,200            | 1,369 | 2009 |
| 2010 |             |       |                  |      |                      |     | 1,732            | 1,789 | 1,789  | 140             | 190 | 1,591            | 1,599 | 2010 |
| 2011 |             |       |                  |      |                      |     | 1,746            | 1,780 | 1,780  | 173             | 150 | 1,573            | 1,630 | 2011 |
| 2012 |             |       |                  |      |                      |     | 1,790            | 1,774 | 1,790  | 187             | 169 | 1,603            | 1,605 | 2012 |
| 2013 |             |       |                  |      |                      |     | 1,782            | 1,751 | 1,782  | 136             | 162 | 1,645            | 1,589 | 2013 |
| 2014 |             |       |                  |      |                      |     | 1,805            | 1,821 | 1,821  | 184             | 184 | 1,620            | 1,637 | 2014 |
| 2015 |             |       |                  |      |                      |     | 1,597            | 1,554 | 1,597  | 141             | 114 | 1,455            | 1,440 | 2015 |
| 2016 |             |       |                  |      |                      |     | 1,609            | 1,692 | 1,692  | 183             | 173 | 1,426            | 1,520 | 2016 |
| 2017 |             |       |                  |      |                      |     | 1,689            | 1,793 | 1,793  | 150             | 196 | 1,538            | 1,597 | 2017 |
| 2018 | 1,720       | 1,749 | (7)              | (13) | (2)                  | 0   | 1,712            | 1,736 | 1,736  | 148             | 148 | 1,564            | 1,588 | 2018 |
| 2019 | 1,723       | 1,766 | (41)             | (26) | (2)                  | 0   | 1,680            | 1,740 | 1,740  | 148             | 118 | 1,532            | 1,622 | 2019 |
| 2020 | 1,741       | 1,774 | (26)             | (23) | (2)                  | 0   | 1,713            | 1,752 | 1,752  | 118             | 118 | 1,595            | 1,633 | 2020 |
| 2021 | 1,741       | 1,774 | 7                | 19   | (3)                  | 1   | 1,745            | 1,793 | 1,793  | 118             | 118 | 1,627            | 1,675 | 2021 |
| 2022 | 1,741       | 1,779 | 19               | 19   | (3)                  | 1   | 1,757            | 1,799 | 1,799  | 118             | 118 | 1,639            | 1,681 | 2022 |
| 2023 | 1,751       | 1,785 | 19               | 19   | (3)                  | 1   | 1,767            | 1,805 | 1,805  | 118             | 118 | 1,649            | 1,687 | 2023 |
| 2024 | 1,759       | 1,792 | 19               | 19   | (3)                  | 1   | 1,774            | 1,812 | 1,812  | 118             | 118 | 1,656            | 1,694 | 2024 |
| 2025 | 1,763       | 1,799 | 19               | 19   | (3)                  | 2   | 1,779            | 1,820 | 1,820  | 118             | 118 | 1,661            | 1,702 | 2025 |
| 2026 | 1,770       | 1,807 | 19               | 19   | (3)                  | 3   | 1,786            | 1,829 | 1,829  | 118             | 118 | 1,668            | 1,711 | 2026 |
| 2027 | 1,779       | 1,816 | 19               | 19   | (3)                  | 3   | 1,794            | 1,838 | 1,838  | 118             | 118 | 1,676            | 1,720 | 2027 |
| 2028 | 1,788       | 1,825 | 19               | 19   | (3)                  | 4   | 1,804            | 1,848 | 1,848  | 118             | 118 | 1,685            | 1,730 | 2028 |
| 2029 | 1,797       | 1,834 | 19               | 19   | (3)                  | 5   | 1,813            | 1,858 | 1,858  | 118             | 118 | 1,695            | 1,740 | 2029 |
| 2030 | 1,806       | 1,843 | 19               | 19   | (3)                  | 6   | 1,822            | 1,868 | 1,868  | 118             | 118 | 1,704            | 1,750 | 2030 |
| 2031 | 1,816       | 1,852 | 19               | 19   | (3)                  | 8   | 1,832            | 1,878 | 1,878  | 118             | 118 | 1,714            | 1,760 | 2031 |
| 2032 | 1,825       | 1,861 | 19               | 19   | (2)                  | 9   | 1,841            | 1,889 | 1,889  | 118             | 118 | 1,723            | 1,771 | 2032 |

## Energy Sales Forecast (MWh)

|      | Econometric |  | + Net Energy Added |  | + Innovation Impacts |  | = System Energy Use |           | - Customer Gen. |  | = MP Delivered Energy | MP System        |      |
|------|-------------|--|--------------------|--|----------------------|--|---------------------|-----------|-----------------|--|-----------------------|------------------|------|
|      |             |  |                    |  |                      |  |                     |           |                 |  |                       | Peak Load Factor |      |
| 2000 |             |  |                    |  |                      |  |                     |           |                 |  | 10,245,420            |                  |      |
| 2001 |             |  |                    |  |                      |  |                     |           |                 |  | 9,658,073             |                  |      |
| 2002 |             |  |                    |  |                      |  | 11,348,001          | 1,187,858 |                 |  | 10,160,143            | 1,636            | 0.79 |
| 2003 |             |  |                    |  |                      |  | 11,078,929          | 1,232,635 |                 |  | 9,846,294             | 1,671            | 0.76 |
| 2004 |             |  |                    |  |                      |  | 11,592,140          | 1,267,728 |                 |  | 10,324,412            | 1,721            | 0.77 |
| 2005 |             |  |                    |  |                      |  | 11,790,167          | 1,258,895 |                 |  | 10,531,272            | 1,727            | 0.78 |
| 2006 |             |  |                    |  |                      |  | 11,844,171          | 1,195,070 |                 |  | 10,649,101            | 1,753            | 0.77 |
| 2007 |             |  |                    |  |                      |  | 11,933,479          | 1,252,965 |                 |  | 10,680,514            | 1,763            | 0.77 |
| 2008 |             |  |                    |  |                      |  | 12,115,604          | 1,276,158 |                 |  | 10,839,446            | 1,719            | 0.80 |
| 2009 |             |  |                    |  |                      |  | 9,173,102           | 1,108,014 |                 |  | 8,065,088             | 1,545            | 0.68 |
| 2010 |             |  |                    |  |                      |  | 11,716,706          | 1,299,292 |                 |  | 10,417,414            | 1,789            | 0.75 |
| 2011 |             |  |                    |  |                      |  | 12,410,307          | 1,422,107 |                 |  | 10,988,200            | 1,780            | 0.80 |
| 2012 |             |  |                    |  |                      |  | 12,307,674          | 1,200,317 |                 |  | 11,107,357            | 1,790            | 0.79 |
| 2013 |             |  |                    |  |                      |  | 12,170,948          | 1,185,139 |                 |  | 10,985,809            | 1,782            | 0.78 |
| 2014 |             |  |                    |  |                      |  | 12,326,943          | 1,287,965 |                 |  | 11,038,979            | 1,821            | 0.77 |
| 2015 |             |  |                    |  |                      |  | 11,286,687          | 1,227,221 |                 |  | 10,059,466            | 1,597            | 0.81 |
| 2016 |             |  |                    |  |                      |  | 10,905,574          | 1,074,786 |                 |  | 9,830,788             | 1,692            | 0.74 |
| 2017 |             |  |                    |  |                      |  | 11,870,111          | 1,215,894 |                 |  | 10,654,217            | 1,793            | 0.76 |
| 2018 | 12,028,005  |  | (35,159)           |  | (2,684)              |  | 11,990,162          | 1,203,204 |                 |  | 10,786,958            | 1,736            | 0.79 |
| 2019 | 12,005,348  |  | (137,559)          |  | (2,888)              |  | 11,864,901          | 1,203,204 |                 |  | 10,661,697            | 1,740            | 0.78 |
| 2020 | 12,174,813  |  | (114,265)          |  | (2,888)              |  | 12,057,661          | 942,981   |                 |  | 11,114,680            | 1,751            | 0.79 |
| 2021 | 12,142,055  |  | 85,514             |  | (2,612)              |  | 12,224,957          | 940,404   |                 |  | 11,284,553            | 1,793            | 0.78 |
| 2022 | 12,124,650  |  | 235,791            |  | (1,983)              |  | 12,358,457          | 940,404   |                 |  | 11,418,053            | 1,798            | 0.78 |
| 2023 | 12,177,141  |  | 237,958            |  | (902)                |  | 12,414,197          | 940,404   |                 |  | 11,473,793            | 1,804            | 0.79 |
| 2024 | 12,254,529  |  | 241,814            |  | 714                  |  | 12,497,057          | 942,981   |                 |  | 11,554,077            | 1,811            | 0.79 |
| 2025 | 12,250,509  |  | 241,864            |  | 2,940                |  | 12,495,313          | 940,404   |                 |  | 11,554,908            | 1,818            | 0.78 |
| 2026 | 12,298,461  |  | 245,130            |  | 5,876                |  | 12,549,466          | 940,404   |                 |  | 11,609,062            | 1,826            | 0.78 |
| 2027 | 12,356,503  |  | 246,887            |  | 9,623                |  | 12,613,012          | 940,404   |                 |  | 11,672,608            | 1,835            | 0.78 |
| 2028 | 12,456,370  |  | 249,639            |  | 14,242               |  | 12,720,251          | 942,981   |                 |  | 11,777,270            | 1,844            | 0.79 |
| 2029 | 12,486,329  |  | 249,642            |  | 19,811               |  | 12,755,782          | 940,404   |                 |  | 11,815,378            | 1,853            | 0.78 |
| 2030 | 12,553,108  |  | 251,989            |  | 26,413               |  | 12,831,510          | 940,404   |                 |  | 11,891,105            | 1,862            | 0.79 |
| 2031 | 12,621,315  |  | 253,409            |  | 34,132               |  | 12,908,856          | 940,404   |                 |  | 11,968,452            | 1,871            | 0.79 |
| 2032 | 12,722,764  |  | 257,517            |  | 57,331               |  | 13,037,612          | 942,981   |                 |  | 12,094,631            | 1,879            | 0.79 |

### **3. Other Information**

#### **A. Subject of Assumption**

Section 7610.0320, Subpart 4, lists specific assumptions to be discussed. The following list contains the discussion of each assumption and Minnesota Power's response.

- Assumptions made regarding the availability of alternative sources of energy.
  - Minnesota Power makes no assumptions regarding the availability of alternative sources of energy.
- Assumptions made regarding expected conversion from other fuels to electricity or vice versa.
  - Minnesota Power's assumptions regarding conversion are explicitly included in the saturation rates for electric heating.
- Assumptions made regarding future prices of electricity for customers and the effect that such prices would have on system demand.
  - See Section 1.C.
- Assumptions made in arriving at the data requested (historical reporting).
  - Minnesota Power makes no such assumptions.
- Assumptions made regarding the effect of existing energy conservations programs under Federal or State legislation on long-term electricity demand
  - See Demand Side Management above.
- Assumptions made regarding the projected effect of new conservations programs the utility deems likely to occur through Federal or State legislation.
  - See Section 1.F.
- Assumptions made regarding current and future saturation levels of appliances and electric space heating.
  - See Section 1.F.

#### **B. Coordination of Forecasts with Other Systems**

Minnesota Power is a member of the Midwest Reliability Organization (MRO), MISO, Edison Electric Institute (EEI), Upper Midwest Utility Forecasters (UMUF), and other trade associations. While each member of these groups independently determines its power requirements, periodic meetings are held to share information and discuss forecasting techniques and methodologies.

### C. Compliance with 7610.0320 Forecast Documentation

| <i>Statute or Rule</i> | <i>Requirement</i>   | <i>Reference Section</i> |
|------------------------|--|--------------------------|
| 7610.0320, Subp. 1(A)  | The overall methodological framework that is used.   | Section 1.A              |
| 7610.0320, Subp. 1(B)  | The specific analytical techniques that are used, their purpose, and the components of the forecast to which they have been applied.   | Sections 1.D, 1.F        |
| 7610.0320, Subp. 1(C)  | The manner in which these specific techniques are related in producing the forecast.   | Section 1.D              |
| 7610.0320, Subp. 1(D)  | The purpose of the technique, typical computations specifying variables and data, and the results of appropriate statistical tests.  | Section 1.F              |
| 7610.0320, Subp. 1(E)  | Forecast confidence levels or ranges of accuracy for annual peak demand and annual electrical consumption.   | Section 1.F              |
| 7610.0320, Subp. 1(F)  | A brief analysis of the methodology used, including its strengths and weaknesses, its suitability to the system, cost considerations, data requirements, past accuracy, and any other factors considered significant to the utility. | Sections 1.B, 1.F        |
| 7610.0320, Subp. 2(A)  | A complete list of data sets used in making the forecast, including a brief description of each data set and an explanation of how each was obtained, or a citation to the source.   | Sections 1.C             |
| 7610.0320, Subp. 2(B)  | A clear identification of any adjustments made to the raw data to adapt them for use in forecasts, including the nature of the adjustment, the reason for the adjustment, and the magnitude of the adjustment.                       | Section 1.F              |
| 7610.0320, Subp. 3     | Discussion of essential assumptions.   | Sections 1.E, 1.F        |
| 7610.0320, Subp. 4     | Subject of assumption.   | Section 3                |
| 7610.0320, Subp. 5(A)  | Description of the extent to which the utility coordinates its load forecasts with those of other systems.   | Section 3                |
| 7610.0320, Subp. 5(B)  | Description of the manner in which such forecasts are coordinated.   | Section 3                |

## 7610.0120 REGISTRATION

| UTILITY OFFICERS | NAME                  | TITLE  |
|------------------|-----------------------|--|
|                  | Alan Hodnik           | Chairman, President, and Chief Executive Officer                                       |
|                  | Brad Oachs            | Senior Vice President -- President, Regulated Operations                               |
|                  | Robert Adams          | Senior Vice President, Chief Financial Officer   |
|                  | Bethany Owen          | Senior Vice President, Chief Legal & Administrative Officer                            |
|                  | Pat Mullen            | Senior Vice President, External Affairs  |
|                  | Deb Amberg            | Senior Vice President, Chief Strategy Officer, Regulated Operations -- President, SWLP |
|                  | Chris Fleege          | Senior Vice President, Minnesota Power Operations                                      |
|                  | Steve Morris          | Vice President, Controller & Chief Accounting Officer                                  |
|                  | Julie Pierce          | Vice President, Minnesota Power Strategy & Planning                                    |
|                  | Franklyn Frederickson | Vice President, Minnesota Power Marketing  |
|                  | Nicole Johnson        | Vice President, Human Resources  |
|                  | Herbert Minke III     | Vice President, Minnesota Power Regulatory Affairs                                     |
|                  | Josh Skelton          | Vice President, Minnesota Power Generation Operations                                  |
|                  | Patrick Cutshall      | Vice President, Corporate Treasurer  |
|                  | Ken Voss              | Chief Technology Officer   |
|                  | Jered Granley         | Chief Risk Officer   |
|                  |                       |  |
|                  |                       |  |
|                  |                       |  |

Co-op

COMMENTS

MINNESOTA ELECTRIC UTILITY ANNUAL REPORT (Continued)

7610.0150 FEDERAL OR STATE DATA SUBSTITUTION

| FEDERAL AGENCY | FORM NUMBER | FORM TITLE  | FILING CYCLE<br>(enter an "X" in the cell) |        |       |
|----------------|-------------|---|--|--------|-------|
|                |             |   | MONTHLY                                    | YEARLY | OTHER |
| FERC           | FERC-1      | Annual FERC Report                                      |  | X      |       |
| FERC           | FERC-5      | Statement of Electric Operating Revenue and Income      | X  |        |       |
| FERC           | FERC-45     | Part 45 Informational Report                            |  |        | X     |
| FERC           | FERC-67     | Steam Electric Plant, Air and Water Survey              |  | X      |       |
| FERC           | FERC-80     | Licensed Projects Recreation Report                     |  |        | X     |
| FERC           | FERC-82     | Retail Rate Level Change                                |  |        | X     |
| DOE/EIA        | EIA-411     | Coordinated Bulk Power Supply Program                   |  | X      |       |
| DOE/EIA        | EIA-412     | Annual Electric Industry Financial Report (Unregulated) |  | X      |       |

COMMENTS



# MINNESOTA ELECTRIC UTILITY ANNUAL REPORT (Continued)

## 7610.0600 OTHER INFORMATION REPORTED ANNUALLY

A utility shall provide the following information for the last calendar year:

**B. LARGEST CUSTOMER LIST - ATTACHMENT ELEC-1**  
If applicable, the Largest Customer List must be submitted either in electronic or paper format. If information is Trade Secret, note it as such.

See "LargestCustomers" worksheet for data entry.

**C. MINNESOTA SERVICE AREA MAP**  
The referenced map must be submitted either in electronic or paper format.

See Instructions for details of the information required on the Minnesota Service Area Map.

| PURCHASES AND SALES FOR RESALE |                                   |               | RESALE ONLY         |           |
|--------------------------------|-----------------------------------|---------------|---------------------|-----------|
| UTILITY NAME                   | INTERCONNECTED UTILITY            | MWH PURCHASED | MWH SOLD FOR RESALE |           |
| Dahlberg Light & Power         |                                   |               |                     | -         |
| Superior Water Light & Power   |                                   |               |                     | 857,761   |
| City of Aitkin                 |                                   |               |                     | 37,881    |
| City of Biwabik                |                                   |               |                     | 6,399     |
| City of Brainerd               |                                   |               |                     | 165,645   |
| City of Buhl                   |                                   |               |                     | 6,869     |
| City of Ely                    |                                   |               |                     | 37,301    |
| City of Gilbert                |                                   |               |                     | 10,720    |
| City of Grand Rapids           |                                   |               |                     | 164,976   |
| City of Hibbing                |                                   |               |                     | 143,166   |
| City of Keewatin               |                                   |               |                     | 5,541     |
| City of Mountain Iron          |                                   |               |                     | 17,506    |
| City of Nashwauk               |                                   |               |                     | 11,567    |
| City of Pierz                  |                                   |               |                     | 10,483    |
| City of Proctor                |                                   |               |                     | 25,516    |
| City of Randall                |                                   |               |                     | 4,980     |
| City of Two Harbors            |                                   |               |                     | 28,868    |
| City of Virginia               |                                   |               |                     | 121,686   |
| Other Non-Required Sales       |                                   |               |                     | 4,038,441 |
| Non-Associated Utilities/Other |                                   | 341,785       |                     |           |
| Municipals                     |                                   | -             |                     |           |
| Other Cooperatives             |                                   | 460,031       |                     |           |
| Square Butte Electric Power    |                                   | 1,739,781     |                     |           |
| Non-Utilities                  |                                   | 238,324       |                     |           |
| Power Marketers                |                                   | 1,103,200     |                     |           |
| Other Public Authorities       |                                   | 2,061,324     |                     |           |
| Utility                        |                                   | 2,380         |                     |           |
| Foreign                        |                                   | 308,138       |                     |           |
| City of Wadena                 | Western Area Power Administration | 70,672        |                     | 70,672    |
| City of Staples                | Western Area Power Administration | 27,624        |                     | 27,624    |
| Great River Energy             | Great River Energy                | 2,435,243     |                     | 2,356,984 |
| ES&AO                          | Minnkota Power                    | 762,292       |                     | 762,292   |

MINNESOTA ELECTRIC UTILITY ANNUAL REPORT (Continued)

7610.0600 OTHER INFORMATION REPORTED ANNUALLY (continued)

A utility shall provide the following information for the last calendar year:

|  |   |   |  |
|--|---|---|--|
| E. RATE SCHEDULES  | The rate schedule and monthly power cost adjustment information must be submitted in electronic or paper format.                                      |   |  |
| See Instructions for details of the information required on the Rate Schedules and Monthly Power Cost Adjustments.                 |   |   |  |
| F. REPORT FORM EIA-861   | A copy of report form EIA-861 filed with the US Dept. of Energy must be submitted in electronic or paper format.                                      |   |  |
| A copy of the report form EIA-861 filed with the Energy Information Administration of the US Dept. of Energy must be submitted.    |   |   |  |
| G. FINANCIAL AND STATISTICAL REPORT  | If applicable, a copy of the Financial and Statistical Report filed with the US Dept. of Agriculture must be submitted in electronic or paper format. |   |  |
| For rural electric cooperatives, a copy of the Financial and Statistical Report to the US Dept of Agriculture must be submitted.   |   |   |  |
| H. GENERATION DATA   |   |   |  |
| If the utility has Minnesota power plants, enter the fuel requirements and generation data on the Plant1, Plant2, etc. worksheets. |   |   |  |
| I. ELECTRIC USE BY MINNESOTA RESIDENTIAL SPACE HEATING USERS   |   |   |  |
| See Instructions for details of the information required for residential space heating users.                                      |   |   |  |
| COLUMN 1<br>NUMBER OF RESIDENTIAL ELECTRICAL SPACE HEATING CUSTOMERS   | COLUMN 2<br>NUMBER OF RESIDENTIAL UNITS SERVED WITH ELECTRICAL SPACE HEATING  | COLUMN 3<br>TOTAL MWH USED BY THESE CUSTOMERS AND UNITS |  |
| 14,478   | 14,478  | 173,127   |  |
| COMMENTS   |   |   |  |
|  |   |   |  |

MINNESOTA ELECTRIC UTILITY ANNUAL REPORT (Continued)

7610.0600 OTHER INFORMATION REPORTED ANNUALLY (continued)

J. ITS DELIVERIES TO ULTIMATE CONSUMERS BY COUNTY FOR THE LAST CALENDAR YEAR

ENERGY DELIVERED TO ULTIMATE CONSUMERS BY COUNTY

| COUNTY CODE | COUNTY NAME       | MWH DELIVERED | COUNTY CODE              | COUNTY NAME     | MWH DELIVERED |
|-------------|-------------------|---------------|--------------------------|-----------------|---------------|
| 1           | Aitkin            |               | 46                       | Martin          |               |
| 2           | Anoka             |               | 47                       | Meeker          |               |
| 3           | Becker            |               | 48                       | Mille Lacs      |               |
| 4           | Beltrami          |               | 49                       | Morrison        | 270,683       |
| 5           | Benton            | 25,079        | 50                       | Mower           |               |
| 6           | Big Stone         |               | 51                       | Murray          |               |
| 7           | Blue Earth        |               | 52                       | Nicollet        |               |
| 8           | Brown             |               | 53                       | Nobles          |               |
| 9           | Carlton           | 334,900       | 54                       | Norman          |               |
| 10          | Carver            |               | 55                       | Olmstead        |               |
| 11          | Cass              | 114,879       | 56                       | Otter Tail      | 890           |
| 12          | Chippewa          |               | 57                       | Pennington      |               |
| 13          | Chisago           |               | 58                       | Pine            | 70,933        |
| 14          | Clay              |               | 59                       | Pipestone       |               |
| 15          | Clearwater        |               | 60                       | Polk            |               |
| 16          | Cook              |               | 61                       | Pope            |               |
| 17          | Cottonwood        |               | 62                       | Ramsey          |               |
| 18          | Crow Wing         | 119,281       | 63                       | Red Lake        |               |
| 19          | Dakota            |               | 64                       | Redwood         |               |
| 20          | Dodge             |               | 65                       | Renville        |               |
| 21          | Douglas           |               | 66                       | Rice            |               |
| 22          | Faribault         |               | 67                       | Rock            |               |
| 23          | Fillmore          |               | 68                       | Roseau          |               |
| 24          | Freeborn          |               | 69                       | St. Louis       | 5,973,893     |
| 25          | Goodhue           |               | 70                       | Scott           |               |
| 26          | Grant             |               | 71                       | Sherburne       |               |
| 27          | Hennepin          |               | 72                       | Sibley          |               |
| 28          | Houston           |               | 73                       | Stearns         | 6,409         |
| 29          | Hubbard           | 94,643        | 74                       | Steele          |               |
| 30          | Isanti            |               | 75                       | Stevens         |               |
| 31          | Itasca            | 839,772       | 76                       | Swift           |               |
| 32          | Jackson           |               | 77                       | Todd            | 208,368       |
| 33          | Kanabec           |               | 78                       | Traverse        |               |
| 34          | Kandiyohi         |               | 79                       | Wabasha         |               |
| 35          | Kittson           |               | 80                       | Wadena          | 92,161        |
| 36          | Koochiching       | 147,483       | 81                       | Waseca          |               |
| 37          | Lac Qui Parle     |               | 82                       | Washington      |               |
| 38          | Lake              | 697,977       | 83                       | Watonwan        |               |
| 39          | Lake of the Woods |               | 84                       | Wilkin          |               |
| 40          | Le Sueur          |               | 85                       | Winona          |               |
| 41          | Lincoln           |               | 86                       | Wright          |               |
| 42          | Lyon              |               | 87                       | Yellow Medicine |               |
| 43          | McLeod            |               |                          |                 |               |
| 44          | Mahnomen          |               |                          |                 |               |
| 45          | Marshall          |               |                          |                 |               |
|             |                   |               | GRAND TOTAL (Entered)    |                 | 8,997,352     |
|             |                   |               | GRAND TOTAL (Calculated) |                 | 8,997,352     |

<= (Should equal "Megawatt hours" column total on ElectricityByClass worksheet)

COMMENTS

# MINNESOTA ELECTRIC UTILITY ANNUAL REPORT (Continued)

## 7610.0600 OTHER INFORMATION REPORTED ANNUALLY (continued)

| J. ITS DELIVERIES TO ULTIMATE CONSUMERS BY MONTH FOR THE LAST CALENDAR YEAR                                      |                  |                      |                             |   |        |           |           |           |        |        |           |  |
|--|------------------|----------------------|-----------------------------|---|--------|-----------|-----------|-----------|--------|--------|-----------|--|
| See Instructions for details of the information required concerning electricity delivered to ultimate consumers. |                  |                      |                             |   |        |           |           |           |        |        |           |  |
| Past Year  | Entire System    | A                    |                             | B | C      | D         | E         | F         | G      | H      | I         |  |
|  |                  | Non-Farm Residential | Residential With Space Heat |   |        |           |           |           |        |        |           |  |
| January  | No. of Customers | 105,463              | 14,505                      |   | 2,299  | 22,698    | 8         | 388       | 692    | 279    | 146,332   |  |
|  | MWH              | 79,916               | 29,465                      |   | 3,713  | 113,225   | 371,622   | 155,719   | 1,682  | 4,553  | 759,897   |  |
| February   | No. of Customers | 105,352              | 14,476                      |   | 2,303  | 22,642    | 8         | 385       | 695    | 278    | 146,139   |  |
|  | MWH              | 60,394               | 26,910                      |   | 3,464  | 97,190    | 351,853   | 145,189   | 1,539  | 4,081  | 690,621   |  |
| March  | No. of Customers | 105,342              | 14,513                      |   | 2,295  | 22,696    | 8         | 385       | 695    | 280    | 146,214   |  |
|  | MWH              | 69,417               | 21,503                      |   | 3,076  | 106,570   | 422,032   | 157,300   | 1,281  | 4,406  | 785,585   |  |
| April  | No. of Customers | 105,245              | 14,486                      |   | 2,389  | 22,645    | 8         | 383       | 693    | 277    | 146,126   |  |
|  | MWH              | 52,393               | 19,106                      |   | 3,033  | 91,585    | 397,703   | 149,637   | 1,285  | 3,727  | 718,470   |  |
| May  | No. of Customers | 105,467              | 14,504                      |   | 2,214  | 22,677    | 8         | 383       | 691    | 276    | 146,220   |  |
|  | MWH              | 55,787               | 11,551                      |   | 2,418  | 94,067    | 432,476   | 138,612   | 992    | 3,772  | 739,675   |  |
| June   | No. of Customers | 105,770              | 14,528                      |   | 2,023  | 22,692    | 8         | 384       | 690    | 280    | 146,375   |  |
|  | MWH              | 55,471               | 8,043                       |   | 2,301  | 98,338    | 404,940   | 143,085   | 948    | 4,323  | 717,449   |  |
| July   | No. of Customers | 105,581              | 14,496                      |   | 2,379  | 22,698    | 8         | 383       | 690    | 278    | 146,513   |  |
|  | MWH              | 71,626               | 5,376                       |   | 2,997  | 108,723   | 423,838   | 140,153   | 921    | 4,612  | 758,247   |  |
| August   | No. of Customers | 105,714              | 14,513                      |   | 2,211  | 22,732    | 8         | 381       | 692    | 278    | 146,529   |  |
|  | MWH              | 65,322               | 4,968                       |   | 2,916  | 108,399   | 421,837   | 157,881   | 906    | 4,154  | 766,384   |  |
| September  | No. of Customers | 105,192              | 14,380                      |   | 2,580  | 22,621    | 8         | 381       | 694    | 276    | 146,132   |  |
|  | MWH              | 59,030               | 4,995                       |   | 3,266  | 98,751    | 405,086   | 153,372   | 1,141  | 4,283  | 729,924   |  |
| October  | No. of Customers | 105,616              | 14,463                      |   | 2,274  | 22,740    | 8         | 381       | 696    | 277    | 146,455   |  |
|  | MWH              | 65,307               | 5,663                       |   | 2,548  | 97,866    | 418,457   | 142,896   | 1,203  | 4,465  | 738,405   |  |
| November   | No. of Customers | 105,826              | 14,454                      |   | 2,074  | 22,751    | 8         | 374       | 697    | 277    | 146,461   |  |
|  | MWH              | 78,675               | 13,214                      |   | 2,650  | 98,875    | 431,707   | 144,482   | 1,433  | 3,051  | 774,088   |  |
| December   | No. of Customers | 105,197              | 14,416                      |   | 2,500  | 22,749    | 8         | 373       | 697    | 278    | 146,218   |  |
|  | MWH              | 88,124               | 22,332                      |   | 3,982  | 110,195   | 448,635   | 139,279   | 1,542  | 4,518  | 818,607   |  |
| Total MWH  |                  | 801,464              | 173,127                     |   | 36,364 | 1,223,786 | 4,930,188 | 1,767,604 | 14,873 | 49,945 | 8,997,352 |  |

### COMMENTS

The Elec\_68\_2016 Form originally included "Irrigation" in Column E. Minnesota Power has changed the column heading to "Mining" to comply with rule 7610.0600, part J: "Mining needs to be reported as a separate category only if annual sales are greater than 1,000 GWH." The Company's annual sales to Mining customers exceed 1,000 GWH.

MINNESOTA ELECTRIC UTILITY ANNUAL REPORT (Continued)

7610.0600 OTHER INFORMATION REPORTED ANNUALLY (continued)

| ELECTRICITY DELIVERED TO ULTIMATE CONSUMERS IN MINNESOTA SERVICE AREA IN LAST CALENDAR YEAR  |   |   |  |             |
|--|---|---|--|-------------|
| See Instructions for details of the information required concerning electricity delivered to ultimate consumers. Exclude station use, distribution losses, and unaccounted for energy losses from this table altogether. |   |   |  |             |
| Classification of Energy<br>Delivered to Ultimate<br>Consumers (include energy<br>used during the year for<br>irrigation and drainage<br>pumping)  | This column reports the<br>number of farms,<br>residences, commercial<br>establishments, etc., and not<br>the number of meters, where<br>different. | This column total should<br>equal the grand total in the<br>worksheet labeled<br>"ElectricityByCounty" which<br>provides deliveries by<br>county. | This column total will be<br>used for the Alternative<br>Energy Assessment and<br>should NOT include<br>revenues from sales for<br>resale (Minnesota Statutes,<br>Section 216B.62, Subd. 5). |             |
|  |   |   |  |             |
|  | Number of Customers<br>at End of Year   | Megawatt hours<br>(round to nearest MWH)  | Revenue<br>(\$)  |             |
| Farm   | 2,295   | 36,364  | 4,282,268  |             |
| Nonfarm-residential  | 119,958   | 974,591   | 104,604,923  |             |
| Commercial   | 22,695  | 1,223,786   | 119,507,546  |             |
| Industrial   | 390   | 6,697,793   | 441,769,968  |             |
| Street and highway lighting  | 693   | 14,873  | 2,449,194  |             |
| All other  | 278   | 49,945  | 4,505,017  |             |
| Entered Total  | 146,309   | 8,997,352   | 677,118,917  |             |
| CALCULATED TOTAL   |   | 146,309   | 8,997,352  | 677,118,917 |
| COMMENTS   |   |   |  |             |

Non-farm Residential  
(\$/kWh) (\$/customer)  
0.107332 872.0114  
=>

PLEASE CHECK THAT THE CALCULATED  
VALUES ABOVE ARE REALISTIC.  
THEY HELP YOU ENTER THE PROPER  
VALUES IN THE NONFARM-RESIDENTIAL  
CELLS TO THE LEFT.

|  |
|--|
| <b>REMEMBER TO SEND THE FOLLOWING ATTACHMENTS:</b>   |
|  |
| 1 If applicable, the Largest Customer List (Attachment ELEC-1),<br>if the separate LargestCustomers spreadsheet file was not used<br>(pursuant to MN Rules Chapter 7610.0600 B.) |
| 2 Minnesota service area map<br>(pursuant to MN Rules Chapter 7610.0600 C.)  |
| 3 Rate schedules and monthly power cost adjustments<br>(pursuant to MN Rules Chapter 7610.0600 E.)   |
| 4 Report form EIA-861 filed with US Dept. of Energy<br>(pursuant to MN Rules Chapter 7610.0600 F.)   |
| 5 If applicable, for rural electric cooperatives,<br>the Financial and Statistical Report filed with US Dept. of Agriculture<br>(pursuant to MN Rules Chapter 7610.0600 G.)      |

## 7610.0430 FUEL REQUIREMENTS AND GENERATION BY FUEL TYPE

Complete one worksheet for each power plant

Scroll down below the data entry tabs to see the ALLOWABLE CODES to be used for Unit Status, Unit Type, Energy Source, Fuel Type, and Unit of Measure fields

Scroll down below the ALLOWABLE CODES to see DEFINITIONS for Capacity Factor, Operating Factor and Forced Outage Rate.

| PLANT ID | (leave this cell blank) |
|----------|-------------------------|
|          |                         |

NUMBER OF UNITS[illegible]

200

| PRIMARY FUEL USE |  | SECONDARY FUEL USE |  |
|------------------|--|--------------------|--|
| Q/V              |  |                    |  |

ALLOWABLE CODES:

## DEFINITIONS

Note: Maintenance percentage is the number of hours of scheduled maintenance divided by 8,760.

## 7610.0430 FUEL REQUIREMENTS AND GENERATION BY FUEL TYPE

POWER PLANT AND GENERATING UNIT DATA REPORT

**INSTRUCTIONS:**

Complete one worksheet for each novel plant.

Scroll down below the data entry tables to see the ALLOWABLE CODES to be used for Unit Status, Unit Type, Energy Source, Fuel Type, and Unit of Measure fields. Scroll down below the ALLOWABLE CODES to see DEFINITIONS for Capacity Factor, Operating Factor and Forced Outage Rate.

|                |                       |                 |                         |
|----------------|-----------------------|-----------------|-------------------------|
| A. PLANT DATA  |                       | PLANT ID        | (leave this cell blank) |
| PLANT NAME     | Bowwell Energy Center | NUMBER OF UNITS | 4                       |
| STREET ADDRESS | 1210 NW 4rd Street    |                 |                         |
| CITY           | Chattahoochee         |                 |                         |
| STATE          | IN                    |                 |                         |
| ZIP CODE       | 45721                 |                 |                         |
| CONTACT PERSON | John Speltz           |                 |                         |
| TELEPHONE      | 216-326-5536 x4684    |                 |                         |

[illegible]

| C. UNIT CAPABILITY DATA |  | CAPACITY (MEGAWATTS) |
|-------------------------|--|----------------------|
| PLANT TOTAL             |  | 0,200,000            |

[illegible][illegible]

| ALLOWABLE CODES               |                             |                                       |                     |         |
|-------------------------------|-----------------------------|---------------------------------------|---------------------|---------|
| Cell Heading                  | Code                        | Code Definition                       | Cell Heading        | Code    |
| * Unit Status                 | USE                         | In-use                                | ** Unit Type        | CS      |
|                               | RET                         | Stand-by                              |                     | IC      |
|                               | FUT                         | Retired                               |                     | GT      |
|                               | FUT                         | Future                                |                     | HC      |
|                               | OTHER                       | Other - provide description           |                     | NC      |
| *** Energy Source & Fuel Type | BIT                         | Bluminnus Coal                        | *** Unit of Measure | NC      |
|                               | COAL                        | Coal (general)                        |                     | WI      |
|                               | DEISEL                      | Diesel                                |                     | OTHER   |
|                               | F06                         | Diesel Fuel (Net Distillate)          |                     | GAL     |
|                               | F06                         | Fuel Oil #6 (Residual Fuel Oil)       |                     | MCF     |
|                               | LIG                         | Lignite                               |                     | MMCF    |
|                               | LPG                         | Liquefied Propane Gas                 |                     | Tons    |
|                               | NG                          | Natural Gas                           |                     | Barrels |
|                               | NC                          | None                                  |                     | Therms  |
|                               | REF                         | Refuse, Bagasse, Peat, Non-wood waste |                     | OTHER   |
|                               | STM                         | Steam                                 |                     |         |
|                               | SUB                         | Sub-Bluminnus Coal                    |                     |         |
|                               | WAT                         | Water (Water)                         |                     |         |
|                               | WIND                        | Wind                                  |                     |         |
|                               | WOOD                        | Wood                                  |                     |         |
| SOLAR                         | Solar                       |                                       |                     |         |
| OTHER                         | Other - provide description |                                       |                     |         |
| Code Definition               | Code                        | Combustion Code                       | Code Definition     |         |
|                               |                             | Internal Combustion (Diesel)          |                     |         |
|                               |                             | Combustion (Gas) Turbine              |                     |         |
|                               |                             | Hydro Turbine (Baler)                 |                     |         |
|                               |                             | Steam Turbine                         |                     |         |
|                               |                             | Nuclear                               |                     |         |
|                               |                             | Wind                                  |                     |         |
|                               |                             | Other - provide description           |                     |         |
|                               |                             | Gallons                               |                     |         |
|                               |                             | Thousand cubic feet                   |                     |         |
|                               |                             | Million cubic feet                    |                     |         |
|                               |                             | Tons                                  |                     |         |
|                               |                             | Barrels                               |                     |         |
|                               |                             | Therms                                |                     |         |

| DEFINITIONS                              |  |
|--|--|
| Forced Outage Rate =<br>(percentage)     | Hours Unit Failed to be Available: X 100<br>Hours Unit Called Upon to Produce                                    |
| Operating Availability =<br>(percentage) | 100 - Maintenance percentage - Forced Outage percentage  |
| Capacity Factor =<br>(percentage)        | $\frac{\text{Total Annual MWh of Production}}{\text{Accumulated Capacity Rating (MW) of the Unit} \times 8,760}$ |

Note: Failure of a unit to be available does not include down time for scheduled maintenance.

Note: Maintenance percentage is the number of hours of scheduled maintenance divided by 8,760.



## 7610.0430 FUEL REQUIREMENTS AND GENERATION BY FUEL TYPE

Complete one worksheet for each power plant

Scroll down below the data entry tables to see the ALLOWABLE CODES to be used for Unit Status, Unit Type, Energy Source, Fuel Type, and Unit of Measure fields

Scroll down below the ALLOWABLE CODES to see DEFINITIONS for Capacity Factor, Operating Factor and Forced Outage Rate.

|                |  |                      |                         |
|----------------|--|----------------------|-------------------------|
| A. PLANT DATA  |  | PLANT ID             | (leave this cell blank) |
| PLANT NAME     |  | Liskin Energy Center |                         |
| STREET ADDRESS |  | PO Box 166           |                         |
| CITY           |  | Aurora               |                         |
| STATE          |  | IN                   |                         |
| ZIP CODE       |  | 59705                |                         |
| COUNTRY        |  | USA                  |                         |
| CONTACT PERSON |  | Joel Pridemski       |                         |
| TELEPHONE      |  | 218-319-4416         |                         |
|                |  | NUMBER OF UNITS      | 2                       |

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| ALLOWABLE CODES               |                             |                                       |                     |                 |                              |
|-------------------------------|-----------------------------|---------------------------------------|---------------------|-----------------|------------------------------|
| Cell Heading                  | Code                        | Code Definition                       | Cell Heading        | Code            |                              |
| * Unit Status                 | USE                         | In-use                                | ** Unit Type        | CS              |                              |
|                               | STB                         | Stand-by                              |                     | IC              |                              |
|                               | RET                         | Retired                               |                     | GT              |                              |
|                               | FUT                         | Future                                |                     | HC              |                              |
|                               | OTHER                       | Other - provide description           |                     | NC              |                              |
| *** Energy Source & Fuel Type | BIT                         | Bluminnus Coal                        | *** Unit of Measure | NC              |                              |
|                               | COAL                        | Coal (general)                        |                     | WI              |                              |
|                               | DEISEL                      | Diesel                                |                     | OTHER           |                              |
|                               | F06                         | Fuel Oil #6 (Mar Distillate)          |                     | GAL             |                              |
|                               | F06                         | Fuel Oil #6 (Residual Fuel Oil)       |                     | MCF             |                              |
|                               | LIG                         | Lignite                               |                     | MMCF            |                              |
|                               | LPG                         | Liquefied Propane Gas                 |                     | Tons            |                              |
|                               | NG                          | Natural Gas                           |                     | Barrels         |                              |
|                               | NC                          | None                                  |                     | Therms          |                              |
|                               | REF                         | Refuse, Bagasse, Peat, Non-wood waste |                     | OTHERS          |                              |
|                               | STM                         | Steam                                 |                     |                 |                              |
|                               | SUB                         | Sub-Bluminnus Coal                    |                     |                 |                              |
|                               | WAT                         | Water (Water)                         |                     |                 |                              |
|                               | WIND                        | Wind                                  |                     |                 |                              |
|                               | WOOD                        | Wood                                  |                     |                 |                              |
| SOLAR                         | Solar                       |                                       |                     |                 |                              |
| OTHER                         | Other - provide description |                                       |                     |                 |                              |
| Code Definition               | Code                        | Code Definition                       | Code                | Code Definition |                              |
|                               |                             |                                       |                     |                 | Combustion Code              |
|                               |                             |                                       |                     |                 | Internal Combustion (Diesel) |
|                               |                             |                                       |                     |                 | Combustion (Gas) Turbine     |
|                               |                             |                                       |                     |                 | Hydro Turbine (Baler)        |
|                               |                             |                                       |                     |                 | Steam Turbine                |
|                               |                             |                                       |                     |                 | Nuclear                      |
|                               |                             |                                       |                     |                 | Wind                         |
|                               |                             |                                       |                     |                 | Other - provide description  |
|                               |                             |                                       |                     |                 | Code Definition              |
| Galions                       |                             |                                       |                     |                 |                              |
| Thousand cubic feet           |                             |                                       |                     |                 |                              |
| Million cubic feet            |                             |                                       |                     |                 |                              |
| Tons                          |                             |                                       |                     |                 |                              |
| Barrels                       |                             |                                       |                     |                 |                              |
| Therms                        |                             |                                       |                     |                 |                              |
| OTHER                         |                             |                                       |                     |                 |                              |

| DEFINITIONS                              |   |
|--|---|
| Forced Outage Rate =<br>(percentage)     | Hours Unit Failed to be Available, X 100<br>Hours Unit Called Upon to Produce   |
| Operating Availability =<br>(percentage) | 100 - Maintenance percentage - Forced Outage percentage   |
| Capacity Factor =<br>(percentage)        | $\frac{\text{Total Annual MWh of Production} \times 100}{\text{Accumulated Capacity Rating (MW) of the Unit} \times 8,760}$ |

**Note:** Failure of a unit to be available does not include down time for scheduled maintenance.

Note: Maintenance percentage is the number of hours of scheduled maintenance divided by 8,760.

|   |      |
|---|------|
| 7610.0430 FUEL REQUIREMENTS AND GENERATION BY FUEL TYPE |      |
| POWER PLANT AND GENERATING UNIT DATA REPORT             | 2017 |

| A. PLANT DATA  |                  | PLANT ID                |
|----------------|------------------|-------------------------|
| PLANT NAME     | M.L. Hibbard     | (leave this cell blank) |
| STREET ADDRESS | 4913 Main Street |                         |
| CITY           | Duluth           |                         |
| STATE          | MN               | NUMBER OF UNITS         |
| ZIP CODE       | 55807            | 2                       |
| COUNTY         | Saint Louis      |                         |
| CONTACT PERSON | David Chura      |                         |
| TELEPHONE      | 218-313-6990     |                         |

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| ALLOWABLE CODES               |        |                                       |                      |        |                              |
|-------------------------------|--------|---------------------------------------|----------------------|--------|------------------------------|
| Cell Heading                  | Code   | Code Definition                       | Cell Heading         | Code   | Code Definition              |
| * Unit Status                 | USE    | In-use                                | ** Unit Type         | CS     | Combined Cycle               |
|                               | STB    | Stand-by                              |                      | IC     | Internal Combustion (Diesel) |
|                               | RET    | Retired                               |                      | GT     | Combustion (Gas) Turbine     |
|                               | FUT    | Future                                |                      | HC     | Hydro                        |
|                               | OTHER  | Other - provide description           |                      | ST     | Steam Turbine (Boiler)       |
| *** Energy Source & Fuel Type |        |                                       |                      | NC     | Nuclear                      |
|                               |        |                                       |                      | WI     | Wind                         |
|                               | BIT    | Bituminous Coal                       | **** Unit of Measure | OTHER  | Other - provide description  |
|                               | COAL   | Coal (general)                        |                      |        |                              |
|                               | DIESEL | Diesel                                |                      | GAL    | Gallons                      |
|                               | F02    | Fuel Oil #2 (Mid Distillate)          |                      | MCF    | Thousand cubic feet          |
|                               | F06    | Fuel Oil #6 (Residual Fuel Oil)       |                      | MMCF   | Million cubic feet           |
|                               | LIG    | Lignite                               |                      | TONS   | Tons                         |
|                               | LPG    | Liquefied Propane Gas                 |                      | BBL    | Barrels                      |
|                               | NG     | Natural Gas                           |                      | THERMS | Therms                       |
|                               | NUC    | Nuclear                               |                      |        |                              |
|                               | REF    | Refuse, Bagasse, Peat, Non-wood waste |                      |        |                              |
|                               | STM    | Steam                                 |                      |        |                              |
|                               | SUB    | Sub-Bituminous Coal                   |                      |        |                              |
|                               | HYD    | Hydro (Water)                         |                      |        |                              |
|                               | WIND   | Wind                                  |                      |        |                              |
|                               | WOOD   | Wood                                  |                      |        |                              |
|                               | SOLAR  | Solar                                 |                      |        |                              |
|                               | OTHER  | Other - provide description           |                      |        |                              |

Note: Maintenance percentage is the number of hours of scheduled maintenance divided by 8,760.

|   |      |
|---|------|
| 7610.0430 FUEL REQUIREMENTS AND GENERATION BY FUEL TYPE |      |
| POWER PLANT AND GENERATING UNIT DATA REPORT             | 2017 |

| A. PLANT DATA  |                      | PLANT ID                |
|----------------|----------------------|-------------------------|
| PLANT NAME     | Rapids Energy Center | (leave this cell blank) |
| STREET ADDRESS | 502 NW 3rd Street    |                         |
| CITY           | Grand Rapids         |                         |
| STATE          | MI                   | NUMBER OF UNITS         |
| ZIP CODE       | 55744                | 4                       |
| COUNTY         | Itasca               |                         |
| CONTACT PERSON | David Chura          |                         |
| TELEPHONE      | 218-313-6990         |                         |

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| ALLOWABLE CODES               |        |                                       |                      |        |                              |
|-------------------------------|--------|---------------------------------------|----------------------|--------|------------------------------|
| Cell Heading                  | Code   | Code Definition                       | Cell Heading         | Code   | Code Definition              |
| * Unit Status                 | USE    | In-use                                | ** Unit Type         | CS     | Combined Cycle               |
|                               | STB    | Stand-by                              |                      | IC     | Internal Combustion (Diesel) |
|                               | RET    | Retired                               |                      | GT     | Combustion (Gas) Turbine     |
|                               | FUT    | Future                                |                      | HC     | Hydro                        |
|                               | OTHER  | Other - provide description           |                      | ST     | Steam Turbine (Boiler)       |
| *** Energy Source & Fuel Type | BIT    | Bituminous Coal                       | **** Unit of Measure | NC     | Nuclear                      |
|                               | COAL   | Coal (general)                        |                      | WI     | Wind                         |
|                               | DIESEL | Diesel                                |                      | OTHER  | Other - provide description  |
|                               | FO2    | Fuel Oil #2 (Mid Distillate)          |                      | GAL    | Gallons                      |
|                               | FO6    | Fuel Oil #6 (Residual Fuel Oil)       |                      | MMCF   | Million cubic feet           |
|                               | LIG    | Lignite                               |                      | TONS   | Tons                         |
|                               | LPG    | Liquefied Propane Gas                 |                      | BBL    | Barrels                      |
|                               | NG     | Natural Gas                           |                      | THERMS | Therms                       |
|                               | NUC    | Nuclear                               |                      |        |                              |
|                               | REF    | Refuse, Bagasse, Peat, Non-wood waste |                      |        |                              |
|                               | STM    | Steam                                 |                      |        |                              |
|                               | SUB    | Sub-Bituminous Coal                   |                      |        |                              |
|                               | HYD    | Hydro (Water)                         |                      |        |                              |
|                               | WIND   | Wind                                  |                      |        |                              |
|                               | WOOD   | Wood                                  |                      |        |                              |
|                               | SOLAR  | Solar                                 |                      |        |                              |
|                               | OTHER  | Other - provide description           |                      |        |                              |

| DEFINITIONS                              |   |
|--|---|
| Forced Outage Rate =<br>(percentage)     | $\frac{\text{Hours Unit Failed to be Available}}{\text{Hours Unit Called Upon to Produce}} \times 100$          |
| Operating Availability =<br>(percentage) | 100 - Maintenance percentage - Forced Outage percentage   |
| Capacity Factor =<br>(percentage)        | $\frac{\text{Total Annual MWh of Production}}{\text{Accredited Capacity Rating (MW) of the Unit}} \times 8,760$ |

Note: Maintenance percentage is the number of hours of scheduled maintenance divided by 8,760.

|   |      |
|---|------|
| 7610.0430 FUEL REQUIREMENTS AND GENERATION BY FUEL TYPE |      |
| POWER PLANT AND GENERATING UNIT DATA REPORT             | 2017 |

INSTRUCTIONS: Complete one worksheet for each power plant

Scroll down below the data entry tables to see the ALLOWABLE CODES to be used for Unit Status, Unit Type, Energy Source, Fuel Type, and Unit of Measure fields

Scroll down below the ALLOWABLE CODES to see DEFINITIONS for Capacity Factor, Operating Factor and Forced Outage Rate.

| A. PLANT DATA  |                            | PLANT ID                |
|----------------|----------------------------|-------------------------|
| PLANT NAME     | SAPPI Cloquet Turb Genr #5 | (leave this cell blank) |
| STREET ADDRESS | 2201 Avenue B              |                         |
| CITY           | Cloquet                    |                         |
| STATE          | MN                         |                         |
| ZIP CODE       | 55720                      | NUMBER OF UNITS 1       |
| COUNTY         | Carlton                    |                         |
| CONTACT PERSON | David Chura                |                         |
| TEL F#HOME     | 218-355-3280               |                         |

| B. INDIVIDUAL GENERATING UNIT DATA |               |              |                |                   |                         |                          |
|------------------------------------|---------------|--------------|----------------|-------------------|-------------------------|--------------------------|
| Unit ID #                          | Unit Status * | Unit Type ** | Year Installed | Energy Source *** | Net Generation<br>(mwh) | Comments                 |
| 5                                  | USE           | ST           | 2001           | WOOD/GAS          | 0                       | No MP ownership in 2017. |
|                                    |               |              |                |                   |                         |                          |
|                                    |               |              |                |                   |                         |                          |
|                                    |               |              |                |                   |                         |                          |
|                                    |               |              |                |                   |                         |                          |
|                                    |               |              |                |                   |                         |                          |
|                                    |               |              |                |                   |                         |                          |
|                                    |               |              |                |                   |                         |                          |
|                                    |               |              |                |                   |                         |                          |
|                                    |               |              |                |                   |                         |                          |
|                                    |               |              |                |                   |                         |                          |
|                                    |               |              |                | PLANT TOTAL       | 0                       |                          |

| C. UNIT CAPABILITY DATA |        | CAPACITY (MEGAWATTS) |                     | PLANT TOTAL          |                        | 0        |  |
|-------------------------|--------|----------------------|---------------------|----------------------|------------------------|----------|--|
| Unit ID #               | Summer | Winter               | Capacity Factor (%) | Operating Factor (%) | Forced Outage Rate (%) | Comments |  |
| 5                       | 22.6   | 22.6                 | 0.00                | 0.0                  | 0.0                    |          |  |
|                         |        |                      |                     |                      |                        |          |  |
|                         |        |                      |                     |                      |                        |          |  |
|                         |        |                      |                     |                      |                        |          |  |
|                         |        |                      |                     |                      |                        |          |  |
|                         |        |                      |                     |                      |                        |          |  |
|                         |        |                      |                     |                      |                        |          |  |
|                         |        |                      |                     |                      |                        |          |  |
| PLANT TOTAL             | 22.6   | 22.6                 |                     |                      |                        |          |  |

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| ALLOWABLE CODES               |        |                                       |                      |        |                              |
|-------------------------------|--------|---------------------------------------|----------------------|--------|------------------------------|
| Cell Heading                  | Code   | Code Definition                       | Cell Heading         | Code   | Code Definition              |
| * Unit Status                 | USE    | In-use                                | ** Unit Type         | CS     | Combined Cycle               |
|                               | STB    | Stand-by                              |                      | IC     | Internal Combustion (Diesel) |
|                               | RET    | Retired                               |                      | GT     | Combustion (Gas) Turbine     |
|                               | FUT    | Future                                |                      | HC     | Hydro                        |
|                               | OTHER  | Other - provide description           |                      | ST     | Steam Turbine (Boiler)       |
| *** Energy Source & Fuel Type | BIT    | Bituminous Coal                       | **** Unit of Measure | NC     | Nuclear                      |
|                               | COAL   | Coal (general)                        |                      | WI     | Wind                         |
|                               | DIESEL | Diesel                                |                      | OTHER  | Other - provide description  |
|                               | FO2    | Fuel Oil #2 (Mid Distillate)          |                      | GAL    | Gallons                      |
|                               | FO6    | Fuel Oil #6 (Residual Fuel Oil)       |                      | MCF    | Thousand cubic feet          |
|                               | LIG    | Lignite                               |                      | MMCF   | Million cubic feet           |
|                               | LPG    | Liquefied Propane Gas                 |                      | TONS   | Tons                         |
|                               | NG     | Natural Gas                           |                      | BBL    | Barrels                      |
|                               | NUC    | Nuclear                               |                      | THERMS | Therms                       |
|                               | REF    | Refuse, Bagasse, Peat, Non-wood waste |                      |        |                              |
|                               | STM    | Steam                                 |                      |        |                              |
|                               | SUB    | Sub-Bituminous Coal                   |                      |        |                              |
|                               | HYD    | Hydro (Water)                         |                      |        |                              |
|                               | WIND   | Wind                                  |                      |        |                              |
|                               | WOOD   | Wood                                  |                      |        |                              |
|                               | SOLAR  | Solar                                 |                      |        |                              |
|                               | OTHER  | Other - provide description           |                      |        |                              |

| DEFINITIONS                           |   |
|---------------------------------------|---|
| Forced Outage Rate = (percentage)     | $\frac{\text{Hours Unit Failed to be Available}}{\text{Hours Unit Called Upon to Produce}} \times 100$          |
| Operating Availability = (percentage) | 100 - Maintenance percentage - Forced Outage percentage   |
| Capacity Factor = (percentage)        | $\frac{\text{Total Annual MWh of Production}}{\text{Accredited Capacity Rating (MW) of the Unit}} \times 8,760$ |

Note: Failure of a unit to be available does not include down time for scheduled maintenance.

Note: Maintenance percentage is the number of hours of scheduled maintenance divided by 8,760.

|   |      |
|---|------|
| 7610.0430 FUEL REQUIREMENTS AND GENERATION BY FUEL TYPE |      |
| POWER PLANT AND GENERATING UNIT DATA REPORT             | 2017 |

| A. PLANT DATA  |                     | PLANT ID                |   |
|----------------|---------------------|-------------------------|---|
| PLANT NAME     | Taconite Harbor     | (leave this cell blank) |   |
| STREET ADDRESS | PO Box 64           |                         |   |
| CITY           | Schroeder           |                         |   |
| STATE          | MIN                 |                         |   |
| ZIP CODE       | 55705               |                         |   |
| COUNTY         | Cook                |                         |   |
| CONTACT PERSON | David Rannetsberger | NUMBER OF UNITS         | 3 |
| TELEPHONE      | 218-406-6833        |                         |   |

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| ALLOWABLE CODES               |        |                                       |                      |        |                              |
|-------------------------------|--------|---------------------------------------|----------------------|--------|------------------------------|
| Cell Heading                  | Code   | Code Definition                       | Cell Heading         | Code   | Code Definition              |
| * Unit Status                 | USE    | In-use                                | ** Unit Type         | CS     | Combined Cycle               |
|                               | STB    | Stand-by                              |                      | IC     | Internal Combustion (Diesel) |
|                               | RET    | Retired                               |                      | GT     | Combustion (Gas) Turbine     |
|                               | FUT    | Future                                |                      | HC     | Hydro                        |
|                               | OTHER  | Other - provide description           |                      | ST     | Steam Turbine (Boiler)       |
| *** Energy Source & Fuel Type |        |                                       |                      | NC     | Nuclear                      |
|                               | BIT    | Bituminous Coal                       |                      | WI     | Wind                         |
|                               | COAL   | Coal (general)                        |                      | OTHER  | Other - provide description  |
|                               | DIESEL | Diesel                                | **** Unit of Measure | GAL    | Gallons                      |
|                               | FO2    | Fuel Oil #2 (Mid Distillate)          |                      | MCF    | Thousand cubic feet          |
|                               | FO6    | Fuel Oil #6 (Residual Fuel Oil)       |                      | MMCF   | Million cubic feet           |
|                               | LIG    | Lignite                               |                      | TONS   | Tons                         |
|                               | LPG    | Liquefied Propane Gas                 |                      | BBL    | Barrels                      |
|                               | NG     | Natural Gas                           |                      | THERMS | Therms                       |
|                               | NUC    | Nuclear                               |                      |        |                              |
|                               | REF    | Refuse, Bagasse, Peat, Non-wood waste |                      |        |                              |
|                               | STM    | Steam                                 |                      |        |                              |
|                               | SUB    | Sub-Bituminous Coal                   |                      |        |                              |
|                               | HYD    | Hydro (Water)                         |                      |        |                              |
|                               | WIND   | Wind                                  |                      |        |                              |
|                               | WOOD   | Wood                                  |                      |        |                              |
|                               | SOLAR  | Solar                                 |                      |        |                              |
|                               | OTHER  | Other - provide description           |                      |        |                              |

| DEFINITIONS                           |   |  |
|---------------------------------------|---|--|
| Forced Outage Rate = (percentage)     | $\frac{\text{Hours Unit Failed to be Available}}{\text{Hours Unit Called Upon to Produce}} \times 100$                      | Note: Failure of a unit to be available does not include down time for scheduled maintenance.  |
| Operating Availability = (percentage) | 100 - Maintenance percentage - Forced Outage percentage   | Note: Maintenance percentage is the number of hours of scheduled maintenance divided by 8,760. |
| Capacity Factor = (percentage)        | $\frac{\text{Total Annual MWH of Production}}{\text{Accredited Capacity Rating (MW) of the Unit}} \times \frac{100}{8,760}$ |  |

|   |      |
|---|------|
| 7610.0430 FUEL REQUIREMENTS AND GENERATION BY FUEL TYPE |      |
| POWER PLANT AND GENERATING UNIT DATA REPORT             | 2017 |

| A. PLANT DATA  |                               |                 | PLANT ID                |
|----------------|-------------------------------|-----------------|-------------------------|
| PLANT NAME     | Thomson Hydroelectric Station |                 | (leave this cell blank) |
| STREET ADDRESS | 180 St. Hwy 210               |                 |                         |
| CITY           | Carlton                       |                 |                         |
| STATE          | MN                            | NUMBER OF UNITS | 6                       |
| ZIP CODE       | 55718                         |                 |                         |
| COUNTY         | Carlton                       |                 |                         |
| CONTACT PERSON | Chris Rousseau                |                 |                         |
| TELEPHONE      | 218-725-2100                  |                 |                         |

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| ALLOWABLE CODES               |        |                                       |                      |        |                              |
|-------------------------------|--------|---------------------------------------|----------------------|--------|------------------------------|
| Cell Heading                  | Code   | Code Definition                       | Cell Heading         | Code   | Code Definition              |
| * Unit Status                 | USE    | In-use                                | ** Unit Type         | CS     | Combined Cycle               |
|                               | STB    | Stand-by                              |                      | IC     | Internal Combustion (Diesel) |
|                               | RET    | Retired                               |                      | GT     | Combustion (Gas) Turbine     |
|                               | FUT    | Future                                |                      | HC     | Hydro                        |
|                               | OTHER  | Other - provide description           |                      | ST     | Steam Turbine (Boiler)       |
| *** Energy Source & Fuel Type | BIT    | Bituminous Coal                       |                      | NC     | Nuclear                      |
|                               | COAL   | Coal (general)                        |                      | WI     | Wind                         |
|                               | DIESEL | Diesel                                |                      | OTHER  | Other - provide description  |
|                               | FO2    | Fuel Oil #2 (Mid Distillate)          | **** Unit of Measure | GAL    | Gallons                      |
|                               | FO6    | Fuel Oil #6 (Residual Fuel Oil)       |                      | MCF    | Thousand cubic feet          |
|                               | LIG    | Lignite                               |                      | MMCF   | Million cubic feet           |
|                               | LPG    | Liquefied Propane Gas                 |                      | TONS   | Tons                         |
|                               | NG     | Natural Gas                           |                      | BBL    | Barrels                      |
|                               | NUC    | Nuclear                               |                      | THERMS | Therms                       |
|                               | REF    | Refuse, Bagasse, Peat, Non-wood waste |                      |        |                              |
|                               | STM    | Steam                                 |                      |        |                              |
|                               | SUB    | Sub-Bituminous Coal                   |                      |        |                              |
|                               | HYD    | Hydro (Water)                         |                      |        |                              |
|                               | WIND   | Wind                                  |                      |        |                              |
|                               | WOOD   | Wood                                  |                      |        |                              |
|                               | SOLAR  | Solar                                 |                      |        |                              |
|                               | OTHER  | Other - provide description           |                      |        |                              |

| DEFINITIONS                                  |  |  |
|--|--|--|
| <b>Forced Outage Rate = (percentage)</b>     | $\frac{\text{Hours Unit Failed to be Available} \times 100}{\text{Hours Unit Called Upon to Produce}}$                     | Note: Failure of a unit to be available does not include down time for scheduled maintenance.  |
| <b>Operating Availability = (percentage)</b> | 100 - Maintenance percentage - Forced Outage percentage  | Note: Maintenance percentage is the number of hours of scheduled maintenance divided by 8,760. |
| <b>Capacity Factor = (percentage)</b>        | $\frac{\text{Total Annual MWH of Production} \times 100}{\text{Accredited Capacity Rating (MW) of the Unit} \times 8,760}$ |  |

## POWER PLANT AND GENERATING UNIT DATA REPORT 2017

INSTRUCTIONS: Complete one worksheet for each power plant

Scroll down below the data entry tables to see the ALLOWABLE CODES to be used for Unit Status, Unit Type, Energy Source, Fuel Type, and Unit of Measure fields

Scroll down below the ALLOWABLE CODES to see DEFINITIONS for Capacity Factor, Operating Factor and Forced Outage Rate.

| A. PLANT DATA  |                                 | PLANT ID                |
|----------------|---------------------------------|-------------------------|
| PLANT NAME     | Blanchard Hydroelectric Station | (leave this cell blank) |
| STREET ADDRESS | PO Box 157                      |                         |
|                | CITY Little Falls               |                         |
|                | STATE MN                        |                         |
|                | ZIP CODE 56345                  | NUMBER OF UNITS 3       |
|                | COUNTY Morrison                 |                         |
| CONTACT PERSON | Chris Rousseau                  |                         |
| TELEPHONE      | 218-745-2100                    |                         |

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| ALLOWABLE CODES               |  |  |                      |   |   |
|-------------------------------|--|--|----------------------|---|---|
| Cell Heading                  | Code   | Code Definition  | Cell Heading         | Code  | Code Definition   |
| * Unit Status                 | USE<br>STB<br>RET<br>FUT<br>OTHER  | In-use<br>Stand-by<br>Retired<br>Future<br>Other - provide description   | ** Unit Type         | CS<br>IC<br>GT<br>HC<br>ST<br>NC<br>WI<br>OTHER | Combined Cycle<br>Internal Combustion (Diesel)<br>Combustion (Gas) Turbine<br>Hydro<br>Steam Turbine (Boiler)<br>Nuclear<br>Wind<br>Other - provide description |
| *** Energy Source & Fuel Type | BIT<br>COAL<br>DIESEL<br>FO2<br>FO6<br>LIG<br>LPG<br>NG<br>NUC<br>REF<br>STM<br>SUB<br>HYD<br>WIND<br>WOOD<br>SOLAR<br>OTHER | Bituminous Coal<br>Coal (general)<br>Diesel<br>Fuel Oil #2 (Mid Distillate)<br>Fuel Oil #6 (Residual Fuel Oil)<br>Lignite<br>Liquefied Propane Gas<br>Natural Gas<br>Nuclear<br>Refuse, Bagasse, Peat, Non-wood waste<br>Steam<br>Sub-Bituminous Coal<br>Hydro (Water)<br>Wind<br>Wood<br>Solar<br>Other - provide description | **** Unit of Measure | GAL<br>MCF<br>MMCF<br>TONS<br>BBL<br>THERMS     | Gallons<br>Thousand cubic feet<br>Million cubic feet<br>Tons<br>Barrels<br>Therms   |

| <b>DEFINITIONS</b>                           |  |
|--|--|
| <b>Forced Outage Rate = (percentage)</b>     | $\frac{\text{Hours Unit Failed to be Available } \times 100}{\text{Hours Unit Called Upon to Produce}}$                      |
| <b>Operating Availability = (percentage)</b> | 100 - Maintenance percentage - Forced Outage percentage  |
| <b>Capacity Factor = (percentage)</b>        | $\frac{\text{Total Annual MWh of Production } \times 100}{\text{Accredited Capacity Rating (MW) of the Unit } \times 8,760}$ |

Note: Failure of a unit to be available does not include down time for scheduled maintenance

Note: Maintenance percentage is the number of hours of scheduled maintenance divided by 8.760.

|   |      |
|---|------|
| 7610.0430 FUEL REQUIREMENTS AND GENERATION BY FUEL TYPE |      |
| POWER PLANT AND GENERATING UNIT DATA REPORT             | 2017 |

| A. PLANT DATA  |                                |                 |                         |
|----------------|--------------------------------|-----------------|-------------------------|
| PLANT NAME     | Pillager Hydroelectric Station | PLANT ID        | (leave this cell blank) |
| STREET ADDRESS | 13449 Pillager Dam Road        |                 |                         |
| CITY           | Pillager                       |                 |                         |
| STATE          | MN                             | NUMBER OF UNITS | 2                       |
| ZIP CODE       | 56473                          |                 |                         |
| COUNTY         | Cass                           |                 |                         |
| CONTACT PERSON | Chris Rousseau                 |                 |                         |
| TELEPHONE      | 218-725-2100                   |                 |                         |

[illegible]

| ALLOWABLE CODES               |        |                                       |                      |        |                              |
|-------------------------------|--------|---------------------------------------|----------------------|--------|------------------------------|
| Cell Heading                  | Code   | Code Definition                       | Cell Heading         | Code   | Code Definition              |
| * Unit Status                 | USE    | In-use                                | ** Unit Type         | CS     | Combined Cycle               |
|                               | STB    | Stand-by                              |                      | IC     | Internal Combustion (Diesel) |
|                               | RET    | Retired                               |                      | GT     | Combustion (Gas) Turbine     |
|                               | FUT    | Future                                |                      | HC     | Hydro                        |
|                               | OTHER  | Other - provide description           |                      | ST     | Steam Turbine (Boiler)       |
| *** Energy Source & Fuel Type | BIT    | Bituminous Coal                       | **** Unit of Measure | NC     | Nuclear                      |
|                               | COAL   | Coal (general)                        |                      | WI     | Wind                         |
|                               | DIESEL | Diesel                                |                      | OTHER  | Other - provide description  |
|                               | FO2    | Fuel Oil #2 (Mid Distillate)          |                      | GAL    | Gallons                      |
|                               | FO6    | Fuel Oil #6 (Residual Fuel Oil)       |                      | MCF    | Thousand cubic feet          |
|                               | LIG    | Lignite                               |                      | MMCF   | Million cubic feet           |
|                               | LPG    | Liquefied Propane Gas                 |                      | TONS   | Tons                         |
|                               | NG     | Natural Gas                           |                      | BBL    | Barrels                      |
|                               | NUC    | Nuclear                               |                      | THERMS | Therms                       |
|                               | REF    | Refuse, Bagasse, Peat, Non-wood waste |                      |        |                              |
|                               | STM    | Steam                                 |                      |        |                              |
|                               | SUB    | Sub-Bituminous Coal                   |                      |        |                              |
|                               | HYD    | Hydro (Water)                         |                      |        |                              |
|                               | WIND   | Wind                                  |                      |        |                              |
|                               | WOOD   | Wood                                  |                      |        |                              |
|                               | SOLAR  | Solar                                 |                      |        |                              |
|                               | OTHER  | Other - provide description           |                      |        |                              |

Note: Maintenance percentage is the number of hours of scheduled maintenance divided by 8,760.



## POWER PLANT AND GENERATING UNIT DATA REPORT 2017

INSTRUCTIONS: Complete one worksheet for each power plant

Scroll down below the data entry tables to see the ALLOWABLE CODES to be used for Unit Status, Unit Type, Energy Source, Fuel Type, and Unit of Measure fields

Scroll down below the ALLOWABLE CODES to see DEFINITIONS for Capacity Factor, Operating Factor and Forced Outage Rate.

| A. PLANT DATA  |                                    | PLANT ID                |
|----------------|------------------------------------|-------------------------|
| PLANT NAME     | Little Falls Hydroelectric Station | (leave this cell blank) |
| STREET ADDRESS | 1 Hydro Street                     |                         |
| CITY           | Little Falls                       |                         |
| STATE          | MN                                 |                         |
| ZIP CODE       | 56345                              |                         |
| COUNTY         | Morrison                           |                         |
| CONTACT PERSON | Chris Rousseau                     | NUMBER OF UNITS         |
| TELEPHONE      | 218-725-2100                       | 6                       |

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| ALLOWABLE CODES               |  |  |                      |   |   |
|-------------------------------|--|--|----------------------|---|---|
| Cell Heading                  | Code   | Code Definition  | Cell Heading         | Code  | Code Definition   |
| * Unit Status                 | USE<br>STB<br>RET<br>FUT<br>OTHER  | In-use<br>Stand-by<br>Retired<br>Future<br>Other - provide description   | ** Unit Type         | CS<br>IC<br>GT<br>HC<br>ST<br>NC<br>WI<br>OTHER | Combined Cycle<br>Internal Combustion (Diesel)<br>Combustion (Gas) Turbine<br>Hydro<br>Steam Turbine (Boiler)<br>Nuclear<br>Wind<br>Other - provide description |
| *** Energy Source & Fuel Type | BIT<br>COAL<br>DIESEL<br>FO2<br>FO6<br>LIG<br>LPG<br>NG<br>NUC<br>REF<br>STM<br>SUB<br>HYD<br>WIND<br>WOOD<br>SOLAR<br>OTHER | Bituminous Coal<br>Coal (general)<br>Diesel<br>Fuel Oil #2 (Mid Distillate)<br>Fuel Oil #6 (Residual Fuel Oil)<br>Lignite<br>Liquefied Propane Gas<br>Natural Gas<br>Nuclear<br>Refuse, Bagasse, Peat, Non-wood waste<br>Steam<br>Sub-Bituminous Coal<br>Hydro (Water)<br>Wind<br>Wood<br>Solar<br>Other - provide description | **** Unit of Measure | GAL<br>MCF<br>MMCF<br>TONS<br>BBL<br>THERMS     | Gallons<br>Thousand cubic feet<br>Million cubic feet<br>Tons<br>Barrels<br>Therms   |

| <b><i>DEFINITIONS</i></b>                        |  |
|--|--|
| <b>Forced Outage Rate =<br/>(percentage)</b>     | $\frac{\text{Hours Unit Failed to be Available} \times 100}{\text{Hours Unit Called Upon to Produce}}$                     |
| <b>Operating Availability =<br/>(percentage)</b> | 100 - Maintenance percentage - Forced Outage percentage  |
| <b>Capacity Factor =<br/>(percentage)</b>        | $\frac{\text{Total Annual MWh of Production} \times 100}{\text{Accredited Capacity Rating (MW) of the Unit} \times 8,760}$ |

Note: Maintenance percentage is the number of hours of scheduled maintenance divided by 8,760.

## POWER PLANT AND GENERATING UNIT DATA REPORT 2017

INSTRUCTIONS: Complete one worksheet for each power plant

Scroll down below the data entry tables to see the ALLOWABLE CODES to be used for Unit Status, Unit Type, Energy Source, Fuel Type, and Unit of Measure fields

Scroll down below the ALLOWABLE CODES to see DEFINITIONS for Capacity Factor, Operating Factor and Forced Outage Rate.

|                       |                               |   |   |
|-----------------------|-------------------------------|---|---|
| <b>A. PLANT DATA</b>  |                               | <b>PLANT ID</b> (leave this cell blank) |   |
| <b>PLANT NAME</b>     | Scanlon Hydroelectric Station |   |   |
| <b>STREET ADDRESS</b> |                               |   |   |
| <b>CITY</b>           | Scanlon                       |   |   |
| <b>STATE</b>          | MN                            | <b>NUMBER OF UNITS</b>                  | 4 |
| <b>ZIP CODE</b>       | 55720                         |   |   |
| <b>COUNTY</b>         | Carlton                       |   |   |
| <b>CONTACT PERSON</b> | Chris Rousseau                |   |   |
| <b>TELEPHONE</b>      | 218-725-2100                  |   |   |

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| ALLOWABLE CODES               |        |                                       |                      |        |                              |
|-------------------------------|--------|---------------------------------------|----------------------|--------|------------------------------|
| Cell Heading                  | Code   | Code Definition                       | Cell Heading         | Code   | Code Definition              |
| * Unit Status                 | USE    | In-use                                | ** Unit Type         | CS     | Combined Cycle               |
|                               | STB    | Stand-by                              |                      | IC     | Internal Combustion (Diesel) |
|                               | RET    | Retired                               |                      | GT     | Combustion (Gas) Turbine     |
|                               | FUT    | Future                                |                      | HC     | Hydro                        |
|                               | OTHER  | Other - provide description           |                      | ST     | Steam Turbine (Boiler)       |
| *** Energy Source & Fuel Type |        |                                       |                      | NC     | Nuclear                      |
|                               | BIT    | Bituminous Coal                       |                      | WI     | Wind                         |
|                               | COAL   | Coal (general)                        |                      | OTHER  | Other - provide description  |
|                               | DIESEL | Diesel                                | **** Unit of Measure | GAL    | Gallons                      |
|                               | F02    | Fuel Oil #2 (Mid Distillate)          |                      | MCF    | Thousand cubic feet          |
|                               | F06    | Fuel Oil #6 (Residual Fuel Oil)       |                      | MMCF   | Million cubic feet           |
|                               | LIG    | Lignite                               |                      | TONS   | Tons                         |
|                               | LPG    | Liquefied Propane Gas                 |                      | BBL    | Barrels                      |
|                               | NG     | Natural Gas                           |                      | THERMS | Therms                       |
|                               | NUC    | Nuclear                               |                      |        |                              |
|                               | REF    | Refuse, Bagasse, Peat, Non-wood waste |                      |        |                              |
|                               | STM    | Steam                                 |                      |        |                              |
|                               | SUB    | Sub-Bituminous Coal                   |                      |        |                              |
|                               | HYD    | Hydro (Water)                         |                      |        |                              |
|                               | WIND   | Wind                                  |                      |        |                              |
|                               | WOOD   | Wood                                  |                      |        |                              |
|                               | SOLAR  | Solar                                 |                      |        |                              |
|                               | OTHER  | Other - provide description           |                      |        |                              |

| DEFINITIONS                              |  |
|--|--|
| Forced Outage Rate =<br>(percentage)     | $\frac{\text{Hours Unit Failed to be Available} \times 100}{\text{Hours Unit Called Upon to Produce}}$                     |
| Operating Availability =<br>(percentage) | 100 - Maintenance percentage - Forced Outage percentage  |
| Capacity Factor =<br>(percentage)        | $\frac{\text{Total Annual MWh of Production} \times 100}{\text{Accredited Capacity Rating (MW) of the Unit} \times 8,760}$ |

|   |      |
|---|------|
| 7610.0430 FUEL REQUIREMENTS AND GENERATION BY FUEL TYPE |      |
| POWER PLANT AND GENERATING UNIT DATA REPORT             | 2017 |

|                       |                              |   |
|-----------------------|------------------------------|---|
| <b>A. PLANT DATA</b>  |                              |   |
| <b>PLANT NAME</b>     | Sylvan Hydroelectric Station | <b>PLANT ID</b> (leave this cell blank) |
| <b>STREET ADDRESS</b> | 13753 Sylvan Dam Road        |   |
| <b>CITY</b>           | Pilager                      |   |
| <b>STATE</b>          | MN                           | <b>NUMBER OF UNITS</b>                  |
| <b>ZIP CODE</b>       | 56473                        | 3                                       |
| <b>COUNTY</b>         | Cass                         |   |
| <b>CONTACT PERSON</b> | Chris Rousseau               |   |
| <b>TELEPHONE</b>      | 218-725-2100                 |   |

[illegible]

| ALLOWABLE CODES               |        |                                       |                      |        |                              |
|-------------------------------|--------|---------------------------------------|----------------------|--------|------------------------------|
| Cell Heading                  | Code   | Code Definition                       | Cell Heading         | Code   | Code Definition              |
| * Unit Status                 | USE    | In-use                                | ** Unit Type         | CS     | Combined Cycle               |
|                               | STB    | Stand-by                              |                      | IC     | Internal Combustion (Diesel) |
|                               | RET    | Retired                               |                      | GT     | Combustion (Gas) Turbine     |
|                               | FUT    | Future                                |                      | HC     | Hydro                        |
|                               | OTHER  | Other - provide description           |                      | ST     | Steam Turbine (Boiler)       |
| *** Energy Source & Fuel Type | BIT    | Bituminous Coal                       | **** Unit of Measure | NC     | Nuclear                      |
|                               | COAL   | Coal (general)                        |                      | WI     | Wind                         |
|                               | DIESEL | Diesel                                |                      | OTHER  | Other - provide description  |
|                               | FO2    | Fuel Oil #2 (Mid Distillate)          |                      | GAL    | Gallons                      |
|                               | FO6    | Fuel Oil #6 (Residual Fuel Oil)       |                      | MCF    | Thousand cubic feet          |
|                               | LIG    | Lignite                               |                      | MMCF   | Million cubic feet           |
|                               | LPG    | Liquefied Propane Gas                 |                      | TONS   | Tons                         |
|                               | NG     | Natural Gas                           |                      | BBL    | Barrels                      |
|                               | NUC    | Nuclear                               |                      | THERMS | Therms                       |
|                               | REF    | Refuse, Bagasse, Peat, Non-wood waste |                      |        |                              |
|                               | STM    | Steam                                 |                      |        |                              |
|                               | SUB    | Sub-Bituminous Coal                   |                      |        |                              |
|                               | HYD    | Hydro (Water)                         |                      |        |                              |
|                               | WIND   | Wind                                  |                      |        |                              |
|                               | WOOD   | Wood                                  |                      |        |                              |
|                               | SOLAR  | Solar                                 |                      |        |                              |
|                               | OTHER  | Other - provide description           |                      |        |                              |

Note: Maintenance percentage is the number of hours of scheduled maintenance divided by 8,760.

|   |      |
|---|------|
| 7610.0430 FUEL REQUIREMENTS AND GENERATION BY FUEL TYPE |      |
| POWER PLANT AND GENERATING UNIT DATA REPORT             | 2017 |

|                       |                              |   |
|-----------------------|------------------------------|---|
| <b>A. PLANT DATA</b>  |                              |   |
| <b>PLANT NAME</b>     | Winton Hydroelectric Station | <b>PLANT ID</b> (leave this cell blank) |
| <b>STREET ADDRESS</b> | PO Box 156                   |   |
| <b>CITY</b>           | Winton                       |   |
| <b>STATE</b>          | MN                           | <b>NUMBER OF UNITS</b>                  |
| <b>ZIP CODE</b>       | 55796                        | 2                                       |
| <b>COUNTY</b>         | Lake                         |   |
| <b>CONTACT PERSON</b> | Chris Rousseau               |   |
| <b>TEL FPHONE</b>     | 218-725-2100                 |   |

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| ALLOWABLE CODES               |        |                                       |                      |        |                              |
|-------------------------------|--------|---------------------------------------|----------------------|--------|------------------------------|
| Cell Heading                  | Code   | Code Definition                       | Cell Heading         | Code   | Code Definition              |
| * Unit Status                 | USE    | In-use                                | ** Unit Type         | CS     | Combined Cycle               |
|                               | STB    | Stand-by                              |                      | IC     | Internal Combustion (Diesel) |
|                               | RET    | Retired                               |                      | GT     | Combustion (Gas) Turbine     |
|                               | FUT    | Future                                |                      | HC     | Hydro                        |
|                               | OTHER  | Other - provide description           |                      | ST     | Steam Turbine (Boiler)       |
| *** Energy Source & Fuel Type | BIT    | Bituminous Coal                       | **** Unit of Measure | NC     | Nuclear                      |
|                               | COAL   | Coal (general)                        |                      | WI     | Wind                         |
|                               | DIESEL | Diesel                                |                      | OTHER  | Other - provide description  |
|                               | FO2    | Fuel Oil #2 (Mid Distillate)          |                      | GAL    | Gallons                      |
|                               | FO6    | Fuel Oil #6 (Residual Fuel Oil)       |                      | MCF    | Thousand cubic feet          |
|                               | LIG    | Lignite                               |                      | MMCF   | Million cubic feet           |
|                               | LPG    | Liquefied Propane Gas                 |                      | TONS   | Tons                         |
|                               | NG     | Natural Gas                           |                      | BBL    | Barrels                      |
|                               | NUC    | Nuclear                               |                      | THERMS | Therms                       |
|                               | REF    | Refuse, Bagasse, Peat, Non-wood waste |                      |        |                              |
|                               | STM    | Steam                                 |                      |        |                              |
|                               | SUB    | Sub-Bituminous Coal                   |                      |        |                              |
|                               | HYD    | Hydro (Water)                         |                      |        |                              |
|                               | WIND   | Wind                                  |                      |        |                              |
|                               | WOOD   | Wood                                  |                      |        |                              |
|                               | SOLAR  | Solar                                 |                      |        |                              |
|                               | OTHER  | Other - provide description           |                      |        |                              |

| <b>DEFINITIONS</b>                                     |   |
|--|---|
| <b>Forced Outage Rate =</b><br><b>(percentage)</b>     | $\frac{\text{Hours Unit Failed to be Available}}{\text{Hours Unit Called Upon to Produce}} \times 100$        |
| <b>Operating Availability =</b><br><b>(percentage)</b> | 100 - Maintenance percentage - Forced Outage percentage   |
| <b>Capacity Factor =</b><br><b>(percentage)</b>        | $\frac{\text{Total Annual MWh of Production}}{\text{Accredited Capacity Rating (MW) of the Unit}} \times 100$ |

|   |      |
|---|------|
| 7610.0430 FUEL REQUIREMENTS AND GENERATION BY FUEL TYPE |      |
| POWER PLANT AND GENERATING UNIT DATA REPORT             | 2017 |

| A. PLANT DATA  |                                   | PLANT ID                |
|----------------|-----------------------------------|-------------------------|
| PLANT NAME     | Knife Falls Hydroelectric Station | (leave this cell blank) |
| STREET ADDRESS |                                   |                         |
| CITY           | Cloquet                           |                         |
| STATE          | MN                                |                         |
| ZIP CODE       | 55720                             | NUMBER OF UNITS         |
| COUNTY         | Carlton                           | 3                       |
| CONTACT PERSON | Chris Rousseau                    |                         |
| TELEPHONE      | 218-725-2100                      |                         |

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| ALLOWABLE CODES               |        |                                       |                      |        |                              |
|-------------------------------|--------|---------------------------------------|----------------------|--------|------------------------------|
| Cell Heading                  | Code   | Code Definition                       | Cell Heading         | Code   | Code Definition              |
| * Unit Status                 | USE    | In-use                                | ** Unit Type         | CS     | Combined Cycle               |
|                               | STB    | Stand-by                              |                      | IC     | Internal Combustion (Diesel) |
|                               | RET    | Retired                               |                      | GT     | Combustion (Gas) Turbine     |
|                               | FUT    | Future                                |                      | HC     | Hydro                        |
|                               | OTHER  | Other - provide description           |                      | ST     | Steam Turbine (Boiler)       |
| *** Energy Source & Fuel Type | BIT    | Bituminous Coal                       |                      | NC     | Nuclear                      |
|                               | COAL   | Coal (general)                        |                      | WI     | Wind                         |
|                               | DIESEL | Diesel                                |                      | OTHER  | Other - provide description  |
|                               | FO2    | Fuel Oil #2 (Mid Distillate)          | **** Unit of Measure | GAL    | Gallons                      |
|                               | FO6    | Fuel Oil #6 (Residual Fuel Oil)       |                      | MCF    | Thousand cubic feet          |
|                               | LIG    | Lignite                               |                      | MMCF   | Million cubic feet           |
|                               | LPG    | Liquefied Propane Gas                 |                      | TONS   | Tons                         |
|                               | NG     | Natural Gas                           |                      | BBL    | Barrels                      |
|                               | NUC    | Nuclear                               |                      | THERMS | Therms                       |
|                               | REF    | Refuse, Bagasse, Peat, Non-wood waste |                      |        |                              |
|                               | STM    | Steam                                 |                      |        |                              |
|                               | SUB    | Sub-Bituminous Coal                   |                      |        |                              |
|                               | HYD    | Hydro (Water)                         |                      |        |                              |
|                               | WIND   | Wind                                  |                      |        |                              |
|                               | WOOD   | Wood                                  |                      |        |                              |
|                               | SOLAR  | Solar                                 |                      |        |                              |
|                               | OTHER  | Other - provide description           |                      |        |                              |

| DEFINITIONS                              |  |  |
|--|--|--|
| Forced Outage Rate =<br>(percentage)     | $\frac{\text{Hours Unit Failed to be Available}}{\text{Hours Unit Called Upon to Produce}} \times 100$         | Note: Failure of a unit to be available does not include down time for scheduled maintenance.  |
| Operating Availability =<br>(percentage) | 100 - Maintenance percentage - Forced Outage percentage  | Note: Maintenance percentage is the number of hours of scheduled maintenance divided by 8,760. |
| Capacity Factor =<br>(percentage)        | $\frac{\text{Total Annual MWh of Production}}{\text{Accredited Capacity Rating (MWh) of the Unit}} \times 100$ |  |

## POWER PLANT AND GENERATING UNIT DATA REPORT 2017

INSTRUCTIONS: Complete one worksheet for each power plant

Scroll down below the data entry tables to see the ALLOWABLE CODES to be used for Unit Status, Unit Type, Energy Source, Fuel Type, and Unit of Measure fields

Scroll down below the ALLOWABLE CODES to see DEFINITIONS for Capacity Factor, Operating Factor and Forced Outage Rate.

| A. PLANT DATA  |                                   | PLANT ID                |
|----------------|-----------------------------------|-------------------------|
| PLANT NAME     | Fond Du Lac Hydroelectric Station | (leave this cell blank) |
| STREET ADDRESS | 14302 Oldenberg Parkway           |                         |
| CITY           | Duluth                            |                         |
| STATE          | MN                                |                         |
| ZIP CODE       | 55808                             | NUMBER OF UNITS         |
| COUNTY         | Saint Louis                       | 1                       |
| CONTACT PERSON | Chris Rousseau                    |                         |
| TELEPHONE      | 218-725-2100                      |                         |

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| ALLOWABLE CODES               |        |                                       |                      |        |                              |
|-------------------------------|--------|---------------------------------------|----------------------|--------|------------------------------|
| Cell Heading                  | Code   | Code Definition                       | Cell Heading         | Code   | Code Definition              |
| * Unit Status                 | USE    | In-use                                | ** Unit Type         | CS     | Combined Cycle               |
|                               | STB    | Stand-by                              |                      | IC     | Internal Combustion (Diesel) |
|                               | RET    | Retired                               |                      | GT     | Combustion (Gas) Turbine     |
|                               | FUT    | Future                                |                      | HC     | Hydro                        |
|                               | OTHER  | OTHER - provide description           |                      | ST     | Steam Turbine (Boiler)       |
| *** Energy Source & Fuel Type | BIT    | Bituminous Coal                       |                      | NC     | Nuclear                      |
|                               | COAL   | Coal (general)                        |                      | WI     | Wind                         |
|                               | DIESEL | Diesel                                |                      | OTHER  | OTHER - provide description  |
|                               | FO2    | Fuel Oil #2 (Mid Distillate)          | **** Unit of Measure | GAL    | Gallons                      |
|                               | FO6    | Fuel Oil #6 (Residual Fuel Oil)       |                      | MCF    | Thousand cubic feet          |
|                               | LIG    | Lignite                               |                      | MMCF   | Million cubic feet           |
|                               | LPG    | Liquefied Propane Gas                 |                      | TONS   | Tons                         |
|                               | NG     | Natural Gas                           |                      | BBL    | Barrels                      |
|                               | NUC    | Nuclear                               |                      | THERMS | Therms                       |
|                               | REF    | Refuse, Bagasse, Peat, Non-wood waste |                      |        |                              |
|                               | STM    | Steam                                 |                      |        |                              |
|                               | SUB    | Sub-Bituminous Coal                   |                      |        |                              |
|                               | HYD    | Hydro (Water)                         |                      |        |                              |
|                               | WIND   | Wind                                  |                      |        |                              |
|                               | WOOD   | Wood                                  |                      |        |                              |
|                               | SOLAR  | Solar                                 |                      |        |                              |
|                               | OTHER  | OTHER - provide description           |                      |        |                              |

| <b><i>DEFINITIONS</i></b>                    |  |
|--|--|
| <b>Forced Outage Rate = (percentage)</b>     | $\frac{\text{Hours Unit Failed to be Available} \times 100}{\text{Hours Unit Called Upon to Produce}}$                     |
| <b>Operating Availability = (percentage)</b> | 100 - Maintenance percentage - Forced Outage percentage  |
| <b>Capacity Factor = (percentage)</b>        | $\frac{\text{Total Annual MWh of Production} \times 100}{\text{Accredited Capacity Rating (MW) of the Unit} \times 8,760}$ |

|   |      |
|---|------|
| 7610.0430 FUEL REQUIREMENTS AND GENERATION BY FUEL TYPE |      |
| POWER PLANT AND GENERATING UNIT DATA REPORT             | 2017 |

| A. PLANT DATA  |                                     | PLANT ID                |
|----------------|-------------------------------------|-------------------------|
| PLANT NAME     | Prairie River Hydroelectric Station | (leave this cell blank) |
| STREET ADDRESS |                                     |                         |
| CITY           | Grand Rapids                        |                         |
| STATE          | MN                                  | NUMBER OF UNITS         |
| ZIP CODE       | 55734                               | 2                       |
| COUNTY         | Itasca                              |                         |
| CONTACT PERSON | Chris Rousseau                      |                         |
| TELEPHONE      | 218-725-2100                        |                         |

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| ALLOWABLE CODES               |        |                                       |                      |        |                              |
|-------------------------------|--------|---------------------------------------|----------------------|--------|------------------------------|
| Cell Heading                  | Code   | Code Definition                       | Cell Heading         | Code   | Code Definition              |
| * Unit Status                 | USE    | In-use                                | ** Unit Type         | CS     | Combined Cycle               |
|                               | STB    | Stand-by                              |                      | IC     | Internal Combustion (Diesel) |
|                               | RET    | Retired                               |                      | GT     | Combustion (Gas) Turbine     |
|                               | FUT    | Future                                |                      | HC     | Hydro                        |
|                               | OTHER  | Other - provide description           |                      | ST     | Steam Turbine (Boiler)       |
| *** Energy Source & Fuel Type | BIT    | Bituminous Coal                       |                      | NC     | Nuclear                      |
|                               | COAL   | Coal (general)                        |                      | WI     | Wind                         |
|                               | DIESEL | Diesel                                | **** Unit of Measure | OTHER  | Other - provide description  |
|                               | FO2    | Fuel Oil #2 (Mid Distillate)          |                      | GAL    | Gallons                      |
|                               | FO6    | Fuel Oil #6 (Residual Fuel Oil)       |                      | MCF    | Thousand cubic feet          |
|                               | LIG    | Lignite                               |                      | MMCF   | Million cubic feet           |
|                               | LPG    | Liquefied Propane Gas                 |                      | TONS   | Tons                         |
|                               | NG     | Natural Gas                           |                      | BBL    | Barrels                      |
|                               | NUC    | Nuclear                               |                      | THERMS | Therms                       |
|                               | REF    | Refuse, Bagasse, Peat, Non-wood waste |                      |        |                              |
|                               | STM    | Steam                                 |                      |        |                              |
|                               | SUB    | Sub-Bituminous Coal                   |                      |        |                              |
|                               | HYD    | Hydro (Water)                         |                      |        |                              |
|                               | WIND   | Wind                                  |                      |        |                              |
|                               | WOOD   | Wood                                  |                      |        |                              |
|                               | SOLAR  | Solar                                 |                      |        |                              |
|                               | OTHER  | Other - provide description           |                      |        |                              |

Note: Maintenance percentage is the number of hours of scheduled maintenance divided by 8,760.

|   |      |
|---|------|
| 7610.0430 FUEL REQUIREMENTS AND GENERATION BY FUEL TYPE |      |
| POWER PLANT AND GENERATING UNIT DATA REPORT             | 2017 |

| A. PLANT DATA  |                     |                                  |
|----------------|---------------------|----------------------------------|
| PLANT NAME     | Taconite Ridge 1    | PLANT ID (leave this cell blank) |
| STREET ADDRESS | Co Rd 102           |                                  |
| CITY           | Mountain Iron       |                                  |
| STATE          | MN                  | NUMBER OF UNITS                  |
| ZIP CODE       | 55768               | 1                                |
| COUNTY         | St. Louis           |                                  |
| CONTACT PERSON | Todd Simmons        |                                  |
| TEL FPHONE     | 218.722.5642 x 6102 |                                  |

[illegible]

| ALLOWABLE CODES               |        |                                       |                      |        |                              |
|-------------------------------|--------|---------------------------------------|----------------------|--------|------------------------------|
| Cell Heading                  | Code   | Code Definition                       | Cell Heading         | Code   | Code Definition              |
| * Unit Status                 | USE    | In-use                                | ** Unit Type         | CS     | Combined Cycle               |
|                               | STB    | Stand-by                              |                      | IC     | Internal Combustion (Diesel) |
|                               | RET    | Retired                               |                      | GT     | Combustion (Gas) Turbine     |
|                               | FUT    | Future                                |                      | HC     | Hydro                        |
|                               | OTHER  | Other - provide description           |                      | ST     | Steam Turbine (Boiler)       |
| *** Energy Source & Fuel Type | BIT    | Bituminous Coal                       | **** Unit of Measure | NC     | Nuclear                      |
|                               | COAL   | Coal (general)                        |                      | WI     | Wind                         |
|                               | DIESEL | Diesel                                |                      | OTHER  | Other - provide description  |
|                               | FO2    | Fuel Oil #2 (Mid Distillate)          |                      | GAL    | Gallons                      |
|                               | FO6    | Fuel Oil #6 (Residual Fuel Oil)       |                      | MCF    | Thousand cubic feet          |
|                               | LIG    | Lignite                               |                      | MMCF   | Million cubic feet           |
|                               | LPG    | Liquefied Propane Gas                 |                      | TONS   | Tons                         |
|                               | NG     | Natural Gas                           |                      | BBL    | Barrels                      |
|                               | NUC    | Nuclear                               |                      | THERMS | Therms                       |
|                               | REF    | Refuse, Bagasse, Peat, Non-wood waste |                      |        |                              |
|                               | STM    | Steam                                 |                      |        |                              |
|                               | SUB    | Sub-Bituminous Coal                   |                      |        |                              |
|                               | HYD    | Hydro (Water)                         |                      |        |                              |
|                               | WIND   | Wind                                  |                      |        |                              |
|                               | WOOD   | Wood                                  |                      |        |                              |
|                               | SOLAR  | Solar                                 |                      |        |                              |
|                               | OTHER  | Other - provide description           |                      |        |                              |

| DEFINITIONS                           |   |
|---------------------------------------|---|
| Forced Outage Rate = (percentage)     | $\frac{\text{Hours Unit Failed to be Available}}{\text{Hours Unit Called Upon to Produce}} \times 100$        |
| Operating Availability = (percentage) | 100 - Maintenance percentage - Forced Outage percentage   |
| Capacity Factor = (percentage)        | $\frac{\text{Total Annual MWh of Production}}{\text{Accredited Capacity Rating (MW) of the Unit}} \times 100$ |



|   |      |
|---|------|
| 7610.0430 FUEL REQUIREMENTS AND GENERATION BY FUEL TYPE |      |
| POWER PLANT AND GENERATING UNIT DATA REPORT             | 2017 |

|                       |                  |                        |                         |
|-----------------------|------------------|------------------------|-------------------------|
| <b>A. PLANT DATA</b>  |                  | <b>PLANT ID</b>        | (leave this cell blank) |
| <b>PLANT NAME</b>     | Bison 1          |                        |                         |
| <b>STREET ADDRESS</b> | 5198 30th Street |                        |                         |
| <b>CITY</b>           | New Salem        |                        |                         |
| <b>STATE</b>          | ND               | <b>NUMBER OF UNITS</b> | 1                       |
| <b>ZIP CODE</b>       | 58563            |                        |                         |
| <b>COUNTY</b>         | Morton           |                        |                         |
| <b>CONTACT PERSON</b> | Todd Simmons     |                        |                         |
| <b>TEL/FAX/HOME</b>   | 218-843-6102     |                        |                         |

[illegible]

| ALLOWABLE CODES               |        |                                       |                      |        |                              |
|-------------------------------|--------|---------------------------------------|----------------------|--------|------------------------------|
| Cell Heading                  | Code   | Code Definition                       | Cell Heading         | Code   | Code Definition              |
| * Unit Status                 | USE    | In-use                                | ** Unit Type         | CS     | Combined Cycle               |
|                               | STB    | Stand-by                              |                      | IC     | Internal Combustion (Diesel) |
|                               | RET    | Retired                               |                      | GT     | Combustion (Gas) Turbine     |
|                               | FUT    | Future                                |                      | HC     | Hydro                        |
|                               | OTHER  | Other - provide description           |                      | ST     | Steam Turbine (Boiler)       |
| *** Energy Source & Fuel Type | BIT    | Bituminous Coal                       | **** Unit of Measure | NC     | Nuclear                      |
|                               | COAL   | Coal (general)                        |                      | WI     | Wind                         |
|                               | DIESEL | Diesel                                |                      | OTHER  | Other - provide description  |
|                               | FO2    | Fuel Oil #2 (Mid Distillate)          |                      | GAL    | Gallons                      |
|                               | FO6    | Fuel Oil #6 (Residual Fuel Oil)       |                      | MCF    | Thousand cubic feet          |
|                               | LIG    | Lignite                               |                      | MMCF   | Million cubic feet           |
|                               | LPG    | Liquefied Propane Gas                 |                      | TONS   | Tons                         |
|                               | NG     | Natural Gas                           |                      | BBL    | Barrels                      |
|                               | NUC    | Nuclear                               |                      | THERMS | Therms                       |
|                               | REF    | Refuse, Bagasse, Peat, Non-wood waste |                      |        |                              |
|                               | STM    | Steam                                 |                      |        |                              |
|                               | SUB    | Sub-Bituminous Coal                   |                      |        |                              |
|                               | HYD    | Hydro (Water)                         |                      |        |                              |
|                               | WIND   | Wind                                  |                      |        |                              |
|                               | WOOD   | Wood                                  |                      |        |                              |
|                               | SOLAR  | Solar                                 |                      |        |                              |
|                               | OTHER  | Other - provide description           |                      |        |                              |

| <b>DEFINITIONS</b>                           |   |
|--|---|
| <b>Forced Outage Rate = (percentage)</b>     | $\frac{\text{Hours Unit Failed to be Available}}{\text{Hours Unit Called Upon to Produce}} \times 100$        |
| <b>Operating Availability = (percentage)</b> | $100 - \text{Maintenance percentage} - \text{Forced Outage percentage}$                                       |
| <b>Capacity Factor = (percentage)</b>        | $\frac{\text{Total Annual MWh of Production}}{\text{Accredited Capacity Rating (MW) of the Unit}} \times 100$ |

Note: Maintenance percentage is the number of hours of scheduled maintenance divided by 8,760.

|   |      |
|---|------|
| 7610.0430 FUEL REQUIREMENTS AND GENERATION BY FUEL TYPE |      |
| POWER PLANT AND GENERATING UNIT DATA REPORT             | 2017 |

| A. PLANT DATA  |                   | PLANT ID                |   |
|----------------|-------------------|-------------------------|---|
| PLANT NAME     | Camp Ripley Solar | (leave this cell blank) |   |
| STREET ADDRESS | 15000 Highway 115 |                         |   |
| CITY           | Little Falls      |                         |   |
| STATE          | MN                |                         |   |
| ZIP CODE       | 55345             |                         |   |
| COUNTY         | Morrison          |                         |   |
| CONTACT PERSON | Lyle Mattson      |                         |   |
| TELEPHONE      | 218-355-2330      | NUMBER OF UNITS         | 1 |

[illegible]

| ALLOWABLE CODES               |        |                                       |                      |        |                              |
|-------------------------------|--------|---------------------------------------|----------------------|--------|------------------------------|
| Cell Heading                  | Code   | Code Definition                       | Cell Heading         | Code   | Code Definition              |
| * Unit Status                 | USE    | In-use                                | ** Unit Type         | CS     | Combined Cycle               |
|                               | STB    | Stand-by                              |                      | IC     | Internal Combustion (Diesel) |
|                               | RET    | Retired                               |                      | GT     | Combustion (Gas) Turbine     |
|                               | FUT    | Future                                |                      | HC     | Hydro                        |
|                               | OTHER  | Other - provide description           |                      | ST     | Steam Turbine (Boiler)       |
| *** Energy Source & Fuel Type | BIT    | Bituminous Coal                       | **** Unit of Measure | NC     | Nuclear                      |
|                               | COAL   | Coal (general)                        |                      | WI     | Wind                         |
|                               | DIESEL | Diesel                                |                      | OTHER  | Other - provide description  |
|                               | F02    | Fuel Oil #2 (Mid Distillate)          |                      | GAL    | Gallons                      |
|                               | F06    | Fuel Oil #6 (Residual Fuel Oil)       |                      | MCF    | Thousand cubic feet          |
|                               | LIG    | Lignite                               |                      | MMCF   | Million cubic feet           |
|                               | LPG    | Liquefied Propane Gas                 |                      | TONS   | Tons                         |
|                               | NG     | Natural Gas                           |                      | BBL    | Barrels                      |
|                               | NUC    | Nuclear                               |                      | THERMS | Therms                       |
|                               | REF    | Refuse, Bagasse, Peat, Non-wood waste |                      |        |                              |
|                               | STM    | Steam                                 |                      |        |                              |
|                               | SUB    | Sub-Bituminous Coal                   |                      |        |                              |
|                               | HYD    | Hydro (Water)                         |                      |        |                              |
|                               | WIND   | Wind                                  |                      |        |                              |
|                               | WOOD   | Wood                                  |                      |        |                              |
|                               | SOLAR  | Solar                                 |                      |        |                              |
|                               | OTHER  | Other - provide description           |                      |        |                              |

| DEFINITIONS                           |  |  |
|---------------------------------------|--|--|
| Forced Outage Rate = (percentage)     | $\frac{\text{Hours Unit Failed to be Available} \times 100}{\text{Hours Unit Called upon to Produce}}$                     | Note: Failure of a unit to be available does not include down time for scheduled maintenance.  |
| Operating Availability = (percentage) | 100 - Maintenance percentage - Forced Outage percentage  | Note: Maintenance percentage is the number of hours of scheduled maintenance divided by 8,760. |
| Capacity Factor = (percentage)        | $\frac{\text{Total Annual MWH of Production} \times 100}{\text{Accredited Capacity Rating (MW) of the Unit} \times 8,760}$ |  |




# MINNESOTA ELECTRIC UTILITY INFORMATION REPORTING - FORECAST SECTION

## INSTRUCTIONS

The individual worksheets in this spreadsheet file correspond closely to the tables in the paper forms received by the utility. The instructions provided with the paper forms also pertain to the data to be entered in each of the worksheets in this file.

**PLEASE DO NOT CHANGE THE NAME OR ORDER OF ANY OF THE WORKSHEET TABS IN THIS FILE**

In general, the following scheme is used on each worksheet:

-  Cells shown with a light green background correspond to headings for columns, rows or individual fields.
-  Cells shown with a light yellow background require data to be entered by the utility.
-  Cells shown with a light brown background generally correspond to fields that are calculated from the data entered, or correspond to fields that are informational and not to be modified by the utility.

Each worksheet contains a section labeled Comments below the main data entry area.

You may enter any comments in that section that may be needed to explain or clarify the data being entered on the worksheet.

Please complete the required worksheets and save the completed spreadsheet file to your local computer.

Then attach the completed spreadsheet file to an e-mail message and send it to the following e-mail address:

[rule7610.reports@state.mn.us](mailto:rule7610.reports@state.mn.us)

If you have any questions please contact:

Anne Sell

MN Department of Commerce

[rule7610.reports@state.mn.us](mailto:rule7610.reports@state.mn.us)

(651) 539-1851

MINNESOTA ELECTRIC UTILITY INFORMATION REPORTING - FORECAST SECTION

7610.0120 REGISTRATION

|                           |  |   |  |                    |  |
|---------------------------|--|---|--|--------------------|--|
| ENTITY ID#<br>REPORT YEAR |  | 68<br>2017  |  | RILS ID#<br>U10680 |  |
| UTILITY DETAILS           |  |   |  |                    |  |
| UTILITY NAME              |  | Minnesota Power Co  |  |                    |  |
| STREET ADDRESS            |  | 30 W Superior St  |  |                    |  |
| CITY                      |  | Duluth  |  |                    |  |
| STATE                     |  | MN  |  |                    |  |
| ZIP CODE                  |  | 55802-2093  |  |                    |  |
| TELEPHONE                 |  | 218/722-5642 x3865  |  |                    |  |
| * UTILITY TYPE            |  | PRIVATE   |  |                    |  |
|                           |  | Scroll down to see allowable UTILITY TYPES  |  |                    |  |
| COMMENTS                  |  |   |  |                    |  |
| CONTACT INFORMATION       |  | CONTACT NAME<br>CONTACT TITLE<br>CONTACT STREET ADDRESS<br>CITY<br>STATE<br>ZIP CODE<br>TELEPHONE<br>CONTACT E-MAIL                               |  |                    |  |
|                           |  | Benjamin Levine<br>Senior Utility Load Forecaster<br>30 West Superior Street<br>Duluth<br>MN<br>55802-2093<br>218-355-3120<br>blevine@mnpower.com |  |                    |  |
| PREPARER INFORMATION      |  | PERSON PREPARING FORMS<br>PREPARER'S TITLE<br>DATE  |  |                    |  |
|                           |  | Benjamin Levine<br>Senior Utility Load Forecaster<br>6/25/2018  |  |                    |  |

ALLOWABLE UTILITY TYPES

- Code  
Private  
Public  
Co-op

## MINNESOTA ELECTRIC UTILITY INFORMATION REPORTING - FORECAST SECTION (Continued)

### 7610.0310 Item A. SYSTEM FORECAST OF ANNUAL ELECTRIC CONSUMPTION BY ULTIMATE CONSUMERS

Provide actual data for your entire system for the past year, your estimate for the present year and all future forecast years.

Please remember that the number of customers should reflect the number of customers at year's end, not the number of meters.

|                       |      | FARM                | NON-FARM<br>RESIDENTIAL | COMMERCIAL           | MINING *            | INDUSTRIAL     | STREET &<br>HIGHWAY<br>LIGHTING | OTHER         | SYSTEM<br>TOTALS      | Calculated<br>System<br>Totals |
|-----------------------|------|---------------------|-------------------------|----------------------|---------------------|----------------|---------------------------------|---------------|-----------------------|--------------------------------|
| Past Year             | 2017 | No. of Cust.<br>MWH | 2,295<br>36,364         | 119,958<br>974,591   | 22,695<br>1,223,786 | 8<br>4,930,188 | 382<br>1,767,604                | 693<br>14,873 | 146,309<br>8,997,352  | 146,309<br>8,997,352           |
| Present Year          | 2018 | No. of Cust.<br>MWH | 2,295<br>36,364         | 120,058<br>1,015,297 | 22,822<br>1,249,190 | 8<br>5,105,464 | 369<br>1,700,652                | 695<br>14,787 | 146,528<br>9,172,622  | 146,528<br>9,172,622           |
| 1st Forecast<br>Year  | 2019 | No. of Cust.<br>MWH | 2,295<br>36,364         | 120,244<br>1,025,933 | 22,973<br>1,269,570 | 8<br>5,047,984 | 362<br>1,698,926                | 702<br>14,852 | 146,866<br>9,142,984  | 146,866<br>9,142,984           |
| 2nd Forecast<br>Year  | 2020 | No. of Cust.<br>MWH | 2,295<br>36,364         | 120,456<br>1,035,095 | 23,155<br>1,287,763 | 8<br>5,415,506 | 356<br>1,654,159                | 706<br>14,941 | 147,258<br>9,493,131  | 147,258<br>9,493,131           |
| 3rd Forecast<br>Year  | 2021 | No. of Cust.<br>MWH | 2,295<br>36,364         | 120,631<br>1,036,942 | 23,331<br>1,296,850 | 8<br>5,567,732 | 347<br>1,657,164                | 709<br>14,885 | 147,603<br>9,658,916  | 147,603<br>9,658,916           |
| 4th Forecast<br>Year  | 2022 | No. of Cust.<br>MWH | 2,295<br>36,364         | 120,779<br>1,042,064 | 23,495<br>1,307,767 | 8<br>5,670,700 | 340<br>1,662,468                | 711<br>14,870 | 147,911<br>9,782,894  | 147,911<br>9,782,894           |
| 5th Forecast<br>Year  | 2023 | No. of Cust.<br>MWH | 2,295<br>36,364         | 120,945<br>1,047,361 | 23,662<br>1,318,719 | 8<br>5,695,274 | 334<br>1,667,980                | 714<br>14,854 | 148,241<br>9,828,920  | 148,241<br>9,828,920           |
| 6th Forecast<br>Year  | 2024 | No. of Cust.<br>MWH | 2,295<br>36,364         | 121,119<br>1,056,266 | 23,828<br>1,333,063 | 8<br>5,725,351 | 327<br>1,679,718                | 717<br>14,876 | 148,577<br>9,893,764  | 148,577<br>9,893,764           |
| 7th Forecast<br>Year  | 2025 | No. of Cust.<br>MWH | 2,295<br>36,364         | 121,259<br>1,057,812 | 23,991<br>1,340,148 | 8<br>5,708,524 | 321<br>1,683,758                | 717<br>14,837 | 148,873<br>9,889,046  | 148,873<br>9,889,046           |
| 8th Forecast<br>Year  | 2026 | No. of Cust.<br>MWH | 2,295<br>36,364         | 121,422<br>1,063,099 | 24,153<br>1,352,735 | 8<br>5,723,396 | 314<br>1,692,888                | 718<br>14,824 | 149,193<br>9,930,864  | 149,193<br>9,930,864           |
| 9th Forecast<br>Year  | 2027 | No. of Cust.<br>MWH | 2,295<br>36,364         | 121,594<br>1,068,480 | 24,317<br>1,366,531 | 8<br>5,745,195 | 308<br>1,702,666                | 721<br>14,805 | 149,525<br>9,981,693  | 149,525<br>9,981,693           |
| 10th Forecast<br>Year | 2028 | No. of Cust.<br>MWH | 2,295<br>36,364         | 121,778<br>1,077,569 | 24,481<br>1,384,625 | 8<br>5,788,775 | 301<br>1,716,430                | 726<br>14,844 | 149,871<br>10,066,562 | 149,871<br>10,066,562          |
| 11th Forecast<br>Year | 2029 | No. of Cust.<br>MWH | 2,295<br>36,364         | 121,985<br>1,079,698 | 24,647<br>1,394,242 | 8<br>5,802,267 | 294<br>1,720,537                | 732<br>14,782 | 150,244<br>10,095,906 | 150,244<br>10,095,906          |
| 12th Forecast<br>Year | 2030 | No. of Cust.<br>MWH | 2,295<br>36,364         | 122,194<br>1,085,455 | 24,817<br>1,407,701 | 8<br>5,833,861 | 288<br>1,728,046                | 739<br>14,781 | 150,625<br>10,154,337 | 150,625<br>10,154,337          |
| 13th Forecast<br>Year | 2031 | No. of Cust.<br>MWH | 2,295<br>36,364         | 122,393<br>1,091,123 | 24,986<br>1,420,158 | 8<br>5,868,154 | 281<br>1,735,213                | 745<br>14,780 | 150,992<br>10,213,844 | 150,992<br>10,213,844          |
| 14th Forecast<br>Year | 2032 | No. of Cust.<br>MWH | 2,295<br>36,364         | 122,577<br>1,100,306 | 25,154<br>1,436,086 | 8<br>5,917,644 | 275<br>1,747,521                | 750<br>14,823 | 151,342<br>10,300,641 | 151,342<br>10,300,641          |

\* MINING needs to be reported as a separate category only if annual sales are greater than 1,000 GWH. Otherwise, include MINING in the INDUSTRIAL category.

#### COMMENTS

|  |
|--|
|  |
|--|

## MINNESOTA ELECTRIC UTILITY INFORMATION REPORTING - FORECAST SECTION (Continued)

### 7610.0310 Item A. MINNESOTA-ONLY FORECAST OF ANNUAL ELECTRIC CONSUMPTION BY ULTIMATE CONSUMERS

Provide actual data for your Minnesota service area only, for the past year, your best estimate for the present year and all future forecast years. Please remember that the number of customers should reflect the number of customers at year's end, not the number of meters.

|                       |      | FARM                | NON-FARM<br>RESIDENTIAL | COMMERCIAL           | MINING *            | INDUSTRIAL     | STREET &<br>HIGHWAY<br>LIGHTING | OTHER         | MN-ONLY<br>TOTALS | Calculated<br>MN-Only<br>Totals |
|-----------------------|------|---------------------|-------------------------|----------------------|---------------------|----------------|---------------------------------|---------------|-------------------|---------------------------------|
| Past Year             | 2017 | No. of Cust.<br>MWH | 2,295<br>36,364         | 119,958<br>974,591   | 22,695<br>1,223,786 | 8<br>4,930,188 | 382<br>1,767,604                | 693<br>14,873 | 278<br>49,945     | 146,309<br>8,997,352            |
| Present Year          | 2018 | No. of Cust.<br>MWH | 2,295<br>36,364         | 120,058<br>1,015,297 | 22,822<br>1,249,190 | 8<br>5,105,464 | 369<br>1,700,652                | 695<br>14,787 | 281<br>50,867     | 146,528<br>9,172,622            |
| 1st Forecast<br>Year  | 2019 | No. of Cust.<br>MWH | 2,295<br>36,364         | 120,244<br>1,025,933 | 22,973<br>1,269,570 | 8<br>5,047,984 | 362<br>1,698,926                | 702<br>14,852 | 282<br>49,356     | 146,866<br>9,142,984            |
| 2nd Forecast<br>Year  | 2020 | No. of Cust.<br>MWH | 2,295<br>36,364         | 120,456<br>1,035,095 | 23,155<br>1,287,763 | 8<br>5,415,506 | 356<br>1,654,159                | 706<br>14,941 | 282<br>49,303     | 147,258<br>9,493,131            |
| 3rd Forecast<br>Year  | 2021 | No. of Cust.<br>MWH | 2,295<br>36,364         | 120,631<br>1,036,942 | 23,331<br>1,296,850 | 8<br>5,567,732 | 347<br>1,657,164                | 709<br>14,885 | 283<br>48,979     | 147,603<br>9,658,916            |
| 4th Forecast<br>Year  | 2022 | No. of Cust.<br>MWH | 2,295<br>36,364         | 120,779<br>1,042,064 | 23,495<br>1,307,767 | 8<br>5,670,700 | 340<br>1,662,468                | 711<br>14,870 | 283<br>48,660     | 147,911<br>9,782,894            |
| 5th Forecast<br>Year  | 2023 | No. of Cust.<br>MWH | 2,295<br>36,364         | 120,945<br>1,047,361 | 23,662<br>1,318,719 | 8<br>5,695,274 | 334<br>1,667,980                | 714<br>14,854 | 283<br>48,369     | 148,241<br>9,828,920            |
| 6th Forecast<br>Year  | 2024 | No. of Cust.<br>MWH | 2,295<br>36,364         | 121,119<br>1,056,266 | 23,828<br>1,333,063 | 8<br>5,725,351 | 327<br>1,679,718                | 717<br>14,876 | 283<br>48,126     | 148,577<br>9,893,764            |
| 7th Forecast<br>Year  | 2025 | No. of Cust.<br>MWH | 2,295<br>36,364         | 121,259<br>1,057,812 | 23,991<br>1,340,148 | 8<br>5,708,524 | 321<br>1,683,758                | 717<br>14,837 | 282<br>47,603     | 148,873<br>9,889,046            |
| 8th Forecast<br>Year  | 2026 | No. of Cust.<br>MWH | 2,295<br>36,364         | 121,422<br>1,063,099 | 24,153<br>1,352,735 | 8<br>5,723,396 | 314<br>1,692,888                | 718<br>14,824 | 282<br>47,559     | 149,193<br>9,930,864            |
| 9th Forecast<br>Year  | 2027 | No. of Cust.<br>MWH | 2,295<br>36,364         | 121,594<br>1,068,480 | 24,317<br>1,366,531 | 8<br>5,745,195 | 308<br>1,702,666                | 721<br>14,805 | 282<br>47,651     | 149,525<br>9,981,693            |
| 10th Forecast<br>Year | 2028 | No. of Cust.<br>MWH | 2,295<br>36,364         | 121,778<br>1,077,569 | 24,481<br>1,384,625 | 8<br>5,788,775 | 301<br>1,716,430                | 726<br>14,844 | 282<br>47,955     | 149,871<br>10,066,562           |
| 11th Forecast<br>Year | 2029 | No. of Cust.<br>MWH | 2,295<br>36,364         | 121,985<br>1,079,698 | 24,647<br>1,394,242 | 8<br>5,802,267 | 294<br>1,720,537                | 732<br>14,782 | 283<br>48,015     | 150,244<br>10,095,906           |
| 12th Forecast<br>Year | 2030 | No. of Cust.<br>MWH | 2,295<br>36,364         | 122,194<br>1,085,455 | 24,817<br>1,407,701 | 8<br>5,833,861 | 288<br>1,728,046                | 739<br>14,781 | 284<br>48,128     | 150,625<br>10,154,337           |
| 13th Forecast<br>Year | 2031 | No. of Cust.<br>MWH | 2,295<br>36,364         | 122,393<br>1,091,123 | 24,986<br>1,420,158 | 8<br>5,868,154 | 281<br>1,735,213                | 745<br>14,780 | 284<br>48,052     | 150,992<br>10,213,844           |
| 14th Forecast<br>Year | 2032 | No. of Cust.<br>MWH | 2,295<br>36,364         | 122,577<br>1,100,306 | 25,154<br>1,436,086 | 8<br>5,917,644 | 275<br>1,747,521                | 750<br>14,823 | 284<br>47,896     | 151,342<br>10,300,641           |

\* MINING needs to be reported as a separate category only if annual sales are greater than 1,000 GWH. Otherwise, include MINING in the INDUSTRIAL category.

#### COMMENTS

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MINNESOTA ELECTRIC UTILITY INFORMATION REPORTING - FORECAST SECTION (Continued)

7610.0310 Item B. FORECAST OF ANNUAL SYSTEM CONSUMPTION AND GENERATION DATA (Express in MWH)

NOTE: (Column 1 + Column 2) = (Column 3 + Column 5) - (Column 4 + Column 6)

It is recognized that there may be circumstances in which the data entered by the utility is more appropriate or accurate than the value in the corresponding automatically-calculated cell. If the value in the automatically-calculated cell does not match the value that your utility entered, please provide an explanation in the Comments area at the bottom of the worksheet.

|                         | Column 1   | Column 2   | Column 3  | Column 4                                     | Column 5  | Column 6   | Column 7   | Column 8   | CALCULATED  |
|-------------------------|--|--|---|--|---|--|--|--|---|
|                         | CONSUMPTION BY ULTIMATE CONSUMERS IN MINNESOTA in MWH [7610.0310 B(1)] | CONSUMPTION BY ULTIMATE CONSUMERS OUTSIDE OF MINNESOTA in MWH [7610.0310 B(2)] | RECEIVED FROM OTHER UTILITIES in MWH [7610.0310 B(3)] | DELIVERED FOR RESALE in MWH [7610.0310 B(4)] | TOTAL ANNUAL NET GENERATION in MWH [7610.0310 B(5)] | TRANSMISSION LINE AND SUBSTATION DISTRIBUTION LOSSES in MWH [7610.0310 B(6)] | TOTAL WINTER CONSUMPTION in MWH [7610.0310 B(7)] | TOTAL SUMMER CONSUMPTION in MWH [7610.0310 B(7)] | (GENERATION + RECEIVED) MINUS (RESALE + LOSSES) MINUS (CONSUMPTION) SHOULD EQUAL ZERO |
| Past Year 2017          | 8,997,352  | 0  | 6,333,222   | 5,695,306                                    | 8,919,879   | 560,443  | 5,529,958  | 5,238,272  | 0   |
| Present Year 2018       | 9,172,622  | 0  | 3,435,372   | 2,844,947                                    | 9,248,323   | 666,127  | 5,414,346  | 5,309,531  | 0   |
| 1st Forecast Year 2019  | 9,142,984  | 0  | 3,989,338   | 2,473,666                                    | 8,274,402   | 647,089  | 5,579,227  | 5,256,303  | 0   |
| 2nd Forecast Year 2020  | 9,493,131  | 0  | 4,391,101   | 2,253,485                                    | 8,020,196   | 664,680  | 5,634,125  | 5,471,376  | 0   |
| 3rd Forecast Year 2021  | 9,658,916  | 0  | 4,402,199   | 2,142,192                                    | 8,063,165   | 664,256  | 5,788,081  | 5,595,671  | 0   |
| 4th Forecast Year 2022  | 9,782,894  | 0  | 4,250,728   | 2,079,100                                    | 8,272,875   | 661,610  | 5,806,859  | 5,629,624  | 0   |
| 5th Forecast Year 2023  | 9,828,920  | 0  | 4,091,264   | 2,084,274                                    | 8,476,315   | 654,384  | 5,860,165  | 5,660,695  | 0   |
| 6th Forecast Year 2024  | 9,893,764  | 0  | 4,343,728   | 2,090,712                                    | 8,288,942   | 648,194  | 5,850,037  | 5,684,509  | 0   |
| 7th Forecast Year 2025  | 9,889,046  | 0  | 3,461,449   | 2,412,135                                    | 9,476,659   | 636,926  | 5,870,958  | 5,696,136  | 0   |
| 8th Forecast Year 2026  | 9,930,864  | 0  | 3,413,724   | 2,347,460                                    | 9,495,427   | 630,827  | 5,902,474  | 5,721,183  | 0   |
| 9th Forecast Year 2027  | 9,981,693  | 0  | 3,308,149   | 2,431,555                                    | 9,731,995   | 626,896  | 5,967,678  | 5,749,830  | 0   |
| 10th Forecast Year 2028 | 10,066,562   | 0  | 3,380,137   | 2,384,223                                    | 9,693,432   | 622,783  | 5,967,086  | 5,783,573  | 0   |
| 11th Forecast Year 2029 | 10,095,906   | 0  | 3,452,597   | 2,331,787                                    | 9,593,403   | 618,306  | 6,001,914  | 5,816,430  | 0   |
| 12th Forecast Year 2030 | 10,154,337   | 0  | 3,502,078   | 2,272,206                                    | 9,541,150   | 616,686  | 6,036,862  | 5,850,327  | 0   |
| 13th Forecast Year 2031 | 10,213,844   | 0  | 3,461,368   | 2,386,327                                    | 9,753,454   | 614,652  | 6,105,483  | 5,885,309  | 0   |
| 14th Forecast Year 2032 | 10,300,641   | 0  | 3,513,931   | 2,379,294                                    | 9,787,696   | 621,691  | 2,069,334  | 5,919,515  | 0   |

COMMENTS

MINNESOTA ELECTRIC UTILITY INFORMATION REPORTING - FORECAST SECTION (Continued)

7610.0310 Item C. PEAK DEMAND BY ULTIMATE CONSUMERS AT THE TIME OF ANNUAL SYSTEM PEAK (in MW)

|                    |      | FARM | NON-FARM<br>RESIDENTIAL | COMMERCIAL | MINING | INDUSTRIAL | STREET &<br>HIGHWAY<br>LIGHTING | OTHER | SYSTEM<br>TOTALS | Calculated<br>System<br>Totals |
|--------------------|------|------|-------------------------|------------|--------|------------|---------------------------------|-------|------------------|--------------------------------|
| Last Year Peak Day | 2017 | 9    | 255                     | 246        | 545    | 369        | 3                               | 365   | 1,793            | 1,793                          |

7610.0310 Item D. PEAK DEMAND BY MONTH FOR THE LAST CALENDAR YEAR (in MW)

|           |      | JANUARY | FEBRUARY | MARCH | APRIL | MAY   | JUNE  | JULY  | AUGUST | SEPTEMBER | OCTOBER | NOVEMBER | DECEMBER |
|-----------|------|---------|----------|-------|-------|-------|-------|-------|--------|-----------|---------|----------|----------|
| Last Year | 2017 | 1,671   | 1,638    | 1,636 | 1,593 | 1,574 | 1,586 | 1,672 | 1,689  | 1,603     | 1,649   | 1,733    | 1,793    |

| COMMENTS |
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MINNESOTA ELECTRIC UTILITY INFORMATION REPORTING - FORECAST SECTION (Continued)

7610.0310 Item E. PART 1: FIRM PURCHASES

(Express in MW)

| NAME OF OTHER UTILITY => |      | Laurentian<br>Energy (LEA<br>(Hibb&Virg) | Oliver Cty Wind<br>(ND FPLE 1&2) | Wing River Wind<br>(CBED) | Manitoba Hydro<br>(MHEB) | Great River<br>Energy (GRE) | Nobles 2 | Contract Solar | Unidentified<br>Purchase |
|--------------------------|------|--|----------------------------------|---------------------------|--------------------------|-----------------------------|----------|----------------|--------------------------|
| Past Year                | 2017 | Summer<br>Winter<br>13<br>13             | 19<br>19                         | 0<br>0                    | 100<br>100               | 150<br>150                  |          |                | 50<br>50                 |
| Present Year             | 2018 | Summer<br>Winter<br>12<br>12             | 17<br>17                         | 0<br>0                    | 100<br>100               | 150<br>150                  |          | 0              | 50<br>50                 |
| 1st Forecast<br>Year     | 2019 | Summer<br>Winter<br>12<br>12             | 17<br>17                         | 0<br>0                    | 100<br>100               | 150<br>150                  |          | 0              | 50<br>50                 |
| 2nd Forecast<br>Year     | 2020 | Summer<br>Winter<br>12<br>12             | 17<br>17                         | 0<br>0                    | 250<br>250               | 0<br>0                      | 38<br>38 | 3              | 0<br>0                   |
| 3rd Forecast<br>Year     | 2021 | Summer<br>Winter<br>12<br>12             | 17<br>17                         | 0<br>0                    | 250<br>250               | 0<br>0                      | 38<br>38 | 3              | 0<br>0                   |
| 4th Forecast<br>Year     | 2022 | Summer<br>Winter<br>12<br>12             | 17<br>17                         | 0<br>0                    | 250<br>250               | 0<br>0                      | 38<br>38 | 3              | 0<br>0                   |
| 5th Forecast<br>Year     | 2023 | Summer<br>Winter<br>12<br>12             | 17<br>17                         | 0<br>0                    | 250<br>250               | 0<br>0                      | 38<br>38 | 3              | 0<br>0                   |
| 6th Forecast<br>Year     | 2024 | Summer<br>Winter<br>12<br>12             | 17<br>17                         | 0<br>0                    | 250<br>250               | 0<br>0                      | 38<br>38 | 3              | 50<br>50                 |
| 7th Forecast<br>Year     | 2025 | Summer<br>Winter<br>12<br>12             | 17<br>17                         | 0<br>0                    | 250<br>250               | 0<br>0                      | 38<br>38 | 6              | 0<br>0                   |
| 8th Forecast<br>Year     | 2026 | Summer<br>Winter<br>12<br>12             | 17<br>17                         | 0<br>0                    | 250<br>250               | 0<br>0                      | 38<br>38 | 6              | 0<br>0                   |
| 9th Forecast<br>Year     | 2027 | Summer<br>Winter<br>12<br>12             | 17<br>17                         | 0<br>0                    | 250<br>250               | 0<br>0                      | 38<br>38 | 6              | 0<br>0                   |
| 10th Forecast<br>Year    | 2028 | Summer<br>Winter<br>12<br>12             | 17<br>17                         | 0<br>0                    | 250<br>250               | 0<br>0                      | 38<br>38 | 6              | 0<br>0                   |
| 11th Forecast<br>Year    | 2029 | Summer<br>Winter<br>12<br>12             | 17<br>17                         | 0<br>0                    | 250<br>250               | 0<br>0                      | 38<br>38 | 6              | 0<br>0                   |
| 12th Forecast<br>Year    | 2030 | Summer<br>Winter<br>12<br>12             | 17<br>17                         | 0<br>0                    | 250<br>250               | 0<br>0                      | 38<br>38 | 6              | 0<br>0                   |
| 13th Forecast<br>Year    | 2031 | Summer<br>Winter<br>12<br>12             | 17<br>8                          | 0<br>0                    | 250<br>250               | 0<br>0                      | 38<br>38 | 6              | 0<br>0                   |
| 14th Forecast<br>Year    | 2032 | Summer<br>Winter<br>12<br>12             | 8<br>0                           | 0<br>0                    | 250<br>250               | 0<br>0                      | 38<br>38 | 6              | 0<br>0                   |

COMMENTS

MINNESOTA ELECTRIC UTILITY INFORMATION REPORTING - FORECAST SECTION (Continued)

7610.0310 Item E. PART 2: FIRM SALES

(Express in MW)

| NAME OF OTHER UTILITY => |      | Basin Electric<br>Power<br>Cooperative<br>(BEPCC) | Other Tail Power<br>(OTP) | Minnesota<br>Municipal Power<br>Agency (MMPA) |
|--------------------------|------|---|---------------------------|---|
| Past Year                | 2017 | Summer<br>Winter                                  | 250<br>250                | 20<br>20                                      |
| Present Year             | 2018 | Summer<br>Winter                                  | 200<br>200                | 10<br>10                                      |
| 1st Forecast<br>Year     | 2019 | Summer<br>Winter                                  | 100<br>100                |   |
| 2nd Forecast<br>Year     | 2020 | Summer<br>Winter                                  |                           |   |
| 3rd Forecast<br>Year     | 2021 | Summer<br>Winter                                  |                           |   |
| 4th Forecast<br>Year     | 2022 | Summer<br>Winter                                  |                           |   |
| 5th Forecast<br>Year     | 2023 | Summer<br>Winter                                  |                           |   |
| 6th Forecast<br>Year     | 2024 | Summer<br>Winter                                  |                           |   |
| 7th Forecast<br>Year     | 2025 | Summer<br>Winter                                  |                           |   |
| 8th Forecast<br>Year     | 2026 | Summer<br>Winter                                  |                           |   |
| 9th Forecast<br>Year     | 2027 | Summer<br>Winter                                  |                           |   |
| 10th Forecast<br>Year    | 2028 | Summer<br>Winter                                  |                           |   |
| 11th Forecast<br>Year    | 2029 | Summer<br>Winter                                  |                           |   |
| 12th Forecast<br>Year    | 2030 | Summer<br>Winter                                  |                           |   |
| 13th Forecast<br>Year    | 2031 | Summer<br>Winter                                  |                           |   |
| 14th Forecast<br>Year    | 2032 | Summer<br>Winter                                  |                           |   |

COMMENTS

MINNESOTA ELECTRIC UTILITY INFORMATION REPORTING - FORECAST SECTION (Continued)

7610.0310 Item F. PART 1: PARTICIPATION PURCHASES

(Express in MW)

| NAME OF OTHER UTILITY ==> |      | Manitoba Hydro<br>(MHEB) | TransAlta<br>(TA) | Shell Energy<br>North America<br>(SENA) |
|---------------------------|------|--------------------------|-------------------|---|
| Past Year                 | 2017 | Summer<br>Winter         | 100<br>100        | 50<br>50                                |
| Present Year              | 2018 | Summer<br>Winter         | 100<br>100        | 50<br>50                                |
| 1st Forecast<br>Year      | 2019 | Summer<br>Winter         | 100<br>100        | 50<br>50                                |
| 2nd Forecast<br>Year      | 2020 | Summer<br>Winter         | 100<br>100        | 50<br>50                                |
| 3rd Forecast<br>Year      | 2021 | Summer<br>Winter         |                   |   |
| 4th Forecast<br>Year      | 2022 | Summer<br>Winter         |                   |   |
| 5th Forecast<br>Year      | 2023 | Summer<br>Winter         |                   |   |
| 6th Forecast<br>Year      | 2024 | Summer<br>Winter         |                   |   |
| 7th Forecast<br>Year      | 2025 | Summer<br>Winter         |                   |   |
| 8th Forecast<br>Year      | 2026 | Summer<br>Winter         |                   |   |
| 9th Forecast<br>Year      | 2027 | Summer<br>Winter         |                   |   |
| 10th Forecast<br>Year     | 2028 | Summer<br>Winter         |                   |   |
| 11th Forecast<br>Year     | 2029 | Summer<br>Winter         |                   |   |
| 12th Forecast<br>Year     | 2030 | Summer<br>Winter         |                   |   |
| 13th Forecast<br>Year     | 2031 | Summer<br>Winter         |                   |   |
| 14th Forecast<br>Year     | 2032 | Summer<br>Winter         |                   |   |

COMMENTS

MINNESOTA ELECTRIC UTILITY INFORMATION REPORTING - FORECAST SECTION (Continued)

7610.0310 Item F. PART 2: PARTICIPATION SALES (Express in MW)

| NAME OF OTHER UTILITY => |      | NextEra (NEPM)   | American Electric Power (AEPEP) | Shell Energy North America (SENA) |
|--------------------------|------|------------------|---------------------------------|-----------------------------------|
| Past Year                | 2017 | Summer<br>Winter | 50<br>50                        | 0<br>0                            |
| Present Year             | 2018 | Summer<br>Winter |                                 | 50<br>50                          |
| 1st Forecast Year        | 2019 | Summer<br>Winter |                                 |                                   |
| 2nd Forecast Year        | 2020 | Summer<br>Winter |                                 |                                   |
| 3rd Forecast Year        | 2021 | Summer<br>Winter |                                 |                                   |
| 4th Forecast Year        | 2022 | Summer<br>Winter |                                 |                                   |
| 5th Forecast Year        | 2023 | Summer<br>Winter |                                 |                                   |
| 6th Forecast Year        | 2024 | Summer<br>Winter |                                 |                                   |
| 7th Forecast Year        | 2025 | Summer<br>Winter |                                 |                                   |
| 8th Forecast Year        | 2026 | Summer<br>Winter |                                 |                                   |
| 9th Forecast Year        | 2027 | Summer<br>Winter |                                 |                                   |
| 10th Forecast Year       | 2028 | Summer<br>Winter |                                 |                                   |
| 11th Forecast Year       | 2029 | Summer<br>Winter |                                 |                                   |
| 12th Forecast Year       | 2030 | Summer<br>Winter |                                 |                                   |
| 13th Forecast Year       | 2031 | Summer<br>Winter |                                 |                                   |
| 14th Forecast Year       | 2032 | Summer<br>Winter |                                 |                                   |

| COMMENTS |
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MINNESOTA ELECTRIC UTILITY INFORMATION REPORTING - FORECAST SECTION (Continued)

76100310 Item G. LOAD AND GENERATION CAPACITY (Express in MW)

|               | Column 1                      | Column 2  | Column 3                     | Column 4                   | Column 5                         | Column 6                     | Column 7                              | Column 8  | Column 9                        | Column 10                             | Column 11                         | Column 12                             | Column 13                             | Column 14  | Column 15  |
|---------------|-------------------------------|---|------------------------------|----------------------------|----------------------------------|------------------------------|---------------------------------------|---|---------------------------------|---------------------------------------|-----------------------------------|---------------------------------------|---------------------------------------|--|--|
|               | SEASONAL<br>MAXIMUM<br>DEMAND | SCHEDULE L<br>THE TIME OF<br>PEAK<br>SYSTEM<br>DEMAND | SEASONAL<br>SYSTEM<br>DEMAND | ANNUAL<br>SYSTEM<br>DEMAND | SEASONAL<br>PURCHASES<br>(TOTAL) | SEASONAL<br>SALES<br>(TOTAL) | SEASONAL<br>NET DEMAND<br>(3 - 5 + 6) | ANNUAL<br>ADJUSTED<br>NET DEMAND<br>(4 - 5 + 6) | NET<br>GENERATING<br>CAPABILITY | PARTICIPATION<br>PURCHASES<br>(TOTAL) | PARTICIPATION<br>SALES<br>(TOTAL) | ADJUSTED<br>CAPACITY<br>(9 + 10 - 11) | NET RESERVE<br>CAPACITY<br>OBLIGATION | TOTAL FIRM<br>CAPACITY<br>OBLIGATION<br>(7 + 13) | SURPLUS (+)<br>OR<br>DEFICIENCY (-)<br>(12 - 14) |
| Past Year     | 1,638                         | Summer.....   | 1,638                        | 1,638                      | 332                              | 280                          | 1,566                                 | 1,598   | 1,842                           | -                                     | -                                 | 1,842                                 | 115                                   | 1,702  | 140  |
| 2017          | 1,589                         | Winter.....   | 1,589                        | 1,638                      | 332                              | 280                          | 1,537                                 | 1,598   | 1,851                           | -                                     | -                                 | 1,851                                 | 126                                   | 1,663  | 187  |
| Present Year  | 1,653                         | Summer.....   | 1,653                        | 1,672                      | 330                              | 200                          | 1,523                                 | 1,542   | 1,692                           | -                                     | -                                 | 1,692                                 | 118                                   | 1,641  | 51   |
| 2018          | 1,672                         | Winter.....   | 1,672                        | 1,672                      | 330                              | 200                          | 1,542                                 | 1,542   | 1,699                           | -                                     | -                                 | 1,699                                 | 119                                   | 1,601  | (3)  |
| 1st Forecast  | 1,673                         | Summer.....   | 1,673                        | 1,672                      | 330                              | 100                          | 1,563                                 | 1,563   | 1,670                           | -                                     | -                                 | 1,670                                 | 115                                   | 1,570  | 70   |
| 2019          | 1,676                         | Winter.....   | 1,676                        | 1,672                      | 320                              | 100                          | 1,576                                 | 1,498   | 1,570                           | -                                     | -                                 | 1,570                                 | 115                                   | 1,529  | 46   |
| 2nd Forecast  | 1,654                         | Summer.....   | 1,654                        | 1,686                      | 320                              | -                            | 1,334                                 | 1,366   | 1,565                           | -                                     | -                                 | 1,565                                 | 118                                   | 1,452  | 113  |
| 2020          | 1,686                         | Winter.....   | 1,686                        | 1,686                      | 320                              | -                            | 1,366                                 | 1,366   | 1,565                           | -                                     | -                                 | 1,565                                 | 120                                   | 1,487  | 79   |
| 3rd Forecast  | 1,686                         | Summer.....   | 1,686                        | 1,726                      | 320                              | -                            | 1,366                                 | 1,406   | 1,567                           | -                                     | -                                 | 1,567                                 | 120                                   | 1,486  | 81   |
| 2021          | 1,726                         | Winter.....   | 1,726                        | 1,726                      | 320                              | -                            | 1,406                                 | 1,406   | 1,534                           | -                                     | -                                 | 1,534                                 | 123                                   | 1,530  | 5  |
| 4th Forecast  | 1,698                         | Summer.....   | 1,698                        | 1,732                      | 320                              | -                            | 1,377                                 | 1,412   | 1,536                           | -                                     | -                                 | 1,536                                 | 121                                   | 1,498  | 38   |
| 2022          | 1,732                         | Winter.....   | 1,732                        | 1,732                      | 320                              | -                            | 1,412                                 | 1,412   | 1,517                           | -                                     | -                                 | 1,517                                 | 123                                   | 1,535  | (18)   |
| 5th Forecast  | 1,707                         | Summer.....   | 1,707                        | 1,738                      | 320                              | -                            | 1,387                                 | 1,417   | 1,518                           | -                                     | -                                 | 1,518                                 | 121                                   | 1,509  | 10   |
| 2023          | 1,738                         | Winter.....   | 1,738                        | 1,738                      | 320                              | -                            | 1,417                                 | 1,417   | 1,549                           | -                                     | -                                 | 1,549                                 | 124                                   | 1,541  | 8  |
| 6th Forecast  | 1,744                         | Summer.....   | 1,744                        | 1,744                      | 320                              | -                            | 1,424                                 | 1,424   | 1,553                           | -                                     | -                                 | 1,553                                 | 124                                   | 1,549  | 5  |
| 2024          | 1,744                         | Winter.....   | 1,744                        | 1,744                      | 321                              | -                            | 1,424                                 | 1,424   | 1,553                           | -                                     | -                                 | 1,553                                 | 124                                   | 1,549  | 5  |
| 7th Forecast  | 1,719                         | Summer.....   | 1,719                        | 1,751                      | 323                              | -                            | 1,368                                 | 1,428   | 1,716                           | -                                     | -                                 | 1,716                                 | 122                                   | 1,518  | 108  |
| 2025          | 1,751                         | Winter.....   | 1,751                        | 1,751                      | 323                              | -                            | 1,428                                 | 1,428   | 1,705                           | -                                     | -                                 | 1,705                                 | 125                                   | 1,552  | 153  |
| 8th Forecast  | 1,726                         | Summer.....   | 1,726                        | 1,759                      | 323                              | -                            | 1,403                                 | 1,436   | 1,699                           | -                                     | -                                 | 1,699                                 | 123                                   | 1,525  | 174  |
| 2026          | 1,759                         | Winter.....   | 1,759                        | 1,759                      | 323                              | -                            | 1,436                                 | 1,436   | 1,706                           | -                                     | -                                 | 1,706                                 | 125                                   | 1,561  | 145  |
| 9th Forecast  | 1,734                         | Summer.....   | 1,734                        | 1,767                      | 323                              | -                            | 1,411                                 | 1,444   | 1,700                           | -                                     | -                                 | 1,700                                 | 123                                   | 1,534  | 165  |
| 2027          | 1,767                         | Winter.....   | 1,767                        | 1,767                      | 323                              | -                            | 1,444                                 | 1,444   | 1,706                           | -                                     | -                                 | 1,706                                 | 126                                   | 1,570  | 136  |
| 10th Forecast | 1,743                         | Summer.....   | 1,743                        | 1,776                      | 323                              | -                            | 1,420                                 | 1,453   | 1,701                           | -                                     | -                                 | 1,701                                 | 124                                   | 1,543  | 158  |
| 2028          | 1,776                         | Winter.....   | 1,776                        | 1,776                      | 323                              | -                            | 1,453                                 | 1,453   | 1,709                           | -                                     | -                                 | 1,709                                 | 126                                   | 1,579  | 130  |
| 11th Forecast | 1,776                         | Summer.....   | 1,776                        | 1,784                      | 323                              | -                            | 1,453                                 | 1,453   | 1,698                           | -                                     | -                                 | 1,698                                 | 124                                   | 1,563  | 112  |
| 2029          | 1,784                         | Winter.....   | 1,784                        | 1,784                      | 323                              | -                            | 1,453                                 | 1,453   | 1,698                           | -                                     | -                                 | 1,698                                 | 124                                   | 1,563  | 112  |
| 12th Forecast | 1,760                         | Summer.....   | 1,760                        | 1,793                      | 323                              | -                            | 1,437                                 | 1,470   | 1,679                           | -                                     | -                                 | 1,679                                 | 126                                   | 1,562  | 90   |
| 2030          | 1,793                         | Winter.....   | 1,793                        | 1,793                      | 323                              | -                            | 1,470                                 | 1,470   | 1,679                           | -                                     | -                                 | 1,679                                 | 128                                   | 1,598  | 81   |
| 13th Forecast | 1,769                         | Summer.....   | 1,769                        | 1,802                      | 323                              | -                            | 1,446                                 | 1,479   | 1,668                           | -                                     | -                                 | 1,668                                 | 126                                   | 1,572  | 96   |
| 2031          | 1,802                         | Winter.....   | 1,802                        | 1,802                      | 315                              | -                            | 1,487                                 | 1,487   | 1,679                           | -                                     | -                                 | 1,679                                 | 128                                   | 1,616  | 63   |
| 14th Forecast | 1,778                         | Summer.....   | 1,778                        | 1,810                      | 315                              | -                            | 1,464                                 | 1,496   | 1,668                           | -                                     | -                                 | 1,668                                 | 126                                   | 1,590  | 78   |
| 2032          | 1,810                         | Winter.....   | 1,810                        | 1,810                      | 306                              | -                            | 1,504                                 | 1,504   | 1,677                           | -                                     | -                                 | 1,677                                 | 129                                   | 1,633  | 44   |

COMMENTS

Minnesota Power long-term resource planning approach reflected in the "Load/GarCap" table (above) utilizes UCAP for unit accreditation, and a MISO-Concident peak demand forecast instead of the MISO System Peak (Non-Concident Peak). The Net Reserve Capacity Obligation of 7.8% is assumed for both summer and winter.

Note: the "Past Year 2017" is reported using UCAP and actual MISO-Concident loads for summer and winter peak. Inclusion of actual (as opposed to forecast) loads in 2017 will result in a surplus/deficit position that varies from was entered in MISO Module E for FY 17-18.

MINNESOTA ELECTRIC UTILITY INFORMATION REPORTING - FORECAST SECTION (Continued)

7610.0310 Item H. ADDITIONS AND RETIREMENTS (Express in MW)

|                    | ADDITIONS | RETIREMENTS |
|--------------------|-----------|-------------|
| Past Year          | 2017      |             |
| Present Year       | 2018      |             |
| 1st Forecast Year  | 2019      | 135         |
| 2nd Forecast Year  | 2020      |             |
| 3rd Forecast Year  | 2021      |             |
| 4th Forecast Year  | 2022      |             |
| 5th Forecast Year  | 2023      |             |
| 6th Forecast Year  | 2024      |             |
| 7th Forecast Year  | 2025      | 233         |
| 8th Forecast Year  | 2026      |             |
| 9th Forecast Year  | 2027      |             |
| 10th Forecast Year | 2028      |             |
| 11th Forecast Year | 2029      |             |
| 12th Forecast Year | 2030      |             |
| 13th Forecast Year | 2031      |             |
| 14th Forecast Year | 2032      |             |

| COMMENTS |
|----------|
|          |

76100430 FUEL REQUIREMENTS AND GENERATION BY FUEL TYPE

Trade Secret Data Excised

Please use the appropriate code for the fuel type as shown in the list at the bottom of the worksheet.

|                    | FUEL TYPE 1  |                 |                       | FUEL TYPE 2  |                 |                       | FUEL TYPE 3  |                 |                       | FUEL TYPE 4  |                 |                       | FUEL TYPE 5  |                 |                       | FUEL TYPE 6  |                 |                       |
|--------------------|--------------|-----------------|-----------------------|--------------|-----------------|-----------------------|--------------|-----------------|-----------------------|--------------|-----------------|-----------------------|--------------|-----------------|-----------------------|--------------|-----------------|-----------------------|
|                    | Name of Fuel | Unit of Measure | QUANTITY OF FUEL USED | Name of Fuel | Unit of Measure | QUANTITY OF FUEL USED | Name of Fuel | Unit of Measure | QUANTITY OF FUEL USED | Name of Fuel | Unit of Measure | QUANTITY OF FUEL USED | Name of Fuel | Unit of Measure | QUANTITY OF FUEL USED | Name of Fuel | Unit of Measure | QUANTITY OF FUEL USED |
| Past Year          |              |                 |                       |              |                 |                       |              |                 |                       |              |                 |                       |              |                 |                       |              |                 |                       |
| Present Year       |              |                 |                       |              |                 |                       |              |                 |                       |              |                 |                       |              |                 |                       |              |                 |                       |
| 1st Forecast Year  |              |                 |                       |              |                 |                       |              |                 |                       |              |                 |                       |              |                 |                       |              |                 |                       |
| 2nd Forecast Year  |              |                 |                       |              |                 |                       |              |                 |                       |              |                 |                       |              |                 |                       |              |                 |                       |
| 3rd Forecast Year  |              |                 |                       |              |                 |                       |              |                 |                       |              |                 |                       |              |                 |                       |              |                 |                       |
| 4th Forecast Year  |              |                 |                       |              |                 |                       |              |                 |                       |              |                 |                       |              |                 |                       |              |                 |                       |
| 5th Forecast Year  |              |                 |                       |              |                 |                       |              |                 |                       |              |                 |                       |              |                 |                       |              |                 |                       |
| 6th Forecast Year  |              |                 |                       |              |                 |                       |              |                 |                       |              |                 |                       |              |                 |                       |              |                 |                       |
| 7th Forecast Year  |              |                 |                       |              |                 |                       |              |                 |                       |              |                 |                       |              |                 |                       |              |                 |                       |
| 8th Forecast Year  |              |                 |                       |              |                 |                       |              |                 |                       |              |                 |                       |              |                 |                       |              |                 |                       |
| 9th Forecast Year  |              |                 |                       |              |                 |                       |              |                 |                       |              |                 |                       |              |                 |                       |              |                 |                       |
| 10th Forecast Year |              |                 |                       |              |                 |                       |              |                 |                       |              |                 |                       |              |                 |                       |              |                 |                       |
| 11th Forecast Year |              |                 |                       |              |                 |                       |              |                 |                       |              |                 |                       |              |                 |                       |              |                 |                       |
| 12th Forecast Year |              |                 |                       |              |                 |                       |              |                 |                       |              |                 |                       |              |                 |                       |              |                 |                       |
| 13th Forecast Year |              |                 |                       |              |                 |                       |              |                 |                       |              |                 |                       |              |                 |                       |              |                 |                       |
| 14th Forecast Year |              |                 |                       |              |                 |                       |              |                 |                       |              |                 |                       |              |                 |                       |              |                 |                       |

- LIST OF FUEL TYPES
- BIT - Bituminous Coal

COAL - Coal (general)

DIESEL - Diesel

FO2 - Fuel Oil #2 (Mid-distillate)

FO3 - Fuel Oil #6 (Residual fuel oil)

LIG - Lignite
- LPG - Liquefied Propane Gas

NG - Natural Gas

NUC - Nuclear

REF - Refuse, Bagasse, Peat, Non-wo

STM - Steam

SUB - Sub-bituminous coal
- HYD - Hydro (water)

WIND - Wind

WOOD - Wood

SOLAR - Solar

COMMENTS





MINNESOTA ELECTRIC UTILITY INFORMATION REPORTING - FORECAST SECTION (Continued)

7610.0600, item A. 24 - HOUR PEAK DAY DEMAND

Each utility shall provide the following information for the last calendar year:

A table of the demand in megawatts by the hour over a 24-hour period for:

- 1. the 24-hour period during the summer season when the megawatt demand on the system was the greatest; and
- 2. the 24-hour period during the winter season when the megawatt demand on the system was the greatest

| TIME<br>OF DAY | DATE                             | DATE                             |
|----------------|----------------------------------|----------------------------------|
|                | 8/1/17                           | 12/27/17                         |
|                | MW USED ON<br>SUMMER<br>PEAK DAY | MW USED ON<br>WINTER<br>PEAK DAY |
| 0100           | 1471                             | 1632                             |
| 0200           | 1449                             | 1617                             |
| 0300           | 1438                             | 1597                             |
| 0400           | 1440                             | 1589                             |
| 0500           | 1461                             | 1614                             |
| 0600           | 1487                             | 1641                             |
| 0700           | 1490                             | 1679                             |
| 0800           | 1531                             | 1708                             |
| 0900           | 1576                             | 1731                             |
| 1000           | 1599                             | 1718                             |
| 1100           | 1633                             | 1725                             |
| 1200           | 1666                             | 1714                             |
| 1300           | 1677                             | 1714                             |
| 1400           | 1689                             | 1689                             |
| 1500           | 1686                             | 1686                             |
| 1600           | 1667                             | 1682                             |
| 1700           | 1667                             | 1743                             |
| 1800           | 1640                             | 1793                             |
| 1900           | 1624                             | 1793                             |
| 2000           | 1610                             | 1766                             |
| 2100           | 1596                             | 1754                             |
| 2200           | 1581                             | 1714                             |
| 2300           | 1538                             | 1681                             |
| 2400           | 1491                             | 1639                             |

| COMMENTS |
|----------|
|          |



July 17, 2019

**VIA E-FILING**

Ms. Anne Sell  
Department of Commerce – Division of Energy Resources  
85 7<sup>th</sup> Place East, Suite 280  
St. Paul, MN 55101-2198

**RE:** Minnesota Power's 2019 Annual Electric Utility Forecast Report  
Docket No.: E-999/PR-19-11

Dear Ms. Sell:

Enclosed please find Minnesota Power's 2019 Annual Electric Utility Forecast Report pursuant to Minn. Stat. § 216C.17, subd. 2 and Minn. Rules Chapter 7610. As an electric utility with Minnesota service areas, Minnesota Power (or "the Company") is required to submit to the Minnesota Department of Commerce – Division of Energy Resources ("Department") by July 1 of each year an annual report specifying its projected long-term energy and demand requirements and document the resources necessary to meet those needs. Minn. Rule 7610.0130 provides the Department authority to grant, for good cause, an extension to a requesting utility. At the Company's request, the Department granted an extension for filing its 2019 Annual Electric Utility Forecast Report to July 19, 2019.

Information included in the "**ELEC\_68\_2018 Largest Customer List.xlsx**" and "**ELEC\_68\_2018 Forecast Report.xlsx**" Excel workbooks, as well as the **Methodology** document has been designated as **TRADE SECRET**.

Minnesota Power has excised material from the public version of the attached report documents as they identify and contain confidential, competitive information regarding Minnesota Power's methods, techniques and process for supplying electric service to its customers. The energy usage by specific customers and generation by fuel type has been consistently treated as Trade Secret in individual filings before the Minnesota Public Utilities Commission. Minnesota Power follows strict internal procedures to maintain the privacy of this information. The public disclosure of this information would have severe competitive implications for customers and Minnesota Power.

Minnesota Power is providing this justification for the information excised from the attached report and why the information should remain trade secret under Minn. Stat. 13.37. Minnesota Power respectfully requests the opportunity to provide additional justification in the event of a challenge to the Trade Secret designation provided herein.

Ms. Sell  
Page 2  
July 17, 2019

The following documents have been uploaded to the Department and Minnesota Public Utilities Commission eDockets/eFiling system using Docket Number 19-11:

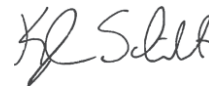
- ELEC\_68\_2018 Annual Report.xlsx
- ELEC\_68\_2018 Forecast Report.xlsx (**TRADE SECRET** & Public versions)
- ELEC\_68\_2018 MN Service Area Map.pdf
- ELEC\_68\_2018 Monthly Power Cost Adjustments.xlsx
- ELEC\_68\_2018 Rate Schedules.pdf
- ELEC\_68\_2018 USDOE EIA-861.pdf
- ELEC\_68\_2018 Largest Customer List.xlsx (**TRADE SECRET**)
- METHOD19.pdf (**TRADE SECRET** & Public versions)

Please don't hesitate to contact either one of us if you need additional paper copies or have any questions.

Sincerely,



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BL/KS:sr  
Attach.

cc: Julie Pierce  
David Moeller  
Lori Hoyum

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## **Introduction**

The utility customer load forecast is the initial step in electric utility planning. Capacity and energy resource commitments are based on forecasts of energy consumption, and seasonal peak demand requirements. Minnesota Power's forecast process combines sound econometric methodology and data from reputable sources to produce a reasonable long-term outlook suitable for planning.

Minnesota Power (or the Company) is committed to continuous forecast process improvement, process transparency, forecast accuracy, and gaining customer insight. This 2019 forecast methodology document demonstrates Minnesota Power's continued efforts to meet these goals through comprehensive documentation, implementation of more systematic and replicable processes, and thorough analysis of results.

A history of increasing accuracy in load forecasting also speaks to the Company's commitment to innovate and enhance its forecast processes. Since 2000, year-ahead forecast error has decreased by an average 0.01 percent per-year; current-year forecast error has decreased at an average rate of 0.07 percent per-year.<sup>1</sup> Minnesota Power owes its record of forecast accuracy to a combination of close contact with customers, continuous validation of forecast model inputs, and steady improvements in statistical analytic capabilities.

In addition to addressing the potential for local additions or losses to the Resale and Industrial customer classes, this year's Annual Forecast Report (AFR 2019) will also include estimated impacts of energy efficiency, distributed generation (solar), and electric vehicles in the Expected scenario outlook. This expanded approach to forecasting can then be integrated into the Company's proactive and flexible planning to better inform the critical electric resource decisions ahead. Minnesota Power's forecasting approach helps keep the potential demand and energy outcomes transparent and robust.

## **2019 Forecast Results Overview**

Minnesota Power is submitting a single Expected scenario outlook in its 2019 Annual Electric Utility Report filing and the resulting long-term forecast is lower. Table 1 below shows the forecast for annual energy sales and seasonal peak demand. Annual energy sales are projected to grow at a 0.5 percent per year rate (on average) from 2018 through 2033. Summer and Winter peak demands are projected to grow at average annual rates of 0.3 percent and 0.4 percent (respectively). The AFR 2019 load forecast reflects about 77 MW<sup>2</sup> of system load growth by 2030.

---

<sup>1</sup> Both error figures are Mean Absolute Percent Error (MAPE) of the energy sales forecast, and were calculated excluding the recessionary years of 2009 and 2010, in which there are significant and unpredictable fluctuations in large industrial loads. The year-ahead error also excludes 2015 and 2016 due to mining industry downturn.

<sup>2</sup> 77 MW = 2030 Annual/Winter Peak (1,805 MW) – 2018 Annual Peak (1,728 MW).

MINNESOTA POWER  
2019 ANNUAL FORECAST REPORT

**Table 1: Energy Sales and Seasonal System Peak Demand Outlook**

| Total Energy Sales |            |            | System Peak Demand |             |            |                        |
|--------------------|------------|------------|--------------------|-------------|------------|------------------------|
|                    | MWh        | Y/Y Growth |                    | Summer (MW) | Y/Y Growth | Winter (MW) Y/Y Growth |
| 2008               | 10,725,706 |            | 2008               | 1,699       |            | 2008 1,719             |
| 2009               | 7,953,378  | -25.8%     | 2009               | 1,350       | -20.6%     | 2009 1,545 -10.1%      |
| 2010               | 10,306,899 | 29.6%      | 2010               | 1,732       | 28.3%      | 2010 1,789 15.7%       |
| 2011               | 10,876,931 | 5.5%       | 2011               | 1,746       | 0.8%       | 2011 1,780 -0.5%       |
| 2012               | 10,996,205 | 1.1%       | 2012               | 1,790       | 2.5%       | 2012 1,774 -0.3%       |
| 2013               | 10,869,993 | -1.1%      | 2013               | 1,782       | -0.5%      | 2013 1,751 -1.3%       |
| 2014               | 11,038,979 | 1.6%       | 2014               | 1,805       | 1.3%       | 2014 1,821 4.0%        |
| 2015               | 10,059,466 | -8.9%      | 2015               | 1,597       | -11.5%     | 2015 1,554 -14.6%      |
| 2016               | 9,830,788  | -2.3%      | 2016               | 1,609       | 0.8%       | 2016 1,692 8.9%        |
| 2017               | 10,654,217 | 8.4%       | 2017               | 1,689       | 4.9%       | 2017 1,794 6.0%        |
| 2018               | 10,638,690 | -0.1%      | 2018               | 1,728       | 2.3%       | 2018 1,714 -4.5%       |
| 2019               | 10,427,373 | -2.0%      | 2019               | 1,657       | -4.1%      | 2019 1,666 -2.8%       |
| 2020               | 10,578,032 | 1.4%       | 2020               | 1,662       | 0.3%       | 2020 1,684 1.1%        |
| 2021               | 10,677,595 | 0.9%       | 2021               | 1,680       | 1.1%       | 2021 1,694 0.6%        |
| 2022               | 10,915,017 | 2.2%       | 2022               | 1,720       | 2.4%       | 2022 1,743 2.9%        |
| 2023               | 11,099,961 | 1.7%       | 2023               | 1,738       | 1.1%       | 2023 1,751 0.5%        |
| 2024               | 11,167,426 | 0.6%       | 2024               | 1,745       | 0.4%       | 2024 1,759 0.4%        |
| 2025               | 11,167,228 | 0.0%       | 2025               | 1,751       | 0.4%       | 2025 1,766 0.4%        |
| 2026               | 11,197,493 | 0.3%       | 2026               | 1,757       | 0.3%       | 2026 1,773 0.4%        |
| 2027               | 11,230,704 | 0.3%       | 2027               | 1,763       | 0.3%       | 2027 1,780 0.4%        |
| 2028               | 11,296,578 | 0.6%       | 2028               | 1,769       | 0.3%       | 2028 1,788 0.4%        |
| 2029               | 11,294,330 | 0.0%       | 2029               | 1,775       | 0.3%       | 2029 1,796 0.5%        |
| 2030               | 11,327,172 | 0.3%       | 2030               | 1,779       | 0.3%       | 2030 1,805 0.5%        |
| 2031               | 11,350,375 | 0.2%       | 2031               | 1,785       | 0.3%       | 2031 1,813 0.5%        |
| 2032               | 11,411,124 | 0.5%       | 2032               | 1,790       | 0.3%       | 2032 1,822 0.5%        |
| 2033               | 11,404,499 | -0.1%      | 2033               | 1,795       | 0.3%       | 2033 1,832 0.5%        |

Minnesota Power remains a Winter peaking utility and will continue to expect an approximate 20 MW difference in this seasonal profile. Figures 1 and 2 below show the projected energy sales and system peak demand (respectively) for AFR 2019 compared to AFR 2018.

MINNESOTA POWER  
2019 ANNUAL FORECAST REPORT

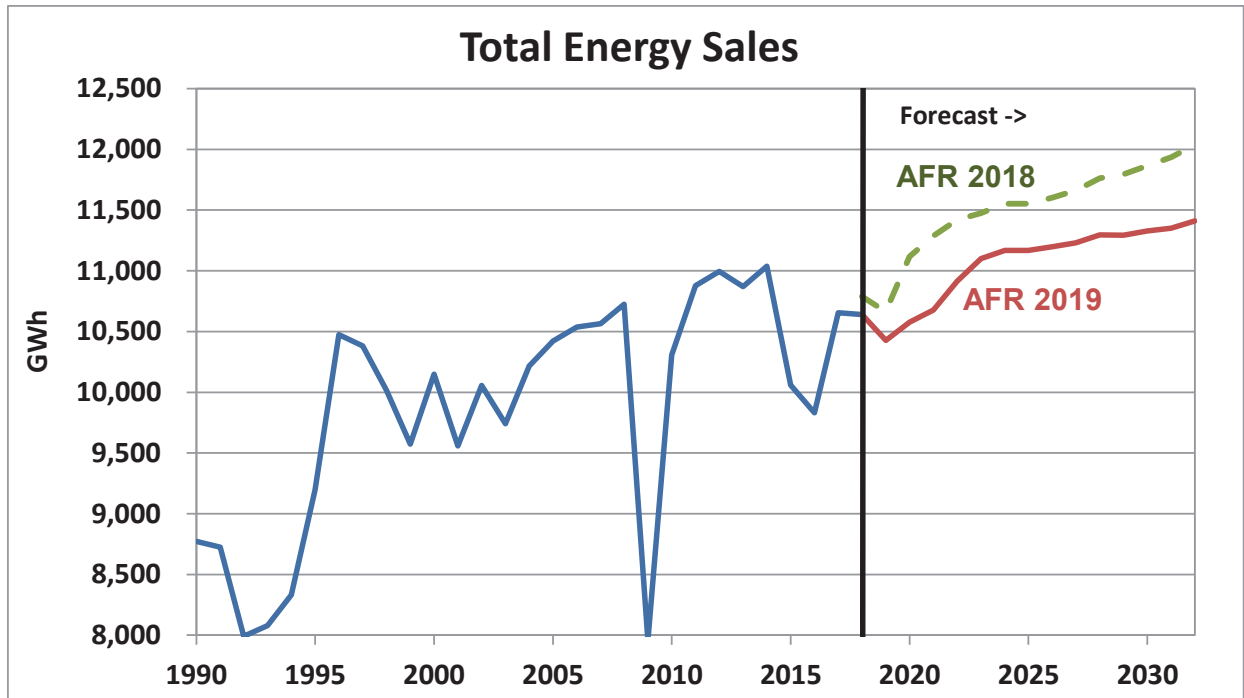


Figure 1: Energy Sales Outlook

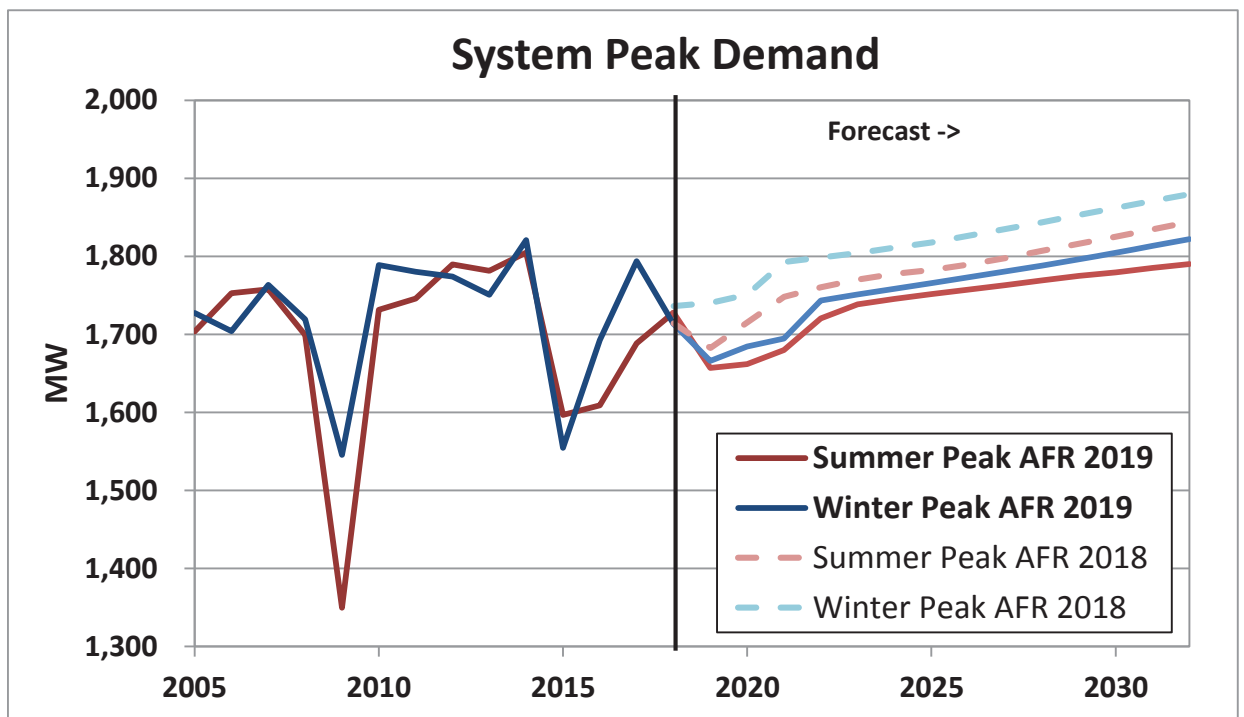


Figure 2: Peak Demand Outlook

## **Document Structure**

This report details the construction of the energy sales and demand forecast for Minnesota Power for the 2019-2033 timeframe. Each section is designed to convey the report requirements per Minn. Rules Chapter 7610, and give insight into the Company's forecasting process and results.

Section 1: Forecast Methodology, Data Inputs, and Assumptions details the development of customer count, peak demand, and energy sales forecasts. This section contains a step-by-step description of Minnesota Power's forecasting process and details the development of databases and models.

Other information included in Section 1:

- Descriptions of all forecast models used in the development of this year's forecasts, including:
  - Model specifications
  - Model statistics
  - Resulting forecast's growth rates
  - A discussion of each model's econometric merits and potential issues, as well as an explanation/justification of each variable
- Additional steps taken in 2019 to improve the forecast process and product
- Strengths and weaknesses of Minnesota Power's methodology
- All data inputs and sources, including an overview of key economic assumptions
- A description of all changes made to the forecast database since last year's forecast
- A discussion of Minnesota Power's sensitivity to Large Industrial customer contracts
- Minnesota Power's confidence in the forecast

Section 2: Forecast Results presents the Expected scenario forecast Minnesota Power developed for the AFR 2019 forecast. This forecast is the product of a robust econometric modeling process and careful consideration of potential industrial and resale customer load developments.

Section 3: Other Information presents other report information required by Minnesota law and cross-references the specific requirements to specific sections in this document.

## **1. Forecast Methodology, Inputs, and Assumptions**

### **A. Overall Framework**

Minnesota Power's forecast models are the result of an analytical econometric methodology, extensive database organization, and quality economic indicators. Forecast models are structural, defined by the mathematical relationship between the forecast quantities and explanatory factors. The forecast models assume a normal distribution and are "50/50"; given the inputs, there is a 50 percent probability that a realized actual will be less than forecast and a 50 percent probability that the realized actual will be more than forecast.

The Minnesota Power forecast process involves several interrelated steps: 1) data gathering, 2) data preparation and development, 3) specification search, 4) forecast determination, 5) initial review and verification, and 6) internal company review and approval. The steps of the forecast process are sequential; although, because of the research dimension, the process involves feedback loops between



MINNESOTA POWER  
2019 ANNUAL FORECAST REPORT

steps 2 and 3. The process is diagrammed in Figure 3 below and discussed in more detail in Section B.

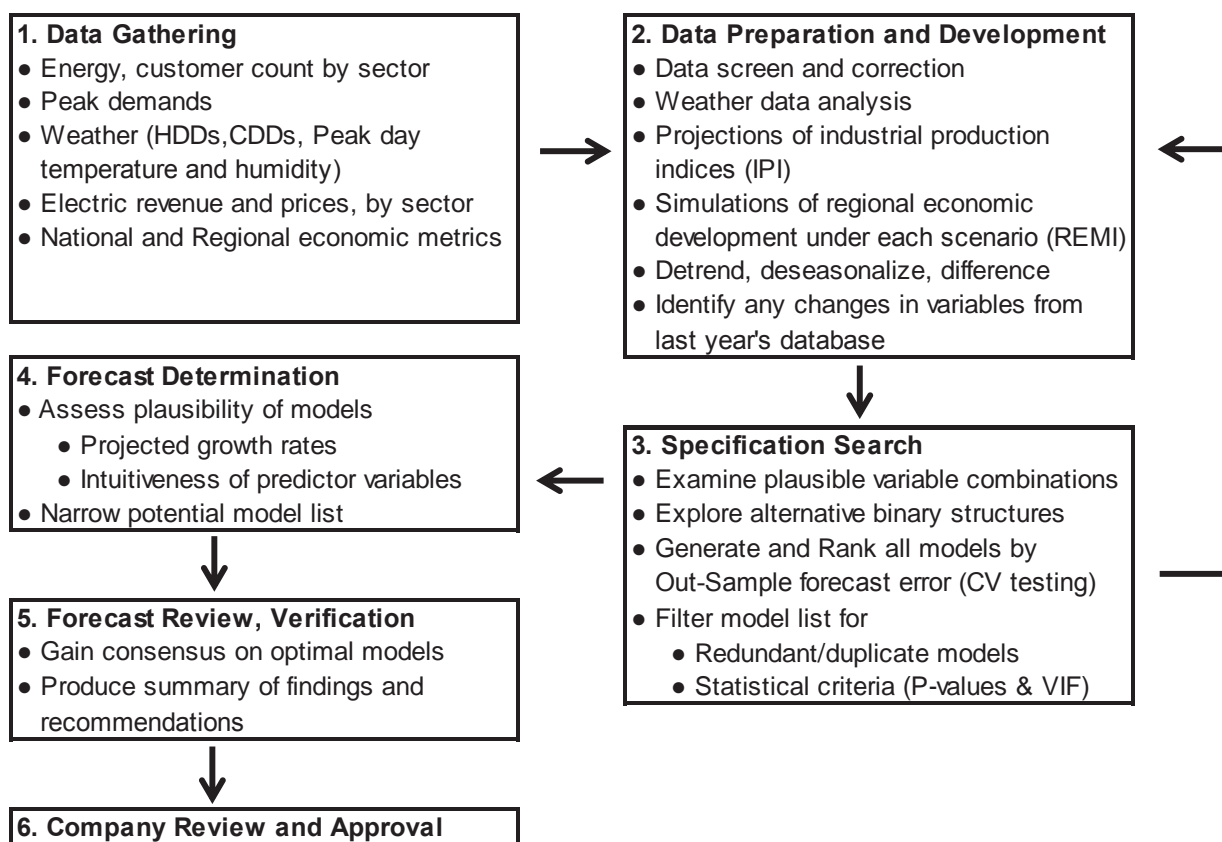


Figure 3: Minnesota Power's Forecast Process

## B. Minnesota Power's Forecast Process

### i. Process Description

1. *Data Gathering* involves updating or adding to the forecast database. The data used in estimation can be broadly categorized as follows:

- *Historical quantities of the variables to be forecast*, which consists of energy sales and customer counts for Minnesota Power's defined customer classes, energy sales, and peak demand.
- *Regional Demographic and Economic data*:
  - *Duluth Metropolitan Statistical Area (MSA)* consists of population, households, sector-specific employment, income metrics, regional product, and other local indicators.
  - *Aggregate 13-County Minnesota Power service territory (13-Co)* consists of population, Gross Regional Product (a Regional Gross Domestic Product (GDP) metric), sector-specific employment, and income metrics.

- *Individual 13-County Minnesota Power service territory (13-Co)* consists of sector-specific employment and income metrics for each individual County.
- *Indicators of National economic activity* such as the Industrial Production Indexes (IPI) or Macroeconomic indicators such as U.S. GDP or Unemployment.
- *Weather and related data* including heating degree days (HDD), cooling degree days (CDD), temperature, humidity, dew point, and wind speed.
- *Appliance saturation data* including air-conditioning and electric space heating.
- *Electricity and Alternative Fuel prices*, which includes the price of electricity, natural gas, and heating oil by sector for the Minnesota Power service territory.

After gathering these data, Minnesota Power compares all series to the previous year's database to identify any changes. The cause of any change to the historical data should be explained and justified. This is explained further in Section C: *Inputs and Sources*.

2. *Data Preparation and Development* involves adjusting raw data inputs and then reviewing the data through diagnostic testing. The purpose of this step is to develop consistently defined and formatted data series for use in regression analysis. Adjustments made to specific raw data inputs are described in the "Inputs and Source" section of this document. General data preparation techniques such as *Data Transformation* and *Interpolation* are described in the *Specific Analytical Techniques* section of this document.
3. *Specification Search* involves selecting an appropriate set of variables that serve as explanatory factors for the customer count, energy sales, and peak demand series being modeled.<sup>3</sup> Minnesota Power does this through a formalized modeling and documentation process involving the following steps:
  - *Parameter and Criteria Definition* – During this step the forecaster manually enters the parameters for model generation and the criteria for filtering unacceptable models. This includes identifying the trend and binary variable structure to be used, number of explanatory variables for testing (typically 2) and the maximum values for acceptable variance inflation factors (VIF) and P-values.<sup>4</sup>
  - *Exhaustive Search* – Identifies all possible combinations of economic variables. There are generally between 20,000 and 200,000 possible combinations of predictor variables for each *Search* run. For each of the five customer count models and twenty-three energy models, there were up to twenty-eight different binary variable structures tested – and each required a separate *Search* run. In total, there were about 300 *Search* runs producing roughly three million models.
  - *Model Generation* – Constructs an ordinary least squares (OLS) regression model for each of the combinations identified in the *Exhaustive Search* step.

<sup>3</sup> Specific analytical techniques applied during this step are detailed in Section D.

<sup>4</sup> To state simply, Variance Inflation Factors identify the presence of multicollinearity and P-values measure the significance of a variable. The definitions of these metrics are explained in greater detail in the *Specific Analytical Techniques* section.

- *Ranking* – Conducts Cross-Validation (CV) on all generated models and ranks them according to the models’ Out-Sample Forecast Error (Root Mean Square Error). Cross-Validation/Out-Sample testing identifies how well the forecast model can be expected to actually perform, and avoids the bias associated with model assessment based on “In-Sample” forecast error (traditional Mean Absolute Percent Error, Mean Percent Error) or goodness-of-fit (Adjusted- $R^2$ ).
- *Filter for Redundant Models* – removes a model from the ranked list if it contains the same economic variable combination<sup>5</sup> as another, statistically superior model.
- *Filtering for Statistical Criteria* – removes a model from the ranked list if it does not meet predefined statistical criteria (HAC-adjusted P-Values,<sup>6</sup> VIF)

After filtering for redundancies and statistical criteria, each of the five customer count models and twenty-three energy models produced between 20 and 72,000 plausible models (about 416,000 in total). Minnesota Power then reviews the top 50-200 models for each dependent variable.<sup>7</sup>

All models generated as part of the *Specification Search* step of AFR 2019 are archived for later review.

4. *Forecast Determination* narrows the list of potential models via a thorough review. Minnesota Power evaluates and compares model statistics, plausibility of the models’ outputs (i.e. the forecast), and model structure (binary or time-trend variables). This step involves the utilization of objective metrics as far as is possible to inform judgment on the part of the forecaster.

The forecast determination process begins by identifying the apparent statistically-superior model. If this model’s forecast growth rate is implausible or predictor variables are unintuitive, Minnesota Power moves on to the second most statistically-superior model. This process continues until the Company identifies a plausible and statistically-sound model. This model is then selected as a preferred or preliminary AFR model for the specified dependent variable (class customer count, class energy sales, or system peak demand).

However, the difference in statistical quality among top models is usually negligible and there are reasons to dismiss the top-ranked model in favor of a lower ranking model. For example, a second place model that has a weather variable structure that allows for accurate after-the-fact weather normalization is ideal, and worth a negligible loss in apparent statistical quality.

This step narrows the model list further; from 50-200 to just two or three select models for each dependent variable.

5. *Forecast Review and Verification* produces a list containing a single, preliminary model for each of the dependent series. During this step, analysts compare and debate the quality of models to reach a consensus around a final set of optimal models. Where a consensus cannot be

<sup>5</sup> Although the model contains the same combination of economic variables, it may vary in that it is a differenced or de-trended form of the variable.

<sup>6</sup> More on Heteroskedasticity and Autocorrelation Consistent (HAC) adjustment in the *Specific analytical Techniques* section.

<sup>7</sup> Models are ranked by a two-year Out-sample Root-Mean-Squared Error (RMSE).

immediately reached because two models may be highly comparable in statistical quality and plausibility of outputs, out-sample forecast accuracy determines the model put forward for *Company Review and Approval*.

6. *Company Review and Approval* involves internally vetting all forecasts to ensure that consistent use of forecast information was employed and that the forecasts are reasonable.

## ii. Specific Analytical Techniques

*Data Transformation Schema for Economic Variables*: Transformations are used to maintain consistency of definition in a variable series and identify different potential relationships between predictor variables and the dependent variable. Minnesota Power uses several data transformations in data development: constant-dollar deflating/inflating, per-day conversion, de-trending/de-seasonalizing, first difference, and exponential.

- *Constant-dollar Deflating/Inflating* - is the process of deflating/inflating all dollar-denominated series to the same base year to maintain consistency of definition. Minnesota Power utilized 2012 as its base year in the 2019 forecast. The 2012 base year is the current standard among public and private data providers such as IHS Global Insight and the Bureau of Economic Analysis (BEA).
- *Per-day Conversion* – divides monthly billed energy use or monthly Heating/Cooling Degree Days by the number of days in the specified month. This transformation normalizes for the effect of varying days-per-month on a monthly aggregate like energy use or Heating/Cooling Degree Days. This results in consistently defined series that are more appropriate for linear regression modeling.
- *De-trend and De-seasonalize* – is the process of removing the historical trend/seasonality from a data series. This reduces the potential for the spurious, or *false*, correlation that often results from mistaking similarity of *trends* with similarity of *variation* between a predictor and the dependent variable.
- *First Difference* – changes the definition of the series from *level* (e.g. the number of customers in a month) to *change* (e.g. the customers gained or lost from one month to the next) by subtracting the previous value from the current. The *first difference* transformation reduces the series to only *variation* (change) so there is no potential to mistake similarity of *trend* with similarity of *variation*.
- *Exponential* – is the application of an exponent to the series; either squaring or cubing the series. This transformation of raw data was only applied to the temperature variables in the Peak Demand model, so the non-linear relationship of load to temperature could be more accurately quantified.

The Company has discontinued use of natural log and first difference of natural log transformations as well as lead/lag transformations for transparency and ease of model interpretation. The addition of these transformations to past reports was exploratory. Minnesota Power forecasters have found these

transformations add minimal predictive value, but make resulting model specifications difficult to interpret and difficult to compare year-to-year changes in model inputs.

Interpolation Technique – Minnesota Power collects and utilizes raw monthly-frequency data whenever possible. However, some data series are not available at a monthly-frequency (e.g. U.S. GDP is only available in quarterly and annual frequencies). Interpolation allows annual or quarterly data to be used in monthly-frequency regression modeling by converting it to a monthly variable.

The specific interpolation function utilized in Minnesota Power’s forecast process is known as a “Cubic Spline” interpolation. This technique is widely used because it produces a smooth monthly series by constraining the first and second derivatives of the variable to be continuous on the entire time interval.

The spline interpolation procedure was conducted in Statistical Analysis System (SAS) using the “Proc Expand” command with the method specified as “Spline” and the observed as “Middle.” The “Middle” specification denotes that an annual-to-monthly interpolation should assume the annual value as June, and July through May should be interpolated points. Quarterly-to-monthly interpolation should assume Quarter 1 as February, Quarter 2 as May, Quarter 3 as August, and Quarter 4 as November; all other months are interpolated points. The cubic spline interpolation function is in piecewise cubic polynomial form:<sup>8</sup>

$$Y_i(t) = a_i + b_i t + c_i t^2 + d_i t^3$$

Where:  $0 \leq t \leq 1$   
 $i = 1, 2, \dots, n - 1$   
 $Y_i = i^{th}$  piece of the spline  
 $a_i, b_i, c_i,$  and  $d_i$  are estimated polynomial coefficients

The cubic spline method of interpolation has been in use since the Company’s 2014 AFR and was an improvement over previously-utilized interpolation methods.

Modeling Techniques – Most of the 28 dependent count and energy variables are modeled using a trend variable to explain general, underlying growth and one or two de-trended or differenced economic/demographic variables to explain any economically-driven divergence from this trend. This approach to regression modeling reduces the potential for an independent variable to be erroneously identified as significant due to spurious, or *false*, correlation.

As a rule, all models are OLS, which are simple, transparent, explainable, and produce optimal estimates of the coefficients. All input variables’ coefficients must be significant at a 90 percent confidence level (as indicated by a HAC-adjusted P-value less than 10 percent) and the VIF of each variable’s coefficient must be less than five (indicating minimal multicollinearity). A constant, trend, or binary variable with a P-value greater than 10 percent or VIF greater than five may be retained if it is critical to the model structure.

- Test for multicollinearity using VIFs (Variance Inflation Factors) - multicollinearity is generally unacceptable in the final models but is assessed in the context of other variables and model statistics. The VIF of a variable is a measurement of its correlation with every other

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<sup>8</sup> <http://mathworld.wolfram.com/CubicSpline.html>.

variable in the model whereas a correlation matrix would only identify the correlation of two variables to each other at each point in the matrix. Thus, VIFs are superior to a correlation matrix as a method of identifying multicollinearity. VIFs are assessed according to these criteria:

- VIF less than 3 is optimal - correlation with the remaining variables is less than 82 percent.
- VIF of 3-5 is acceptable, but is assessed in context with other diagnostics.
- VIF of 5-10 is generally unacceptable, but is assessed in context with other diagnostics. A VIF > 5 implies correlation with remaining variables is greater than 90 percent.
- VIF greater than 10 is unacceptable correlation for any economic variable. In this case the correlation with the remaining variables is greater than 95 percent.

VIFs on all economic and demographic variables in all models are well within acceptable limits. Minnesota Power considers high VIFs on certain binaries variables inconsequential since the cause of this correlation is clear; it's interacting with the intercept, weather variables, or other binaries. Because these binaries are important to the structure of the model, they are not excluded in the same way an economic variable would be if found to have high multicollinearity with other variables.

- Heteroscedasticity and Autocorrelation Consistent (HAC) - adjusts the standard errors of regression coefficients to correct t-statistics and P-values for biases resulting from autocorrelation and/or heteroscedasticity. Minnesota Power computes the HAC-adjusted P-values using a common HAC specification.<sup>9</sup> These HAC-adjusted P-values are used to determine inclusion/exclusion in the model. Coefficients themselves are not affected by this adjustment.

The AFR 2019 HAC-adjustment procedure simultaneously corrects P-values for both autocorrelation and heteroscedasticity. This automated adjustment streamlines model testing and selection, and produces a more robust final forecast.

Models that meet the above criteria, have plausible outputs (forecasts), and have intuitive econometric interpretations are put forward as potential final models for review during the *Forecast Determination* and *Forecast Review and Verification* steps (AFR 2019 Forecast Process pgs. 7-8).

Once forecast models are verified and finalized, they form the basis of the “econometrically-determined” outlook for energy sales, peak demand, and customer count. Assumptions for future load additions/losses and/or adjustments to account for recent customer expansions are applied to the econometric outlook to produce Minnesota Power’s final energy sales, peak demand, and customer count outlook.

*Leveraging Binary Variables to Account for Recent Trends* – Several of Minnesota Power’s largest industrial and resale customers are in a time of significant change, and an accurate load forecast depends on properly identifying and accounting for these changes.

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<sup>9</sup> Developed using Andrews (1991).



In AFR 2014, Minnesota Power began adjusting historical sales series to “back-out” recent large customer load additions to avoid double-counting customer usage in the forecast timeframe; once (partially) embedded in the econometric projection, and again through a post-regression load adjustment.

This approach is appropriate when the load addition/loss is quantifiable (e.g. a new customer, or a new customer-owned generator), but shouldn’t be used when the load addition/loss cannot be accurately quantified (an existing customer’s recent expansion); adjusting raw historical sales data with an estimate would just introduce additional uncertainty to the estimate.

Minnesota Power continues to adjust historical series for known/measurable recent load additions, and has supplemented this approach with the use of binaries and trend variables that account for large changes in load that cannot be precisely quantified (such as a customer expansion that’s not metered separately).

The variables denote and account for a structural shift in a dependent variable (historical sales), and are then terminated at the start of the forecast timeframe to effectively “back out” this recent change so it can be accurately quantified and explicitly applied through a post-regression adjustment to the econometric series.

*Polynomial temperature specification for peak demand* – the AFR 2019 peak demand model uses a third-degree (cubed) temperature series alongside an un-adjusted temperature series to capture the non-linear relationship of load to temperature. The two variables (cubed and un-adjusted) create a polynomial temperature specification.

This approach was first used in AFR 2016 and was a change from prior AFRs that leveraged either a monthly interaction specification or a spline-type (temperature range) specification. These previous approaches model the effect of temperature on demand, and identify the non-continuous or non-linear relationship of load to temperature, but neither approach is the simplest solution.

A polynomial temperature specification is continuous/not segmented, so it can always be leveraged for weather-normalization. This specification is much simpler and commonly used in demand modeling. The Company has avoided using this specification in the past, believing that the coefficients associated with the spline-segments efficiently and clearly conveyed information about load’s response to weather in a specific temperature range. However, the testing of after-the-fact weather-normalization has convinced Minnesota Power Load Forecasting that a Polynomial specification is superior.

*Modeled Peak Demand using hour-specific weather observations* – Prior to AFR 2017, the Company modeled peak demand using monthly HDD/CDD or daily high/low temperatures. Since AFR 2017, Minnesota Power has modeled peak demand as a function of the weather observations specific to the hour in which the peak occurred. The Company identified the historical peak date/times and queried an hourly weather observation dataset to identify the hourly temperature, humidity, and wind-chill coincident with the system peak. In theory, the temperature at the time of the peak should be more closely related with the load than a daily high or low temperature (for example). The Company has witnessed improved model statistics using this approach.

*Objective pre-specification of seasonal binary variables* – This approach allowed Minnesota Power to avoid redundant or unusable specifications in its model *Search* runs, and more efficiently review viable forecast models. Since this does not affect model selection or final AFR model results, and is really just a process efficiency measure, the Company does not consider this new approach to modeling a “methodological adjustment.”

As described in Section 1Bi (“*Specification Search*”), Minnesota Power’s model production process involves *Parameter and Criteria Definition*. During this step the forecaster identifies what structural variables (trend and binary variables) should be included in a particular R *Specification Search* program run. In past AFRs, Minnesota Power determined the binary variable combinations largely through intuition and a guess-and-check approach (e.g. if the January binary was insignificant in several early model runs, this structural variable would be excluded from future runs).

In AFR 2019, the Company leveraged SAS (“Statistical Analysis System”) software’s “BackWard elimination” technique<sup>10</sup> to identify the most plausible seasonally binary variable combination prior to conducting *Specification Search*. This approach is more efficient and objective.

### iii. Methodological Adjustments for AFR 2019

Minnesota Power is continuously improving its forecast methodologies to better model and predict customer energy requirements, and for the last decade there have been numerous and substantial improvements with each annual forecast. The Company examined and tested several potential enhancements for this year’s AFR, and chose to implement four notable enhancements in methodology or modeling practices.

*Incorporation of Energy Efficiency in Modeling Energy Requirements* – In past forecasts, the effect of conservation programs were assumed implicit in the energy sales forecasts. This approach was favored since it’s highly objective, involves no manipulation of the historical energy sales data prior to regression modeling, and required no exogenous adjustment for energy efficiency to be applied to the raw econometric model results. Whether this method can fully capture the recent, escalating effects of conservation on energy sales has come into question.

After thorough research, testing, review by colleagues at other Midwest utilities, and discussions with Minnesota Department of Commerce (DOC) Staff, the Company has identified a preferred approach to forecasting energy efficiency: use energy efficiency as an input variable to the regression models, referred to as “EE as RHS var” or “Energy Efficiency as a Right Hand Side Variable.” The “EE as RHS var” methodology has several advantages over other common energy efficiency forecasting methodologies:

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<sup>10</sup> Backward elimination works through iteration by first modeling with a full set of seasonal binaries, then removing the insignificant binary that contributes the least to the model, then re-modeling with this subset of seasonal binaries, remove insignificant...etc. until all seasonal binary variables in the subset are significant.  
[http://support.sas.com/documentation/cdl/en/stathpug/66410/HTML/default/viewer.htm#stathpug\\_introcom\\_stat\\_sect029.htm](http://support.sas.com/documentation/cdl/en/stathpug/66410/HTML/default/viewer.htm#stathpug_introcom_stat_sect029.htm)



- Avoids double-counting energy efficiency impacts in the forecast timeframe.<sup>11</sup>
- Accounts for historical and projected conservation resulting from both Company programs and organic, customer-driven efforts.<sup>12</sup>
- Leverages raw sales data in regression modeling: sales data are not adjusted for conservation impacts prior to modeling.<sup>13</sup>
- Doesn't require after-the-fact adjustments to econometric outputs: the energy sales forecasts already contain the effects of energy efficiency.

An "Energy Efficiency" variable explains recent trends in customer consumption that cannot be explained by economic, demographic, or weather effects. Further, this method allows the Company to quantify the volume of Conservation Improvement Programs (CIP) energy efficiency embedded in the load forecast, which will be useful in a number of applications including resource plan modeling.

The "Energy Efficiency" variable development process, data sources, and key assumptions are described in section 1B iv. "Treatment of DSM, CIP, DG, and EV in the Forecast." Discussion of the interpretation, role/function, and justification for use of a particular energy efficiency variable within a model is documented in Section 1E "Econometric Model Documentation."

*Distributed Solar Generation Forecasting* – In past forecasts, the Company did not make explicit, exogenous assumptions for Distributed Generation: Solar ("DG Solar"), but noted that "it may become possible/necessary to account for this transition in the load forecast."<sup>14</sup> Minnesota Power has identified a viable methodology for this transition, has projected DG Solar adoption, and has adjusted the energy sales and peak demand forecasts per this DG Solar outlook.

New DG Solar installs were projected using the exponential growth observed in recent years where the number of new residential solar installations has grown by about 20% per year and new commercial installations has expanded by about 40% per year. This outlook for the number of new installs is combined with assumptions for the sizing (kW capacity) of those new installations, an expected capacity factor, and seasonal production characteristics to produce estimates of monthly energy production and peak reduction. The energy sales and peak demand forecasts are only adjusted for *new* installs (i.e. installations expected to come online in the forecast timeframe). The effects of currently installed arrays are presumed to be embedded in the forecast.

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<sup>11</sup> The historical impact of conservation is effectively captured by the  $\beta x$  (coefficient x variable) series for the energy efficiency variable that spans the historical and forecast timeframes. There are no exogenous assumptions or adjustments for energy efficiency, and, in theory, no double counting.

<sup>12</sup> Company-driven energy efficiency is used as an *indicator* of energy sales, and the regression model will assign this variable more or less weight depending on the variable's observed correlation with sales. If the observed decrease in sales is greater than the increase in the energy efficiency variable (i.e. Company-driven energy efficiency), the model is inferring some organically-driven conservation.

<sup>13</sup> Another common method entails "adding-back" historical conservation to actual sales to reconstruct a history in which conservation effects have been removed. This series is modeled, projected, and then modified for future savings. This approach to forecasting sales with conservation impacts seems intuitive, but it involves modifying the historical series using an estimated series (historical CIP savings), which can create uncertainty in the resulting model and forecast.

<sup>14</sup> In section 1B iv "Treatment of Demand-Side Management (DSM), Conservation Improvement Programs (CIP), and Distributed Generation (DG)" of AFR's 2018 and 2017.

The Company projects that about 1,350 new DG Solar installations will connect to the Minnesota Power grid by 2030 (i.e. installed in years 2019-2030), generating about 15,000 MWh per year and reducing sales by an equivalent amount.

A more detailed explanation of the DG Solar forecasting method including: data sources, modeling methodology, key assumptions, and sales reduction by class and year is documented in section 1B iv. “Treatment of DSM, CIP, DG, and EV in the Forecast.”

*Electric Vehicle Adoption Forecasting* – Minnesota Power recognizes the potential load growth that could result from this new electric end-use and has incorporated an outlook for Electric Vehicle (EV) adoption into the residential energy sales and peak demand forecasts.

Fleet vehicles and commercial charging are not addressed in AFR 2019. Fleet EV adoption in Minnesota Power’s territory is too limited to gauge the pace of organic adoption or draw meaningful parallels between local and national adoption rates. Projecting public EV charging usage will also require further study. For the sake of simplicity in this inaugural attempt at modeling EV impacts on the Minnesota Power system, the Company attributes all new electric vehicle usage to the residential class. Minnesota Power will continue to gather data and refine its methods to model and incorporate new electric end-uses like EVs into the annual forecast.

The Company projected residential EV (light-weight vehicle) adoption based on a national-level outlook<sup>15</sup> that’s been scaled to the Minnesota Power region. The energy and demand requirements of EVs adopted in the forecast timeframe (2019-2033) are added to the energy sales and peak demand outlooks. The effects of currently-owned EVs are presumed to be embedded in the econometric forecast.

Currently, the Company estimates there are about 180 light-weight (i.e. non-fleet) EVs registered in Minnesota Power’s retail service territory,<sup>16</sup> which equates to an approximate 0.2% penetration level among residential customers and an estimated 350-450 MWh of energy consumption in 2018. This level of consumption represents just 0.05% of all sales to residential customers, so this is currently a relatively small end-use.

By 2030, EV saturation among Minnesota Power customers is projected to just exceed 7%, which equates to about 8,000 EVs and 20,000 MWh in additional energy requirements from the residential sector. This also equates to increases of about 2.5 MW and 7.2 MW in the 2030 Summer and Winter peaks (respectively).

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<sup>15</sup> Bloomberg ([https://data.bloomberglp.com/bnef/sites/14/2017/07/BNEF\\_EVO\\_2017\\_ExecutiveSummary.pdf](https://data.bloomberglp.com/bnef/sites/14/2017/07/BNEF_EVO_2017_ExecutiveSummary.pdf)) published a projection of US take-rate in its 2017 Electric Vehicle Outlook (but not in the 2018 Outlook), which could be combined with IHS Global Insight’s outlook for Light Vehicle sales to produce an estimate of EV sales by year. Sales were cumulated and divided by U.S. household count to infer an overall saturation rate. The 2019 Electric Vehicle Outlook (EVO) was released too late in the forecast’s development to be included in the 2019 AFR, but the overall adoption rate does not differ significantly from the 2017 adoption outlook.

<sup>16</sup> IHS Global Insight and Polk provided a total count of EVs registered by zip code for the zip codes fully or partially served by Minnesota Power. In many cases, the Company only serves a small share of households in a particular zip code (per Census data), so some estimation/scaling of the EV count data was required. An exact count of EVs owned by Minnesota Power customers is not available.

A more detailed explanation of the EV forecasting method including: data sources, modeling methodology, key assumptions, and sales increase by year is documented in section 1B iv. “Treatment of DSM, CIP, DG, and EV in the Forecast.”

*Energy Requirements Modeling* – In AFR 2018, the Company experimented with modeling total customer *energy requirements*, inclusive of customer-owned generation. The customer generation was subsequently subtracted from the econometric forecast of energy requirements to produce a projection of energy sales. This method was more complicated to execute and explain than simply modeling energy sales, and the theoretical advantages (discussed in AFR 2018) did not materialize. The Company elected to revert to its long-standing approach of modeling sales directly and leveraging binary variables to denote changes in historical customer owned generation. There are no material changes in the resulting forecasts by switching to or from this methodology.

#### **iv. Treatment of DSM, CIP, DG, and EV in the Forecast**

DSM programs represent activities that a utility undertakes to change the configuration or magnitude of the load shape of individual customers or a class of customers.

Minnesota Power has engaged in several different types of DSM:

- *Conservation* - Conservation results in a reduction in total electric energy consumed by a customer and the potential to reduce both on-peak and off-peak demand. Conservation generally results in a reduction in the overall rate of growth of electric energy demand. Conservation, in the context of Minnesota Power conservation programs,<sup>17</sup> may also include process efficiency, which results in the potential to reduce the total electric energy consumed by a customer as well as to decrease on-peak and/or off-peak demand. Process efficiency reduces the overall growth rate of electric demand because it results in greater production, through more efficient equipment or processes, from a facility for the same energy inputs. If the facility failed to implement process efficiency projects, more electric energy would be required to meet production requirements. Process efficiency generally results in avoided energy production and capacity additions over the long-term.
- *Peak Shaving* - Peak shaving reduces peak demand without affecting off-peak demand. Minnesota Power’s dual-fuel load control and Large Power (LP) interruptible programs are peak shaving programs for economic and emergency conditions.

*Load Shifting* - Electric demand is shifted from on-peak to off-peak hours. In 2014, Minnesota Power initiated a Time-of-Day (TOD) Rate Pilot and in 2015 extended the program.<sup>18</sup> Under this rate, customers pay more for usage during on-peak hours and critical peak pricing events, and receive a discount for usage during off-peak hours. The goal of this pilot is to gauge customer interest in new

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<sup>17</sup>Minnesota Power’s Power of One program is made available to home and business customers. Refer to on-line conservation resources at <http://www.mnpower.com/EnergyConservation> for more information.

<sup>18</sup> Details of the program extension can be found under Docket Number E015/M-12-233 filed on March 25, 2018.

rate offerings that incentivize load shifting and to further inform decisions about broader program implementation and infrastructure investment.

### Accounting for Conservation in the Forecast:

As described in the “Methodological Adjustments for AFR 2019” section, Minnesota Power’s 2019 forecast accounts for conservation using the “Energy Efficiency as a Right Hand Side Variable” methodology. In this methodology, an “Energy Efficiency” variable is used as an input to the regression model, and the resulting econometric series includes the effects of energy efficiency; adjustments to the energy sales series prior to, or after, regression modeling are unnecessary.

Development of the “Energy Efficiency” variable began by gathering savings data for each retail customer class, Superior Water Light and Power, and the Company’s 15 municipal customers. Incremental (i.e. first year) savings data for the historical and forecast timeframe was assembled from a number of sources. Table 2 documents the derivation of energy savings assumptions for each historical and forecast period.

**Table 2: Energy Efficiency Variable Data Source**

|   | Historical<br>2008-2018 | Forecast-> |      |           |           |
|---|-------------------------|------------|------|-----------|-----------|
|   |                         | 2019       | 2020 | 2020-2029 | 2030-2033 |
| <b>MP Retail</b>  |                         |            |      |           |           |
| <b>Resale</b>   |                         |            |      |           |           |
| MN Municipal  |                         |            |      |           |           |
| SWLP  |                         |            |      |           |           |
| <b>MP CIP Compliance Filing</b>   |                         |            |      |           |           |
| <b>MP CIP Triennial</b>   |                         |            |      |           |           |
| <b>Energy Savings Platform</b>  |                         |            |      |           |           |
| <b>Historical 3-Year Average</b>  |                         |            |      |           |           |
| <b>Provided by Resale Customer</b>                                      |                         |            |      |           |           |
| <b>Center for Energy and Environment (CEE) - Utility Reporting Tool</b> |                         |            |      |           |           |
| <b>Extrapolated from CEE Trend</b>                                      |                         |            |      |           |           |

Historical incremental savings data for Minnesota Power was obtained from the Company’s past CIP compliance filings, Minnesota Municipal customers’ historical savings information was obtained from the MN “Energy Savings Platform.”<sup>19</sup> Superior Water Light and Power provided its own historical savings information to Minnesota Power.

Forecast assumptions for Minnesota Power’s residential and commercial savings in 2019 and 2020 were derived from the Company’s most recent Triennial filing (2017-2019), and energy savings assumptions<sup>20</sup> beyond 2020 were derived primarily from the Center for Energy and Environment’s

<sup>19</sup> <http://mnecipdata.cloudapp.net/Default.aspx>

<sup>20</sup> Resale customer assumptions for near-term (2019) incremental savings were not available in CEE’s tool, so the Company assumed a five-year historical average. Superior Water Light and Power’s incremental savings outlook was assumed as a five-year historical average normalized for large customer conservation projects that unlikely to occur with any frequency and should not bias the forecast.

(CEE) new Utility Reporting Tool.<sup>21</sup> The Company modified CEE’s forecasts of “Program” potential<sup>22</sup> savings at the generator in two ways:

1. Incremental savings by retail class were produced by scaling CEE’s total annual incremental savings per the class-composition of Minnesota Power’s past achieved savings.<sup>23</sup>
2. Projections of municipal customer cumulative savings (starting in 2020) were scaled to align with recent historical savings (a five-year average).<sup>24</sup>

For each of the retail classes and resale customers, the Company cumulated the historical and projected incremental savings<sup>25</sup> to produce a “cumulative energy savings” series.<sup>26</sup> This cumulative series is the optimal variable format/definition for modeling energy sales; Figures 4 and 5 below demonstrate why this is the case by plotting incremental and cumulative residential energy savings (at meter) since the passage of the U.S. “Energy Independence and Security Act” of 2007 and the MN “Next Generation Energy Act” of 2007.

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<sup>21</sup> <https://www.mncee.org/cmsctx/pv/emmaappleman/culture/en-US/wg/bc32b2f9-415e-43fc-885f-a6b77d7329a9/h/7c8c2cd92b01eaff3e98ba1b2941fc39e8cad43c23c520dbe32102e613a9ee03/-/cms/getdoc/5b0746d4-4ad0-49b9-9a85-7d4212b56a03/pv.aspx>

<sup>22</sup> CEE projected three levels of potential savings: Program, Economic, and Max Potential. Minnesota Power leveraged the “Program” potential savings figures in its data development since the Program metric aligned most closely with the Company’s 2017 Triennial filing and past achieved savings.

<sup>23</sup> CEE produces estimates of savings by customer class, but the Company noticed CEE’s savings were heavily concentrated towards residential measures. Whereas residential savings have historically comprised only about 18% of total CIP savings, CEE estimates showed residential savings accounting for 23% to 37%, depending on the year. The Company considered CEE’s estimates of total annual savings to be plausible, but the composition of those savings by customer class would need to be aligned with observed history to avoid biasing the energy sales forecasts.

<sup>24</sup> The CEE forecast of municipal customer incremental savings for 2020 (first forecast year) were, in total, about 50% greater than five-year historical average of incremental savings for these same municipals. The Company inferred from this that CEE’s projections of Cumulative savings were inflated by a similar amount. Scaling the CEE cumulative savings estimates prevented a large step change in the final “energy efficiency” variables for each municipal customer.

<sup>25</sup> For municipal customer savings, the cumulative savings series was calculated by 1) cumulating all incremental savings pre-2020, and adding this to 2) CEE’s projection of cumulative savings post-2020. This was computationally easier, and required fewer assumptions on the part of the Company. A similar process for retail classes that leveraged CEE’s cumulative savings was not possible since the customer class-level savings needed to be scaled per the composition of past achieved savings.

<sup>26</sup> Using internal estimates of Minnesota Power’s past programs’ life of measures. A Life of Measure (LoM) is the approximate time a conservation measure will reduce energy consumption. Most conservation measures have a 10-20 year life. A portfolio from any particular program year will contain measures that end earlier than others, so the overall impact of measures implemented in a program year will fade over time.



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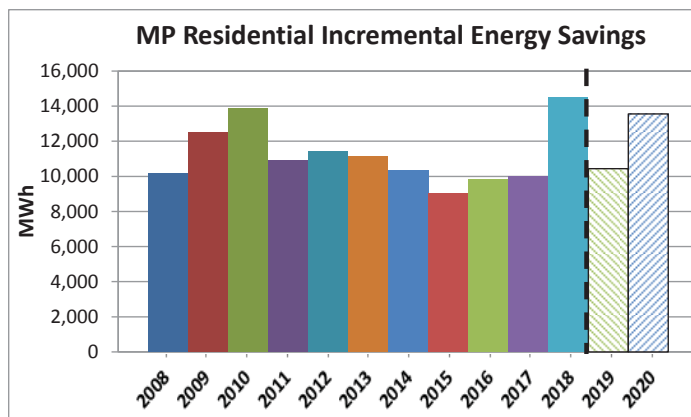


Figure 4: Residential Incremental Energy Savings

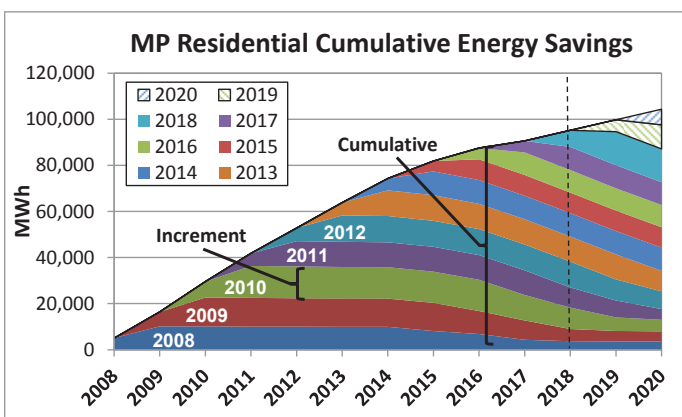


Figure 5: Residential Cumulative Energy Savings

Incremental energy savings are the “first year” or single year savings achieved via a portfolio of efficiency measures implemented in a single year. Incremental savings are fairly constant from year-to-year, around 11,000 MWh; from an econometric modeling perspective, this variable might indicate a constant shift in the level of annual sales, but it would not indicate a change in growth rate or trajectory of annual sales.

A cumulative savings metric represents the lasting impacts of conservation programs<sup>27</sup> by aggregating or *cumulating* the savings from all past conservation measures. This cumulative series grows substantially from 2008-to-present; a timeframe in which Minnesota Power’s residential energy sales growth has largely stalled. From an econometric modeling perspective, a cumulative savings format/definition is indicative of a change in growth rate/trajectory of annual sales. This is precisely the phenomenon that requires explanation and quantification, and why the “cumulative” series is the optimal variable format/definition for modeling energy sales.

Note that accumulating the *annual* incremental series only produces *annual* cumulative savings series, whereas Minnesota Power’s energy models are *monthly*-frequency. The Company used the same annual cumulative savings value for all 12 monthly observations of a particular year,<sup>28</sup> and did not attempt to estimate monthly energy savings by distributing or interpolating the annual values. Estimation of monthly savings values would have 1) involved additional assumptions on the part of Minnesota Power forecasters, and 2) potentially imparted bias to the final model through the weather coefficients. A key strength of the “Energy Efficiency as a Right Hand Side Variable” methodology is that involves making relatively few assumptions, leveraging raw data as much as possible, and relying on the regression modeling process to objectively “solve for” unknown variables such as the seasonality of energy efficiency impacts.

The Company used a cumulative savings, annual “Energy Efficiency” variable in regression models for sales to the residential, commercial, and public authorities classes, as well as five of the

<sup>27</sup> The figure above also shows how these conservation measure impacts fade over time as households replace the aging appliances (for example).

<sup>28</sup> Note that the Company did not divide the annual values by 12. Dividing or multiplying a variable by a constant (e.g. 12) prior to regression modeling has no effect on the resulting forecast; the regression model would adjust the parameter estimates (i.e. coefficient) to maintain a least squared error function. Dividing a variable by 12 would result in a coefficient that’s 12 times larger.

Company's 15 resale customers modeled in AFR 2019. The cumulative energy sales assumptions used in regression modeling (i.e. the "Energy Efficiency" variables) and corresponding incremental savings assumptions are shown in the tables below by year.

**Table 3: Cumulative Energy Sales Assumptions**

**Table 4: Incremental Energy Savings Assumptions**

[Trade Secret Data Begins]

Trade secret data excised.

[Trade Secret Data Ends]

#### **Accounting for Distributed Generation (DG):**

As described in the "Methodological Adjustments for AFR 2019" section, Minnesota Power's 2019 forecast accounts for the effects of DG Solar by netting the projected solar generation from the energy sales forecast. The Company adjusted the energy sales and peak demand outlook per all DG Solar adoption in the forecast timeframe (2019-2033); current DG Solar is assumed inherent in the econometric forecast.

Currently, there are just over 270 Distributed Generation (DG) Solar installations with a combined nameplate capacity of about 4.5 MW, reducing sales by an estimated 4,500 MWh/year (0.2% of combined residential and commercial sales in 2018). The Company projects that its customers will have installed about 15 MW of small-scale solar,<sup>29</sup> displacing about 15,000 MWh in energy sales by 2030.

The process of forecasting DG solar generation involves two separate assumptions: 1) the rate of adoption (i.e. number of new installations each year), and 2) the average size of those new installations. When calculating both assumptions, the Company opted to segment the DG solar customer population into Residential and Commercial customers; the two classes show separate rates of historical adoption and have tended to install different sized arrays.

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<sup>29</sup> This is Customer installations only, and does not include Minnesota Power developments like Community Solar.

The adoption rate was forecast by extrapolating the exponential trend observed in recent years; these forecasts are shown as the dotted lines in Figure 6 below. The exponential growth functions were identified by regressing each of the historical installations series against a “time-trend” variable and a square of the time-trend series.

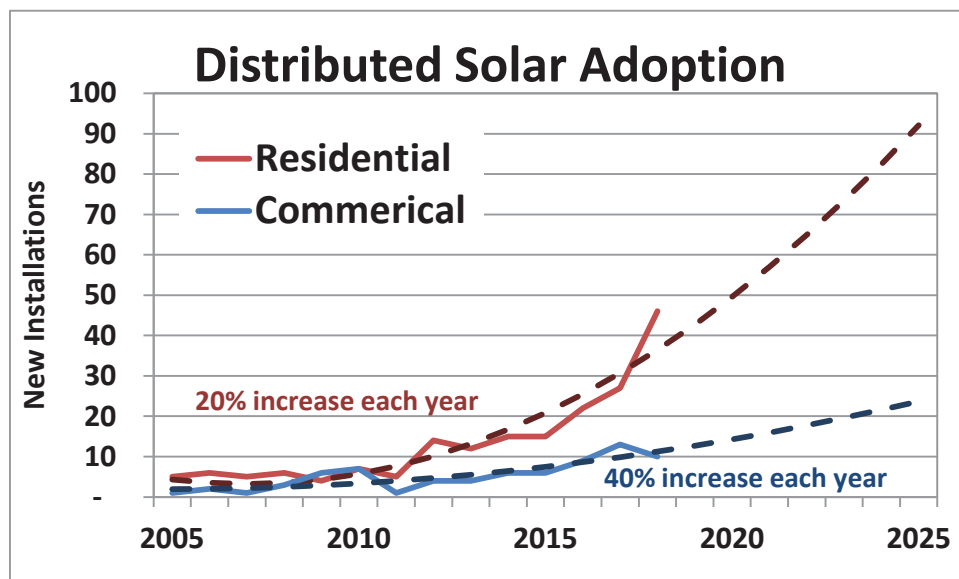


Figure 6: Residential and Commercial Distributed Solar Adoption

The average size (capacity) of new installations in the forecast timeframe is assumed as a simple three-year historical average (2016-2018) by class: residential customer DG solar installations have averaged a capacity of about 9 kW and commercial customer DG solar installations have averaged about 21 kW.<sup>30</sup>

The adoption rate series is combined with the average installation size assumption to arrive at an estimate of total kW installed per year in the forecast timeframe for both the residential and commercial classes. The “kW installed per year” series (for both commercial and residential) are transformed into cumulative series that represent the total kW installed as of a point in time, inclusive of all installations from the current and prior years.

Finally, the Company calculated the estimated impact of new DG solar on energy sales by converting the capacity series (kW) to an energy series (kWh) using an 11% capacity factor<sup>31</sup> assumption for new distributed installations. Table 5 below shows the core assumptions of the Company’s annual DG solar outlook.

<sup>30</sup> Extremely large outliers were omitted. The Company recognizes that installations are often sized per the energy requirements of the customer, and if per-customer usage declines due to conservation it’s likely that installation size will similarly decrease. The Company also recognizes the potential, past and present, for rogue installations (i.e. installations that are not reported to Minnesota Power); this forecast does not account for this potential.

<sup>31</sup> This is the observed average capacity factor of metered solar installations on Minnesota Power’s System.



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**Table 5: Minnesota Power Outlook for New (post-2018) Distributed Solar**

|             | Installation Count | Capacity (kW) | Energy Production (MWh) |
|-------------|--------------------|---------------|-------------------------|
| <b>2019</b> | <b>55</b>          | <b>644</b>    | <b>635</b>              |
| <b>2020</b> | <b>64</b>          | <b>1,382</b>  | <b>1,363</b>            |
| <b>2021</b> | <b>73</b>          | <b>2,221</b>  | <b>2,190</b>            |
| <b>2022</b> | <b>83</b>          | <b>3,167</b>  | <b>3,124</b>            |
| <b>2023</b> | <b>93</b>          | <b>4,229</b>  | <b>4,170</b>            |
| <b>2024</b> | <b>104</b>         | <b>5,412</b>  | <b>5,338</b>            |
| <b>2025</b> | <b>116</b>         | <b>6,725</b>  | <b>6,632</b>            |
| <b>2026</b> | <b>128</b>         | <b>8,174</b>  | <b>8,062</b>            |
| <b>2027</b> | <b>141</b>         | <b>9,766</b>  | <b>9,632</b>            |
| <b>2028</b> | <b>155</b>         | <b>11,509</b> | <b>11,351</b>           |
| <b>2029</b> | <b>169</b>         | <b>13,410</b> | <b>13,226</b>           |
| <b>2030</b> | <b>184</b>         | <b>15,475</b> | <b>15,262</b>           |
| <b>2031</b> | <b>200</b>         | <b>17,712</b> | <b>17,469</b>           |
| <b>2032</b> | <b>216</b>         | <b>20,128</b> | <b>19,852</b>           |
| <b>2033</b> | <b>233</b>         | <b>22,731</b> | <b>22,418</b>           |

Identifying the impact of DG solar on the monthly peak demand outlook involves calculating the amount of solar generation that's likely during a specific month's likely peak time (i.e. historical median peak hour) using a simulated hourly solar production curve.<sup>32</sup> Minnesota Power typically peaks at 6 or 7 PM (well after sun-set) in winter months, so DG solar at the time of the peak is 0% and projected winter peaks are not reduced. In summer months, Minnesota Power has historically peaked at 3 or 4 PM when DG solar is on average 55% of installed capacity (the effective load carrying capacity or "ELCC" is 0.55).<sup>33</sup> Summer peak forecasts are reduced by 55% of the projected new installed solar capacity; this equates to a 0.5 MW reduction in the 2019 summer peak, growing to an approximate 8.5 MW reduction in summer peak by 2030.

<sup>32</sup> The Company used PVSYST software to simulate eight different 10 kW systems per a Typical Meteorological Year. The eight systems varied by location within Minnesota Power's service territory, and by tilt, azimuth, and tracking ability. Each simulated profile was then weighted per the installed KW by location and array specification, and all profiles were totaled. This totaled curve was used to determine the capacity factor of DG solar for each month. Note that this curve was based on 2011 weather information and installations as this was readily available. Simulating with more current information or aggregating actual metered production data would have been time-intensive and likely would have yielded similar results with regards to the capacity factor, which was the only assumption derived from this simulated production curve.

<sup>33</sup> DG solar output is less than 100% during the peak for several reasons, including: 1) diversity in installation arrangement and geography (every solar installation will not experience max output at the same time), 2) the likely Minnesota Power system peak timing is well after noon (12-to-1 PM would be the highest solar output hour), and probabilistic variance in weather is taken into account (although its likely to be sunny and hot on the day of the system peak, that does not guarantee perfect conditions at the precise hour of the peak).

## Accounting for Adoption of Electric Vehicles (EV):

Minnesota Power produced an outlook of regional light-weight, residential EV adoption and energy use by 1) projecting an adoption rate, 2) translating that adoption rate into a cumulative, “total number of EVs on the road” figure for each year of the forecast, and 3) converting that EV count into an energy consumption and coincident peak load outlook. The Company modified the econometric energy sales and peak demand outlooks per these estimates of EV requirements. The Company adjusted its sales outlook only for EVs adopted in the forecast timeframe (2019-2033); current EV ownership is assumed inherent in the econometric forecast.

The EV adoption rate forecast the Minnesota Power service territory follows a projected national adoption rate, but lagged by 4 years. To-date, EV adoption/penetration among Minnesota Power customers trails the nation by about 4 years: in 2018 Minnesota Power customers had an approximate EV saturation of 0.2% whereas the national saturation rate<sup>34</sup> was nearly 1%. The National EV saturation rate was last at 0.2% in 2014, so – for the purposes of forecasting – the Company assumed its customers’ EV adoption would continue to lag the nation by about 4 years and would follow the national trend forecast from Bloomberg.<sup>35</sup> Figure 7 below shows the adoption rates of Minnesota Power customers and the U.S.

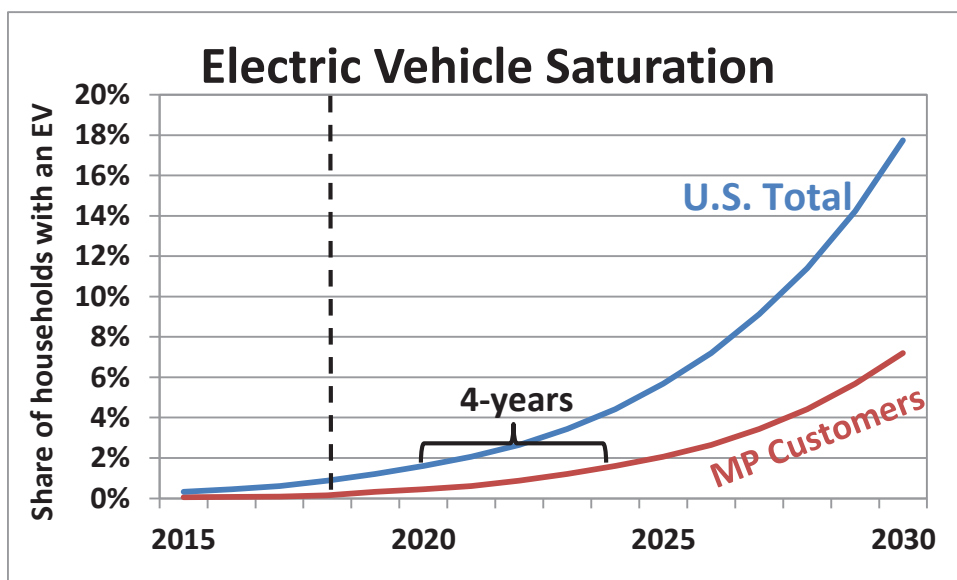


Figure 7: Minnesota Power vs. U.S. Electric Vehicle Saturation

<sup>34</sup> Inside EVs (<https://insideevs.com>) was used to gather actual EV sales data, and the U.S. household count was derived from the U.S. Census (<https://www.census.gov/data/tables/time-series/demo/families/households.html>). There are approximately 1.1 million EVs on U.S. roads and about 127 million households in the U.S., so - on average - roughly 1% of US households own an EV.

<sup>35</sup> Bloomberg ([https://data.bloomberglp.com/bnef/sites/14/2017/07/BNEF\\_EVO\\_2017\\_ExecutiveSummary.pdf](https://data.bloomberglp.com/bnef/sites/14/2017/07/BNEF_EVO_2017_ExecutiveSummary.pdf)) published a projection of U.S. take-rate in 2017 (but not in 2018), which could be combined with IHS Global Insight’s outlook for Light Vehicle sales to produce an estimate of EV sales by year in the U.S. Sales were cumulated and divided by U.S. household count to infer an overall saturation rate. The 2019 Electric Vehicle Outlook (EVO) was released to late in the forecast’s development to be included in the 2019 AFR, but the overall adoption rate does not differ significantly from the 2017 adoption outlook.

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The annual saturation rate outlook (shown in Figure 7) is then multiplied by Minnesota Power's residential customer count<sup>36</sup> to estimate the total number of EVs in Minnesota Power's service territory. The annual EV energy requirements forecast was calculated by multiplying the EV count and an estimate of per-unit energy requirements, which the Company assumes is about 2,520 kWh per year.<sup>37</sup> Table 6 shows the outlook for EVs in the Minnesota Power's service territory.

**Table 6: Minnesota Power Residential Electric Vehicle Outlook**

|      | Vehicle Count | Saturation | Energy Requirements (MWh) |
|------|---------------|------------|---------------------------|
| 2019 | 358           | 0.3%       | 446                       |
| 2020 | 493           | 0.5%       | 787                       |
| 2021 | 667           | 0.6%       | 1,224                     |
| 2022 | 972           | 0.9%       | 1,994                     |
| 2023 | 1,338         | 1.2%       | 2,915                     |
| 2024 | 1,770         | 1.6%       | 4,005                     |
| 2025 | 2,287         | 2.1%       | 5,307                     |
| 2026 | 2,939         | 2.7%       | 6,950                     |
| 2027 | 3,808         | 3.4%       | 9,141                     |
| 2028 | 4,911         | 4.4%       | 11,920                    |
| 2029 | 6,319         | 5.7%       | 15,468                    |
| 2030 | 8,020         | 7.2%       | 19,755                    |
| 2031 | 10,194        | 9.1%       | 25,232                    |
| 2032 | 12,749        | 11.4%      | 31,671                    |
| 2033 | 15,949        | 14.2%      | 39,735                    |

The Company did not attempt to modify this annual energy requirement estimate (2,520 kWh) per regional commute distances or regional climate and related efficiency; both estimates would involve comparisons of national and regional characteristics that are difficult to make at this early stage of adoption. However, the Company did leverage regional temperature information to impart a seasonal (i.e. monthly) distribution to the overall annual EV energy requirements estimates.

EV energy requirements/efficiency will vary with temperature; consequently, EV efficiency will also vary by month. The Company combined regional weather information<sup>38</sup> with observations of the Nissan Leaf's seasonal efficiency<sup>39</sup> to identify this seasonal variance in energy requirements. The results suggest that EV efficiency is optimal between 60 and 70 degrees Fahrenheit which is the

<sup>36</sup> Count of Standard Residential and All Electric accounts – excludes Dual Fuel and Controlled Access to avoid double counting and inflating the estimate of households served.

<sup>37</sup> General Motors estimates the annual energy use of a Chevy Volt is 2,520 kWh – <https://www.energy.gov/eere/electricvehicles/charging-home> – Rough estimates of energy requirements based on regional commuting distances and 33 kWh per 100 mi (Nissan Leaf rated efficiency) produced 2,580 kWh, so the Chevy Volt estimate is likely an accurate enough assumption for long-term forecasting.

<sup>38</sup> The Company used a twenty-year historical average temperature by month at Duluth International Airport. This is consistent with weather assumptions used energy and peak demand forecasting.

<sup>39</sup> [https://pubs.acs.org/doi/suppl/10.1021/es505621s/suppl\\_file/es505621s\\_si\\_001.pdf](https://pubs.acs.org/doi/suppl/10.1021/es505621s/suppl_file/es505621s_si_001.pdf)

average daily temperature during the summer months in North Eastern Minnesota.<sup>40</sup> During winter months, when the average daily temperature is just 15 degrees Fahrenheit, EVs will require about 40% more energy than during optimal conditions.

Identifying the impact of EV charging on monthly peak demand requires information on charging patterns/characteristics – i.e. how/when customers will tend to charge their vehicles. A National Renewable Energy Laboratory (NREL) value assessment study of electric vehicles<sup>41</sup> contained modeled EV charging patterns for several customer types. For the purposes of determining EV charging load coincident with the system peak demand, Minnesota Power assumed the charging profile representative of: level 1 charging, at a single family dwelling, with *no* Time of Use (TOU) restriction or rate.

Per these profiles, approximately 12% of daily residential EV energy requirements are met at the most typical winter peak hour (6 PM) and about 6% of daily EV energy requirements are met during the likely summer peak hour (3 PM).<sup>42</sup>

The Company projects that by the late 2030, about 7% of Minnesota Power customers will own an EV, and Minnesota Power will be the primary service provider to about 8,000 EVs. This outlook assumes Minnesota Power customers' EV penetration and adoption continues to lag the U.S. by about 4 years. The Company attributes this lag in adoption to issues of income, population density/cost-efficiency of commercial charging station locations, and reduced efficiency in cold-weather. These factors may be overcome with technological advancement or a rapid escalation in gasoline costs, or Minnesota Power customers may “catch-up” to the rest of the country in EV adoption regardless of these limiting factors. The Company will refresh its EV forecast and methodology each year, and will publish the results along with any substantive methodological changes or key findings in the AFR.

## **v. Methodological Strengths and Weaknesses**

The Company's forecast process combines econometric modeling with a sensible approach to modifying model outputs for assumed changes in large customer loads or new technology adoption. An econometric approach, utilizing regression modeling, is optimal for estimating a baseline projection with a given economic outlook and capturing the historical and projected effects of energy efficiency. However, a fully econometric process would not imply any of the substantial industrial expansions that are likely in the Minnesota Power service territory. A combined “econometric/large customer load addition” approach produces the most reasonable forecast.

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<sup>40</sup> The Company recognizes that temperature during a summer day may vary considerably, and that overall efficiency in summer months should be lower than optimal. More accurate assumptions for seasonal/temperature-related efficiency would involve more complicated assumptions for driving times and coincident temperatures. This is something the Company will investigate in the future. The Company opted for simplicity of assumption in this regard for this inaugural EV forecast.

<sup>41</sup> <https://www.nrel.gov/docs/fy17osti/66980.pdf>

<sup>42</sup> The Company recognizes that these assumptions do not capture the mid-day load potential for commercial or “at work” charging, and only accounts for home charging patterns. This is not an oversight. The Company does not currently have sufficient information to project commercial charging, but will re-evaluate in future iterations of the AFR.

The Company's econometric modeling process has two key strengths: it is both highly replicable, and adept at narrowing the list of potential models to only those that are most likely to produce quality results which allows more time for in-depth statistical testing and critical review of each model.

That said, there are some weaknesses to a combined "econometric/large customer load addition" approach. For instance, there is some subjectivity in the perceived likelihood of individual large customer load addition/losses since their magnitude or timing is difficult to estimate in a probabilistic way. To minimize subjectivity on the part of Minnesota Power, the Company utilizes information that has been publicly communicated by prospective customers in its scenario planning.

Minnesota Power is highly sensitive to large industrial customer decisions as large taconite, paper, and pipeline customers represent more than half of Minnesota Power's system demand and energy sales at any given point in time. The Company addresses this potential for error by maintaining close contact with existing and potential customers to keep current on their plans.

### **C. Inputs and Sources**

Minnesota Power draws on a number of external data sources and vendors for its indicator variables. Each year, the forecast database is updated with the most current economic and demographic data available. This involves an update of the entire historical timeframe since these data are frequently revised. Special attention is given to identifying any changes from previous years' data and data sources. Changes from last year's database are clarified later in this section.

#### **i. AFR 2019 Forecast Database Inputs**

##### Weather

Weather data for Duluth, Minnesota was collected for historical periods from the National Oceanic and Atmospheric Administration (NOAA) and from Weather Underground (WU).<sup>43</sup> Minnesota Power utilizes Monthly HDDs and CDDs in energy sales forecasting and peak-day weather conditions in peak demand forecasting.

Monthly total HDD and CDD are sourced from NOAA. The monthly total HDD and CDD values are normalized for the number of days in a month by dividing the monthly HDD or CDD count by the number of days in the month. This results in the "per-day" series HDDpd and CDDpd. For example:

The "per-day" value of 46.1 HDDpd in January 1990 was calculated as follows:

Duluth Minnesota's HDD count for January 1990 (1428) is divided by the number of days in January (31) to produce an HDDpd value of 46.1.

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<sup>43</sup> <http://www.wunderground.com/>.

Normalizing the series by transforming to a per-day unit allows for a more accurate estimate of the weather’s impact on energy sales. The forecast assumes a twenty-year historical average for each month (Apr 1999 – Mar 2019). For example, January’s forecast assumption is an average of Jan-00, Jan-01,..., Jan-19.

Temperature, humidity, and wind-chill data used to model peak demand are derived from Schneider Electric. In previous forecasts, the Company has leveraged either NOAA or WU for daily or monthly-frequency values. The 2019 AFR forecast database features weather observations that are specific to the historical peak hour (i.e. the temperature, humidity, and wind-chill at the time of the peak). This closer alignment between the peak demands and the weather that induced them should produce a more accurate estimate of weather-sensitivity and a more accurate forecast of future peak demand.

Development of the historical weather series begins by establishing the date and time of historical monthly peaks. Weather observations for these date/times is then gathered and organized into a monthly-frequency weather series.

Calculating a twenty-year historical average of peak-time weather for use as a forecast assumption requires recorded peak dates for the timeframe prior to the establishment of the current electronic database (1998-1999). Minnesota Power uses the Federal Energy Regulatory Commission (FERC) Form 1 to identify the dates for peaks prior to 1999 and then gathers the corresponding weather data. Forecast assumptions for peak-day weather can be calculated from the completed twenty-year history.

A Temperature-Humidity Index (THI)<sup>44</sup> is utilized to take into account the effect of heat and, when applicable, humidity on summer peaks. The THI is only applicable when temperatures exceed 75 degrees. A Wind-chill (WC) index<sup>45</sup> was also utilized to capture the cold temperatures and, when applicable, the cooling effects of wind speed.

### IHS Global Insight

IHS Global Insight is the singular source for all economic and demographic outlooks used in Minnesota Power’s load forecast.<sup>46</sup> A single source for National, Metropolitan Statistical Area (MSA), and County-level outlooks ensures internal consistency of forecast assumptions.

IHS Global Insights data development process begins with producing a national-level forecast. County-level and MSA data for Northeast Minnesota is then calculated through a “Top-down/Bottom-up” approach; the Minnesota Power area economy is modeled independently, considering unique local conditions, and is then linked to the national economy to ensure consistency across the national, regional, state, and MSA levels.

Since 2009, Minnesota Power has utilized IHS Global Insight estimates of historical and forecast economic activity in Northeast Minnesota as key inputs to energy and customer count models. Recent years’ forecast processes have featured an expansion of IHS Global Insight data use, and AFR 2019 continues this trend towards greater granularity and constancy.

<sup>44</sup> [http://www.wpc.ncep.noaa.gov/html/heatindex\\_equation.shtml](http://www.wpc.ncep.noaa.gov/html/heatindex_equation.shtml).

<sup>45</sup> <http://www.nws.noaa.gov/os/windchill/index.shtml>.

<sup>46</sup> With the exception of two series that are derived from REMI: Population and GRP for the 13-County Planning Region.



AFR 2014 featured the adoption of IHS Global Insight’s national-level economic indicators as inputs to Industrial Production Index (IPI) modeling process. IHS Global Insight provided access to more national-level variables than the previous source<sup>47</sup> and allowed Minnesota Power to expand its IPI forecast database. The data source change also maintained consistency of assumption in all areas of Minnesota Power’s forecast process and among all levels of geographic granularity.

In both AFR 2015 and AFR 2016, the Company expanded the forecast database to include more geographically-granular indicators to add predictive power by more-closely aligning with the area containing Minnesota Power’s customer base. AFR 2015 featured the addition of Duluth Metropolitan Statistical Area (Duluth MSA)<sup>48</sup> economic indicators, and the AFR 2016 database was expanded to include economic indicators for all *individual* counties in the 13-County Planning Area in addition to the 13-County Planning Area Aggregate.<sup>49</sup> This expanded the number of economic/demographic predictor variables from 78 (in AFR 2015 database) to 454 (in the AFR 2016 and subsequent databases).

IHS Global Insight utilizes the most current historical data available from public data sources, which is updated frequently. These updates flow through IHS Global Insight’s process to ultimately effect the historical series used in Minnesota Power’s forecast database. Thus, the historical regional employment and income data has changed from last year’s database.

The frequency of the raw Duluth MSA and National-level economic data is quarterly, and interpolation to a monthly frequency is necessary for use in Minnesota Power’s monthly forecasting process. The interpolation method used is described in the *Specific Analytical Techniques* section.

#### Regional Economic Models, Inc. (REMI)

Minnesota Power subscribes to the latest REMI Policy Insight version (PI+) for northeastern Minnesota. This input/output econometric simulation software combines a national economic outlook<sup>50</sup> with specified regional economic conditions to produce a forecast for a 13-County Planning Area such as employment by sector, population, economic output by sector, and Gross Regional Product (GRP).

For AFR 2019, REMI was used to quantify the indirect economic effects of known and expected changes in regional employment (i.e. expansions and layoffs/closures) to produce an expected economic outlook for the region.

IHS Global Insight economic indicators for both 13-County Planning Area and the Duluth MSA are calibrated using the results of REMI’s economic simulations. As the REMI outlook is adjusted for alternative planning scenarios, the monthly employment and income outlooks are changed accordingly.

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<sup>47</sup> Blue Chip Economic Indicators.

<sup>48</sup> The Duluth MSA is defined as St. Louis and Carlton counties in Minnesota, and Douglas County in Wisconsin.

<sup>49</sup> Minnesota Power’s 13 County Planning Area is defined as: Carlton, Cass, Crow Wing, Hubbard, Itasca, Koochiching, Lake, Morrison, Pine, Saint Louis, Todd, and Wadena counties in Minnesota, and Douglas County Wisconsin.

<sup>50</sup> Prior to simulation, REMI is calibrated to the IHS Global Insight National Economic Outlook.

Some indicators such as population and GRP are not provided by IHS Global Insight for the 13-County Planning area. These series are derived directly from REMI outputs, and are of annual frequency. Interpolation to a monthly frequency is necessary for use in Minnesota Power's monthly forecasting process. The interpolation method used is described in the *Specific Analytical Techniques* section.

Like IHS Global Insight, REMI relies on data from public sources that are subject to revision. These revised data inputs result in revised historical values for the economic and demographic indicators used in Minnesota Power's database.

### Indexes of Industrial Production (IPI series)

The indexes of industrial production are measures of sector-specific production in a given month relative to a base year, 2012 in this case (that is, 2012 = 100). The indexes exhibit a high degree of correlation with Minnesota Power's historical industrial energy sales and are, therefore, ideal for forecasting future energy sales to the class.

The historical national-level IPI data were obtained from the Board of Governors of the Federal Reserve. The historical data is regularly revised to incorporate better data, better methods, and to update the base year. To capture these revisions, Minnesota Power updates the entire historical data series each year. These revisions are explained on the Federal Reserve's website.<sup>51</sup>

Forecasts for each national-level IPI were developed from the projections of national-level economic indicators from IHS Global Insight, and are, therefore, consistent with all other AFR 2018 forecast assumptions. These macroeconomic drivers are used to model and forecast the national-level IPI series.

The historical Minnesota iron IPI was developed using actual iron ore production data from the U.S. Geological Survey website (USGS).<sup>52</sup> The projected Minnesota iron IPI was developed by scaling the national-level Iron IPI forecast using an assumption of the industry's composition going forward. Minnesota now comprises about 83% of U.S. product, so the Minnesota iron IPI equals the national-level IPI x 0.83. The entire historical and forecast Minnesota iron IPI was then indexed to 2012 for consistency with past AFR, the other IPI series used in AFR 2019, and the U.S. Federal Reserve's current standard index year.

Note that Minnesota Power de-trends all input variables prior to modeling and opted to utilize an already de-seasonalized series from the external source rather than applying its own de-seasonalizing function. Both the seasonally-adjusted and unadjusted series are available from the Board of Governors of the Federal Reserve. The 2019 forecast database utilizes the seasonally adjusted historical indexes.

<sup>51</sup> <http://www.federalreserve.gov/releases/g17/revisions/Current/g17rev.pdf>.

<sup>52</sup> [https://minerals.usgs.gov/minerals/pubs/commodity/iron\\_ore/](https://minerals.usgs.gov/minerals/pubs/commodity/iron_ore/)



## Energy Prices

Estimates of future Minnesota Power rate changes are incorporated into the average electric price forecasts as generally indicative of the intention and anticipation of changes in the Company's rate structure and prices.

Average energy prices, history and forecast data, are from the Department of Energy (DOE) and Energy Information Administration (EIA). The fuel types considered are electricity and natural gas. End-use class energy price data is categorized by DOE/EIA into residential, commercial, and industrial. DOE's Annual Energy Outlook (AEO) is used for the forecast period. DOE provides historical energy price data for Minnesota, forecast energy price data for the West North Central (WNC) region, and the national total. Minnesota Power's historical average electric price data are from the Company's FERC Form 1 and represent annual class revenue divided by annual class energy. All energy prices are deflated by the 2012 base year GDP implicit price deflator (IPD).

## Energy Efficiency, Distributed Solar, and Electric Vehicles

Refer to section 1B iv. "Treatment of DSM, CIP, DG, and EV in the Forecast" for all data and assumption sources concerning Energy Efficiency, Distributed Solar, and Electric Vehicles.

### **ii. Adjustments to Raw Energy Use and Customer Count Data**

Minnesota Power made a limited number of adjustments to internally developed data for AFR 2019, which fall into three general categories:

1. Adjustments to raw customer count data for billing anomalies
2. Adjustments to raw sales and peak demand data for large load additions and losses
3. Adjustments to convert sales data into overall energy requirements data

***Adjustments to raw customer count and energy sales data for billing anomalies*** – Minnesota Power's historical customer count and energy sales data contain a number of anomalous or missing observations that can affect modeling and resulting forecasts.

Employing a binary variable during modeling or adjusting the raw data prior to modeling are two common techniques used to avoid biasing models with anomalous observations. Prior to the AFR 2014 process, Minnesota Power used both techniques, but their application was not entirely consistent. The Company's current database and modeling policy is as follows:

Where there is a systemic shift (e.g. seasonal billing in residential customers count), Minnesota Power does not adjust the raw data and instead utilizes a binary variable in modeling. When there are less than 3 consecutive anomalous observations, Minnesota Power adjusts the raw data prior to regression using straight-line interpolation. In general, an observation was considered anomalous if it varied by more than 0.5 percent from a straight-line-interpolated value.

The 2019 customer count and energy sales database contains 231 monthly points (about 2.5 percent of all monthly points) that have been adjusted in this way.

*Adjustments to raw sales and peak demand data to account for large load additions and losses –*  
All adjustments to the historical database are described below in detail and organized by sector. The impact of this methodological change on the forecast for each customer class is discussed in the *Model Documentation* section.

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has been intentionally left blank.

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*Notes on Adjustments to historical series:*

- When assessing the ability of economic variables to reflect the above mentioned structural breaks, Minnesota Power identified those instances when the raw energy sales series could be modeled more accurately than the adjusted series; in these cases when the economic data explains the change, the use of the raw sales series is appropriate. When the adjusted series can be modeled more accurately than the raw series, then it's evident that the economic data cannot adequately explain the shift and the adjusted historical sales series should be utilized. However, it should be noted that it is the Company's preference to use binary variables in these instances when the relationship between variables has changed by some measurable constant. This technique utilizes the raw data series (unadjusted) as a result.
- When recent load additions or losses can be accurately quantified, they are removed from the historical sales and peak series prior to modeling and a post-regression adjustment is used to account for the load addition or loss in the forecast timeframe. When it is not possible to accurately quantify this recent change (e.g. if a customer is served by a municipal customer and their usage data is not accessible by Minnesota Power), then no adjustment is made to the historical data. In this case, a post-regression adjustment is still applied to account for the load addition in the forecast timeframe. When it's evident that this load addition or loss is reflected in the econometric forecast or the change can be modeled with a binary variable, Minnesota Power will cease the application of a specific post-regression adjustment.

**iii. Changes to Forecast Database**

Regarding externally derived data, Minnesota Power noted several changes between the AFR 2019 forecast database and the AFR 2018 database. Several changes concern adjustments to the historical dependent series (energy use, customer count, peak) and are explained in the previous section on *"Adjustments to raw sales and peak demand data to account for large load additions and losses."*

Regarding, regional economic indicators, all changes were fairly minor and are explainable and plausible. Minnesota Power is confident in moving forward with the database updates. Table 2 shows the series that were utilized in both the AFR 2018 and the AFR 2019 forecasts. The table shows the percent difference of the last full historical year common to both databases (2017), and identifies the percent difference in a forecast year (2025) for comparison.

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**Table 7: Changes to Forecast Database**

| Economic and Demographic Variables                              | Changes to Database<br>2018 to 2019 | Percent difference in<br>variable in 2017 | Percent difference in<br>variable by 2025 |
|---|-------------------------------------|---|---|
| MP Area Total Non-Farm Employment                               | Change #1                           | 0.0%                                      | -2.2%                                     |
| MP Area Employment in Education & Health                        | Change #1                           | -0.8%                                     | -3.9%                                     |
| MP Area Employment in Government                                | Change #1                           | 0.2%                                      | -1.4%                                     |
| MP Area Employment in Professional Business Services            | Change #1                           | -0.6%                                     | -3.4%                                     |
| MP Area Employment in Information Services                      | Change #1                           | -1.6%                                     | -8.5%                                     |
| MP Area Employment in Financial Services                        | Change #1                           | 0.4%                                      | -5.0%                                     |
| MP Area Employment in Manufacturing                             | Change #1                           | 0.4%                                      | -1.4%                                     |
| MP Area Employment in Construction, Natural Resources, & Mining | Change #1                           | -0.2%                                     | -0.9%                                     |
| MP Area Gross Regional Product                                  | Change #1                           | -0.5%                                     | 1.7%                                      |
| MP Area Non-Wage Personal Income                                | Change #1                           | 8.3%                                      | 6.7%                                      |
| MP Area Wage Distribution                                       | Change #1                           | 5.6%                                      | 1.7%                                      |
| MP Area Population  | Change #1                           | -0.1%                                     | -0.3%                                     |
| MP Area Income per Capita                                       | Change #1                           | 7.2%                                      | 5.3%                                      |
| MP Area Product per Capita                                      | Change #1                           | -0.5%                                     | 1.9%                                      |
| MP Area Employment to Population Ratio                          | Change #1                           | 0.1%                                      | -1.9%                                     |
|   |                                     |   |   |
| Duluth MSA Total Non-Farm Employment                            | Change #2                           | -0.1%                                     | -1.7%                                     |
| Duluth MSA Employment in Education & Health                     | Change #2                           | 0.0%                                      | -2.3%                                     |
| Duluth MSA Employment in Manufacturing                          | Change #2                           | 0.2%                                      | 1.1%                                      |
| Duluth MSA Employment in Government                             | Change #2                           | -0.5%                                     | -3.4%                                     |
| Duluth MSA Real Gross Metro Product                             | Change #2                           | 8.1%                                      | 8.4%                                      |
| Duluth MSA Population   | Change #2                           | -0.6%                                     | -0.7%                                     |
| Duluth MSA Disposable Total Personal Income                     | Change #2                           | 8.9%                                      | 6.8%                                      |
| Duluth MSA Housing Starts                                       | Change #2                           | 194.5%                                    | -18.3%                                    |
|   |                                     |   |   |
| St. Louis County Employment in Government                       | Change #3                           | -0.5%                                     | -3.2%                                     |
| St. Louis County Employment in Education and Health             | Change #3                           | 0.0%                                      | -3.1%                                     |
| St. Louis County Employment in Manufacturing                    | Change #3                           | 0.3%                                      | 3.5%                                      |
| St. Louis County Employment in Information Services             | Change #3                           | -0.3%                                     | -12.9%                                    |
| St. Louis County Employment in Leisure & Hospitality            | Change #3                           | 0.7%                                      | 3.4%                                      |
| St. Louis County Employment in Financial Services               | Change #3                           | -0.2%                                     | -8.5%                                     |
| St. Louis County Total Personal Income                          | Change #3                           | 6.1%                                      | 5.2%                                      |
| St. Louis County Non-Wage Personal Income                       | Change #3                           | 6.4%                                      | 6.4%                                      |
| Itasca County Total Personal Income                             | Change #3                           | 9.3%                                      | 7.5%                                      |
| Itasca County Employment in Government                          | Change #3                           | 0.4%                                      | 0.7%                                      |
| Itasca County Non-Wage Personal Income                          | Change #3                           | 8.3%                                      | 7.5%                                      |
| Douglas County Employment in Education and Health               | Change #3                           | -0.7%                                     | -3.7%                                     |
|   |                                     |   |   |
| Industrial Production Index: Iron Ore Mining                    | Change #4                           | -3.9%                                     | 0.5%                                      |
| Industrial Production Index: Paper                              | Change #4                           | 0.2%                                      | -1.7%                                     |

Change #1 (Minnesota Power Area Employment, Regional Product, & Population Metrics) – When aggregated to annual values, the employment and regional product series for the Minnesota Power 13-County area show overall downward movement from the AFR 2018 historical data. The outlooks for each series have been updated to reflect the most current outlook by IHS Global Insight.

Change #2 (Duluth MSA Employment, Metro Product, Population, and Housing Metrics) – Most Duluth MSA variables are lower than in the AFR 2018 database. AFR 2018's Housing Starts preliminary value for 2017 has since been revised by IHS Global Insight to reflect a much higher

(598 vs. 203) actual number. Similar to the 13-County metrics above, the outlooks for each series have been updated to reflect the most current outlook by IHS Global Insight.

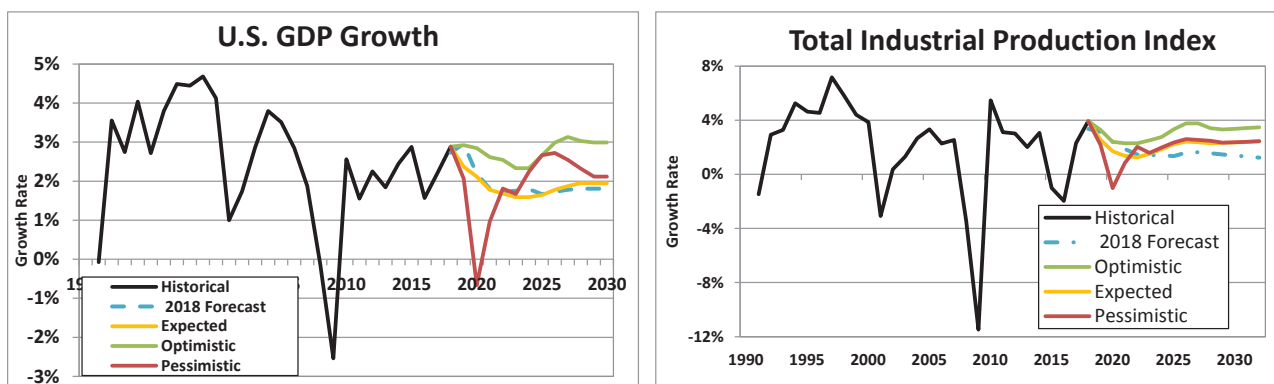
*Change #3 (Individual County Employment/Personal Income Metrics)* – most employment and income variables for St. Louis/Itasca/Douglas Counties have increased relative to the AFR 2018 historical data. The historical data and projections for each series have been updated to reflect the most current data available from IHS Global Insight.

*Change #4 (Industrial Production Indexes)* – As noted in the *Inputs and Sources* section, historical IPI series were downloaded from the Federal Reserve Board’s Data Download Program. The iron IPI in both the 2019 and 2018 databases is a Minnesota-only definition using the methodology described in the “AFR 2019 Inputs and Sources” section. It should be noted that the base year (2012 = 100) for all IPI is the same as last year’s projection.

## D. Overview of Key Inputs/Assumptions

### i. National Economic Assumptions

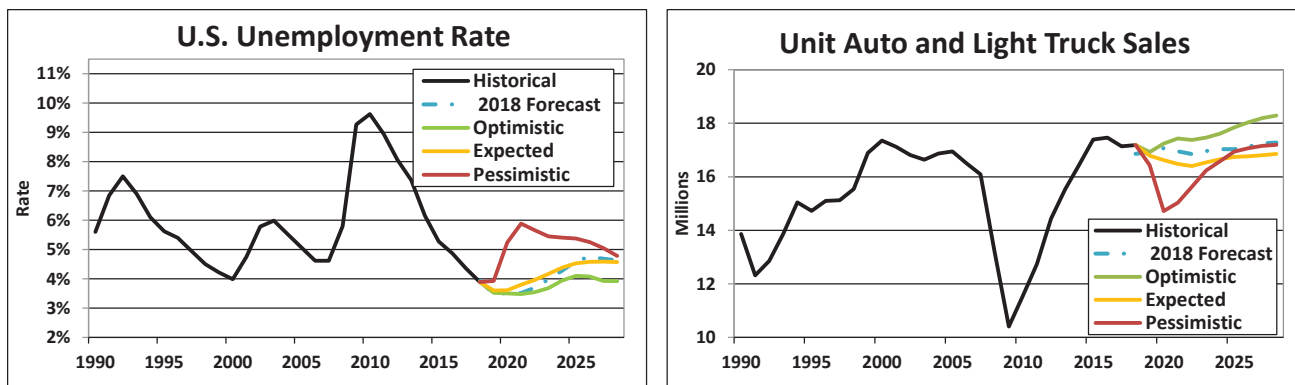
The national economic outlook is derived from IHS Global Insight and serves as the basis for Minnesota Power’s regional economic model simulations. Some of the key outputs of the national economic forecast are GDP, IPI, unemployment rates, and auto sales. These variables are shown in Figures 8-11 below, for the Expected, Optimistic, and Pessimistic cases.



Figures 8 and 9: National Economic Outlook (GDP and Industrial Production)

The Expected case (yellow) macroeconomic outlook serves as the underlying assumption for in AFR 2019. In the Expected case, U.S. GDP and IPI growth average 1.9 and 2.1 percent per year from 2019-2033 respectively.

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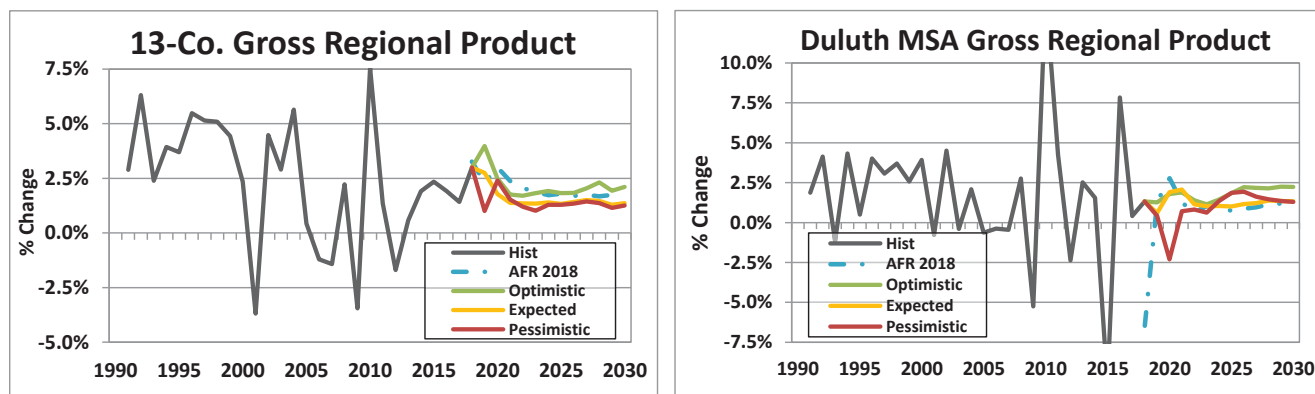


Figures 10 and 11: National Economic Outlook (Unemployment Rate and Auto Sales)

Figure 10 shows the unemployment rates in the three national outlooks all fluctuate slightly in the first few years of the forecast timeframe before reaching long term labor market stability consistent with the assumed rate of GDP growth. Assumptions of unit auto and light truck sales in Figure 11 show similar pattern in the forecast timeframe with moderate improvement in the short-term and stabilization in the long-term.

## ii. Regional Economic Assumptions

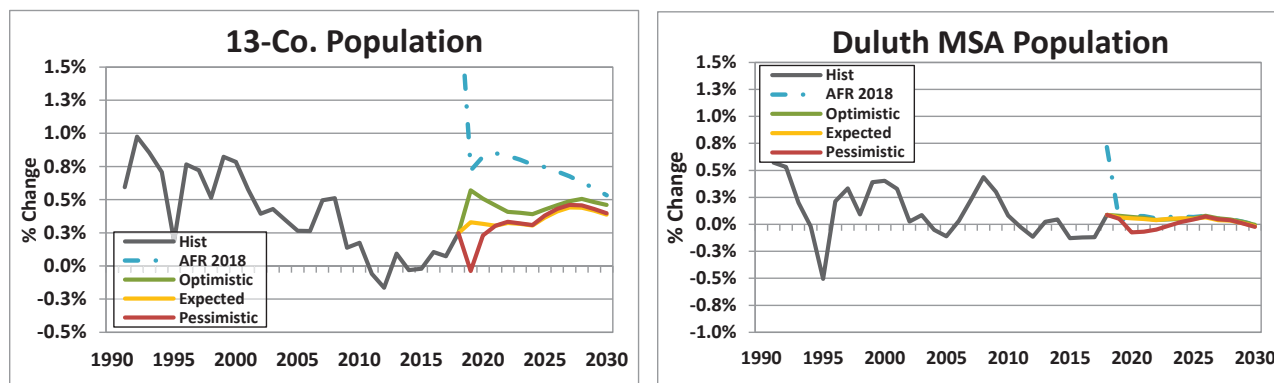
The Regional Economic Model provided by REMI is calibrated to the geographic area additively defined as 13 counties, 12 counties in Minnesota (Carlton, Cass, Crow Wing, Hubbard, Itasca, Koochiching, Lake, Morrison, Pine, Saint Louis, Todd, and Wadena) and one county in Wisconsin (Douglas). This is referred to as the “13-County Planning Area.” Minnesota Power expanded its database to include economic and demographic indicators at the Metropolitan Statistical Area level (this includes St. Louis and Carlton counties in Minnesota and Douglas County Wisconsin). The graphs below show alternative economic outlooks for both regions based on the high and low outlooks for the nation. The regional economic outlooks are further specified by incorporating scenario-specific inputs into REMI, as described in Section 1.C. Figures 12 and 13 compare the historical and projected growth rate of both regions’ product.



Figures 12 and 13: Regional Economic Outlooks (13-County Product and Duluth MSA Product)

The 13-County Planning Area’s Gross Regional Product averages 1.5 percent per-year growth in the forecast timeframe whereas the Duluth MSA product averages just 1.3 percent per-year in the

forecast timeframe. Population growth rates show a similar trend: the 13-County Planning Area grows at about 0.4 percent in the forecast timeframe and the Duluth MSA area population grows at just 0.02 percent per-year. The difference in the two regions' historical and projected growth, shown below in Figures 14 and 15, demonstrates why Minnesota Power expanded its database to include both Duluth MSA and the 13-County regional data.



Figures 14 and 15: Regional Economic Outlooks (13-County Population and Duluth MSA Population)

## A. Econometric Model Documentation

This section presents the statistical detail of all models utilized in the development of the AFR 2019 forecast. The model's structure, key diagnostic statistics, forecast results, and a discussion of the model are provided for added transparency.

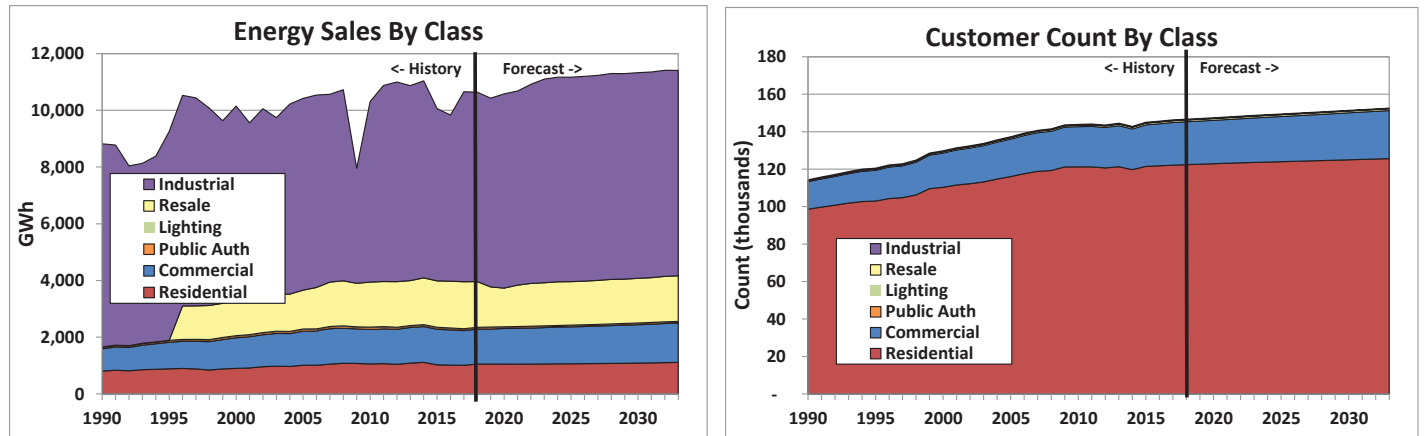
Models are shown with each variable's coefficient, t-statistic, P-value, and VIF. A graph displays the historical series, growth rates for timeframes of interest, and compares this year's forecast to last year's forecast. A table shows a more focused view of the forecast with a shorter historical timeframe to examine year-over-year growth rates. Key diagnostic statistics for the OLS model are shown in a table in the bottom left corner of each page. Specific diagnostic criteria and modeling techniques discussed in this section are described in detail in Section B. Minnesota Power's Forecast Process under the heading *Specific Analytical Techniques*.

Minnesota Power offers a discussion of the modeling approach, econometric interpretations of key variables, and potential model issues for each model. This portion of the model documentation also compares this year's model with last year's model and notes any interesting findings or insights gained.

The forecast values shown in the chart and tables for each model combine the econometric output with specific load, energy, and customers count additions. The total energy sales outlook is shown below (left) with the total customer count outlook (right).



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Figures 16 and 17: Projection of Energy Sales and Customer Count by Class

Minnesota Power did not develop a model to forecast Sales for Resale customer count. Minnesota Power currently has 16 resale customers, each of which has signed a service agreement. The loss or gain of a resale customer is therefore better accounted for by reviewing these agreements and communicating with customers. Econometric models are not appropriate for estimating future resale customer counts.

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## Residential Customer Count - Expected Scenario

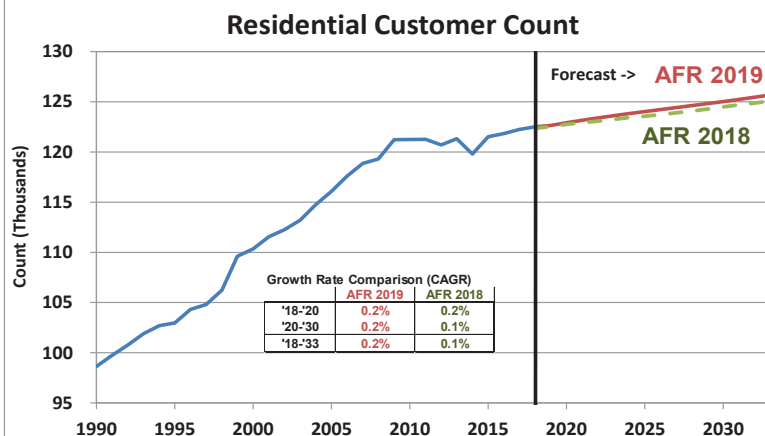
Estimation Start/End: 1/1990 - 3/2019  
Unit Modeled/Forecast: Monthly Customer Count

| Variable         | Model Specifications |         |             |      |
|------------------|----------------------|---------|-------------|------|
|                  | Coefficient          | P-Value | HAC-P-Value | VIF  |
| CONST            | 89,359.70            | 0.00%   | 0.00%       |      |
| Time_Trend       | 92.79                | 0.00%   | 0.00%       |      |
| Bill_Res_1       | (1,829.54)           | 0.00%   | 0.00%       |      |
| Bill_Res_2       | (3,359.90)           | 0.00%   | 0.00%       |      |
| BI_2012_2033     | 15,224.51            | 0.00%   | 0.00%       |      |
| Trend_2012_2033  | (65.15)              | 0.00%   | 0.00%       |      |
| PBS_13_t         | 0.29                 | 0.00%   | 3.70%       | 2.30 |
| MSA_Edu_Health_t | 232.67               | 0.00%   | 7.56%       | 4.20 |

Residential Customer Count

| Count | Y/Y Growth |
|-------|------------|
| 2008  | 119,300    |
| 2009  | 121,217    |
| 2010  | 121,235    |
| 2011  | 121,251    |
| 2012  | 120,697    |
| 2013  | 121,314    |
| 2014  | 119,789    |
| 2015  | 121,515    |
| 2016  | 121,836    |
| 2017  | 122,253    |
| 2018  | 122,506    |
| 2019  | 122,642    |
| 2020  | 122,907    |
| 2021  | 123,183    |
| 2022  | 123,399    |
| 2023  | 123,621    |
| 2024  | 123,829    |
| 2025  | 124,006    |
| 2026  | 124,201    |
| 2027  | 124,406    |
| 2028  | 124,617    |
| 2029  | 124,824    |
| 2030  | 125,036    |
| 2031  | 125,245    |
| 2032  | 125,439    |
| 2033  | 125,660    |

| Model Statistics        | Magnitude |
|-------------------------|-----------|
| Adjusted R <sup>2</sup> | 99.7%     |
| AIC                     | 12.33     |
| SIC                     | 12.41     |
| Degrees of Freedom      | 343       |
| Durban-Watson           | 0.6       |
| MAPE                    | 0.31%     |
| In-Sample RMSE          | 469       |
| Out-of-Sample RMSE      | 658       |



### Model Discussion

The AFR 2019 forecast of residential customer count is very similar to the AFR 2019 outlook. The forecast annual growth rate increased by about 0.1% from AFR 2018 as actual account growth in 2018 outpaced last year's projections by about 150 customers. The AFR 2019 projected customer count is about 550 customers (0.4%) higher than the AFR 2018 outlook by 2030.

Key economic drivers of customer growth include Employment in the Professional Business Services sector (13-County) and Education & Health employment (Duluth MSA). This differs from last year's model which utilized Manufacturing Employment (Duluth MSA) in addition to Education & Health employment. Nearly all of the top models for residential customer count used Employment in the Education and Health sector, and this variable has been a staple of AFR residential count models for several years.

Minnesota Power's econometric interpretation of the key drivers is as follows: For each new Professional & Business Services employee, the customer count should increase by about 0.29. For each job added to the Education & Health sector, the customer count should increase by about 0.233. These impacts are in addition to a general upward trend over time.

The combination of a binary and a trend variable for the 2012-2033 timeframe mark a shift in the level and trend of the estimate to align with recent customer growth. These variables effectively shift the first forecast year (2019) to align with the last historical year (2018). Without these corrective binary variables, a small but growing divergence between actual and predicted customer growth in the late historical timeframe suggests the economic indicators alone would overstate customer count. Without these binary variables, the model would project an increase of about 400 customers from 2018 to 2019 (a 0.3% increase).

Two binary variables (Bill\_Res) account for seasonal billing between 1994 and 2001. Due to accounting practices, during this timeframe the recorded customer counts from November to May are 2,000-6,000 lower than from June to October. Previous years' residential customer count models also utilized these variables.

This year's model is highly comparable to last year's in terms of statistical quality. The Adjusted R-Squared indicates there's a high goodness-of-fit, and the low SIC indicates a highly parsimonious model. The HAC-Adjusted P-values ("HAC-P-Value") suggests all variables' coefficients are significant. In-sample and Out-sample error metrics are similar to last year: In-sample MAPE is 0.31% vs. 0.27% in the 2018 model, and Out-sample RMSE is 658 vs. 593 in the 2018 model. The low Variance Inflation Factors (VIF) of each economic variable proves there is no significant multicollinearity among non-binary, non-trend variables.

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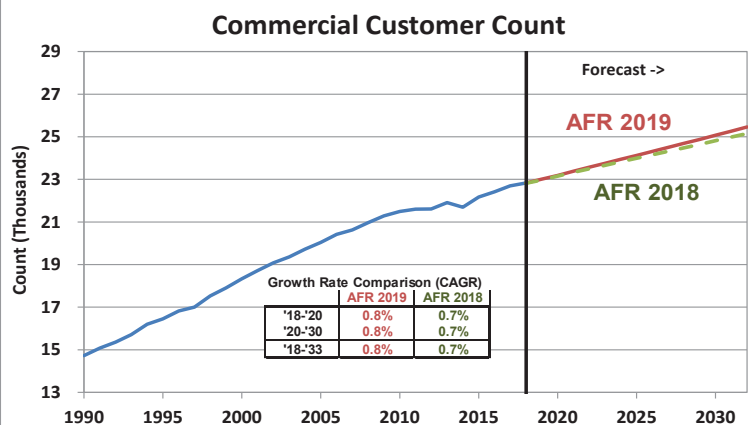
## Commercial Customer Count - Expected Scenario

Estimation Start/End: 1/1990 - 3/2019  
Unit Modeled/Forecast: Monthly Customer Count

| Variable        | Model Specifications |         |             |      |
|-----------------|----------------------|---------|-------------|------|
|                 | Coefficient          | P-Value | HAC-P-Value | VIF  |
| CONST           | 13,327.61            | 0.00%   | 0.00%       |      |
| Time_Trend      | 28.35                | 0.00%   | 0.00%       |      |
| Bi_2010_2033    | 3,379.21             | 0.00%   | 0.00%       |      |
| Trend_2010_2033 | (14.15)              | 0.00%   | 0.00%       |      |
| Info_StLou_t    | 0.23                 | 0.00%   | 0.00%       | 3.90 |
| GRP_13_t        | 47.70                | 0.00%   | 0.03%       | 2.00 |

| Commercial Customer Count |            |       |
|---------------------------|------------|-------|
| Count                     | Y/Y Growth |       |
| 2008                      | 20,969     |       |
| 2009                      | 21,287     | 1.5%  |
| 2010                      | 21,491     | 1.0%  |
| 2011                      | 21,603     | 0.5%  |
| 2012                      | 21,614     | 0.1%  |
| 2013                      | 21,915     | 1.4%  |
| 2014                      | 21,697     | -1.0% |
| 2015                      | 22,170     | 2.2%  |
| 2016                      | 22,420     | 1.1%  |
| 2017                      | 22,695     | 1.2%  |
| 2018                      | 22,834     | 0.6%  |
| 2019                      | 23,011     | 0.8%  |
| 2020                      | 23,184     | 0.7%  |
| 2021                      | 23,382     | 0.9%  |
| 2022                      | 23,571     | 0.8%  |
| 2023                      | 23,758     | 0.8%  |
| 2024                      | 23,943     | 0.8%  |
| 2025                      | 24,128     | 0.8%  |
| 2026                      | 24,314     | 0.8%  |
| 2027                      | 24,501     | 0.8%  |
| 2028                      | 24,690     | 0.8%  |
| 2029                      | 24,878     | 0.8%  |
| 2030                      | 25,069     | 0.8%  |
| 2031                      | 25,264     | 0.8%  |
| 2032                      | 25,458     | 0.8%  |
| 2033                      | 25,652     | 0.8%  |

| Model Statistics   | Magnitude |
|--------------------|-----------|
| Adjusted R^2       | 99.9%     |
| AIC                | 9.17      |
| SIC                | 9.23      |
| Degrees of Freedom | 345       |
| Durban-Watson      | 1.4       |
| MAPE               | 0.34%     |
| In-Sample RMSE     | 97        |
| Out-of-Sample RMSE | 99        |



### Model Discussion

The AFR 2019 forecast of commercial customer count is very similar to the (AFR 2018) outlook. The forecast annual growth rate increased by about 0.1% from AFR 2018 as actual account growth in 2018 outpaced last year's projections by about 12 customers. The AFR 2019 projected customer count is about 250 customers (1.0%) higher than the AFR 2018 outlook by 2030.

Key economic drivers of customer growth include Employment in the Information sector (St. Louis County), as well as 13-County Gross Regional Product. This model differs slightly from last year's model which was driven by Employment in the Information (13-County) and Financial Services sectors (St. Louis County), but 13-County Gross Regional Product has been used in past AFR commercial models, so this is not new or unintuitive. Employment in the Information sector has been leveraged as an indicator of commercial customer account growth for several years now.

Minnesota Power's econometric interpretation of the key drivers is as follows: For each job added in the Information sector, the commercial customer count should increase by about 0.23. As Gross Regional Product increases by \$1 Billion, commercial customer count should increase by about 48. These impacts are in addition to a general upward trend over time.

The combination of a binary and a trend variable for the 2010-2033 timeframe mark a shift in the level and trend of the estimate to align with recent customer growth. These variables effectively shift the first forecast year (2019) to align with the last historical year (2018). Without this corrective binary variable, a small but growing divergence between actual and predicted customer growth suggests the economic indicators alone would overstate customer count, and the 2019 forecast value confirms this. Without these binary variables, the model would project an increase of about 830 customers from 2018 to 2019 (a 3.6% increase).

This year's model is highly comparable to last year's in terms of statistical quality. The Adjusted R-Squared indicates there's a high goodness-of-fit, and the low SIC indicates a highly parsimonious model. The HAC-Adjusted P-values ("HAC-P-Value") suggests all variables' coefficients' are significant. In-sample and Out-sample error metrics are nearly identical: In-sample MAPE is 0.34% vs. 0.34% in the 2018 model, and Out-sample RMSE is 99 vs. 101 in the 2018 model. The low Variance Inflation Factors (VIF) of each economic variable proves there is no significant multicollinearity among non-binary, non-trend variables.

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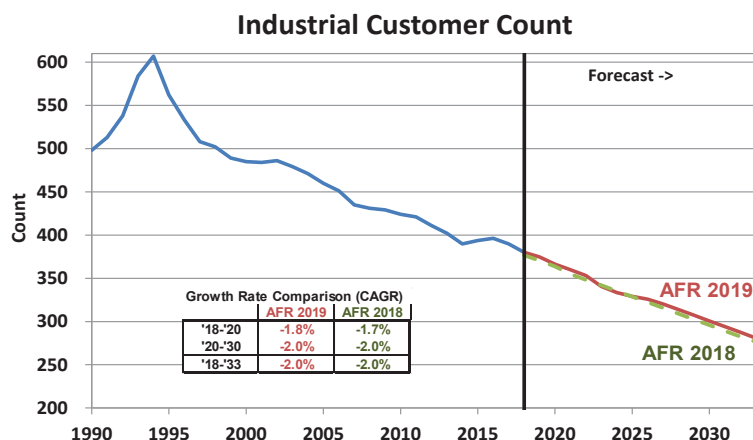
## Industrial Customer Count - Expected Scenario

Estimation Start/End: 2/1990 - 3/2019  
Unit Modeled/Forecast: Monthly Customer Count

| Variable              | Model Specifications |         |             |      |
|-----------------------|----------------------|---------|-------------|------|
|                       | Coefficient          | P-Value | HAC-P-Value | VIF  |
| CONST                 | 560.23               | 0.00%   | 0.00%       |      |
| Time_Trend            | (0.55)               | 0.00%   | 0.00%       |      |
| TotNonF_13_diff       | 0.001                | 47.16%  | 7.80%       | 1.00 |
| ProductPerCap_13_diff | 66,933.36            | 0.00%   | 2.35%       | 1.00 |

| Industrial Customer Count |       |            |
|---------------------------|-------|------------|
| Year                      | Count | Y/Y Growth |
| 2008                      | 431   |            |
| 2009                      | 429   | -0.5%      |
| 2010                      | 424   | -1.2%      |
| 2011                      | 421   | -0.7%      |
| 2012                      | 411   | -2.4%      |
| 2013                      | 402   | -2.2%      |
| 2014                      | 390   | -3.1%      |
| 2015                      | 394   | 1.0%       |
| 2016                      | 396   | 0.6%       |
| 2017                      | 390   | -1.6%      |
| 2018                      | 380   | -2.5%      |
| 2019                      | 375   | -1.4%      |
| 2020                      | 366   | -2.2%      |
| 2021                      | 360   | -1.8%      |
| 2022                      | 353   | -1.8%      |
| 2023                      | 341   | -3.6%      |
| 2024                      | 333   | -2.1%      |
| 2025                      | 329   | -1.3%      |
| 2026                      | 326   | -1.0%      |
| 2027                      | 320   | -1.7%      |
| 2028                      | 314   | -2.0%      |
| 2029                      | 307   | -2.1%      |
| 2030                      | 301   | -2.1%      |
| 2031                      | 294   | -2.2%      |
| 2032                      | 288   | -2.2%      |
| 2033                      | 281   | -2.3%      |

| Model Statistics   | Magnitude |
|--------------------|-----------|
| Adjusted R^2       | 86.9%     |
| AIC                | 6.17      |
| SIC                | 6.22      |
| Degrees of Freedom | 346       |
| Durban-Watson      | 0.1       |
| MAPE               | 2.59%     |
| In-Sample RMSE     | 22        |
| Out-of-Sample RMSE | 26        |



### Model Discussion

The AFR 2019 forecast of industrial customer count growth is nearly identical to the AFR 2018 outlook. The key economic drivers of customer count are Total Non-Farm Employment (13-County) and Product per-capita (13-County). The AFR 2018 model for industrial customer count was driven only by Total Non-Farm Employment (13-County).

Minnesota Power's econometric interpretation of the key drivers are as follows: As the month-to-month change in 13-County Total Non-Farm Employment increases by 1,000 the customer count should increase by 1. As the month-to-month change in 13-County Product per-capita increases by 0.0001 the customer count should increase by 6.7. These impacts are in addition to a general downward trend over time, as indicated by the negatively signed trend variable.

This year's model is comparable to last year's in terms of statistical quality. The Adjusted R-Squared indicates there's moderate goodness-of-fit, and the low SIC indicates a highly parsimonious model. The HAC-Adjusted P-values ("HAC-P-Value") suggests all variables' coefficients' are significant. In-sample and Out-sample error metrics are very similar: In-sample MAPE is 2.59% vs. 2.49% in the AFR 2018 model, and Out-sample RMSE is 26.2 vs. 27.6 in the 2018 model. The low Variance Inflation Factor (VIF) of the economic variable proves there is no significant multicollinearity among non-binary, non-trend variables.

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## Public Authorities Customer Count - Expected Scenario

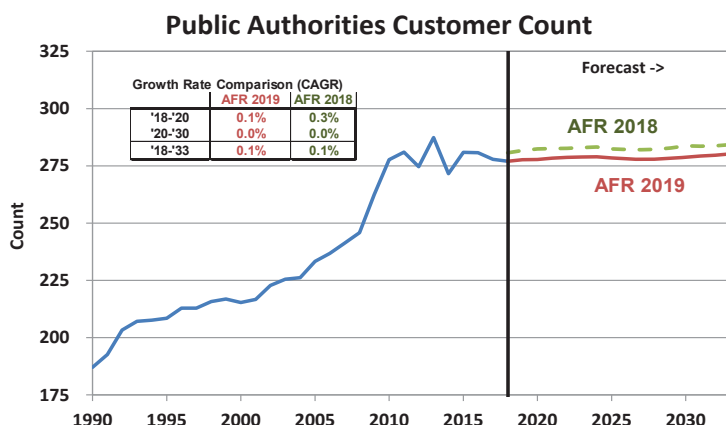
Estimation Start/End: 1/1990 - 3/2019  
Unit Modeled/Forecast: Monthly Customer Count

| Variable         | Model Specifications |         |             |      |
|------------------|----------------------|---------|-------------|------|
|                  | Coefficient          | P-Value | HAC-P-Value | VIF  |
| CONST            | (35.93)              | 0.64%   | 31.58%      |      |
| Time_Trend       | 0.18                 | 0.00%   | 0.00%       |      |
| Bi_7_2009        | 25.60                | 0.00%   | 0.00%       |      |
| Bi_2011_2033     | 8.65                 | 0.00%   | 0.01%       |      |
| MSA_Edu_Health_t | 5.62                 | 0.00%   | 0.00%       | 1.50 |
| Gov_13_t         | 0.002                | 0.00%   | 0.28%       | 1.20 |

Public Auth. Customer Count  
Count Y/Y Growth

|      |     |       |
|------|-----|-------|
| 2008 | 246 |       |
| 2009 | 262 | 6.7%  |
| 2010 | 278 | 5.8%  |
| 2011 | 281 | 1.2%  |
| 2012 | 275 | -2.3% |
| 2013 | 287 | 4.6%  |
| 2014 | 272 | -5.5% |
| 2015 | 281 | 3.4%  |
| 2016 | 281 | -0.1% |
| 2017 | 278 | -1.0% |
| 2018 | 277 | -0.3% |
| 2019 | 278 | 0.2%  |
| 2020 | 278 | 0.0%  |
| 2021 | 278 | 0.2%  |
| 2022 | 279 | 0.1%  |
| 2023 | 279 | 0.1%  |
| 2024 | 279 | 0.0%  |
| 2025 | 278 | -0.2% |
| 2026 | 278 | -0.1% |
| 2027 | 278 | -0.1% |
| 2028 | 278 | 0.0%  |
| 2029 | 278 | 0.1%  |
| 2030 | 279 | 0.2%  |
| 2031 | 279 | 0.2%  |
| 2032 | 280 | 0.1%  |
| 2033 | 280 | 0.2%  |

| Model Statistics   | Magnitude |
|--------------------|-----------|
| Adjusted R^2       | 98.3%     |
| AIC                | 2.91      |
| SIC                | 2.98      |
| Degrees of Freedom | 345       |
| Durban-Watson      | 0.6       |
| MAPE               | 1.49%     |
| In-Sample RMSE     | 4.3       |
| Out-of-Sample RMSE | 6.0       |



### Model Discussion

The AFR 2019 forecast of public authorities customer count growth is lower than AFR 2018 forecast. Key economic drivers of customer growth include Employment in the Education & Health sector (Duluth MSA) and Public sector employment (13-County). Last year's model also used both of these variables.

Minnesota Power's econometric interpretation of the key drivers is as follows: For every 1,000 jobs added in the Education & Health sector at the Duluth MSA level, the customer count should increase by about 5.6. For every 1,000 jobs added in the Public sector (13-County), the customer count should increase by 2.

A binary variable starting in July-2009 accounts for a step-change or "systematic shift" in the historical accounting data. The corrective binary variables shift the forecast up slightly to avoid improbable decreases in customer counts, but do not impact the forecast trajectory; this is determined by the economic variables. A binary variable "Bi\_2011\_2033" is necessary to align the immediate forecast years with recent historical levels.

This year's model is highly comparable to last year's in terms of statistical quality. The Adjusted R-Squared indicates there's a high goodness-of-fit, and the low SIC indicates a highly parsimonious model. The HAC-Adjusted P-values ("HAC-P-Value") suggests all variables' coefficients' (except the intercept) are significant. In-sample and Out-sample error metrics are nearly identical: In-sample MAPE is 1.49% vs. 1.51% in the 2018 model, and Out-sample RMSE is 6.0 vs. 6.1 in the 2018 model. The low Variance Inflation Factors (VIF) of each economic variable proves there is no significant multicollinearity among non-binary, non-trend variables.

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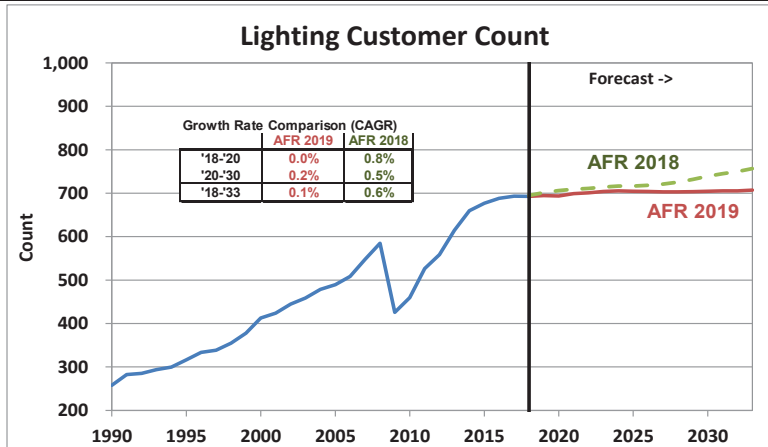
## Street Lighting Customer Count - Expected Scenario

Estimation Start/End: 2/1990 - 3/2019  
Unit Modeled/Forecast: Monthly Customer Count

| Variable        | Model Specifications |         |             |      |
|-----------------|----------------------|---------|-------------|------|
|                 | Coefficient          | P-Value | HAC-P-Value | VIF  |
| CONST           | (197.62)             | 0.00%   | 1.53%       |      |
| Time_Trend      | 1.34                 | 0.00%   | 0.00%       |      |
| Bi_7_2009       | (1,001.29)           | 0.00%   | 0.00%       |      |
| Trend_7_2009    | 3.56                 | 0.00%   | 0.00%       |      |
| Bi_2014_2033    | 1,204.00             | 0.00%   | 0.00%       |      |
| Trend_2014_2033 | (4.08)               | 0.00%   | 0.00%       |      |
| EduH_13_t       | 0.01                 | 0.00%   | 0.00%       | 3.40 |
| MSA_Pop_diff    | 50.750               | 0.00%   | 4.04%       | 1.20 |

| Lighting Customer Count |            |        |
|-------------------------|------------|--------|
| Count                   | Y/Y Growth |        |
| 2008                    | 585        |        |
| 2009                    | 426        | -27.1% |
| 2010                    | 460        | 7.9%   |
| 2011                    | 527        | 14.5%  |
| 2012                    | 559        | 6.1%   |
| 2013                    | 615        | 10.0%  |
| 2014                    | 660        | 7.4%   |
| 2015                    | 677        | 2.6%   |
| 2016                    | 688        | 1.7%   |
| 2017                    | 693        | 0.8%   |
| 2018                    | 693        | -0.1%  |
| 2019                    | 695        | 0.3%   |
| 2020                    | 694        | -0.2%  |
| 2021                    | 699        | 0.8%   |
| 2022                    | 701        | 0.3%   |
| 2023                    | 704        | 0.4%   |
| 2024                    | 706        | 0.2%   |
| 2025                    | 705        | -0.2%  |
| 2026                    | 704        | -0.1%  |
| 2027                    | 703        | -0.1%  |
| 2028                    | 703        | -0.1%  |
| 2029                    | 704        | 0.1%   |
| 2030                    | 704        | 0.1%   |
| 2031                    | 705        | 0.1%   |
| 2032                    | 705        | 0.0%   |
| 2033                    | 707        | 0.3%   |

| Model Statistics   | Magnitude |
|--------------------|-----------|
| Adjusted R^2       | 99.4%     |
| AIC                | 4.83      |
| SIC                | 4.92      |
| Degrees of Freedom | 342       |
| Durban-Watson      | 0.3       |
| MAPE               | 1.95%     |
| In-Sample RMSE     | 11        |
| Out-of-Sample RMSE | 14        |



### Model Discussion

The AFR 2019 forecast of street lighting customer count growth is lower than the AFR 2018 outlook. The key drivers of customer growth include Employment in the Education & Health sector (13-County) and Duluth MSA Population. Last year's model used Non-Wage Personal Income (St. Louis County) and Employment in the Education & Health sector (Duluth MSA).

Minnesota Power's econometric interpretation of the key drivers is as follows: As 13-County employment in Education & Health increases by 1,000, street lighting customer count should increase by about 12 customers. As the month-to-month change in Duluth MSA population increases by 1,000, street lighting customer count should increase by about 51 customers. These impacts are in addition to a general upward trend over time.

A combination of a binary and trend variable starting in July-2009 account for a step-change or "systematic shift" in the historical accounting data.

A combination of a binary variable for 2014-2033 and trend variable denoting the 2014-2033 timeframe shift the level and trend of the estimate to align with recent customer growth. These variables effectively shift the first forecast year (2019) to align with the last historical year (2018). Without this corrective binary variable, a small but growing divergence between actual and predicted customer growth suggests the economic indicators alone would overstate customer count, and the 2019 forecast value confirms this. Without these binary variables, the model would project an increase of about 70 customers from 2018 to 2019 (a 10.1% increase).

This year's model is comparable to last year's in terms of statistical quality. The Adjusted R-Squared indicates there's a quality goodness-of-fit, and the low SIC indicates a highly parsimonious model. The HAC-Adjusted P-values ("HAC-P-Value") suggests all variables' coefficients' are significant. In-sample and Out-sample error metrics are very similar: In-sample MAPE is 1.95% vs. 1.83% in the 2018 model, and Out-sample RMSE is 14 vs. 17 in the 2018 model. The low Variance Inflation Factor (VIF) of the economic variable proves there is no significant multicollinearity among non-binary, non-trend variables.

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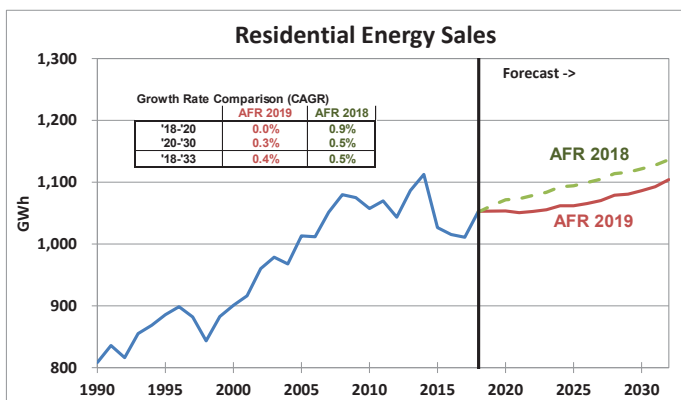
## Residential Energy Use - Expected Scenario

Estimation Start/End: 1/1990 - 3/2019  
Unit Modeled/Forecast: Monthly Per-Customer, Per-Day Use (KWh)

| Variable     | Model Specifications |         |             |      |
|--------------|----------------------|---------|-------------|------|
|              | Coefficient          | P-Value | HAC-P-Value | VIF  |
| CONST        | 17.70                | 0.00%   | 0.00%       |      |
| Time_Trend   | 0.01                 | 0.20%   | 0.63%       |      |
| Bi_Feb       | (1.58)               | 0.01%   | 0.45%       |      |
| Bi_Mar       | (2.54)               | 0.00%   | 0.00%       |      |
| Bi_Apr       | (1.72)               | 0.03%   | 0.00%       |      |
| Bi_May       | (1.94)               | 0.02%   | 0.01%       |      |
| Bi_Jun       | (2.23)               | 0.00%   | 0.00%       |      |
| Bi_Sep       | (1.75)               | 0.01%   | 0.00%       |      |
| Bi_Oct       | (3.12)               | 0.00%   | 0.00%       |      |
| Bi_Nov       | (2.92)               | 0.00%   | 0.00%       |      |
| Apr_Res_EE   | (0.00003)            | 0.34%   | 0.01%       |      |
| May_Res_EE   | (0.00003)            | 1.26%   | 0.00%       |      |
| Oct_Res_EE   | (0.00002)            | 3.38%   | 0.73%       |      |
| Bi_2008_2033 | 1.00                 | 1.32%   | 2.69%       |      |
| EE_Res       | (0.00001)            | 2.26%   | 4.46%       |      |
| Dul_HDDpd    | 0.22                 | 0.00%   | 0.00%       | 3.90 |
| Dul_CDDpd    | 0.62                 | 0.00%   | 0.00%       | 3.20 |

| Residential Energy Sales |           |            |
|--------------------------|-----------|------------|
|                          | MWh       | Y/Y Growth |
| 2008                     | 1,079,836 |            |
| 2009                     | 1,075,117 | -0.4%      |
| 2010                     | 1,057,476 | -1.6%      |
| 2011                     | 1,069,856 | 1.2%       |
| 2012                     | 1,043,281 | -2.5%      |
| 2013                     | 1,086,481 | 4.1%       |
| 2014                     | 1,112,579 | 2.4%       |
| 2015                     | 1,026,454 | -7.7%      |
| 2016                     | 1,015,465 | -1.1%      |
| 2017                     | 1,010,955 | -0.4%      |
| 2018                     | 1,052,800 | 4.1%       |
| 2019                     | 1,053,246 | 0.0%       |
| 2020                     | 1,053,474 | 0.0%       |
| 2021                     | 1,050,720 | -0.3%      |
| 2022                     | 1,052,541 | 0.2%       |
| 2023                     | 1,055,480 | 0.3%       |
| 2024                     | 1,061,906 | 0.6%       |
| 2025                     | 1,061,821 | 0.0%       |
| 2026                     | 1,065,500 | 0.3%       |
| 2027                     | 1,070,421 | 0.5%       |
| 2028                     | 1,079,021 | 0.8%       |
| 2029                     | 1,080,726 | 0.2%       |
| 2030                     | 1,086,375 | 0.5%       |
| 2031                     | 1,092,787 | 0.6%       |
| 2032                     | 1,104,119 | 1.0%       |
| 2033                     | 1,110,585 | 0.6%       |

| Model Statistics        | Magnitude |
|-------------------------|-----------|
| Adjusted R <sup>2</sup> | 85.7%     |
| AIC                     | 1.17      |
| SIC                     | 1.36      |
| Degrees of Freedom      | 334       |
| Durban-Watson           | 2.0       |
| MAPE                    | 5.44%     |
| In-Sample RMSE          | 1.8       |
| Out-of-Sample RMSE      | 1.8       |



### Model Discussion

The AFR 2019 forecast of residential energy use is lower than the AFR 2018 outlook. The graph shown above shows the final residential energy sales outlook, which combines the econometric forecast (i.e. the product of the use-per-customer per day model and the customer count model) and the projected impacts of electric vehicle and distributed solar adoption.

The AFR 2019 residential per-customer use model does not use an employment or demographic indicator variable as these variables rarely correlate well with per-customer usage and often are not intuitive or explainable. Instead, the Company uses weather and seasonal binary variables to indicate month-to-month variation in sales, a time-trend to indicate long-term underlying growth, and Energy Efficiency variables to explain recent changes in seasonality and long-term underlying growth.

The AFR 2019 model uses two forms of Energy Efficiency variable as predictors of residential energy sales: "EE\_Res" & "(Month) Res\_EE." The "EE\_Res" variable represents the cumulative effects of all past conservation measures on each year's sales, and the annual energy savings value is leveraged for all 12 monthly observations of a given year. The "(Month) Res\_EE" variables are an interaction of a monthly binary and the annual energy savings value and these variables indicate where seasonality is impacted in a significant way by conservation. All monthly interactions were tested, but only the interactions marking the shoulder months of April, May, and October were found to be statistically significant (i.e. impact is distinct from the "EE\_Res" variable). This is an interesting result, and at this point it's too early to tell whether it suggests a real phenomenon or a quirk of modeling. Its possible conservation really has had an outsized impact on sales in these shoulder months, or it's possible (for example) that the absence of strong weather in these months allows the model to attribute an impact to the energy efficiency variables with a high degree of confidence despite a fairly small sample size. The Company will continue to research this seasonality of conservation phenomena.

The combined effect of the Energy Efficiency variables with their respective coefficients suggests residential energy consumption was about 88,000 MWh (8.3%) lower in 2019 than it would have been in the absence of all past Minnesota Power CIP and organic, customer-driven conservation.

The AFR 2019 and AFR 2018 models both use simple monthly HDD and CDD (per-day) specification. Simplifying the weather variable definition in both respects did not seem to negatively affect model statistics or output. This approach guarantees accurate after-the-fact weather-normalization and was applied in all other weather-sensitive models as well.

This year's model is comparable to last year's in terms of statistical quality. The Adjusted R-Squared indicates there's a quality goodness-of-fit, and the low SIC indicates a highly parsimonious model. The HAC-Adjusted P-values ("HAC-P-Value") suggests all variables' coefficients are significant. In-sample and Out-sample error metrics are similar: In-sample MAPE is 5.44% vs. 5.33% in the 2018 model, and Out-sample RMSE is 1.8 vs. 1.7 in the 2018 model. The low Variance Inflation Factors (VIF) of each economic variable proves there is no significant multicollinearity among non-binary, non-trend variables.



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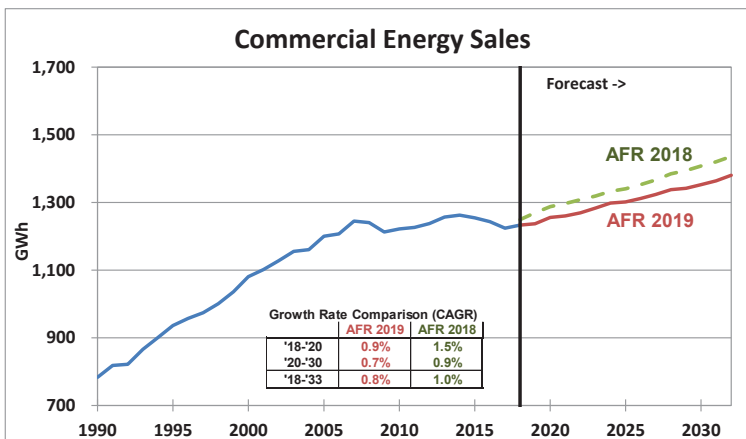
## Commercial Energy Use - Expected Scenario

Estimation Start/End: 2/1990 - 3/2019  
Unit Modeled/Forecast: Monthly Per-Customer, Per-Day Use (KWh)

| Variable         | Model Specifications |         |             | VIF  |
|------------------|----------------------|---------|-------------|------|
|                  | Coefficient          | P-Value | HAC-P-Value |      |
| CONST            | 71.63                | 0.15%   | 0.00%       |      |
| Time_Trend       | 0.07                 | 0.00%   | 0.00%       |      |
| Bi_Jan           | (9.65)               | 0.00%   | 0.00%       |      |
| Bi_Apr           | (6.88)               | 0.04%   | 0.26%       |      |
| Bi_Jun           | 16.04                | 0.00%   | 0.00%       |      |
| Bi_Jul           | 18.43                | 0.00%   | 0.00%       |      |
| Bi_Aug           | 27.03                | 0.00%   | 0.00%       |      |
| Bi_Sep           | 25.67                | 0.00%   | 0.00%       |      |
| Bi_Oct           | (4.72)               | 2.04%   | 2.41%       |      |
| Bi_Nov           | (8.80)               | 0.00%   | 0.00%       |      |
| Bi_2008_2033     | (3.98)               | 9.75%   | 0.68%       |      |
| EE_Com           | (0.0001)             | 0.00%   | 0.00%       |      |
| Dul_HDDpd_Seas   | 0.73                 | 0.00%   | 0.00%       | 5.00 |
| Dul_CDDpd        | 2.59                 | 0.03%   | 0.29%       | 3.50 |
| MSA_TotNonfarm_t | 0.42                 | 2.11%   | 0.02%       | 2.20 |
| Gov_13_diff      | 0.003                | 0.26%   | 0.34%       | 1.10 |

| Commercial Energy Sales |           |            |
|-------------------------|-----------|------------|
| Year                    | MWh       | Y/Y Growth |
| 2008                    | 1,240,327 |            |
| 2009                    | 1,212,778 | -2.2%      |
| 2010                    | 1,221,753 | 0.7%       |
| 2011                    | 1,226,174 | 0.4%       |
| 2012                    | 1,237,386 | 0.9%       |
| 2013                    | 1,256,540 | 1.5%       |
| 2014                    | 1,262,464 | 0.5%       |
| 2015                    | 1,254,681 | -0.6%      |
| 2016                    | 1,243,045 | -0.9%      |
| 2017                    | 1,223,786 | -1.5%      |
| 2018                    | 1,233,117 | 0.8%       |
| 2019                    | 1,236,911 | 0.3%       |
| 2020                    | 1,255,436 | 1.5%       |
| 2021                    | 1,259,858 | 0.4%       |
| 2022                    | 1,269,402 | 0.8%       |
| 2023                    | 1,283,122 | 1.1%       |
| 2024                    | 1,297,983 | 1.2%       |
| 2025                    | 1,301,607 | 0.3%       |
| 2026                    | 1,311,799 | 0.8%       |
| 2027                    | 1,323,531 | 0.9%       |
| 2028                    | 1,337,735 | 1.1%       |
| 2029                    | 1,341,957 | 0.3%       |
| 2030                    | 1,352,312 | 0.8%       |
| 2031                    | 1,363,953 | 0.9%       |
| 2032                    | 1,380,261 | 1.2%       |
| 2033                    | 1,387,973 | 0.6%       |

| Model Statistics   | Magnitude |
|--------------------|-----------|
| Adjusted R^2       | 60.8%     |
| AIC                | 4.41      |
| SIC                | 4.58      |
| Degrees of Freedom | 334       |
| Durban-Watson      | 2.7       |
| MAPE               | 4.41%     |
| In-Sample RMSE     | 8.9       |
| Out-of-Sample RMSE | 9.1       |



### Model Discussion

The AFR 2019 forecast of commercial energy use is lower than the AFR 2018 estimate. The graph above shows the final residential energy sales outlook, which combines the econometric forecast (i.e. the product of the use-per-customer per day model and the customer count model) and the projected impacts distributed solar adoption.

Key drivers of this year's commercial energy use model are Total Non-Farm Employment (MSA) and Public Sector Employment (13-County). The commercial customer class includes many state university and independent school district facilities, so public sector employment is a reasonable and intuitive indicator of energy usage.

Minnesota Power's econometric interpretation of the key drivers is as follows: For every 1,000 Non-Farm jobs added in the Duluth MSA, monthly commercial use-per-customer should increase by about 12.7 kWh. As the month-to-month change in Public Sector Employment increases by 1,000, monthly commercial use-per-customer should increase by about 79.1 kWh.

The AFR 2019 model uses an Energy Efficiency variable as a predictor of commercial per-customer sales: the "EE\_Com" variable represents the cumulative effects of all past conservation measures on each year's sales, and the annual energy savings value is leveraged for all 12 monthly observations of a given year. The combined effect of the Energy Efficiency variable and coefficient would suggest commercial energy consumption was about 174,000 MWh (14%) lower than it would have been in the absence of Minnesota Power CIP and organic, customer-driven conservation. However, the commercial class has seen some loss of larger accounts in recent years, which has reduced the overall per-customer use in the class – the Energy Efficiency variable/coefficient is likely capturing some of this impact, so the 160,000 MWh (13%) reduction is not entirely attributable to conservation but the overall effect on sales should be accurate.

This year's model is comparable to last year's in terms of statistical quality. The Adjusted R-Squared of 61% indicates there's just a moderate traditional "goodness-of-fit", but this was the case in last year's model as well (Adjusted R-Squared was 56%) and the Company does not consider the R-Squared an indicator of predictive quality. Minnesota Power's objective metric is the Out-Sample Root Mean Square Error.

The HAC-Adjusted P-values ("HAC-P-Value") suggests all variables' coefficients are significant. In-sample and Out-sample error metrics are similar: In-sample MAPE is 4.41% vs. 4.73% in the 2018 model, and Out-sample RMSE is 9.13 vs. 9.66 in the 2018 model. The low Variance Inflation Factors (VIF) of each economic variable proves there is no significant multicollinearity among non-binary, non-trend variables.



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## Mining and Metals Energy Use - Expected Scenario

Estimation Start/End: 1/1996 - 3/2019  
Unit Modeled/Forecast: Monthly Per-Day Use (MWh)

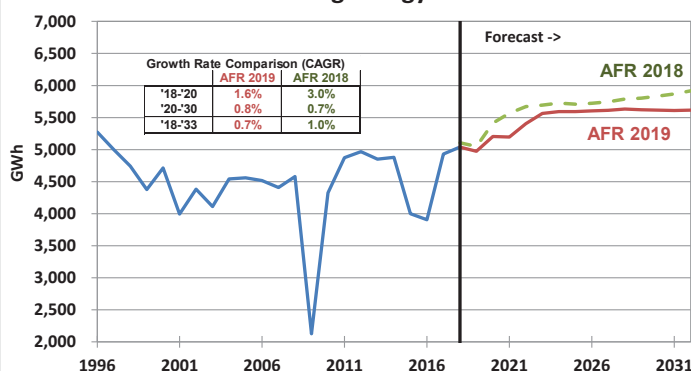
| Variable    | Model Specifications |         |             |      |
|-------------|----------------------|---------|-------------|------|
|             | Coefficient          | P-Value | HAC-P-Value | VIF  |
| CONST       | (47,043.58)          | 0.03%   | 0.31%       |      |
| Bi_Mine1    | (1,517.50)           | 0.00%   | 0.00%       |      |
| Bi_Mine2    | 1,341.93             | 0.00%   | 0.00%       |      |
| Trend_Mine2 | (46.45)              | 0.00%   | 0.00%       |      |
| Bi_Mine3    | (2,723.06)           | 0.00%   | 0.00%       |      |
| Bi_Mine4    | (490.90)             | 0.45%   | 0.14%       |      |
| MSA_Pop_t   | 185.95               | 0.01%   | 0.09%       | 1.90 |
| Iron_IPI_t  | 76.12                | 0.00%   | 0.00%       | 2.60 |

### Mining and Metals Energy Sales

|      | MWh       | Y/Y Growth |
|------|-----------|------------|
| 2008 | 4,579,234 |            |
| 2009 | 2,124,675 | -53.6%     |
| 2010 | 4,324,450 | 103.5%     |
| 2011 | 4,874,331 | 12.7%      |
| 2012 | 4,968,517 | 1.9%       |
| 2013 | 4,851,094 | -2.4%      |
| 2014 | 4,879,520 | 0.6%       |
| 2015 | 4,000,557 | -18.0%     |
| 2016 | 3,906,570 | -2.3%      |
| 2017 | 4,930,188 | 26.2%      |
| 2018 | 5,039,138 | 2.2%       |
| 2019 | 4,972,959 | -1.3%      |
| 2020 | 5,205,309 | 4.7%       |
| 2021 | 5,196,724 | -0.2%      |
| 2022 | 5,405,168 | 4.0%       |
| 2023 | 5,564,801 | 3.0%       |
| 2024 | 5,594,393 | 0.5%       |
| 2025 | 5,592,946 | 0.0%       |
| 2026 | 5,605,255 | 0.2%       |
| 2027 | 5,611,691 | 0.1%       |
| 2028 | 5,634,340 | 0.4%       |
| 2029 | 5,620,357 | -0.2%      |
| 2030 | 5,616,364 | -0.1%      |
| 2031 | 5,610,289 | -0.1%      |
| 2032 | 5,615,263 | 0.1%       |
| 2033 | 5,586,514 | -0.5%      |

| Model Statistics   | Magnitude |
|--------------------|-----------|
| Adjusted R^2       | 89.3%     |
| AIC                | 12.81     |
| SIC                | 12.91     |
| Degrees of Freedom | 271       |
| Durban-Watson      | 1.3       |
| MAPE               | 4.84%     |
| In-Sample RMSE     | 596       |
| Out-of-Sample RMSE | 724       |

### Mining Energy Sales



### Model Discussion

The AFR 2019 outlook for mining and metals energy use is lower than the AFR 2018 projection. The graph and table show the total sales forecast for this class, which combines the output of the econometric forecast with load additions.

Key drivers of this year's mining energy use model are Duluth MSA Population and the Minnesota (MN) Iron IPI. The econometric interpretation of economic variables are as follows: As Population (Duluth MSA) increases by 1,000, Minnesota Power's mining and metals customers' should increase monthly use by about 5,660 MWh. For each 1-unit increase in the MN IPI for Iron, Minnesota Power's mining and metals customers' should increase monthly use by about 2,315 MWh.

This year's model incorporates some of the same binary variables as AFR 2018 to control for known or suspected definitional changes in the historical mining energy sales series. These variables have been added with the goal of avoiding bias in the IPI's coefficient for these past definitional changes in the mining and metals sales series.

The "Bi\_Mine1" binary variable denotes a timeframe from May-2015 to Feb-2017, when significant mining load was idled. The variable accounts for a change in relationship between Minnesota Power mining customer energy use and the MN IPI, and allow for a more exact estimation of the relationship

"Bi\_Mine2" and "Trend\_Mine2" are binary and trend variables (respectively) that denote the timeframe from 1996-2001, when a large mining customer ended operations. The two variables account for a change in relationship between Minnesota Power mining customer energy and the MN IPI, and allow for a more exact estimation of the relationship during the current paradigm.

The "Bi\_Mine3" binary variable denotes the recession period from early 2009 to early 2010 where the model would systematically over-forecast monthly energy use by about 61%. This variable accounts for a possible change in the regular relationship between mining customer usage and the MN IPI.

The "Bi\_Mine4" binary variable denotes known seasonal operations specific to Minnesota Power's mining customers.

This year's model is comparable to last year's in terms of statistical quality. The Adjusted R-Squared indicates there's a quality goodness-of-fit, and the low SIC indicates a highly parsimonious model. The P-values suggests all variables' coefficients' are significant. In-sample and Out-sample error metrics are similar: In-sample MAPE is 4.84% vs. 4.26% in the 2018 model, and Out-sample RMSE is 724 vs. 691 in the 2018 model. The low Variance Inflation Factor (VIF) of the economic variable proves there is no significant multicollinearity among non-binary, non-trend variables.

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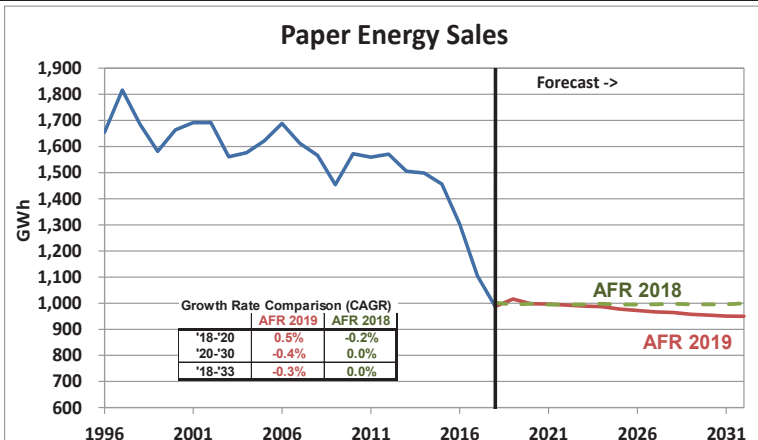
## Paper and Wood Products Energy Use - Expected Scenario

Estimation Start/End: 1/1996 - 3/2019  
Unit Modeled/Forecast: Monthly Per-Day Use (MWh)

| Variable         | Model Specifications |         |             |      |
|------------------|----------------------|---------|-------------|------|
|                  | Coefficient          | P-Value | HAC-P-Value | VIF  |
| CONST            | 1,244.77             | 3.59%   | 23.24%      |      |
| Bi_Mar           | 160.68               | 0.27%   | 0.00%       |      |
| Bi_Jun           | 225.08               | 0.00%   | 0.00%       |      |
| Bi_Jul           | 121.19               | 2.56%   | 1.91%       |      |
| Bi_Aug           | 318.92               | 0.00%   | 0.00%       |      |
| Bi_Sep           | 316.57               | 0.00%   | 0.00%       |      |
| Bi_Oct           | 303.13               | 0.00%   | 0.00%       |      |
| Bi_Nov           | 105.27               | 5.18%   | 1.20%       |      |
| Bi_Paper1        | (301.74)             | 0.06%   | 0.00%       |      |
| Bi_Paper2        | (654.34)             | 0.00%   | 0.00%       |      |
| Bi_Paper3        | (362.36)             | 0.00%   | 0.00%       |      |
| MSA_TotNonfarm_t | 21.47                | 0.00%   | 0.80%       | 1.20 |
| Paper_IPI_diff   | 31.54                | 0.53%   | 0.17%       | 1.00 |

| Paper/Wood Energy Sales |           |            |
|-------------------------|-----------|------------|
|                         | MWh       | Y/Y Growth |
| 2008                    | 1,566,402 |            |
| 2009                    | 1,453,928 | -7.2%      |
| 2010                    | 1,572,565 | 8.2%       |
| 2011                    | 1,559,519 | -0.8%      |
| 2012                    | 1,570,852 | 0.7%       |
| 2013                    | 1,505,113 | -4.2%      |
| 2014                    | 1,498,810 | -0.4%      |
| 2015                    | 1,456,091 | -2.9%      |
| 2016                    | 1,302,920 | -10.5%     |
| 2017                    | 1,104,160 | -15.3%     |
| 2018                    | 987,208   | -10.6%     |
| 2019                    | 1,015,838 | 2.9%       |
| 2020                    | 998,085   | -1.7%      |
| 2021                    | 996,478   | -0.2%      |
| 2022                    | 992,892   | -0.4%      |
| 2023                    | 989,011   | -0.4%      |
| 2024                    | 986,745   | -0.2%      |
| 2025                    | 977,425   | -0.9%      |
| 2026                    | 971,690   | -0.6%      |
| 2027                    | 966,250   | -0.6%      |
| 2028                    | 964,093   | -0.2%      |
| 2029                    | 957,350   | -0.7%      |
| 2030                    | 954,268   | -0.3%      |
| 2031                    | 950,444   | -0.4%      |
| 2032                    | 949,981   | 0.0%       |
| 2033                    | 944,758   | -0.5%      |

| Model Statistics   | Magnitude |
|--------------------|-----------|
| Adjusted R^2       | 76.5%     |
| AIC                | 10.97     |
| SIC                | 11.14     |
| Degrees of Freedom | 266       |
| Durban-Watson      | 0.9       |
| MAPE               | 4.62%     |
| In-Sample RMSE     | 236       |
| Out-of-Sample RMSE | 263       |



### Model Discussion

The AFR 2019 outlook for paper and wood Products energy requirements is lower than the AFR 2018 projection. The graph and table show the total sales forecast for this class, which combines the output of the econometric forecast with load additions.

The AFR 2019 model uses Total Non-Farm Employment (Duluth MSA) and the Industrial Production Index (IPI) for Paper as economic drivers. Last year's model used just the IPI for Paper.

Minnesota Power's econometric interpretation of the key drivers is as follows: As Total Non-Farm employment increases by 1,000, monthly paper and wood customer use increases by about 650 MWh. As the month-to-month change in the Paper IPI increases by 1, monthly paper and wood customer use increases by about 960 MWh.

The three "Bi\_Paper" binary variables denote decreases in sales to paper customers due to transition of customer generation assets or closure of paper production capacity. Binary variables are used as this is not a situation in which pre-regression adjustments to the historical series would be appropriate. These variables terminate at the beginning of the forecast timeframe, producing an econometric forecast that's at a pre-change-in-operations level. Post-regression load adjustments are then applied to reduce the outlook in the amount of the operational changes likely demands.

This year's model is comparable to last year's in terms of statistical quality. The Adjusted R-Squared indicates there's reasonable goodness-of-fit, and error metrics show this is a fairly accurate model: In-sample MAPE is 4.62% vs. 3.56% in the 2018 model, and Out-sample RMSE is 263 vs. 284 in the 2018 model.

A low SIC indicates a highly parsimonious model. The low Variance Inflation Factors (VIF) of each economic variable proves there is no significant multicollinearity among non-binary, non-trend variables. HAC-Adjusted P-values ("HAC-P-Value") suggests all variables' coefficients' (except the intercept) are significant.

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Pipelines and Other Industrial Energy Use - Expected Scenario

Estimation Start/End: 1/1996 - 3/2019  
Unit Modeled/Forecast: Monthly Per-Day Use (MWh)

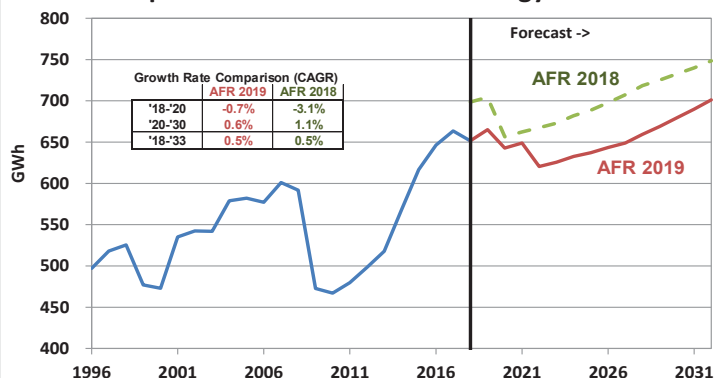
| Variable          | Model Specifications |         |             |      |
|-------------------|----------------------|---------|-------------|------|
|                   | Coefficient          | P-Value | HAC-P-Value | VIF  |
| CONST             | (8,132.45)           | 0.00%   | 0.00%       |      |
| Time_Trend        | 0.58                 | 0.12%   | 0.57%       |      |
| Bi_Pipe_Other1    | (4,998.05)           | 0.00%   | 0.00%       |      |
| Trend_Pipe_Other1 | 17.60                | 0.00%   | 0.00%       |      |
| CRMine_13_t       | 0.04                 | 0.00%   | 0.71%       | 1.70 |
| Pop_13_t          | 16.04                | 0.00%   | 0.00%       | 4.80 |

Other Industrial Energy Sales

|      | MWh     | Y/Y Growth |
|------|---------|------------|
| 2008 | 591,696 |            |
| 2009 | 472,751 | -20.1%     |
| 2010 | 467,062 | -1.2%      |
| 2011 | 479,799 | 2.7%       |
| 2012 | 498,474 | 3.9%       |
| 2013 | 517,786 | 3.9%       |
| 2014 | 568,206 | 9.7%       |
| 2015 | 616,625 | 8.5%       |
| 2016 | 646,339 | 4.8%       |
| 2017 | 663,444 | 2.6%       |
| 2018 | 651,545 | -1.8%      |
| 2019 | 665,195 | 2.1%       |
| 2020 | 642,770 | -3.4%      |
| 2021 | 648,892 | 1.0%       |
| 2022 | 620,492 | -4.4%      |
| 2023 | 625,713 | 0.8%       |
| 2024 | 632,700 | 1.1%       |
| 2025 | 637,135 | 0.7%       |
| 2026 | 643,437 | 1.0%       |
| 2027 | 648,963 | 0.9%       |
| 2028 | 659,490 | 1.6%       |
| 2029 | 668,839 | 1.4%       |
| 2030 | 679,503 | 1.6%       |
| 2031 | 689,945 | 1.5%       |
| 2032 | 701,176 | 1.6%       |
| 2033 | 706,717 | 0.8%       |

| Model Statistics        | Magnitude |
|-------------------------|-----------|
| Adjusted R <sup>2</sup> | 60.8%     |
| AIC                     | 9.64      |
| SIC                     | 9.72      |
| Degrees of Freedom      | 273       |
| Durban-Watson           | 1.2       |
| MAPE                    | 6.69%     |
| In-Sample RMSE          | 123       |
| Out-of-Sample RMSE      | 139       |

Pipelines & Other Industrial Energy Sales



Model Discussion

The outlook for pipelines and other industrial energy sales is lower than the AFR 2018 projection. The graph and table show the total sales forecast for this class, which combines the output of the econometric forecast with load additions/losses.

The AFR 2019 econometric model for pipelines and other industrial uses Construction, Natural Resources, & Mining Employment (13-County) and Population (13-County). The AFR 2018 model included Employment in Manufacturing (St. Louis County) and Population (13-County).

Minnesota Power's econometric interpretation of the key drivers is as follows: As the Construction, Natural Resources, & Mining sector employment increases by 1,000, other industrial monthly energy usage increases by about 1,340 MWh. As the area's Population increases by 1,000, other industrial's monthly energy usage increases by about 490 MWh. These impacts are in addition to a general upward trend over time.

Both AFR 2019 and AFR 2018 models feature two key structural variables: a binary ("Bi\_Pipe\_Other1") and a trend variable ("Trend\_Pipe\_Other1") denoting the period in which a large pipeline customer began adding substantial load, and drove the majority of the energy use increase in the customer class. The binary and trend variables effectively "back-out" this recent load addition, so this customer's expected energy use can be addressed in isolation through a post-regression load addition to avoid double-counting.

The ability to address this pipeline customer's expected usage directly and exactly in the forecast timeframe is especially important in the AFR 2019 forecast; there is a high likelihood that this recently-added pumping load will be short-lived due to pumping capacity additions elsewhere on the system. This shift is evident in the graph above; usage by pipeline and other industrial customers drops sharply from 2021 to 2022 as added pumping capacity outside Minnesota Power's territory relieves the pumps served by a specific retail pumping customer.

This year's model is similar to last year's in terms of statistical quality. The Adjusted R-Squared indicates there's a reasonable goodness-of-fit, and the low SIC indicates a highly parsimonious model. In-sample and Out-sample error metrics are fairly similar to the 2018 model: In-sample MAPE is 6.69% vs. 6.14% in the 2018 model, and Out-sample RMSE is 139 from 128 in the 2018 model. The low Variance Inflation Factors (VIF) of each economic variable proves there is no significant multicollinearity among non-binary, non-trend variables.

The HAC-Adjusted P-values ("HAC-P-Value") suggests all variables' coefficients' are significant.

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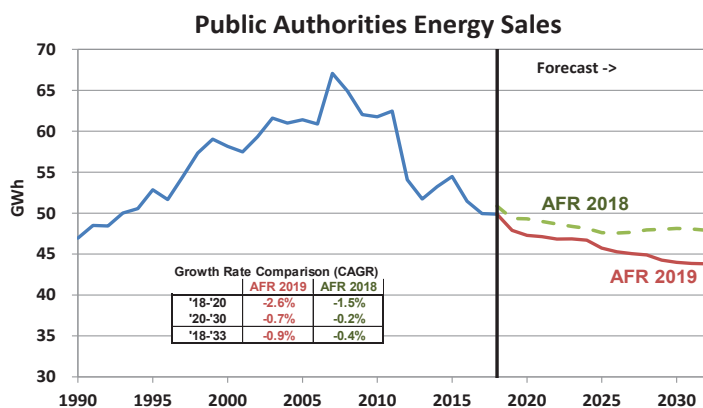
Public Authorities Energy Use - Expected Scenario

Estimation Start/End: 1/1990 - 3/2019  
Unit Modeled/Forecast: Monthly Per-Day Use (MWh)

| Variable           | Model Specifications |         |             |      |
|--------------------|----------------------|---------|-------------|------|
|                    | Coefficient          | P-Value | HAC-P-Value | VIF  |
| CONST              | (91.95)              | 20.40%  | 27.58%      |      |
| Time_Trend         | 0.15                 | 0.00%   | 0.00%       |      |
| EE_Com             | (0.0002)             | 0.00%   | 0.00%       |      |
| Dul_HDDpd          | 0.17                 | 1.54%   | 1.34%       | 1.60 |
| Dul_CDDpd          | 4.20                 | 0.01%   | 0.09%       | 1.60 |
| EduH_13_t          | 0.003                | 2.47%   | 3.69%       | 3.10 |
| ProductPerCap_13_t | 3,361.56             | 0.23%   | 0.43%       | 1.70 |

| Public Auth. Energy Sales |        |            |
|---------------------------|--------|------------|
|                           | MWh    | Y/Y Growth |
| 2008                      | 64,912 |            |
| 2009                      | 62,036 | -4.4%      |
| 2010                      | 61,766 | -0.4%      |
| 2011                      | 62,457 | 1.1%       |
| 2012                      | 54,074 | -13.4%     |
| 2013                      | 51,736 | -4.3%      |
| 2014                      | 53,236 | 2.9%       |
| 2015                      | 54,470 | 2.3%       |
| 2016                      | 51,455 | -5.5%      |
| 2017                      | 49,945 | -2.9%      |
| 2018                      | 49,884 | -0.1%      |
| 2019                      | 47,895 | -4.0%      |
| 2020                      | 47,287 | -1.3%      |
| 2021                      | 47,116 | -0.4%      |
| 2022                      | 46,827 | -0.6%      |
| 2023                      | 46,851 | 0.1%       |
| 2024                      | 46,690 | -0.3%      |
| 2025                      | 45,727 | -2.1%      |
| 2026                      | 45,272 | -1.0%      |
| 2027                      | 45,046 | -0.5%      |
| 2028                      | 44,882 | -0.4%      |
| 2029                      | 44,270 | -1.4%      |
| 2030                      | 43,988 | -0.6%      |
| 2031                      | 43,848 | -0.3%      |
| 2032                      | 43,808 | -0.1%      |
| 2033                      | 43,621 | -0.4%      |

| Model Statistics   | Magnitude |
|--------------------|-----------|
| Adjusted R^2       | 37.7%     |
| AIC                | 5.99      |
| SIC                | 6.06      |
| Degrees of Freedom | 344       |
| Durban-Watson      | 2.3       |
| MAPE               | 10.36%    |
| In-Sample RMSE     | 20        |
| Out-of-Sample RMSE | 20        |



Model Discussion

The AFR 2019 outlook for public authorities energy use is lower than the AFR 2018 forecast. Key drivers of this year's energy use model are Education and Health sector employment (13-County) and Product per-capita (13-County). AFR 2018 also used area Education and Health employment, along with Population (13-County). Minnesota Power's econometric interpretation of the key driver is as follows: For every 1,000 job increase in the Education & Health sector, monthly public authority usage should increase by about 91 MWh. As 13-County Product per-capita increases by 0.001, monthly public authority usage should increase by about 102 MWh.

The AFR 2019 model uses an Energy Efficiency variable as a predictor of public authorities' energy sales: the "EE\_Com" variable represents the cumulative effects of all past conservation measures on each year's sales, and the annual energy savings value is leveraged for all 12 monthly observations of a given year. The commercial-sector energy efficiency variable was used for the public authorities model since 1) both customer groups are served by the same CIP program (Power Grant/Power of One Business), and 2) the overall trend of conservation in public authorities is likely very similar to commercial customers.

The combined effect of the Energy Efficiency variable and coefficient would suggest public authorities energy consumption was about 20,000 MWh (40.1%) lower than it would have been in the absence of Minnesota Power CIP and organic, customer-driven conservation. However, the public authorities class has seen some loss of larger accounts in recent years, which has reduced the overall per-customer use in the class – the Energy Efficiency variable/coefficient is likely also capturing this impact, so the 18,000 MWh (37%) reduction is not entirely attributable to conservation but the overall effect on sales is accurate.

This year's model is similar to last year's in terms of statistical quality. The Adjusted R-Squared indicates there's moderate goodness-of-fit, and the low SIC indicates a highly parsimonious model. In-sample and Out-sample error metrics are very similar: In-sample MAPE is 10.36% vs. 9.70% in the 2018 model, and Out-sample RMSE is 20.1 vs. 20.2 in the 2018 model. The low Variance Inflation Factors (VIF) of each economic variable proves there is no significant multicollinearity among non-binary, non-trend variables.

The HAC-Adjusted P-values ("HAC-P-Value") suggests all variables' coefficients' (except the intercept) are significant.

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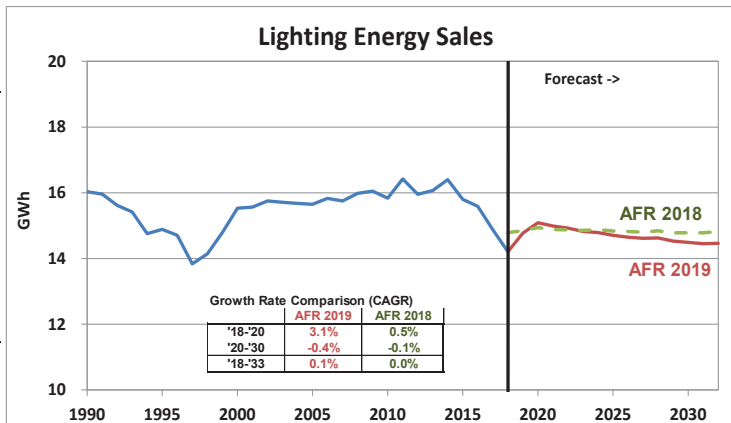
## Street Lighting Energy Use - Expected Scenario

Estimation Start/End: 1/1990 - 3/2019  
Unit Modeled/Forecast: Monthly Per-Day Use (MWh)

| Variable       | Model Specifications |         |             |      |
|----------------|----------------------|---------|-------------|------|
|                | Coefficient          | P-Value | HAC-P-Value | VIF  |
| CONST          | 46.47                | 0.00%   | 0.00%       |      |
| Time_Trend     | (0.01)               | 0.54%   | 1.20%       |      |
| Bi_Jan         | 2.58                 | 1.57%   | 0.50%       |      |
| Bi_Feb         | (2.55)               | 1.70%   | 0.15%       |      |
| Bi_Mar         | (9.80)               | 0.00%   | 0.00%       |      |
| Bi_Apr         | (14.82)              | 0.00%   | 0.00%       |      |
| Bi_May         | (20.82)              | 0.00%   | 0.00%       |      |
| Bi_Jun         | (24.23)              | 0.00%   | 0.00%       |      |
| Bi_Jul         | (23.56)              | 0.00%   | 0.00%       |      |
| Bi_Aug         | (19.79)              | 0.00%   | 0.00%       |      |
| Bi_Sep         | (11.93)              | 0.00%   | 0.00%       |      |
| Bi_Oct         | (8.59)               | 0.00%   | 0.00%       |      |
| Bi_Nov         | (2.98)               | 0.58%   | 0.00%       |      |
| Bi_Light1      | (3.48)               | 0.00%   | 0.04%       |      |
| NonWPI StLou_t | 0.003                | 1.09%   | 0.01%       | 1.00 |

| Lighting Energy Sales |        |            |
|-----------------------|--------|------------|
|                       | MWh    | Y/Y Growth |
| 2008                  | 15,981 |            |
| 2009                  | 16,050 | 0.4%       |
| 2010                  | 15,834 | -1.3%      |
| 2011                  | 16,420 | 3.7%       |
| 2012                  | 15,954 | -2.8%      |
| 2013                  | 16,066 | 0.7%       |
| 2014                  | 16,400 | 2.1%       |
| 2015                  | 15,801 | -3.7%      |
| 2016                  | 15,588 | -1.4%      |
| 2017                  | 14,873 | -4.6%      |
| 2018                  | 14,206 | -4.5%      |
| 2019                  | 14,776 | 4.0%       |
| 2020                  | 15,087 | 2.1%       |
| 2021                  | 14,990 | -0.6%      |
| 2022                  | 14,923 | -0.4%      |
| 2023                  | 14,825 | -0.7%      |
| 2024                  | 14,789 | -0.2%      |
| 2025                  | 14,705 | -0.6%      |
| 2026                  | 14,650 | -0.4%      |
| 2027                  | 14,614 | -0.2%      |
| 2028                  | 14,629 | 0.1%       |
| 2029                  | 14,531 | -0.7%      |
| 2030                  | 14,489 | -0.3%      |
| 2031                  | 14,451 | -0.3%      |
| 2032                  | 14,461 | 0.1%       |
| 2033                  | 14,375 | -0.6%      |

| Model Statistics   | Magnitude |
|--------------------|-----------|
| Adjusted R^2       | 83.1%     |
| AIC                | 2.86      |
| SIC                | 3.02      |
| Degrees of Freedom | 336       |
| Durban-Watson      | 1.7       |
| MAPE               | 4.99%     |
| In-Sample RMSE     | 4.1       |
| Out-of-Sample RMSE | 4.3       |



### Model Discussion

The outlook for energy use by street lighting customer is lower than the AFR 2018 forecast, but the model utilizes similar economic variables as drivers. Both the AFR 2019 and the AFR 2018 lighting per-day use models use Non-Wage Personal Income – St. Louis County and 13-County respectively – as a key economic/demographic indicator.

Minnesota Power's econometric interpretation of the key driver is as follows: As area Non-Wage Personal Income increases by \$1 Billion, monthly lighting usage should increase by about 91 MWh.

"Bi\_Light1" is a binary variable denoting the 1990-1999 timeframe and effectively shifts the level of the estimate to account for changes to the Company's accounting practices, which affected historical energy use data. The corrective binary shifts the forecast to avoid improbably changes in energy use, but does not impact the forecast trajectory; this is determined by the economic variable.

This year's model is comparable to last year's in terms of statistical quality. The Adjusted R-Squared indicates there's high goodness-of-fit, and the low SIC indicates a highly parsimonious model. In-sample and Out-sample error metrics are nearly identical to the 2018 model: In-sample MAPE is 4.99% vs. 5.02% in the 2018 model, and Out-sample RMSE is 4.25 vs. 4.23 in the 2018 model. The low Variance Inflation Factors (VIF) of each economic variable proves there is no significant multicollinearity among non-binary, non-trend variables.

The HAC-Adjusted P-values ("HAC-P-Value") suggests all variables' coefficients' are significant.

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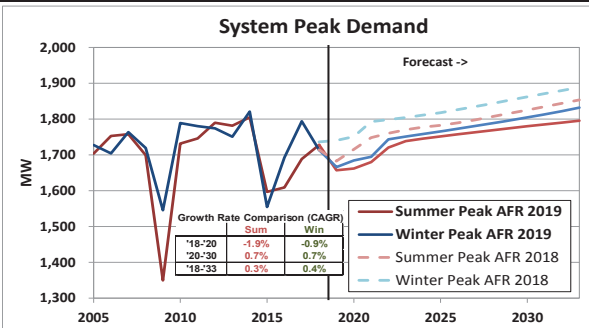
System Peak Demand - Expected Scenario

Estimation Start/End: 6/1999 - 3/2019  
Unit Modeled/Forecast: Monthly Peak Demand

| Variable                          | Model Specifications |         |             |       |
|-----------------------------------|----------------------|---------|-------------|-------|
|                                   | Coefficient          | P-Value | HAC-P-Value | VIF   |
| CONST                             | 346.59               | 0.00%   | 0.00%       |       |
| Weather-Normalized_Energy-per-day | 0.035                | 0.00%   | 0.00%       | 2.76  |
| Time_Trend                        | 0.42                 | 0.00%   | 0.00%       | 1.20  |
| Summer-Peak Binary                | 44.06                | 0.00%   | 0.01%       | 1.32  |
| Winter-Peak Binary                | 29.13                | 0.19%   | 0.04%       | 1.50  |
| Wind-Chill_Temp-Humid_Index       | (1.13)               | 0.00%   | 0.00%       | 12.70 |
| Wind-Chill_Temp-Humid_Index_3     | 0.00021              | 0.00%   | 0.00%       | 8.64  |
| Bi_2009                           | (42.50)              | 0.32%   | 0.26%       | 2.03  |
| Bi_2015                           | (19.73)              | 4.94%   | 3.58%       | 1.50  |
| Jan_W-N_Energy-per-day            | (0.00062)            | 7.88%   | 3.70%       | 1.85  |
| Feb_W-N_Energy-per-day            | (0.00068)            | 5.71%   | 1.03%       | 1.83  |
| Mar_W-N_Energy-per-day            | (0.00074)            | 1.90%   | 1.16%       | 1.39  |
| Nov_W-N_Energy-per-day            | 0.00059              | 5.18%   | 2.83%       | 1.25  |

| System Peak Demand |            |             |            |
|--------------------|------------|-------------|------------|
| Summer (MW)        | Y/Y Growth | Winter (MW) | Y/Y Growth |
| 2008               | 1,669      | 2008        | 1,719      |
| 2009               | 1,350      | 2009        | 1,545      |
|                    | -20.6%     |             | -10.1%     |
| 2010               | 1,732      | 2010        | 1,789      |
|                    | 28.3%      |             | 15.7%      |
| 2011               | 1,746      | 2011        | 1,780      |
|                    | 0.8%       |             | -0.5%      |
| 2012               | 1,790      | 2012        | 1,774      |
|                    | 2.5%       |             | -0.3%      |
| 2013               | 1,782      | 2013        | 1,751      |
|                    | -0.5%      |             | -1.3%      |
| 2014               | 1,805      | 2014        | 1,821      |
|                    | 1.3%       |             | 4.0%       |
| 2015               | 1,597      | 2015        | 1,554      |
|                    | -11.5%     |             | -14.6%     |
| 2016               | 1,609      | 2016        | 1,692      |
|                    | 0.8%       |             | 8.9%       |
| 2017               | 1,689      | 2017        | 1,794      |
|                    | 4.9%       |             | 6.0%       |
| 2018               | 1,728      | 2018        | 1,714      |
|                    | 2.3%       |             | -4.5%      |
| 2019               | 1,667      | 2019        | 1,695      |
|                    | -4.1%      |             | -2.8%      |
| 2020               | 1,662      | 2020        | 1,684      |
|                    | 0.3%       |             | 1.1%       |
| 2021               | 1,680      | 2021        | 1,694      |
|                    | 1.1%       |             | 0.6%       |
| 2022               | 1,720      | 2022        | 1,743      |
|                    | 2.4%       |             | 2.9%       |
| 2023               | 1,738      | 2023        | 1,751      |
|                    | 1.1%       |             | 0.5%       |
| 2024               | 1,745      | 2024        | 1,759      |
|                    | 0.4%       |             | 0.4%       |
| 2025               | 1,751      | 2025        | 1,766      |
|                    | 0.4%       |             | 0.4%       |
| 2026               | 1,757      | 2026        | 1,773      |
|                    | 0.3%       |             | 0.4%       |
| 2027               | 1,763      | 2027        | 1,780      |
|                    | 0.3%       |             | 0.4%       |
| 2028               | 1,769      | 2028        | 1,788      |
|                    | 0.3%       |             | 0.4%       |
| 2029               | 1,775      | 2029        | 1,795      |
|                    | 0.3%       |             | 0.5%       |
| 2030               | 1,779      | 2030        | 1,805      |
|                    | 0.3%       |             | 0.5%       |
| 2031               | 1,785      | 2031        | 1,813      |
|                    | 0.3%       |             | 0.5%       |
| 2032               | 1,790      | 2032        | 1,822      |
|                    | 0.3%       |             | 0.5%       |
| 2033               | 1,795      | 2033        | 1,832      |
|                    | 0.3%       |             | 0.5%       |

| Model Statistics   | Magnitude |
|--------------------|-----------|
| Adjusted R^2       | 90.3%     |
| AIC                | 7.01      |
| SIC                | 7.20      |
| Degrees of Freedom | 225       |
| Durban-Watson      | 1.6       |
| MAPE               | 1.76%     |
| In-Sample RMSE     | 32        |
| Out-of-Sample RMSE | 35        |



Model Discussion

The long-run outlook for Minnesota Power's system peak is lower than the 2018 outlook due to reduced sales in all classes.

Minnesota Power continued the modeling methodology established in AFR 2014 that more accurately accounts for recent changes in the customer class composition. Historical demand is adjusted to remove recent large customer load additions, so they can be more accurately and directly accounted for in the forecast time frame. This avoids the potential for double-counting customer load. Adjustments to the historical peak demand data are detailed in the "Adjustments to Raw Data" section.

Minnesota Power also adjusted the peak definition used for modeling by reverting back to delivered load (similar to AFR 2017 and prior versions). This change is documented under Energy/Load Requirements Modeling within the Methodological Adjustments for AFR 2019 section.

Temperature variables play a critical role in peak demand modeling, and both the definition and structure of these variables are important for interpreting the results. Both the 2019 and 2018 AFR use a third-degree polynomial specification on a Temperature Humidity and Wind-Chill Index (THWCI). Similar to last year, the AFR 2019 peak demand is modeled as a function of the weather observations specific to the hour in which the peak occurred.

A polynomial temperature specification has been selected since after-the fact weather-normalization can be problematic. It's sometimes impossible to calculate the weather impact in months like May or September that may lack extreme enough weather to fit into a specific spline-segment definition (THI/High-temp or Wind-Chill/Low-temp). A polynomial temperature specification is continuous, not segmented, so it can always be leveraged for weather-normalization. This methodological/variable specification change is discussed further in the Specific Analytical Techniques section.

The 2019 AFR peak demand model utilized two binaries to indicate the month of the system's historical summer and winter peaks, and assumed this peak in July/January (respectively) throughout the forecast timeframe. Summer peaks typically occur in either July or August, historical winter peaks have occurred in November, December, February, but are most likely in January. This broad distribution of peak occurrence dilutes the model's measured seasonality, and as a result, the peak forecast will understate both the summer and winter peak demand figures. The utilization of these peak binaries focuses the seasonal peaks – which may have occurred in August or July, or December or January - into the months of July and January. This ensures seasonal peaks are not under forecast as a result of historical diversity in the timing of those seasonal peaks.

The model also includes two binaries ("Bi\_2009" and "Bi\_2015") denoting periods of economic downturn for Minnesota Power's large industrial customers, resulting in abnormally low usage. During these periods the normal relationship of Peak to Energy was affected by the idling of large, high load factor customers. These binaries effectively remove these downturns periods from consideration in the regression model and allow for more accurate estimation of model coefficients under more normal economic conditions.

There is no energy efficiency variable in the peak demand model. All conservation impacts are inherent in the econometric energy sales forecast, which is used as an input to the peak demand regression model.

This year's model is comparable to last year's in terms of statistical quality. The Adjusted R-Squared indicates there's high goodness-of-fit, and the low SIC indicates a highly parsimonious model. In-sample and Out-sample error metrics are similar to the 2018 model: In-sample MAPE is 1.76% vs. 1.51% in the 2018 model, and Out-sample RMSE is 35 vs. 33 in the 2018 model. The Variance Inflation Factors (VIF) on the two weather terms suggests they are highly correlated with each other. This is expected; the two variables are related by a power of 3 (one is the cubed-root of the other). This is not indicative of any negative underlying issues concerning multicollinearity.

The HAC-Adjusted P-values ("HAC-P-Value") suggests all variables' coefficients are significant.

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## B. Confidence in Forecast & Historical Accuracy

Minnesota Power has a strong record of accurate forecasting and consistent improvements in forecast accuracy over time. Excluding the mining downturn years (2009/2010 and 2015/2016), each successive AFR has reduced its energy sales forecast error by about .01% over the prior year (on average).

Figures 18-20 show Minnesota Power's past AFR forecast accuracy for aggregate energy use, Summer Peak, and Winter Peak demand. The bottom values in each column (**Bold**) represent the forecast accuracy in the current year, or the year it was produced. For example, the lower right value of 1.4 percent is the difference between the forecast produced in 2018 (AFR 2018) and the 2018 year-end actual. Similarly, the cell just above the current year accuracy (**Bold, Italic**) represents the accuracy of the forecast in the year immediately after its formulation. For example, AFR 2015 (formulated in 2015) forecast of 2016 was 5.9 percent (581 GWh) above the actual (due to effects of Mining downturn).

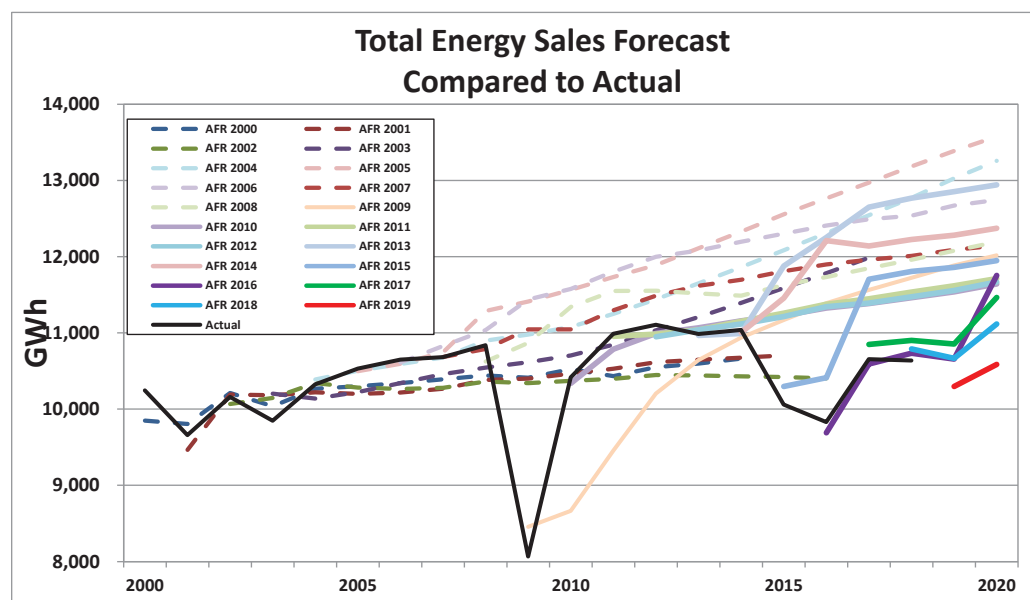


Figure 18: AFR Energy Sales Forecast Accuracy



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| Total Energy Sales Forecast Error |       |       |       |      |       |       |       |       |       |       |        |        |       |       |       |       |       |       | Average Error of AFRs | Avg. Error of AFRs |
|-----------------------------------|-------|-------|-------|------|-------|-------|-------|-------|-------|-------|--------|--------|-------|-------|-------|-------|-------|-------|-----------------------|--------------------|
| Forecast                          | 2000  | 2001  | 2002  | 2003 | 2004  | 2005  | 2006  | 2007  | 2008  | 2009  | 2010   | 2011   | 2012  | 2013  | 2014  | 2015  | 2016  | 2017  |                       |                    |
| AFR 2000                          | -3.9% | 1.5%  | 0.5%  | 1.9% | -0.6% | -2.2% | -2.9% | -2.7% | -3.7% | 29.1% | 1.0%   | -5.1%  | -5.0% | -3.5% | -3.4% | 6.4%  |       |       | 0.1%                  | 1.5%               |
| AFR 2001                          |       | -2.0% | 0.3%  | 3.4% | -1.0% | -3.1% | -4.1% | -3.9% | -4.2% | 29.0% | 0.5%   | -4.2%  | -4.4% | -3.1% | -3.3% | 6.4%  |       |       | 0.4%                  | 0.3%               |
| AFR 2002                          |       |       | -0.9% | 3.1% | 0.2%  | -2.4% | -3.6% | -3.8% | -4.4% | 28.2% | -0.4%  | -5.4%  | -5.9% | -5.0% | -5.5% | 3.6%  | 5.8%  |       | 0.2%                  | 3.1%               |
| AFR 2003                          |       |       |       | 3.6% | -1.8% | -2.9% | -2.9% | -2.1% | -2.7% | 31.6% | 2.8%   | -1.3%  | -0.6% | 2.0%  | 3.2%  | 15.2% | 19.8% | 12.5% | 5.1%                  | 1.8%               |
| AFR 2004                          |       |       |       |      | 0.6%  | -0.3% | -0.5% | 0.0%  | 0.6%  | 36.1% | 6.4%   | 2.4%   | 3.0%  | 6.0%  | 7.5%  | 20.1% | 25.2% | 17.7% | 9.7%                  | 0.3%               |
| AFR 2005                          |       |       |       |      |       | -0.3% | -0.5% | 0.6%  | 4.1%  | 41.5% | 11.0%  | 6.8%   | 7.0%  | 10.2% | 11.7% | 24.8% | 29.9% | 21.8% | 13.8%                 | 0.5%               |
| AFR 2006                          |       |       |       |      |       |       | -0.3% | 1.4%  | 1.8%  | 41.8% | 11.1%  | 7.4%   | 8.0%  | 10.0% | 10.5% | 22.3% | 26.2% | 17.2% | 13.5%                 | 1.4%               |
| AFR 2007                          |       |       |       |      |       |       |       | 0.0%  | -0.5% | 37.0% | 6.0%   | 2.8%   | 3.4%  | 5.7%  | 6.0%  | 17.4% | 21.0% | 12.3% | 10.3%                 | 0.5%               |
| AFR 2008                          |       |       |       |      |       |       |       |       | -2.0% | 34.8% | 8.9%   | 5.1%   | 4.0%  | 4.8%  | 4.1%  | 15.6% | 19.3% | 11.2% | 10.7%                 | 34.8%              |
| AFR 2009                          |       |       |       |      |       |       |       |       |       | 4.8%  | -16.8% | -13.9% | -8.1% | -3.1% | -0.9% | 11.0% | 15.9% | 8.5%  | 0.7%                  | 16.8%              |
| AFR 2010                          |       |       |       |      |       |       |       |       |       |       | -0.8%  | -1.8%  | -1.0% | 0.7%  | 1.1%  | 11.6% | 15.2% | 6.9%  | 4.4%                  | 1.8%               |
| AFR 2011                          |       |       |       |      |       |       |       |       |       |       |        | -0.3%  | -1.1% | 0.5%  | 1.0%  | 11.9% | 15.7% | 7.5%  | 5.5%                  | 1.1%               |
| AFR 2012                          |       |       |       |      |       |       |       |       |       |       |        |        | -1.4% | 0.5%  | 0.7%  | 11.5% | 15.4% | 6.9%  | 5.9%                  | 0.5%               |
| AFR 2013                          |       |       |       |      |       |       |       |       |       |       |        |        |       | -0.2% | 18.1% | 24.6% | 18.7% | 13.5% | 0.4%                  |                    |
| AFR 2014                          |       |       |       |      |       |       |       |       |       |       |        |        |       |       | -0.3% | 13.9% | 24.2% | 13.9% | 13.3%                 | 13.9%              |
| AFR 2015                          |       |       |       |      |       |       |       |       |       |       |        |        |       |       |       | 2.4%  | 5.9%  | 9.9%  | 7.3%                  | 5.9%               |
| AFR 2016                          |       |       |       |      |       |       |       |       |       |       |        |        |       |       |       |       | -1.4% | -0.6% | 0.9%                  | -0.4%              |
| AFR 2017                          |       |       |       |      |       |       |       |       |       |       |        |        |       |       |       |       |       | 1.8%  | 2.5%                  | 2.1%               |
| AFR 2018                          |       |       |       |      |       |       |       |       |       |       |        |        |       |       |       |       |       |       | 1.4%                  | 1.4%               |

**N.n%** = Year-Ahead Forecast      Avg Year-Ahead Error = 2.2%  
 Avg Year-Ahead Error (No Downturns) = -0.7%  
**N.n%** = Current Year Forecast      Avg Current Year Error = 0.0%  
**N.n%** = 5 Year-Ahead Forecast      Avg 5 Year Error = 7.4%  
 Avg 5 Year Error (No Downturns) = 2.5%

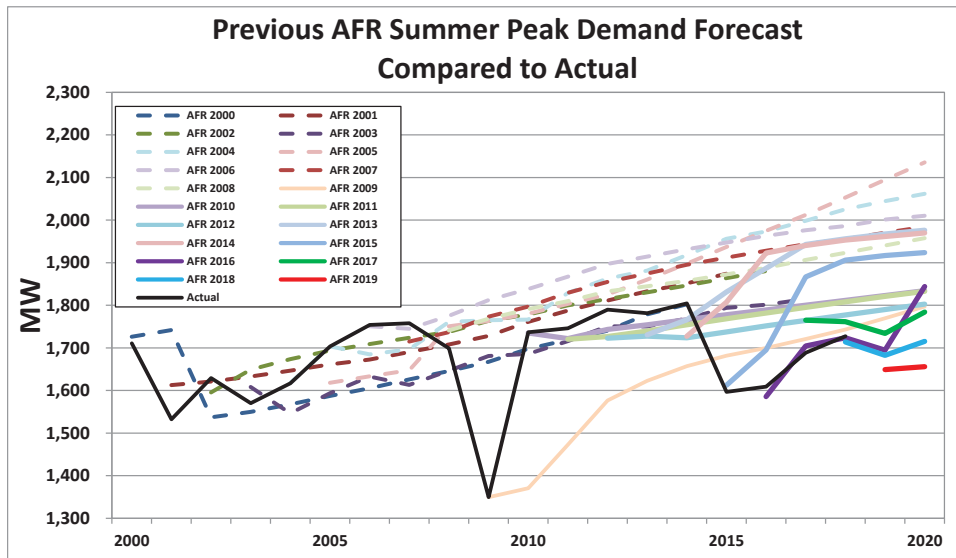


Figure 19: AFR Summer Peak Demand Forecast Accuracy

| Summer System Peak Error |      |       |       |       |       |       |       |       |       |       |        |        |        |       |       |       |       |       | Average Error of AFRs | Avg. Error of AFRs |
|--------------------------|------|-------|-------|-------|-------|-------|-------|-------|-------|-------|--------|--------|--------|-------|-------|-------|-------|-------|-----------------------|--------------------|
| Forecast                 | 2000 | 2001  | 2002  | 2003  | 2004  | 2005  | 2006  | 2007  | 2008  | 2009  | 2010   | 2011   | 2012   | 2013  | 2014  | 2015  | 2016  | 2017  |                       |                    |
| AFR 2000                 | 0.9% | 13.7% | -5.6% | -1.3% | -3.1% | -6.8% | -8.5% | -7.5% | -3.1% | 23.6% | -2.2%  | -1.6%  | -2.8%  | -0.2% | -0.1% | 17.4% |       |       | -0.3%                 | 13.7%              |
| AFR 2001                 |      | 5.2%  | -0.5% | 4.0%  | 1.8%  | -2.5% | -4.6% | -3.8% | 0.5%  | 28.0% | 1.4%   | 2.4%   | 1.2%   | 2.9%  | 2.6%  | 17.4% |       |       | 3.7%                  | 0.5%               |
| AFR 2002                 |      |       | -2.0% | 5.0%  | 3.5%  | -0.6% | -2.6% | -1.9% | 2.3%  | 30.7% | 2.4%   | 3.1%   | 1.4%   | 2.7%  | 2.3%  | 16.7% | 16.9% |       | 5.3%                  | 5.0%               |
| AFR 2003                 |      |       |       | 2.4%  | -4.4% | -6.4% | -6.9% | -8.2% | -3.1% | 24.6% | -2.9%  | -1.7%  | -2.2%  | -1.7% | -2.0% | 12.4% | 12.0% | 7.5%  | 1.3%                  | 4.4%               |
| AFR 2004                 |      |       |       |       | 0.0%  | -3.9% | -3.5% | 3.7%  | 30.8% | 1.7%  | 4.8%   | 4.1%   | 5.6%   | 6.3%  | 22.5% | 22.7% | 18.4% | 8.7%  | 0.0%                  |                    |
| AFR 2005                 |      |       |       |       |       | -5.0% | -6.9% | -6.3% | 3.1%  | 30.7% | 2.5%   | 3.3%   | 2.0%   | 4.4%  | 5.2%  | 21.3% | 22.8% | 19.2% | 8.2%                  | 6.9%               |
| AFR 2006                 |      |       |       |       |       |       | -0.2% | -0.7% | 4.5%  | 34.3% | 5.9%   | 7.0%   | 6.0%   | 7.5%  | 7.0%  | 22.0% | 22.0% | 17.1% | 11.3%                 | 0.7%               |
| AFR 2007                 |      |       |       |       |       |       |       | -2.4% | 2.2%  | 31.4% | 3.5%   | 4.8%   | 3.6%   | 5.2%  | 5.0%  | 19.8% | 19.8% | 15.1% | 10.1%                 | 2.2%               |
| AFR 2008                 |      |       |       |       |       |       |       |       | 2.5%  | 31.0% | 3.2%   | 3.7%   | 2.4%   | 3.6%  | 2.9%  | 17.3% | 17.4% | 12.9% | 9.8%                  | 31.0%              |
| AFR 2009                 |      |       |       |       |       |       |       |       |       | 0.0%  | -21.1% | -15.6% | -11.9% | -8.9% | -8.2% | 5.3%  | 5.7%  | 1.9%  | -5.2%                 | 21.1%              |
| AFR 2010                 |      |       |       |       |       |       |       |       |       |       | -0.1%  | -1.4%  | -2.6%  | -1.5% | -2.1% | 11.3% | 11.2% | 6.6%  | 2.9%                  | 1.4%               |
| AFR 2011                 |      |       |       |       |       |       |       |       |       |       |        | -1.5%  | -3.5%  | -2.4% | -2.8% | 10.8% | 10.8% | 6.3%  | 2.8%                  | 3.5%               |
| AFR 2012                 |      |       |       |       |       |       |       |       |       |       |        |        | -3.7%  | -3.0% | -4.5% | 8.8%  | 8.9%  | 4.5%  | 2.0%                  | 3.0%               |
| AFR 2013                 |      |       |       |       |       |       |       |       |       |       |        |        |        | -2.8% | -2.1% | 14.7% | 17.3% | 15.1% | 9.2%                  | 2.1%               |
| AFR 2014                 |      |       |       |       |       |       |       |       |       |       |        |        |        |       | -4.3% | 13.2% | 19.5% | 14.9% | 11.3%                 | 13.2%              |
| AFR 2015                 |      |       |       |       |       |       |       |       |       |       |        |        |        |       |       | 1.0%  | 5.4%  | 10.6% | 6.8%                  | 5.4%               |
| AFR 2016                 |      |       |       |       |       |       |       |       |       |       |        |        |        |       |       |       | -1.4% | 0.9%  | -0.2%                 | -0.2%              |
| AFR 2017                 |      |       |       |       |       |       |       |       |       |       |        |        |        |       |       |       |       | 4.5%  | 3.2%                  | 2.0%               |
| AFR 2018                 |      |       |       |       |       |       |       |       |       |       |        |        |        |       |       |       |       |       | -0.8%                 | -0.8%              |

**N.n%** = Year-Ahead Forecast      Avg Year-Ahead Error = 1.7%  
 Avg Year-Ahead Error (No Downturns) = -1.9%  
**N.n%** = Current Year Forecast      Avg Current Year Error = -0.4%  
**N.n%** = 5 Year-Ahead Forecast      Avg 5 Year Error = 4.5%  
 Avg 5 Year Error (No Downturns) = 1.7%

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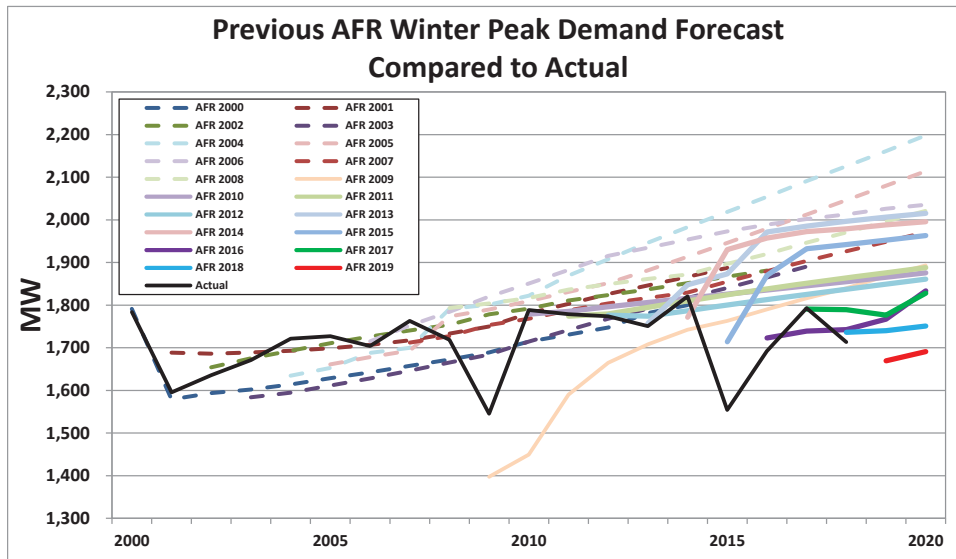


Figure 20: AFR Winter Peak Demand Forecast Accuracy

|          |          | Winter System Peak Error |       |       |       |       |       |       |       |       |       |        |        |       |       |       |       |       |       | Average Error of AFR | Avg. Error Year-Ahead |
|----------|----------|--------------------------|-------|-------|-------|-------|-------|-------|-------|-------|-------|--------|--------|-------|-------|-------|-------|-------|-------|----------------------|-----------------------|
|          |          | 2000                     | 2001  | 2002  | 2003  | 2004  | 2005  | 2006  | 2007  | 2008  | 2009  | 2010   | 2011   | 2012  | 2013  | 2014  | 2015  | 2016  | 2017  | 2018                 |                       |
| Forecast | AFR 2000 | 0.4%                     | -1.0% | -2.6% | -4.1% | -6.2% | -5.7% | -3.6% | -6.0% | -2.7% | 9.3%  | -4.1%  | -2.7%  | -1.5% | 1.8%  | -1.1% |       |       |       | -2.0%                | 1.0%                  |
|          | AFR 2001 |                          | 5.8%  | 3.1%  | 1.1%  | -1.6% | -1.6% | 0.2%  | -2.6% | 0.8%  | 13.3% | -0.4%  | 1.4%   | 2.9%  | 5.5%  | 2.5%  | 21.4% |       |       | 3.4%                 | 3.1%                  |
|          | AFR 2002 |                          |       | 1.1%  | 0.2%  | -1.6% | -0.9% | 1.3%  | -1.3% | 2.0%  | 15.1% | 0.2%   | 1.8%   | 2.8%  | 4.9%  | 1.7%  | 20.1% | 11.2% |       | 3.9%                 | 0.2%                  |
|          | AFR 2003 |                          |       |       | -5.2% | -7.4% | -6.7% | -4.4% | -6.6% | -3.1% | 9.0%  | -4.1%  | -2.1%  | -0.3% | 2.4%  | -0.2% | 18.4% | 10.2% | 5.5%  | 0.3%                 | 7.4%                  |
|          | AFR 2004 |                          |       |       |       | -5.0% | -4.3% | -0.9% | -3.6% | 4.2%  | 16.6% | 1.9%   | 5.1%   | 7.6%  | 11.2% | 8.9%  | 29.9% | 21.4% | 16.6% | 8.9%                 | 4.3%                  |
|          | AFR 2005 |                          |       |       |       |       | -3.8% | -1.5% | -3.9% | 3.2%  | 15.8% | 1.2%   | 2.9%   | 4.4%  | 7.5%  | 5.1%  | 25.2% | 17.0% | 12.2% | 7.5%                 | 1.5%                  |
|          | AFR 2006 |                          |       |       |       |       |       | 0.7%  | -0.6% | 3.8%  | 17.8% | 3.5%   | 5.8%   | 8.0%  | 10.5% | 7.3%  | 27.0% | 17.5% | 11.7% | 10.0%                | 0.6%                  |
|          | AFR 2007 |                          |       |       |       |       |       |       | -2.9% | 0.5%  | 13.5% | -1.1%  | 0.5%   | 1.7%  | 3.8%  | 0.5%  | 19.4% | 11.1% | 6.2%  | 5.5%                 | 0.5%                  |
|          | AFR 2008 |                          |       |       |       |       |       |       |       | 4.3%  | 16.8% | 1.6%   | 3.2%   | 4.2%  | 6.3%  | 2.8%  | 22.1% | 13.5% | 8.6%  | 8.9%                 | 16.8%                 |
|          | AFR 2009 |                          |       |       |       |       |       |       |       |       | -9.6% | -18.9% | -10.6% | -6.2% | -2.4% | -4.3% | 13.4% | 5.8%  | 1.3%  | -2.4%                | 18.9%                 |
|          | AFR 2010 |                          |       |       |       |       |       |       |       |       |       | -0.5%  | 0.4%   | 1.3%  | 3.2%  | -0.2% | 17.5% | 8.5%  | 2.9%  | 4.6%                 | 0.4%                  |
|          | AFR 2011 |                          |       |       |       |       |       |       |       |       |       |        | -0.3%  | 0.3%  | 2.5%  | -0.6% | 17.4% | 8.6%  | 3.3%  | 5.0%                 | 0.3%                  |
|          | AFR 2012 |                          |       |       |       |       |       |       |       |       |       |        |        | 0.1%  | 1.3%  | -1.9% | 15.8% | 7.1%  | 1.8%  | 4.5%                 | 1.3%                  |
|          | AFR 2013 |                          |       |       |       |       |       |       |       |       |       |        |        |       | 1.5%  | 20.5% | 16.5% | 10.7% | 16.5% | 11.0%                | 1.5%                  |
|          | AFR 2014 |                          |       |       |       |       |       |       |       |       |       |        |        |       | 0.4%  | -2.7% | 24.2% | 15.7% | 10.0% | 12.5%                | 24.2%                 |
|          | AFR 2015 |                          |       |       |       |       |       |       |       |       |       |        |        |       |       | 10.3% | 10.5% | 7.8%  | 13.4% | 10.5%                | 10.5%                 |
|          | AFR 2016 |                          |       |       |       |       |       |       |       |       |       |        |        |       |       |       | 1.8%  | -3.0% | 1.7%  | 0.2%                 | 3.0%                  |
|          | AFR 2017 |                          |       |       |       |       |       |       |       |       |       |        |        |       |       |       |       |       | -0.1% | 2.2%                 | 4.4%                  |
|          | AFR 2018 |                          |       |       |       |       |       |       |       |       |       |        |        |       |       |       |       |       |       | 1.3%                 | 1.3%                  |

|      |                         |                                       |       |
|------|-------------------------|---------------------------------------|-------|
| N.n% | = Year-Ahead Forecast   | Avg Year-Ahead Error =                | 1.5%  |
|      |                         | Avg Year-Ahead Error (No Downturns) = | -0.9% |
| N.n% | = Current Year Forecast | Avg Current Year Error =              | -0.2% |
| N.n% | = 5 Year-Ahead Forecast | Avg 5 Year Error =                    | 4.4%  |
|      |                         | Avg 5 Year Error (No Downturns) =     | 2.3%  |

## **2. AFR 2019 Expected Scenario Forecast Description**

### **A. Forecast Scenario Description**

The AFR 2019 Expected scenario includes changes in customer operations that are not certain, but have a high likelihood of occurring. This high likelihood is characterized by formal communication from the customer, plus one or more of the following:

- An Electric Service Agreement is either executed or is in negotiation;
- The change in operation is supported by customer actions, such as construction or investment that will result in additional power requirements; and/or
- A timeframe for the operation and resulting power.

The Expected scenario assumes additional load from several new and existing customers. Most notably, this scenario accounts for a new industrial facility on the Iron Range; the facility is expected to reach full demand in mid-2022.

The scenario assumes a moderate, or “expected,” rate of national economic growth as the basis for the regional economic model.

The Expected scenario results in compound annual energy sales and peak demand growth of 0.5 percent and 0.4 percent, respectively, from 2018 through 2033.

### **B. Other Adjustments to Econometric Forecast**

Minnesota Power’s forecast scenario is the summation of the econometric model results and arithmetic adjustments for impacts which cannot be accurately modeled. These exogenous impacts are documented as separate seasonal peak and energy adjustments in the Expected scenario tables. These adjustments fall into the following categories:

1. **Net Load/Energy Added:** are exogenous adjustments for load added due to Distributed Solar Generation, Electric Vehicle impacts, new customers or expansion by existing customers, and lost load due to closure or loss of contract. This adjustment includes all load added or lost on the system, regardless of how that load is met; “Net Load/Energy Added” accounts for any change in load at the system level. To preserve customer confidentiality, the seasonal demand and energy impacts are netted to a single value before being applied to the econometric values.
2. **Customer Generation:** is the demand on Minnesota Power system that is met by customer owned generation. Customer generation can fluctuate without clear economic causes so this component of Minnesota Power system peak is removed to more accurately model demand for an econometric forecast. The process for this adjustment can be outlined in 3 steps:
  - Remove Customer Generation from the historical peak series.

- Econometrically project a less volatile “FERC load coincident w/Monthly Minnesota Power System peak (MW)” monthly peak series.
- Arithmetically account for Customer Generation after forecasting.

This procedure has been a methodological staple of Minnesota Power forecasting for over a decade and increases the quality of the econometric processes and resulting forecasts.

The forecast assumption for customer generation is determined by averaging the historical customer generation coincident with the monthly peak over a twelve-year historical timeframe. The result is a set of 12 distinct monthly values for each month of the year. The MWh adjustment is determined similarly through averaging the most recent twelve-year historical timeframe, but excluding 2009 due to its irregularly low value. These adjustments are credits that increase the estimated peaks and system energy use projection by the estimated amount.

This Customer Generation adjustment to peak and energy forecasts also accounts for expected changes in the operation or ownership of generating assets that would affect deliveries to customers.

3. **Dual Fuel:** Minnesota Power has a robust Dual Fuel program for residential and commercial customers. Dual Fuel impacts are accounted for in the forecast in the same way as conservation. The impacts of historical interruptions are assumed to be inherent in the forecast since curtailments affected historical monthly peak demand. Post-regression adjustments for dual fuel would produce an artificially low peak demand forecast. Minnesota Power will account for dual fuel interruption as a resource and not as an adjustment to the load forecast.

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## C. Expected Scenario Peak Demand and Energy Outlook

### Peak Forecast (MW)

| Econometric |       |       | + | Net Load Added |     | = | MP Delivered Load |       | + | Customer Gen. |     | = | MP System Peak |       |        |
|-------------|-------|-------|---|----------------|-----|---|-------------------|-------|---|---------------|-----|---|----------------|-------|--------|
|             | Sum   | Win   |   | Sum            | Win |   | Sum               | Win   |   | Sum           | Win |   | Sum            | Win   | Annual |
| 2000        |       |       |   |                |     |   | 1,469             | 1,503 |   | 242           | 281 |   | 1,711          | 1,784 | 1,784  |
| 2001        |       |       |   |                |     |   | 1,383             | 1,421 |   | 150           | 175 |   | 1,533          | 1,595 | 1,595  |
| 2002        |       |       |   |                |     |   | 1,464             | 1,456 |   | 165           | 180 |   | 1,629          | 1,636 | 1,636  |
| 2003        |       |       |   |                |     |   | 1,408             | 1,496 |   | 163           | 175 |   | 1,570          | 1,671 | 1,671  |
| 2004        |       |       |   |                |     |   | 1,449             | 1,533 |   | 168           | 189 |   | 1,617          | 1,721 | 1,721  |
| 2005        |       |       |   |                |     |   | 1,535             | 1,555 |   | 169           | 172 |   | 1,703          | 1,727 | 1,727  |
| 2006        |       |       |   |                |     |   | 1,584             | 1,534 |   | 169           | 170 |   | 1,753          | 1,704 | 1,753  |
| 2007        |       |       |   |                |     |   | 1,582             | 1,584 |   | 176           | 179 |   | 1,758          | 1,763 | 1,763  |
| 2008        |       |       |   |                |     |   | 1,552             | 1,575 |   | 147           | 145 |   | 1,699          | 1,719 | 1,719  |
| 2009        |       |       |   |                |     |   | 1,200             | 1,369 |   | 150           | 176 |   | 1,350          | 1,545 | 1,545  |
| 2010        |       |       |   |                |     |   | 1,591             | 1,599 |   | 140           | 190 |   | 1,732          | 1,789 | 1,789  |
| 2011        |       |       |   |                |     |   | 1,573             | 1,630 |   | 173           | 150 |   | 1,746          | 1,780 | 1,780  |
| 2012        |       |       |   |                |     |   | 1,603             | 1,605 |   | 187           | 169 |   | 1,790          | 1,774 | 1,790  |
| 2013        |       |       |   |                |     |   | 1,645             | 1,589 |   | 136           | 162 |   | 1,782          | 1,751 | 1,782  |
| 2014        |       |       |   |                |     |   | 1,620             | 1,637 |   | 184           | 184 |   | 1,805          | 1,821 | 1,821  |
| 2015        |       |       |   |                |     |   | 1,442             | 1,461 |   | 155           | 94  |   | 1,597          | 1,554 | 1,597  |
| 2016        |       |       |   |                |     |   | 1,453             | 1,520 |   | 156           | 173 |   | 1,609          | 1,692 | 1,692  |
| 2017        |       |       |   |                |     |   | 1,538             | 1,599 |   | 150           | 195 |   | 1,689          | 1,794 | 1,794  |
| 2018        |       |       |   |                |     |   | 1,589             | 1,564 |   | 139           | 150 |   | 1,728          | 1,714 | 1,728  |
| 2019        | 1,536 | 1,544 |   | (31)           | (0) |   | 1,505             | 1,544 |   | 152           | 122 |   | 1,657          | 1,666 | 1,666  |
| 2020        | 1,541 | 1,550 |   | (1)            | 12  |   | 1,540             | 1,562 |   | 122           | 122 |   | 1,662          | 1,684 | 1,684  |
| 2021        | 1,547 | 1,556 |   | 11             | 16  |   | 1,558             | 1,572 |   | 122           | 122 |   | 1,680          | 1,694 | 1,694  |
| 2022        | 1,553 | 1,563 |   | 45             | 59  |   | 1,598             | 1,621 |   | 122           | 122 |   | 1,720          | 1,743 | 1,743  |
| 2023        | 1,561 | 1,570 |   | 56             | 59  |   | 1,616             | 1,629 |   | 122           | 122 |   | 1,738          | 1,751 | 1,751  |
| 2024        | 1,568 | 1,577 |   | 55             | 60  |   | 1,623             | 1,637 |   | 122           | 122 |   | 1,745          | 1,759 | 1,759  |
| 2025        | 1,575 | 1,584 |   | 55             | 60  |   | 1,629             | 1,644 |   | 122           | 122 |   | 1,751          | 1,766 | 1,766  |
| 2026        | 1,581 | 1,590 |   | 54             | 61  |   | 1,635             | 1,651 |   | 122           | 122 |   | 1,757          | 1,773 | 1,773  |
| 2027        | 1,588 | 1,596 |   | 53             | 62  |   | 1,641             | 1,658 |   | 122           | 122 |   | 1,763          | 1,780 | 1,780  |
| 2028        | 1,594 | 1,603 |   | 53             | 63  |   | 1,647             | 1,666 |   | 122           | 122 |   | 1,769          | 1,788 | 1,788  |
| 2029        | 1,601 | 1,609 |   | 52             | 65  |   | 1,653             | 1,674 |   | 122           | 122 |   | 1,775          | 1,796 | 1,796  |
| 2030        | 1,606 | 1,616 |   | 52             | 67  |   | 1,657             | 1,683 |   | 122           | 122 |   | 1,779          | 1,805 | 1,805  |
| 2031        | 1,612 | 1,622 |   | 51             | 69  |   | 1,663             | 1,691 |   | 122           | 122 |   | 1,785          | 1,813 | 1,813  |
| 2032        | 1,618 | 1,628 |   | 50             | 72  |   | 1,668             | 1,700 |   | 122           | 122 |   | 1,790          | 1,822 | 1,822  |
| 2033        | 1,623 | 1,634 |   | 50             | 76  |   | 1,673             | 1,710 |   | 122           | 122 |   | 1,795          | 1,832 | 1,832  |

### Energy Sales Forecast (MWh)

| Econometric |            | + Net Energy Added |  | = MP Delivered Energy |  | - Customer Gen. |  | = System Energy Use |  | MP System |             |
|-------------|------------|--------------------|--|-----------------------|--|-----------------|--|---------------------|--|-----------|-------------|
|             |            |                    |  |                       |  |                 |  |                     |  | Peak      | Load Factor |
| 2000        |            |                    |  | 10,029,324            |  |                 |  |                     |  |           |             |
| 2001        |            |                    |  | 9,476,860             |  |                 |  |                     |  |           |             |
| 2002        |            |                    |  | 9,950,113             |  | 1,187,858       |  | 11,137,971          |  | 1,636     | 0.78        |
| 2003        |            |                    |  | 9,638,417             |  | 1,232,635       |  | 10,871,052          |  | 1,671     | 0.74        |
| 2004        |            |                    |  | 10,117,168            |  | 1,267,728       |  | 11,384,896          |  | 1,721     | 0.76        |
| 2005        |            |                    |  | 10,345,265            |  | 1,258,895       |  | 11,604,160          |  | 1,727     | 0.77        |
| 2006        |            |                    |  | 10,443,777            |  | 1,195,070       |  | 11,638,847          |  | 1,753     | 0.76        |
| 2007        |            |                    |  | 10,670,857            |  | 1,252,965       |  | 11,923,822          |  | 1,763     | 0.77        |
| 2008        |            |                    |  | 10,826,034            |  | 1,276,158       |  | 12,102,192          |  | 1,719     | 0.80        |
| 2009        |            |                    |  | 8,062,253             |  | 1,108,014       |  | 9,170,267           |  | 1,545     | 0.68        |
| 2010        |            |                    |  | 10,417,422            |  | 1,299,292       |  | 11,716,714          |  | 1,789     | 0.75        |
| 2011        |            |                    |  | 10,988,200            |  | 1,422,107       |  | 12,410,307          |  | 1,780     | 0.80        |
| 2012        |            |                    |  | 11,107,357            |  | 1,200,317       |  | 12,307,674          |  | 1,790     | 0.79        |
| 2013        |            |                    |  | 10,985,809            |  | 1,185,139       |  | 12,170,948          |  | 1,782     | 0.78        |
| 2014        |            |                    |  | 11,038,979            |  | 1,287,965       |  | 12,326,944          |  | 1,821     | 0.77        |
| 2015        |            |                    |  | 10,059,466            |  | 1,227,221       |  | 11,286,687          |  | 1,597     | 0.81        |
| 2016        |            |                    |  | 9,830,787             |  | 1,074,786       |  | 10,905,573          |  | 1,692     | 0.74        |
| 2017        |            |                    |  | 10,654,217            |  | 1,215,894       |  | 11,870,111          |  | 1,794     | 0.76        |
| 2018        |            |                    |  | 10,638,691            |  | 1,236,276       |  | 11,874,967          |  | 1,728     | 0.78        |
| 2019        | 10,302,989 | 124,385            |  | 10,427,373            |  | 1,218,184       |  | 11,645,557          |  | 1,666     | 0.80        |
| 2020        | 10,371,985 | 206,047            |  | 10,578,032            |  | 956,728         |  | 11,534,760          |  | 1,684     | 0.78        |
| 2021        | 10,369,727 | 307,868            |  | 10,677,595            |  | 955,384         |  | 11,632,979          |  | 1,694     | 0.78        |
| 2022        | 10,401,334 | 513,683            |  | 10,915,017            |  | 955,384         |  | 11,870,401          |  | 1,743     | 0.78        |
| 2023        | 10,442,977 | 656,983            |  | 11,099,961            |  | 955,384         |  | 12,055,345          |  | 1,751     | 0.79        |
| 2024        | 10,515,615 | 651,811            |  | 11,167,426            |  | 956,728         |  | 12,124,154          |  | 1,759     | 0.79        |
| 2025        | 10,522,645 | 644,583            |  | 11,167,228            |  | 955,384         |  | 12,122,612          |  | 1,766     | 0.78        |
| 2026        | 10,555,406 | 642,087            |  | 11,197,493            |  | 955,384         |  | 12,152,877          |  | 1,773     | 0.78        |
| 2027        | 10,590,824 | 639,880            |  | 11,230,704            |  | 955,384         |  | 12,186,088          |  | 1,780     | 0.78        |
| 2028        | 10,655,757 | 640,821            |  | 11,296,578            |  | 956,728         |  | 12,253,306          |  | 1,788     | 0.78        |
| 2029        | 10,655,939 | 638,391            |  | 11,294,330            |  | 955,384         |  | 12,249,714          |  | 1,796     | 0.78        |
| 2030        | 10,688,881 | 638,291            |  | 11,327,172            |  | 955,384         |  | 12,282,556          |  | 1,805     | 0.78        |
| 2031        | 10,710,827 | 639,549            |  | 11,350,375            |  | 955,384         |  | 12,305,759          |  | 1,813     | 0.77        |
| 2032        | 10,768,420 | 642,704            |  | 11,411,124            |  | 956,728         |  | 12,367,852          |  | 1,822     | 0.77        |
| 2033        | 10,761,575 | 642,923            |  | 11,404,499            |  | 955,384         |  | 12,359,883          |  | 1,832     | 0.77        |

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**Customer Count Forecast by Class**

| Year | Residential | Commercial | Industrial | Street Lighting | Public Authorities | Resale | Total   |
|------|-------------|------------|------------|-----------------|--------------------|--------|---------|
| 2005 | 116,072     | 20,040     | 460        | 490             | 233                | 18     | 137,313 |
| 2006 | 117,596     | 20,419     | 451        | 509             | 237                | 18     | 139,229 |
| 2007 | 118,870     | 20,630     | 435        | 548             | 241                | 18     | 140,742 |
| 2008 | 119,300     | 20,969     | 431        | 585             | 246                | 18     | 141,549 |
| 2009 | 121,217     | 21,287     | 429        | 426             | 262                | 18     | 143,639 |
| 2010 | 121,235     | 21,491     | 424        | 460             | 278                | 18     | 143,906 |
| 2011 | 121,251     | 21,603     | 421        | 527             | 281                | 18     | 144,101 |
| 2012 | 120,697     | 21,614     | 411        | 559             | 275                | 18     | 143,573 |
| 2013 | 121,314     | 21,915     | 402        | 615             | 287                | 18     | 144,551 |
| 2014 | 119,789     | 21,697     | 390        | 660             | 272                | 17     | 142,824 |
| 2015 | 121,515     | 22,170     | 394        | 677             | 281                | 17     | 145,054 |
| 2016 | 121,836     | 22,420     | 396        | 688             | 281                | 17     | 145,638 |
| 2017 | 122,253     | 22,695     | 390        | 693             | 278                | 17     | 146,326 |
| 2018 | 122,506     | 22,834     | 380        | 693             | 277                | 17     | 146,707 |
| 2019 | 122,642     | 23,011     | 375        | 695             | 278                | 17     | 147,017 |
| 2020 | 122,907     | 23,184     | 366        | 694             | 278                | 16     | 147,444 |
| 2021 | 123,183     | 23,382     | 360        | 699             | 278                | 16     | 147,918 |
| 2022 | 123,399     | 23,571     | 353        | 701             | 279                | 16     | 148,319 |
| 2023 | 123,621     | 23,758     | 341        | 704             | 279                | 16     | 148,718 |
| 2024 | 123,829     | 23,943     | 333        | 706             | 279                | 16     | 149,105 |
| 2025 | 124,006     | 24,128     | 329        | 705             | 278                | 16     | 149,462 |
| 2026 | 124,201     | 24,314     | 326        | 704             | 278                | 16     | 149,839 |
| 2027 | 124,406     | 24,501     | 320        | 703             | 278                | 16     | 150,224 |
| 2028 | 124,617     | 24,690     | 314        | 703             | 278                | 16     | 150,618 |
| 2029 | 124,824     | 24,878     | 307        | 704             | 278                | 16     | 151,008 |
| 2030 | 125,036     | 25,069     | 301        | 704             | 279                | 16     | 151,405 |
| 2031 | 125,245     | 25,264     | 294        | 705             | 279                | 16     | 151,804 |
| 2032 | 125,439     | 25,458     | 288        | 705             | 280                | 16     | 152,185 |
| 2033 | 125,660     | 25,652     | 281        | 707             | 280                | 16     | 152,596 |

**Energy Sales Forecast (MWh) by Customer Class**

| Year | Residential | Commercial | Industrial | Street Lighting | Public Authorities | Resale    | Total      |
|------|-------------|------------|------------|-----------------|--------------------|-----------|------------|
| 2005 | 1,013,156   | 1,200,075  | 6,761,669  | 15,647          | 61,395             | 1,293,323 | 10,345,265 |
| 2006 | 1,011,698   | 1,206,607  | 6,782,975  | 15,830          | 60,883             | 1,365,784 | 10,443,777 |
| 2007 | 1,051,453   | 1,244,929  | 6,622,051  | 15,751          | 67,057             | 1,669,616 | 10,670,857 |
| 2008 | 1,079,836   | 1,240,327  | 6,737,332  | 15,981          | 64,912             | 1,687,646 | 10,826,034 |
| 2009 | 1,075,117   | 1,212,778  | 4,051,354  | 16,050          | 62,036             | 1,644,918 | 8,062,253  |
| 2010 | 1,057,476   | 1,221,753  | 6,364,077  | 15,834          | 61,766             | 1,696,516 | 10,417,422 |
| 2011 | 1,069,856   | 1,226,174  | 6,913,648  | 16,420          | 62,457             | 1,699,644 | 10,988,200 |
| 2012 | 1,043,281   | 1,237,386  | 7,037,843  | 15,954          | 54,074             | 1,718,819 | 11,107,357 |
| 2013 | 1,086,481   | 1,256,540  | 6,873,992  | 16,066          | 51,736             | 1,700,993 | 10,985,809 |
| 2014 | 1,112,579   | 1,262,464  | 6,946,536  | 16,400          | 53,236             | 1,647,763 | 11,038,979 |
| 2015 | 1,026,454   | 1,254,681  | 6,073,273  | 15,801          | 54,470             | 1,634,786 | 10,059,466 |
| 2016 | 1,015,465   | 1,243,045  | 5,855,829  | 15,588          | 51,455             | 1,649,406 | 9,830,787  |
| 2017 | 1,010,955   | 1,223,786  | 6,697,793  | 14,873          | 49,945             | 1,656,865 | 10,654,217 |
| 2018 | 1,052,800   | 1,233,117  | 6,677,891  | 14,206          | 49,884             | 1,610,791 | 10,638,691 |
| 2019 | 1,053,246   | 1,236,911  | 6,653,992  | 14,776          | 47,895             | 1,420,554 | 10,427,373 |
| 2020 | 1,053,474   | 1,255,436  | 6,846,163  | 15,087          | 47,287             | 1,360,585 | 10,578,032 |
| 2021 | 1,050,720   | 1,259,858  | 6,842,095  | 14,990          | 47,116             | 1,462,815 | 10,677,595 |
| 2022 | 1,052,541   | 1,269,402  | 7,018,553  | 14,923          | 46,827             | 1,512,771 | 10,915,017 |
| 2023 | 1,055,480   | 1,283,122  | 7,179,526  | 14,825          | 46,851             | 1,520,156 | 11,099,961 |
| 2024 | 1,061,906   | 1,297,983  | 7,213,838  | 14,789          | 46,690             | 1,532,220 | 11,167,426 |
| 2025 | 1,061,821   | 1,301,607  | 7,207,506  | 14,705          | 45,727             | 1,535,862 | 11,167,228 |
| 2026 | 1,065,500   | 1,311,799  | 7,220,383  | 14,650          | 45,272             | 1,539,889 | 11,197,493 |
| 2027 | 1,070,421   | 1,323,531  | 7,226,904  | 14,614          | 45,046             | 1,550,188 | 11,230,704 |
| 2028 | 1,079,021   | 1,337,735  | 7,257,923  | 14,629          | 44,882             | 1,562,388 | 11,296,578 |
| 2029 | 1,080,726   | 1,341,957  | 7,246,546  | 14,531          | 44,270             | 1,566,301 | 11,294,330 |
| 2030 | 1,086,375   | 1,352,312  | 7,250,135  | 14,489          | 43,988             | 1,579,873 | 11,327,172 |
| 2031 | 1,092,787   | 1,363,953  | 7,250,678  | 14,451          | 43,848             | 1,584,660 | 11,350,375 |
| 2032 | 1,104,119   | 1,380,261  | 7,266,420  | 14,461          | 43,808             | 1,602,054 | 11,411,124 |
| 2033 | 1,110,585   | 1,387,973  | 7,237,989  | 14,375          | 43,621             | 1,609,954 | 11,404,499 |

### **3. Other Information**

#### **A. Subject of Assumption**

Section 7610.0320, Subpart 4, lists specific assumptions to be discussed. The following list contains the discussion of each assumption and Minnesota Power's response.

- Assumptions made regarding the availability of alternative sources of energy.
  - Minnesota Power makes no assumptions regarding the availability of alternative sources of energy.
- Assumptions made regarding expected conversion from other fuels to electricity or vice versa.
  - Minnesota Power's assumptions regarding conversion are explicitly included in the saturation rates for electric heating.
- Assumptions made regarding future prices of electricity for customers and the effect that such prices would have on system demand.
  - See Section 1.C.
- Assumptions made in arriving at the data requested (historical reporting).
  - Minnesota Power makes no such assumptions.
- Assumptions made regarding the effect of existing energy conservations programs under Federal or State legislation on long-term electricity demand
  - See Demand Side Management above.
- Assumptions made regarding the projected effect of new conservations programs the utility deems likely to occur through Federal or State legislation.
  - See Section 1.F.
- Assumptions made regarding current and future saturation levels of appliances and electric space heating.
  - See Section 1.F.

#### **B. Coordination of Forecasts with Other Systems**

Minnesota Power is a member of the Midwest Reliability Organization (MRO), MISO, Edison Electric Institute (EEI), Upper Midwest Utility Forecasters (UMUF), and other trade associations. While each member of these groups independently determines its power requirements, periodic meetings are held to share information and discuss forecasting techniques and methodologies.



MINNESOTA POWER  
2019 ANNUAL FORECAST REPORT

**C. Compliance with 7610.0320 Forecast Documentation**

| <i><b>Statute or Rule</b></i> | <i><b>Requirement</b></i>  | <i><b>Reference Section</b></i> |
|-------------------------------|--|---------------------------------|
| 7610.0320, Subp. 1(A)         | The overall methodological framework that is used.   | Section 1.A                     |
| 7610.0320, Subp. 1(B)         | The specific analytical techniques that are used, their purpose, and the components of the forecast to which they have been applied.   | Sections 1.D, 1.F               |
| 7610.0320, Subp. 1(C)         | The manner in which these specific techniques are related in producing the forecast.   | Section 1.D                     |
| 7610.0320, Subp. 1(D)         | The purpose of the technique, typical computations specifying variables and data, and the results of appropriate statistical tests.  | Section 1.F                     |
| 7610.0320, Subp. 1(E)         | Forecast confidence levels or ranges of accuracy for annual peak demand and annual electrical consumption.   | Section 1.F                     |
| 7610.0320, Subp. 1(F)         | A brief analysis of the methodology used, including its strengths and weaknesses, its suitability to the system, cost considerations, data requirements, past accuracy, and any other factors considered significant to the utility. | Sections 1.B, 1.F               |
| 7610.0320, Subp. 2(A)         | A complete list of data sets used in making the forecast, including a brief description of each data set and an explanation of how each was obtained, or a citation to the source.   | Sections 1.C                    |
| 7610.0320, Subp. 2(B)         | A clear identification of any adjustments made to the raw data to adapt them for use in forecasts, including the nature of the adjustment, the reason for the adjustment, and the magnitude of the adjustment.                       | Section 1.F                     |
| 7610.0320, Subp. 3            | Discussion of essential assumptions.   | Sections 1.E, 1.F               |
| 7610.0320, Subp. 4            | Subject of assumption.   | Section 3                       |
| 7610.0320, Subp. 5(A)         | Description of the extent to which the utility coordinates its load forecasts with those of other systems.   | Section 3                       |
| 7610.0320, Subp. 5(B)         | Description of the manner in which such forecasts are coordinated.   | Section 3                       |



MINNESOTA ELECTRIC UTILITY ANNUAL REPORT

7610.0120 REGISTRATION

|             |      |
|-------------|------|
| ENTITY ID#  | 68   |
| REPORT YEAR | 2018 |

|                        |    |
|------------------------|----|
| Number of Power Plants | 19 |
|------------------------|----|

|  |                    |
|--|--------------------|
| <b>UTILITY DETAILS</b>                     |                    |
| UTILITY NAME                               | Minnesota Power Co |
| STREET ADDRESS                             | 30 W Superior St   |
| CITY                                       | Duluth             |
| STATE                                      | MN                 |
| ZIP CODE                                   | 55802-2093         |
| TELEPHONE                                  | 218-722-5642 x3865 |
| * UTILITY TYPE                             | PRIVATE            |
| Scroll down to see allowable UTILITY TYPES |                    |

|                            |  |
|----------------------------|--|
| <b>CONTACT INFORMATION</b> |  |
| CONTACT NAME               | Benjamin Levine  |
| CONTACT TITLE              | Senior Utility Load Forecaster                               |
| CONTACT STREET ADDRESS     | 30 West Superior Street                                      |
| CITY                       | Duluth   |
| STATE                      | MN   |
| ZIP CODE                   | 55802-2093   |
| TELEPHONE                  | 218-355-3120   |
| CONTACT EMAIL ADDRESS      | <a href="mailto:blevine@mnpower.com">blevine@mnpower.com</a> |

|                         |   |
|-------------------------|---|
| <b>UTILITY OFFICERS</b> |   |
| NAME                    | TITLE   |
| Alan Hodnik             | Chairman and Chief Executive Officer                                  |
| Bethany Owen            | President   |
| Robert Adams            | Senior Vice President, Chief Financial Officer                        |
| Steve Morris            | Vice President, Controller & Chief Accounting Officer                 |
| Maggie Thickers         | Vice President, Chief Legal Officer & Corporate Secretary             |
| Julie Pierce            | Vice President, Minnesota Power Strategy & Planning                   |
| Franklyn Frederickson   | Vice President, Minnesota Power Customer Experience                   |
| Josh Skelton            | Vice President, Minnesota Power Generation Operations & ALLETE Safety |
| Nicole Johnson          | Vice President, Human Resources                                       |
| Patrick Cutshall        | Vice President, Corporate Treasurer                                   |
| Daniel Gunderson        | Vice President, Minnesota Power Transmission and Distribution         |
| Ken Voss                | Chief Technology Officer  |
| Jered Granley           | Chief Risk Officer  |
| Bill Carlson            | Chief Audit Officer   |
|                         |   |
|                         |   |
|                         |   |

|                             |  |
|-----------------------------|--|
| <b>PREPARER INFORMATION</b> |  |
| PERSON PREPARING FORMS      | (do not type "Same as Above")                                |
| PREPARER'S TITLE            | Benjamin Levine  |
| DATE                        | 7/17/2019  |
| PREPARER'S EMAIL ADDRESS    | <a href="mailto:blevine@mnpower.com">blevine@mnpower.com</a> |

|                 |
|-----------------|
| <b>COMMENTS</b> |
|                 |

ALLOWABLE UTILITY TYPES

- Code\*  
Private  
Public  
Co-op

MINNESOTA ELECTRIC UTILITY ANNUAL REPORT (Continued)

7610.0150 FEDERAL OR STATE DATA SUBSTITUTION

| FEDERAL AGENCY<br>(please spell out acronyms)       | FORM NUMBER | FORM TITLE   | FILING CYCLE<br>(enter an "X" in the cell) |        |       |   |
|---|-------------|--|--|--------|-------|---|
|   |             |  | MONTHLY                                    | YEARLY | OTHER |   |
| Dept of Energy, Federal Energy Regulatory Comm      | FERC-1      | Annual Report of Major Electric Utility                |  | X      |       |   |
| Dept of Energy, Federal Energy Regulatory Comm      | FERC-5      | Statement of Electric Operating Revenue and Income     | X  |        |       |   |
| Dept of Energy, Federal Energy Regulatory Comm      | FERC-45     | Part 45 Informational Report                           |  |        |       | X |
| Dept of Energy, Federal Energy Regulatory Comm      | FERC-67     | Steam Electric Plant, Air and Water Survey             |  | X      |       |   |
| Dept of Energy, Federal Energy Regulatory Comm      | FERC-80     | Licensed Projects Recreation Report                    |  |        |       | X |
| Dept of Energy, Federal Energy Regulatory Comm      | FERC-82     | Retail Rate Level Change                               |  |        |       | X |
| S Dept of Energy, Energy Information Administration | EIA-411     | Estimated Bulk Power Supply and Demand Program Report  |  | X      |       |   |
| S Dept of Energy, Energy Information Administration | EIA-412     | Annual Electric Industry Financial Report (Terminated) |  | X      |       |   |

COMMENTS

# MINNESOTA ELECTRIC UTILITY ANNUAL REPORT (Continued)

## 7610.0600 OTHER INFORMATION REPORTED ANNUALLY

A utility shall provide the following information for the last calendar year:

**B. LARGEST CUSTOMER LIST - ATTACHMENT ELEC-1** If applicable, the Largest Customer List must be submitted in electronic format. If information is Trade Secret, note it as such.

See "LargestCustomers" worksheet for data entry.

**C. MINNESOTA SERVICE AREA MAP** The referenced map must be submitted in electronic format.  
See Instructions for details of the information required on the Minnesota Service Area Map.

| D. PURCHASES AND SALES FOR RESALE           |  | INTERCONNECTED UTILITY<br>(please spell out acronyms) |  | MWH<br>PURCHASED | MWH<br>SOLD FOR RESALE |
|---|--|---|--|------------------|------------------------|
| UTILITY NAME<br>(please spell out acronyms) |  |   |  |                  |                        |
| Dahlberg Light & Power                      |  |   |  |                  | -                      |
| Superior Water Light & Power                |  |   |  |                  | 812,938                |
| City of Aitkin                              |  |   |  |                  | 38,745                 |
| City of Biwabik                             |  |   |  |                  | 6,588                  |
| City of Brainerd                            |  |   |  |                  | 170,684                |
| City of Buhl                                |  |   |  |                  | 6,927                  |
| City of Ely                                 |  |   |  |                  | 38,129                 |
| City of Gilbert                             |  |   |  |                  | 11,163                 |
| City of Grand Rapids                        |  |   |  |                  | 162,919                |
| City of Hibbing                             |  |   |  |                  | 137,899                |
| City of Keewatin                            |  |   |  |                  | 5,740                  |
| City of Mountain Iron                       |  |   |  |                  | 18,629                 |
| City of Nashwauk                            |  |   |  |                  | 11,908                 |
| City of Pierz                               |  |   |  |                  | 10,786                 |
| City of Proctor                             |  |   |  |                  | 26,934                 |
| City of Randall                             |  |   |  |                  | 5,083                  |
| City of Two Harbors                         |  |   |  |                  | 28,969                 |
| City of Virginia                            |  |   |  |                  | 116,751                |
| Other Non-Required Sales                    |  |   |  |                  | 3,952,562              |
| Non-Associated Utilities/Other              |  |   |  | 295,100          |                        |
| Municipals                                  |  |   |  | 4,712            |                        |
| Other Cooperatives                          |  |   |  | 465,421          |                        |
| Square Butte Electric Power                 |  |   |  | 1,717,616        |                        |
| Non-Utilities                               |  |   |  | 160,004          |                        |
| Power Marketers                             |  |   |  | 1,100,800        |                        |
| Other Public Authorities                    |  |   |  | 2,353,496        |                        |
| Utility                                     |  |   |  | 16               |                        |
| Foreign                                     |  |   |  | 294,876          |                        |
| City of Wadena                              |  | Western Area Power Administration (WAPA)              |  | 72,429           | 72,429                 |
| City of Staples                             |  | Western Area Power Administration (WAPA)              |  | 28,212           | 28,212                 |
| Great River Energy                          |  | Great River Energy (GRE)                              |  | 2,498,864        | 2,419,084              |
| Otter Tail Power                            |  | Otter Tail Power (OTP)                                |  | 754,094          | 754,094                |

# MINNESOTA ELECTRIC UTILITY ANNUAL REPORT (Continued)

## 7610.0600 OTHER INFORMATION REPORTED ANNUALLY (continued)

A utility shall provide the following information for the last calendar year:

|                          |  |
|--------------------------|--|
| <b>E. RATE SCHEDULES</b> | <b>The rate schedule and monthly power cost adjustment information must be submitted in electronic format.</b> |
|--------------------------|--|

See Instructions for details of the information required on the Rate Schedules and Monthly Power Cost Adjustments.

|                               |   |
|-------------------------------|---|
| <b>F. REPORT FORM EIA-861</b> | <b>A copy of report form EIA-861 filed with the US Department of Energy must be submitted in electronic format.</b> |
|-------------------------------|---|

A copy of the report form EIA-861 filed with the Energy Information Administration of the US Department of Energy must be submitted.

|  |  |
|--|--|
| <b>G. FINANCIAL AND STATISTICAL REPORT</b> | <b>If applicable, a copy of the Financial and Statistical Report filed with the US Department of Agriculture must be submitted in electronic format.</b> |
|--|--|

For rural electric cooperatives, a copy of the Financial and Statistical Report to the US Department of Agriculture must be submitted.

## H. GENERATION DATA

If the utility has Minnesota power plants, enter the fuel requirements and generation data on the Plant1, Plant2, etc. worksheets.

| <b>I. ELECTRIC USE BY MINNESOTA RESIDENTIAL SPACE HEATING USERS</b>                           |   |   |
|---|---|---|
| See Instructions for details of the information required for residential space heating users. |   |   |
| COLUMN 1<br>NUMBER OF RESIDENTIAL<br>ELECTRICAL SPACE<br>HEATING CUSTOMERS                    | COLUMN. 2<br>NUMBER OF RESIDENTIAL UNITS<br>SERVED WITH ELECTRICAL<br>SPACE HEATING | COLUMN 3<br>TOTAL MWH<br>USED BY THESE<br>CUSTOMERS AND UNITS |
| 14,450  | 14,450  | 188,982   |

| <b>COMMENTS</b> |
|-----------------|
|                 |

## MINNESOTA ELECTRIC UTILITY ANNUAL REPORT (Continued)

### 7610.0600 OTHER INFORMATION REPORTED ANNUALLY (continued)

#### J. ITS DELIVERIES TO ULTIMATE CONSUMERS BY COUNTY FOR THE LAST CALENDAR YEAR

ENERGY DELIVERED TO ULTIMATE CONSUMERS BY COUNTY IN 2018

| COUNTY CODE              | COUNTY NAME       | MWH DELIVERED | COUNTY CODE | COUNTY NAME     | MWH DELIVERED |
|--------------------------|-------------------|---------------|-------------|-----------------|---------------|
| 1                        | Aitkin            |               | 46          | Martin          |               |
| 2                        | Anoka             |               | 47          | Meeker          |               |
| 3                        | Becker            |               | 48          | Mille Lacs      |               |
| 4                        | Beltrami          |               | 49          | Morrison        | 260,648       |
| 5                        | Benton            | 25,557        | 50          | Mower           |               |
| 6                        | Big Stone         |               | 51          | Murray          |               |
| 7                        | Blue Earth        |               | 52          | Nicollet        |               |
| 8                        | Brown             |               | 53          | Nobles          |               |
| 9                        | Carlton           | 340,483       | 54          | Norman          |               |
| 10                       | Carver            |               | 55          | Olmstead        |               |
| 11                       | Cass              | 121,689       | 56          | Otter Tail      | 913           |
| 12                       | Chippewa          |               | 57          | Pennington      |               |
| 13                       | Chisago           |               | 58          | Pine            | 73,943        |
| 14                       | Clay              |               | 59          | Pipestone       |               |
| 15                       | Clearwater        |               | 60          | Polk            |               |
| 16                       | Cook              |               | 61          | Pope            |               |
| 17                       | Cottonwood        |               | 62          | Ramsey          |               |
| 18                       | Crow Wing         | 124,964       | 63          | Red Lake        |               |
| 19                       | Dakota            |               | 64          | Redwood         |               |
| 20                       | Dodge             |               | 65          | Renville        |               |
| 21                       | Douglas           |               | 66          | Rice            |               |
| 22                       | Faribault         |               | 67          | Rock            |               |
| 23                       | Fillmore          |               | 68          | Roseau          |               |
| 24                       | Freeborn          |               | 69          | St. Louis       | 6,161,780     |
| 25                       | Goodhue           |               | 70          | Scott           |               |
| 26                       | Grant             |               | 71          | Sherburne       |               |
| 27                       | Hennepin          |               | 72          | Sibley          |               |
| 28                       | Houston           |               | 73          | Stearns         | 6,745         |
| 29                       | Hubbard           | 97,286        | 74          | Steele          |               |
| 30                       | Isanti            |               | 75          | Stevens         |               |
| 31                       | Itasca            | 702,594       | 76          | Swift           |               |
| 32                       | Jackson           |               | 77          | Todd            | 210,058       |
| 33                       | Kanabec           |               | 78          | Traverse        |               |
| 34                       | Kandiyohi         |               | 79          | Wabasha         |               |
| 35                       | Kittson           |               | 80          | Wadena          | 95,365        |
| 36                       | Koochiching       | 192,283       | 81          | Waseca          |               |
| 37                       | Lac Qui Parle     |               | 82          | Washington      |               |
| 38                       | Lake              | 613,592       | 83          | Watsonwan       |               |
| 39                       | Lake of the Woods |               | 84          | Wilkin          |               |
| 40                       | Le Sueur          |               | 85          | Winona          |               |
| 41                       | Lincoln           |               | 86          | Wright          |               |
| 42                       | Lyon              |               | 87          | Yellow Medicine |               |
| 43                       | McLeod            |               |             |                 |               |
| 44                       | Mahnomen          |               |             |                 |               |
| 45                       | Marshall          |               |             |                 |               |
| GRAND TOTAL (Entered)    |                   |               |             |                 | 9,027,899     |
| GRAND TOTAL (Calculated) |                   |               |             |                 | 9,027,899     |

#### COMMENTS

# MINNESOTA ELECTRIC UTILITY ANNUAL REPORT (Continued)

## 7610.0600 OTHER INFORMATION REPORTED ANNUALLY (continued)

| J. ITS DELIVERIES TO ULTIMATE CONSUMERS BY MONTH FOR THE LAST CALENDAR YEAR                                      |                         |                      |                             |                |                               |              |                               |                           |                              |                               |
|--|-------------------------|----------------------|-----------------------------|----------------|-------------------------------|--------------|-------------------------------|---------------------------|------------------------------|-------------------------------|
| See Instructions for details of the information required concerning electricity delivered to ultimate consumers. |                         |                      |                             |                |                               |              |                               |                           |                              |                               |
| Past Year<br>(2018)  | A                       |                      | B                           |                | C                             |              | D                             |                           | E                            |                               |
|  | Entire System           | Non-Farm Residential | Residential With Space Heat | Farm           | Small Commercial & Industrial | Mining*      | Large Commercial & Industrial | Street & Highway Lighting | H Other (Include Municipals) | I Total (Columns A through H) |
| January  | No. of Customers<br>MWH | 105,617<br>85,783    | 14,482<br>30,462            | 2,317<br>3,696 | 22,879<br>111,390             | 9<br>432,903 | 374<br>137,229                | 690<br>1,639              | 278<br>4,802                 | 146,646<br>807,903            |
| February   | No. of Customers<br>MWH | 105,745<br>69,702    | 14,426<br>30,742            | 2,045<br>3,217 | 22,827<br>102,665             | 9<br>398,428 | 373<br>128,123                | 687<br>1,471              | 277<br>4,020                 | 146,389<br>738,367            |
| March  | No. of Customers<br>MWH | 105,320<br>63,420    | 14,453<br>25,210            | 2,493<br>3,518 | 22,814<br>101,150             | 9<br>439,392 | 373<br>144,052                | 687<br>1,257              | 277<br>4,606                 | 146,426<br>782,605            |
| April  | No. of Customers<br>MWH | 105,863<br>59,596    | 14,441<br>20,568            | 2,051<br>2,740 | 22,776<br>96,707              | 9<br>397,220 | 372<br>144,646                | 693<br>1,163              | 277<br>4,129                 | 146,482<br>726,767            |
| May  | No. of Customers<br>MWH | 105,526<br>51,584    | 14,461<br>13,920            | 2,489<br>3,015 | 22,771<br>97,647              | 9<br>415,909 | 369<br>142,237                | 690<br>1,010              | 277<br>3,486                 | 146,592<br>728,808            |
| June   | No. of Customers<br>MWH | 106,029<br>63,504    | 14,474<br>6,366             | 2,052<br>2,378 | 22,768<br>99,746              | 9<br>407,271 | 369<br>134,218                | 688<br>898                | 276<br>4,408                 | 146,665<br>718,789            |
| July   | No. of Customers<br>MWH | 105,555<br>73,155    | 14,465<br>5,329             | 2,614<br>3,369 | 22,814<br>110,710             | 9<br>425,798 | 369<br>135,448                | 695<br>827                | 277<br>4,227                 | 146,798<br>758,863            |
| August   | No. of Customers<br>MWH | 106,189<br>72,300    | 14,433<br>5,229             | 2,153<br>2,855 | 22,798<br>112,770             | 9<br>411,547 | 373<br>140,753                | 696<br>908                | 277<br>4,390                 | 146,928<br>750,750            |
| September  | No. of Customers<br>MWH | 106,178<br>61,882    | 14,445<br>5,030             | 2,053<br>2,468 | 22,861<br>98,714              | 9<br>408,358 | 370<br>134,099                | 695<br>1,052              | 277<br>4,040                 | 146,888<br>715,644            |
| October  | No. of Customers<br>MWH | 105,717<br>69,525    | 14,451<br>7,660             | 2,493<br>2,896 | 22,871<br>95,380              | 9<br>428,213 | 372<br>137,277                | 696<br>1,135              | 277<br>3,724                 | 146,886<br>745,811            |
| November   | No. of Customers<br>MWH | 106,303<br>78,744    | 14,429<br>14,919            | 1,780<br>2,146 | 22,898<br>99,540              | 9<br>433,397 | 368<br>130,874                | 698<br>1,363              | 277<br>3,584                 | 146,762<br>764,567            |
| December   | No. of Customers<br>MWH | 105,352<br>78,325    | 14,436<br>23,547            | 2,740<br>4,001 | 22,931<br>106,699             | 9<br>440,702 | 370<br>129,798                | 700<br>1,483              | 277<br>4,470                 | 146,815<br>789,024            |
| Total MWH  |                         | 827,519              | 188,982                     | 36,299         | 1,233,117                     | 5,039,138    | 1,638,753                     | 14,206                    | 49,884                       | 9,027,899                     |

### COMMENTS

The Elec\_68\_2018 Form originally included "Irrigation" in Column E. Minnesota Power has changed the column heading to "Mining" to comply with rule 7610.0600, part J: "Mining needs to be reported as a separate category only if annual sales are greater than 1,000 GWH." The Company's annual sales to Mining customers exceed 1,000 GWH.

MINNESOTA ELECTRIC UTILITY ANNUAL REPORT (Continued)

7610.0600 OTHER INFORMATION REPORTED ANNUALLY (continued)

| ELECTRICITY DELIVERED TO ULTIMATE CONSUMERS IN MINNESOTA SERVICE AREA IN LAST CALENDAR YEAR  |                           |  |  |  |
|--|---------------------------|--|--|--|
| See Instructions for details of the information required concerning electricity delivered to ultimate consumers. Exclude station use, distribution losses, and unaccounted for energy losses from this table altogether. |                           |  |  |  |
| Classification of Energy Delivered to Ultimate Consumers (include energy used during the year for irrigation and drainage pumping)   |                           | This column reports the number of farms, residences, commercial establishments, etc., and not the number of meters, where different. | This column total should equal the grand total in the worksheet labeled "ElectricityByCounty" which provides deliveries by county. | This column total will be used for the Alternative Energy Assessment and should NOT include revenues from sales for resale (Minnesota Statutes, Section 216B.62, Subd. 5). |
|  |                           | Number of Customers at End of Year   | Megawatt hours (round to nearest MWH)  | Revenue (\$)   |
|  | Farm                      | 2,273  | 36,299   | 4,577,152  |
|  | Non-Farm Residential      | 120,233  | 1,016,502  | 111,891,300  |
|  | Commercial                | 22,834   | 1,233,117  | 124,102,941  |
|  | Industrial                | 380  | 6,677,891  | 430,298,865  |
|  | Street & Highway Lighting | 693  | 14,206   | 2,467,252  |
|  | All other                 | 277  | 49,884   | 4,637,432  |
|  | Entered Total             | 146,690  | 9,027,899  | 677,974,942  |
| CALCULATED TOTAL   |                           | 146,690  | 9,027,899  | 677,974,942  |

| COMMENTS |
|----------|
|          |

**REMEMBER TO SEND/UPLOAD THE FOLLOWING ATTACHMENTS:**

**DO NOT INSERT THE ATTACHMENT INTO THIS WORKBOOK**

|   |   |
|---|---|
| 1 | If applicable, the Largest Customer List (Attachment ELEC-1),<br>if the separate LargestCustomers workbook was not used<br>(pursuant to MN Rules Chapter 7610.0600 B)         |
| 2 | Minnesota Service Area Map<br>(pursuant to MN Rules Chapter 7610.0600 C)  |
| 3 | Rate Schedules and Monthly Power Cost Adjustments<br>(pursuant to MN Rules Chapter 7610.0600 E)   |
| 4 | Report form EIA-861 filed with US Department of Energy<br>(pursuant to MN Rules Chapter 7610.0600 F)  |
| 5 | If applicable, for rural electric cooperatives,<br>the Financial and Statistical Report filed with US Department of Agriculture<br>(pursuant to MN Rules Chapter 7610.0600 G) |





**MINNESOTA ELECTRIC UTILITY ANNUAL REPORT (Continued)**

## 7610.0430 FUEL REQUIREMENTS AND GENERATION BY FUEL TYPE

## POWER PLANT AND GENERATING UNIT DATA REPORT

INSTRUCTIONS: Complete one worksheet for each power plant

Scroll down below the data entry tables to see the ALLOWABLE CODES to be used for Unit Status, Unit Type, Energy Source, Fuel Type, and Unit of Measure fields

Scroll down below the ALLOWABLE CODES to see DEFINITIONS for Capacity Factor, Operating Factor and Forced Outage Rate.

| A. PLANT DATA  |                      |                 |       |
|----------------|----------------------|-----------------|-------|
| PLANT NAME     | Laskin Energy Center | PLANT ID        | 68015 |
| STREET ADDRESS | PO Box 166           |                 |       |
| CITY           | Aurora               |                 |       |
| STATE          | MN                   | NUMBER OF UNITS | 2     |
| ZIP CODE       | 55705                |                 |       |
| COUNTY         | Saint Louis          |                 |       |
| CONTACT PERSON | Jodi Piekarski       |                 |       |
| TEL FPHONE     | 218-313-4416         |                 |       |

[illegible]

| C. UNIT CAPABILITY DATA | CAPACITY (MEGAWATTS) |        |        |                     | Plant Total          | 13,893.00              |          |
|-------------------------|----------------------|--------|--------|---------------------|----------------------|------------------------|----------|
|                         | Unit ID #            | Summer | Winter | Capacity Factor (%) | Operating Factor (%) | Forced Outage Rate (%) | Comments |
|                         | 1                    | 55.00  | 55.00  | 2.03%               | 98.01%               | 8.53%                  |          |
|                         | 2                    | 55.00  | 55.00  | 1.22%               | 92.62%               | 5.69%                  |          |
|                         |                      |        |        |                     |                      |                        |          |
|                         |                      |        |        |                     |                      |                        |          |
|                         |                      |        |        |                     |                      |                        |          |
|                         |                      |        |        |                     |                      |                        |          |
|                         |                      |        |        |                     |                      |                        |          |

[illegible]

| ALLOWABLE CODES                  |        |                                       |                         |        |                              |
|----------------------------------|--------|---------------------------------------|-------------------------|--------|------------------------------|
| Cell Heading                     | Code   | Code Definition                       | Cell Heading            | Code   | Code Definition              |
| * Unit Status                    | USE    | In-use                                | ** Unit Type            | CS     | Combined Cycle               |
|                                  | STB    | Stand-by                              |                         | IC     | Internal Combustion (Diesel) |
|                                  | RET    | Retired                               |                         | GT     | Combustion (Gas) Turbine     |
|                                  | FUT    | Future                                |                         | HC     | Hydro                        |
|                                  | OTHER  | Other - provide description           |                         | ST     | Steam Turbine (Boiler)       |
| *** Energy Source<br>& Fuel Type | BIT    | Bituminous Coal                       |                         | NC     | Nuclear                      |
|                                  | COAL   | Coal (general)                        |                         | WI     | Wind                         |
|                                  | DIESEL | Diesel                                |                         | OTHER  | Other - provide description  |
|                                  | FO2    | Fuel Oil #2 (Mid Distillate)          |                         |        |                              |
|                                  | FO6    | Fuel Oil #6 (Residual Fuel Oil)       |                         |        |                              |
|                                  | LIG    | Lignite                               | **** Unit of<br>Measure | GAL    | Gallons                      |
|                                  | LPG    | Liquefied Propane Gas                 |                         | MCF    | Thousand cubic feet          |
|                                  | NG     | Natural Gas                           |                         | MMCF   | Million cubic feet           |
|                                  | NUC    | Nuclear                               |                         | TONS   | Tons                         |
|                                  | REF    | Refuse, Bagasse, Peat, Non-wood waste |                         | BBL    | Barrels                      |
|                                  | STM    | Steam                                 |                         | THERMS | Therms                       |
|                                  | SUB    | Sub-Bituminous Coal                   |                         |        |                              |
|                                  | HYD    | Hydro (Water)                         |                         |        |                              |
|                                  | WIND   | Wind                                  |                         |        |                              |
|                                  | WOOD   | Wood                                  |                         |        |                              |
|                                  | SOLAR  | Solar                                 |                         |        |                              |
|                                  | OTHER  | Other - provide description           |                         |        |                              |

| <b>DEFINITIONS</b>                              |  |
|---|--|
| <b>Forced Outage Rate =</b><br>(percentage)     | $\frac{\text{Hours Unit Failed to be Available}}{\text{Hours Unit Called Upon to Produce}} \times 100$         |
| <b>Operating Availability =</b><br>(percentage) | 100 - Maintenance percentage - Forced Outage percentage  |
| <b>Capacity Factor =</b><br>(percentage)        | $\frac{\text{Total Annual MWh of Production}}{\text{Accredited Capacity Rating (MWh) of the Unit}} \times 100$ |

Note: Failure of a unit to be available does not include down time for scheduled maintenance.

Note: Maintenance percentage is the number of hours of scheduled maintenance divided by 8,760.





**MINNESOTA ELECTRIC UTILITY ANNUAL REPORT (Continued)**

## 7610.0430 FUEL REQUIREMENTS AND GENERATION BY FUEL TYPE

## POWER PLANT AND GENERATING UNIT DATA REPORT

INSTRUCTIONS: Complete one worksheet for each power plant

Scroll down below the data entry tables to see the ALLOWABLE CODES to be used for Unit Status, Unit Type, Energy Source, Fuel Type, and Unit of Measure fields

Scroll down below the ALLOWABLE CODES to see DEFINITIONS for Capacity Factor, Operating Factor and Forced Outage Rate.

| A. PLANT DATA  |                            | PLANT ID        |
|----------------|----------------------------|-----------------|
| PLANT NAME     | SAPPI Cloquet Turb Genr #5 | 68020           |
| STREET ADDRESS | 2201 Avenue B              |                 |
| CITY           | Cloquet                    |                 |
| STATE          | MN                         | NUMBER OF UNITS |
| ZIP CODE       | 55720                      | 1               |
| COUNTY         | Carlton                    |                 |
| CONTACT PERSON | David Chura                |                 |
| TEI PHONE      | 218-355-3280               |                 |

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| <b><i>ALLOWABLE CODES</i></b>                    |             |                                       |                             |             |                              |
|--|-------------|---------------------------------------|-----------------------------|-------------|------------------------------|
| <b>Cell Heading</b>                              | <b>Code</b> | <b>Code Definition</b>                | <b>Cell Heading</b>         | <b>Code</b> | <b>Code Definition</b>       |
| <b>* Unit Status</b>                             | USE         | In-use                                | <b>** Unit Type</b>         | CS          | Combined Cycle               |
|  | STB         | Stand-by                              |                             | IC          | Internal Combustion (Diesel) |
|  | RET         | Retired                               |                             | GT          | Combustion (Gas) Turbine     |
|  | FUT         | Future                                |                             | HC          | Hydro                        |
|  | OTHER       | Other - provide description           |                             | ST          | Steam Turbine (Boiler)       |
| <b>*** Energy Source<br/>    &amp; Fuel Type</b> | BIT         | Bituminous Coal                       |                             | NC          | Nuclear                      |
|  | COAL        | Coal (general)                        |                             | WI          | Wind                         |
|  | DIESEL      | Diesel                                |                             | OTHER       | Other - provide description  |
|  | FO2         | Fuel Oil #2 (Mid Distillate)          | <b>**** Unit of Measure</b> | GAL         | Gallons                      |
|  | FO6         | Fuel Oil #6 (Residual Fuel Oil)       |                             | MCF         | Thousand cubic feet          |
|  | LIG         | Lignite                               |                             | MMCF        | Million cubic feet           |
|  | LPG         | Liquefied Propane Gas                 |                             | TONS        | Tons                         |
|  | NG          | Natural Gas                           |                             | BBL         | Barrels                      |
|  | NUC         | Nuclear                               |                             | THERMS      | Therms                       |
|  | REF         | Refuse, Bagasse, Peat, Non-wood waste |                             |             |                              |
|  | STM         | Steam                                 |                             |             |                              |
|  | SUB         | Sub-Bituminous Coal                   |                             |             |                              |
|  | HYD         | Hydro (Water)                         |                             |             |                              |
|  | WIND        | Wind                                  |                             |             |                              |
|  | WOOD        | Wood                                  |                             |             |                              |
|  | SOLAR       | Solar                                 |                             |             |                              |
|  | OTHER       | Other - provide description           |                             |             |                              |

### ***DEFINITIONS***

|  |   |
|--|---|
| <b>Forced Outage Rate =</b><br><b>(percentage)</b>     | <u>Hours Unit Failed to be Available</u> X <u>100</u><br>Hours Unit Called Upon to Produce                |
| <b>Operating Availability =</b><br><b>(percentage)</b> | 100 - Maintenance percentage - Forced Outage percentage   |
| <b>Capacity Factor =</b><br><b>(percentage)</b>        | <u>Total Annual MWH of Production</u> X <u>100</u><br>Accredited Capacity Rating (MW) of the Unit X 8,760 |

Note: Failure of a unit to be available does not include down time for scheduled maintenance.

Note: Maintenance percentage is the number of hours of scheduled maintenance divided by 8,760.

**MINNESOTA ELECTRIC UTILITY ANNUAL REPORT (Continued)**

## 7610.0430 FUEL REQUIREMENTS AND GENERATION BY FUEL TYPE

## 2018

INSTRUCTIONS: Complete one worksheet for each power plant

Scroll down below the data entry tables to see the ALLOWABLE CODES to be used for Unit Status, Unit Type, Energy Source, Fuel Type, and Unit of Measure fields

Scroll down below the ALLOWABLE CODES to see DEFINITIONS for Capacity Factor, Operating Factor and Forced Outage Rate.

| A. PLANT DATA  |                     |                 |       |
|----------------|---------------------|-----------------|-------|
| PLANT NAME     | Taconite Harbor     | PLANT ID        | 68026 |
| STREET ADDRESS | PO Box 64           |                 |       |
| CITY           | Schroeder           |                 |       |
| STATE          | MN                  | NUMBER OF UNITS | 3     |
| ZIP CODE       | 55705               |                 |       |
| COUNTY         | Cook                |                 |       |
| CONTACT PERSON | David Rannetsberger |                 |       |
| TEI FBHONR     | 218-416-6833        |                 |       |

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| ALLOWABLE CODES                  |        |                                       |              |                         |                              |                     |
|----------------------------------|--------|---------------------------------------|--------------|-------------------------|------------------------------|---------------------|
| Cell Heading                     | Code   | Code Definition                       | Cell Heading | Code                    | Code Definition              |                     |
| * Unit Status                    | USE    | In-use                                | ** Unit Type | CS                      | Combined Cycle               |                     |
|                                  | STB    | Stand-by                              |              | IC                      | Internal Combustion (Diesel) |                     |
|                                  | RET    | Retired                               |              | GT                      | Combustion (Gas) Turbine     |                     |
|                                  | FUT    | Future                                |              | HC                      | Hydro                        |                     |
|                                  | OTHER  | Other - provide description           |              | ST                      | Steam Turbine (Boiler)       |                     |
| *** Energy Source<br>& Fuel Type | BIT    | Bituminous Coal                       |              | NC                      | Nuclear                      |                     |
|                                  | COAL   | Coal (general)                        |              | WI                      | Wind                         |                     |
|                                  | DIESEL | Diesel                                |              | OTHER                   | Other - provide description  |                     |
|                                  | FO2    | Fuel Oil #2 (Mid Distillate)          |              | **** Unit of<br>Measure | GAL                          | Gallons             |
|                                  | FO6    | Fuel Oil #6 (Residual Fuel Oil)       |              |                         | MCF                          | Thousand cubic feet |
|                                  | LIG    | Lignite                               | MMCF         |                         | Million cubic feet           |                     |
|                                  | LPG    | Liquefied Propane Gas                 | TONS         |                         | Tons                         |                     |
|                                  | NG     | Natural Gas                           | BBL          |                         | Barrels                      |                     |
|                                  | NUC    | Nuclear                               | THERMS       |                         | Therms                       |                     |
|                                  | REF    | Refuse, Bagasse, Peat, Non-wood waste |              |                         |                              |                     |
|                                  | STM    | Steam                                 |              |                         |                              |                     |
|                                  | SUB    | Sub-Bituminous Coal                   |              |                         |                              |                     |
|                                  | HYD    | Hydro (Water)                         |              |                         |                              |                     |
|                                  | WIND   | Wind                                  |              |                         |                              |                     |
|                                  | WOOD   | Wood                                  |              |                         |                              |                     |
|                                  | SOLAR  | Solar                                 |              |                         |                              |                     |
|                                  | OTHER  | Other - provide description           |              |                         |                              |                     |

### ***DEFINITIONS***

|  |  |
|--|--|
| <b>Forced Outage Rate =</b><br><b>(percentage)</b>     | <u>Hours Unit Failed to be Available X 100</u><br>Hours Unit Called Upon to Produce                |
| <b>Operating Availability =</b><br><b>(percentage)</b> | 100 - Maintenance percentage - Forced Outage percentage  |
| <b>Capacity Factor =</b><br><b>(percentage)</b>        | <u>Total Annual MWh of Production X 100</u><br>Accredited Capacity Rating (MW) of the Unit X 8,760 |

Note: Failure of a unit to be available does not include down time for scheduled maintenance

Note: Maintenance percentage is the number of hours of scheduled maintenance divided by 8,760.

**MINNESOTA ELECTRIC UTILITY ANNUAL REPORT (Continued)**

## 7610.0430 FUEL REQUIREMENTS AND GENERATION BY FUEL TYPE

## POWER PLANT AND GENERATING UNIT DATA REPORT

INSTRUCTIONS: Complete one worksheet for each power plant

Scroll down below the data entry tables to see the ALLOWABLE CODES to be used for Unit Status, Unit Type, Energy Source, Fuel Type, and Unit of Measure fields

Scroll down below the ALLOWABLE CODES to see DEFINITIONS for Capacity Factor, Operating Factor and Forced Outage Rate.

| A. PLANT DATA  |                               |                 |       |
|----------------|-------------------------------|-----------------|-------|
| PLANT NAME     | Thomson Hydroelectric Station | PLANT ID        | 68016 |
| STREET ADDRESS | 180 State Hwy 210             |                 |       |
| CITY           | Carlton                       |                 |       |
| STATE          | MN                            | NUMBER OF UNITS | 6     |
| ZIP CODE       | 55718                         |                 |       |
| COUNTY         | Carlton                       |                 |       |
| CONTACT PERSON | Chris Rousseau                |                 |       |
| TEI FBHONF     | 218.725.2100                  |                 |       |

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| C. UNIT CAPABILITY DATA | CAPACITY (MEGAWATTS) |        |        |                     | Plant Total          | 355,802.45             |          |
|-------------------------|----------------------|--------|--------|---------------------|----------------------|------------------------|----------|
|                         | Unit ID #            | Summer | Winter | Capacity Factor (%) | Operating Factor (%) | Forced Outage Rate (%) | Comments |
|                         | 1                    | 13.00  | 13.00  | 52.56%              | 98.79%               | 0.09%                  |          |
|                         | 2                    | 13.00  | 13.00  | 51.12%              | 97.23%               | 0.01%                  |          |
|                         | 3                    | 13.00  | 13.00  | 50.45%              | 72.72%               | 24.21%                 |          |
|                         | 4                    | 10.80  | 10.80  | 56.04%              | 95.18%               | 2.43%                  |          |
|                         | 5                    | 10.80  | 10.80  | 56.84%              | 97.21%               | 0.39%                  |          |
|                         | 6                    | 12.00  | 12.00  | 72.44%              | 97.27%               | 0.17%                  |          |
|                         |                      |        |        |                     |                      |                        |          |
|                         |                      |        |        |                     |                      |                        |          |

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| ALLOWABLE CODES                  |        |                                       |                         |        |                              |
|----------------------------------|--------|---------------------------------------|-------------------------|--------|------------------------------|
| Cell Heading                     | Code   | Code Definition                       | Cell Heading            | Code   | Code Definition              |
| * Unit Status                    | USE    | In-use                                | ** Unit Type            | CS     | Combined Cycle               |
|                                  | STB    | Stand-by                              |                         | IC     | Internal Combustion (Diesel) |
|                                  | RET    | Retired                               |                         | GT     | Combustion (Gas) Turbine     |
|                                  | FUT    | Future                                |                         | HC     | Hydro                        |
|                                  | OTHER  | Other - provide description           |                         | ST     | Steam Turbine (Boiler)       |
| *** Energy Source<br>& Fuel Type |        |                                       |                         | NC     | Nuclear                      |
|                                  |        |                                       |                         | WI     | Wind                         |
|                                  | BIT    | Bituminous Coal                       |                         | OTHER  | Other - provide description  |
|                                  | COAL   | Coal (general)                        |                         |        |                              |
|                                  | DIESEL | Diesel                                |                         |        |                              |
|                                  |        |                                       | **** Unit of<br>Measure | GAL    | Gallons                      |
|                                  | FO2    | Fuel Oil #2 (Mid Distillate)          |                         | MCF    | Thousand cubic feet          |
|                                  | FO6    | Fuel Oil #6 (Residual Fuel Oil)       |                         | MMCF   | Million cubic feet           |
|                                  | LIG    | Lignite                               |                         | TONS   | Tons                         |
|                                  | LPG    | Liquefied Propane Gas                 |                         | BBL    | Barrels                      |
|                                  | NG     | Natural Gas                           |                         | THERMS | Therms                       |
|                                  | NUC    | Nuclear                               |                         |        |                              |
|                                  | REF    | Refuse, Bagasse, Peat, Non-wood waste |                         |        |                              |
|                                  | STM    | Steam                                 |                         |        |                              |
|                                  | SUB    | Sub-Bituminous Coal                   |                         |        |                              |
|                                  | HYD    | Hydro (Water)                         |                         |        |                              |
|                                  | WIND   | Wind                                  |                         |        |                              |
|                                  | WOOD   | Wood                                  |                         |        |                              |
|                                  | SOLAR  | Solar                                 |                         |        |                              |
|                                  | OTHER  | Other - provide description           |                         |        |                              |

### ***DEFINITIONS***

|  |  |
|--|--|
| <b>Forced Outage Rate =<br/>(percentage)</b>     | <u>Hours Unit Failed to be Available X 100</u><br>Hours Unit Called Upon to Produce                |
| <b>Operating Availability =<br/>(percentage)</b> | 100 - Maintenance percentage - Forced Outage percentage  |
| <b>Capacity Factor =<br/>(percentage)</b>        | <u>Total Annual MWh of Production X 100</u><br>Accredited Capacity Rating (MW) of the Unit X 8,760 |

Note: Failure of a unit to be available does not include down time for scheduled maintenance

Note: Maintenance percentage is the number of hours of scheduled maintenance divided by 8,760.

**MINNESOTA ELECTRIC UTILITY ANNUAL REPORT (Continued)**

## 7610.0430 FUEL REQUIREMENTS AND GENERATION BY FUEL TYPE

## POWER PLANT AND GENERATING UNIT DATA REPORT

INSTRUCTIONS: Complete one worksheet for each power plant

Scroll down below the data entry tables to see the ALLOWABLE CODES to be used for Unit Status, Unit Type, Energy Source, Fuel Type, and Unit of Measure fields

Scroll down below the ALLOWABLE CODES to see DEFINITIONS for Capacity Factor, Operating Factor and Forced Outage Rate.

| A. PLANT DATA  |                                 |                 |       |
|----------------|---------------------------------|-----------------|-------|
| PLANT NAME     | Blanchard Hydroelectric Station | PLANT ID        | 68001 |
| STREET ADDRESS | PO Box 157                      |                 |       |
| CITY           | Little Falls                    |                 |       |
| STATE          | MN                              | NUMBER OF UNITS | 3     |
| ZIP CODE       | 56345                           |                 |       |
| COUNTY         | Morris                          |                 |       |
| CONTACT PERSON | Chris Rousseau                  |                 |       |
| TEI FBHONF     | 218-725-2100                    |                 |       |

[illegible]

| C. UNIT CAPABILITY DATA | CAPACITY (MEGAWATTS) |        |        |                     | Plant Total          | 101,216.73             |          |
|-------------------------|----------------------|--------|--------|---------------------|----------------------|------------------------|----------|
|                         | Unit ID #            | Summer | Winter | Capacity Factor (%) | Operating Factor (%) | Forced Outage Rate (%) | Comments |
|                         | 1                    | 6.00   | 6.00   | 66.13%              | 99.61%               | 0.13%                  |          |
|                         | 2                    | 6.00   | 6.00   | 80.47%              | 99.72%               | 0.01%                  |          |
|                         | 3                    | 6.00   | 6.00   | 45.98%              | 97.20%               | 2.23%                  |          |
|                         |                      |        |        |                     |                      |                        |          |
|                         |                      |        |        |                     |                      |                        |          |
|                         |                      |        |        |                     |                      |                        |          |
|                         |                      |        |        |                     |                      |                        |          |
|                         |                      |        |        |                     |                      |                        |          |

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| ALLOWABLE CODES                  |        |                                       |                         |        |                              |
|----------------------------------|--------|---------------------------------------|-------------------------|--------|------------------------------|
| Cell Heading                     | Code   | Code Definition                       | Cell Heading            | Code   | Code Definition              |
| * Unit Status                    | USE    | In-use                                | ** Unit Type            | CS     | Combined Cycle               |
|                                  | STB    | Stand-by                              |                         | IC     | Internal Combustion (Diesel) |
|                                  | RET    | Retired                               |                         | GT     | Combustion (Gas) Turbine     |
|                                  | FUT    | Future                                |                         | HC     | Hydro                        |
|                                  | OTHER  | Other - provide description           |                         | ST     | Steam Turbine (Boiler)       |
| *** Energy Source<br>& Fuel Type |        |                                       |                         | NC     | Nuclear                      |
|                                  |        |                                       |                         | WI     | Wind                         |
|                                  | BIT    | Bituminous Coal                       |                         | OTHER  | Other - provide description  |
|                                  | COAL   | Coal (general)                        |                         |        |                              |
|                                  | DIESEL | Diesel                                |                         |        |                              |
|                                  |        |                                       | **** Unit of<br>Measure | GAL    | Gallons                      |
|                                  | FO2    | Fuel Oil #2 (Mid Distillate)          |                         | MCF    | Thousand cubic feet          |
|                                  | FO6    | Fuel Oil #6 (Residual Fuel Oil)       |                         | MMCF   | Million cubic feet           |
|                                  | LIG    | Lignite                               |                         | TONS   | Tons                         |
|                                  | LPG    | Liquefied Propane Gas                 |                         | BBL    | Barrels                      |
|                                  | NG     | Natural Gas                           |                         | THERMS | Therms                       |
|                                  | NUC    | Nuclear                               |                         |        |                              |
|                                  | REF    | Refuse, Bagasse, Peat, Non-wood waste |                         |        |                              |
|                                  | STM    | Steam                                 |                         |        |                              |
|                                  | SUB    | Sub-Bituminous Coal                   |                         |        |                              |
|                                  | HYD    | Hydro (Water)                         |                         |        |                              |
|                                  | WIND   | Wind                                  |                         |        |                              |
|                                  | WOOD   | Wood                                  |                         |        |                              |
|                                  | SOLAR  | Solar                                 |                         |        |                              |
|                                  | OTHER  | Other - provide description           |                         |        |                              |

### ***DEFINITIONS***

|  |   |
|--|---|
| <b>Forced Outage Rate =</b><br><b>(percentage)</b>     | <u>Hours Unit Failed to be Available</u> X <u>100</u><br>Hours Unit Called Upon to Produce                |
| <b>Operating Availability =</b><br><b>(percentage)</b> | 100 - Maintenance percentage - Forced Outage percentage   |
| <b>Capacity Factor =</b><br><b>(percentage)</b>        | <u>Total Annual MWh of Production</u> X <u>100</u><br>Accredited Capacity Rating (MW) of the Unit X 8,760 |

Note: Failure of a unit to be available does not include down time for scheduled maintenance.

Note: Maintenance percentage is the number of hours of scheduled maintenance divided by 8,760.



**MINNESOTA ELECTRIC UTILITY ANNUAL REPORT (Continued)**

## 7610.0430 FUEL REQUIREMENTS AND GENERATION BY FUEL TYPE

## POWER PLANT AND GENERATING UNIT DATA REPORT

INSTRUCTIONS: Complete one worksheet for each power plant

Scroll down below the data entry tables to see the ALLOWABLE CODES to be used for Unit Status, Unit Type, Energy Source, Fuel Type, and Unit of Measure fields

Scroll down below the ALLOWABLE CODES to see DEFINITIONS for Capacity Factor, Operating Factor and Forced Outage Rate.

| A. PLANT DATA  |                                |                 |       |
|----------------|--------------------------------|-----------------|-------|
| PLANT NAME     | Pillager Hydroelectric Station | PLANT ID        | 68011 |
| STREET ADDRESS | 13449 Pillager Dam Rd          |                 |       |
| CITY           | Pillager                       |                 |       |
| STATE          | MN                             | NUMBER OF UNITS | 2     |
| ZIP CODE       | 56473                          |                 |       |
| COUNTY         | Cass                           |                 |       |
| CONTACT PERSON | Chris Rousseau                 |                 |       |
| TEL FPHONE     | 218-725-2100                   |                 |       |

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| ALLOWABLE CODES               |        |                                       |                      |        |                              |
|-------------------------------|--------|---------------------------------------|----------------------|--------|------------------------------|
| Cell Heading                  | Code   | Code Definition                       | Cell Heading         | Code   | Code Definition              |
| * Unit Status                 | USE    | In-use                                | ** Unit Type         | CS     | Combined Cycle               |
|                               | STB    | Stand-by                              |                      | IC     | Internal Combustion (Diesel) |
|                               | RET    | Retired                               |                      | GT     | Combustion (Gas) Turbine     |
|                               | FUT    | Future                                |                      | HC     | Hydro                        |
|                               | OTHER  | Other - provide description           |                      | ST     | Steam Turbine (Boiler)       |
|                               |        |                                       |                      | NC     | Nuclear                      |
| *** Energy Source & Fuel Type | BIT    | Bituminous Coal                       |                      | WI     | Wind                         |
|                               | COAL   | Coal (general)                        |                      | OTHER  | Other - provide description  |
|                               | DIESEL | Diesel                                |                      |        |                              |
|                               | FO2    | Fuel Oil #2 (Mid Distillate)          | **** Unit of Measure | GAL    | Gallons                      |
|                               | FO6    | Fuel Oil #6 (Residual Fuel Oil)       |                      | MCF    | Thousand cubic feet          |
|                               | LIG    | Lignite                               |                      | MMCF   | Million cubic feet           |
|                               | LPG    | Liquefied Propane Gas                 |                      | TONS   | Tons                         |
|                               | NG     | Natural Gas                           |                      | BBL    | Barrels                      |
|                               | NUC    | Nuclear                               |                      | THERMS | Therms                       |
|                               | REF    | Refuse, Bagasse, Peat, Non-wood waste |                      |        |                              |
|                               | STM    | Steam                                 |                      |        |                              |
|                               | SUB    | Sub-Bituminous Coal                   |                      |        |                              |
|                               | HYD    | Hydro (Water)                         |                      |        |                              |
|                               | WIND   | Wind                                  |                      |        |                              |
|                               | WOOD   | Wood                                  |                      |        |                              |
|                               | SOLAR  | Solar                                 |                      |        |                              |
|                               | OTHER  | Other - provide description           |                      |        |                              |

### ***DEFINITIONS***

|  |   |
|--|---|
| <b>Forced Outage Rate =<br/>(percentage)</b>     | <u>Hours Unit Failed to be Available</u> X <u>100</u><br>Hours Unit Called Upon to Produce                |
| <b>Operating Availability =<br/>(percentage)</b> | 100 - Maintenance percentage - Forced Outage percentage   |
| <b>Capacity Factor =<br/>(percentage)</b>        | <u>Total Annual MWh of Production</u> X <u>100</u><br>Accredited Capacity Rating (MW) of the Unit X 8,760 |

Note: Failure of a unit to be available does not include down time for scheduled maintenance.

Note: Maintenance percentage is the number of hours of scheduled maintenance divided by 8,760.

**MINNESOTA ELECTRIC UTILITY ANNUAL REPORT (Continued)**

## 7610.0430 FUEL REQUIREMENTS AND GENERATION BY FUEL TYPE

## POWER PLANT AND GENERATING UNIT DATA REPORT

INSTRUCTIONS: Complete one worksheet for each power plant

Scroll down below the data entry tables to see the ALLOWABLE CODES to be used for Unit Status, Unit Type, Energy Source, Fuel Type, and Unit of Measure fields

Scroll down below the ALLOWABLE CODES to see DEFINITIONS for Capacity Factor, Operating Factor and Forced Outage Rate.

| A. PLANT DATA  |                                    |                 |       |
|----------------|------------------------------------|-----------------|-------|
| PLANT NAME     | Little Falls Hydroelectric Station | PLANT ID        | 68007 |
| STREET ADDRESS | 1 Hydro St                         |                 |       |
| CITY           | Little Falls                       |                 |       |
| STATE          | MN                                 | NUMBER OF UNITS | 6     |
| ZIP CODE       | 56345                              |                 |       |
| COUNTY         | Morrison                           |                 |       |
| CONTACT PERSON | Chris Rousseau                     |                 |       |
| TEI FBHONF     | 218-725-2100                       |                 |       |

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|                   |             |               |          |                      |                                |               |          |                      |                                |                    |  |  |  |
|-------------------|-------------|---------------|----------|----------------------|--------------------------------|---------------|----------|----------------------|--------------------------------|--------------------|--|--|--|
| D. UNIT FUEL USED | Plant Total |               | 4.60     | 4.60                 | PRIMARY FUEL USE               |               |          |                      |                                | SECONDARY FUEL USE |  |  |  |
|                   | Unit ID #   | Fuel Type *** | Quantity | Unit of Measure **** | BTU Content<br>(for coal only) | Fuel Type *** | Quantity | Unit of Measure **** | BTU Content<br>(for coal only) |                    |  |  |  |
|                   | 1           |               |          |                      |                                |               |          |                      |                                |                    |  |  |  |
|                   | 2           |               |          |                      |                                |               |          |                      |                                |                    |  |  |  |
|                   | 3           |               |          |                      |                                |               |          |                      |                                |                    |  |  |  |
|                   | 4           |               |          |                      |                                |               |          |                      |                                |                    |  |  |  |
|                   | 5           |               |          |                      |                                |               |          |                      |                                |                    |  |  |  |
|                   | 6           |               |          |                      |                                |               |          |                      |                                |                    |  |  |  |
|                   |             |               |          |                      |                                |               |          |                      |                                |                    |  |  |  |
|                   |             |               |          |                      |                                |               |          |                      |                                |                    |  |  |  |

| ALLOWABLE CODES                  |        |                                       |                         |        |                              |
|----------------------------------|--------|---------------------------------------|-------------------------|--------|------------------------------|
| Cell Heading                     | Code   | Code Definition                       | Cell Heading            | Code   | Code Definition              |
| * Unit Status                    | USE    | In-use                                | ** Unit Type            | CS     | Combined Cycle               |
|                                  | STB    | Stand-by                              |                         | IC     | Internal Combustion (Diesel) |
|                                  | RET    | Retired                               |                         | GT     | Combustion (Gas) Turbine     |
|                                  | FUT    | Future                                |                         | HC     | Hydro                        |
|                                  | OTHER  | Other - provide description           |                         | ST     | Steam Turbine (Boiler)       |
| *** Energy Source<br>& Fuel Type |        |                                       |                         | NC     | Nuclear                      |
|                                  |        |                                       |                         | WI     | Wind                         |
|                                  | BIT    | Bituminous Coal                       |                         | OTHER  | Other - provide description  |
|                                  | COAL   | Coal (general)                        |                         |        |                              |
|                                  | DIESEL | Diesel                                |                         |        |                              |
|                                  |        |                                       | **** Unit of<br>Measure | GAL    | Gallons                      |
|                                  | FO2    | Fuel Oil #2 (Mid Distillate)          |                         | MCF    | Thousand cubic feet          |
|                                  | FO6    | Fuel Oil #6 (Residual Fuel Oil)       |                         | MMCF   | Million cubic feet           |
|                                  | LIG    | Lignite                               |                         | TONS   | Tons                         |
|                                  | LPG    | Liquefied Propane Gas                 |                         | BBL    | Barrels                      |
|                                  | NG     | Natural Gas                           |                         | THERMS | Therms                       |
|                                  | NUC    | Nuclear                               |                         |        |                              |
|                                  | REF    | Refuse, Bagasse, Peat, Non-wood waste |                         |        |                              |
|                                  | STM    | Steam                                 |                         |        |                              |
|                                  | SUB    | Sub-Bituminous Coal                   |                         |        |                              |
|                                  | HYD    | Hydro (Water)                         |                         |        |                              |
|                                  | WIND   | Wind                                  |                         |        |                              |
|                                  | WOOD   | Wood                                  |                         |        |                              |
|                                  | SOLAR  | Solar                                 |                         |        |                              |
|                                  | OTHER  | Other - provide description           |                         |        |                              |

### ***DEFINITIONS***

|  |  |
|--|--|
| <b>Forced Outage Rate =</b><br><b>(percentage)</b>     | <u>Hours Unit Failed to be Available</u> X <u>100</u><br>Hours Unit Called Upon to Produce                 |
| <b>Operating Availability =</b><br><b>(percentage)</b> | 100 - Maintenance percentage - Forced Outage percentage  |
| <b>Capacity Factor =</b><br><b>(percentage)</b>        | <u>Total Annual MWh of Production</u> X <u>100</u><br>Accredited Capacity Rating (MWh) of the Unit X 8,760 |

Note: Failure of a unit to be available does not include down time for scheduled maintenance.

Note: Maintenance percentage is the number of hours of scheduled maintenance divided by 8,760.

**MINNESOTA ELECTRIC UTILITY ANNUAL REPORT (Continued)**

## 7610.0430 FUEL REQUIREMENTS AND GENERATION BY FUEL TYPE

## POWER PLANT AND GENERATING UNIT DATA REPORT

INSTRUCTIONS: Complete one worksheet for each power plant

Scroll down below the data entry tables to see the ALLOWABLE CODES to be used for Unit Status, Unit Type, Energy Source, Fuel Type, and Unit of Measure fields

Scroll down below the ALLOWABLE CODES to see DEFINITIONS for Capacity Factor, Operating Factor and Forced Outage Rate.

| A. PLANT DATA  |                               |                 |       |
|----------------|-------------------------------|-----------------|-------|
| PLANT NAME     | Scanlon Hydroelectric Station | PLANT ID        | 68013 |
| STREET ADDRESS |                               |                 |       |
| CITY           | Scanlon                       |                 |       |
| STATE          | MN                            | NUMBER OF UNITS | 4     |
| ZIP CODE       | 55720                         |                 |       |
| COUNTY         | Carlton                       |                 |       |
| CONTACT PERSON | Chris Rousseau                |                 |       |
| TEL FPHONE     | 218-725-2100                  |                 |       |

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|                   |             |               |          |                      |                                |               |          |                      |                                |                    |  |  |  |
|-------------------|-------------|---------------|----------|----------------------|--------------------------------|---------------|----------|----------------------|--------------------------------|--------------------|--|--|--|
| D. UNIT FUEL USED | Plant Total |               | 1.60     | 1.60                 | PRIMARY FUEL USE               |               |          |                      |                                | SECONDARY FUEL USE |  |  |  |
|                   | Unit ID #   | Fuel Type *** | Quantity | Unit of Measure **** | BTU Content<br>(for coal only) | Fuel Type *** | Quantity | Unit of Measure **** | BTU Content<br>(for coal only) |                    |  |  |  |
|                   | 1           |               |          |                      |                                |               |          |                      |                                |                    |  |  |  |
|                   | 2           |               |          |                      |                                |               |          |                      |                                |                    |  |  |  |
|                   | 3           |               |          |                      |                                |               |          |                      |                                |                    |  |  |  |
|                   | 4           |               |          |                      |                                |               |          |                      |                                |                    |  |  |  |
|                   |             |               |          |                      |                                |               |          |                      |                                |                    |  |  |  |
|                   |             |               |          |                      |                                |               |          |                      |                                |                    |  |  |  |
|                   |             |               |          |                      |                                |               |          |                      |                                |                    |  |  |  |
|                   |             |               |          |                      |                                |               |          |                      |                                |                    |  |  |  |

| <b><i>ALLOWABLE CODES</i></b>            |             |                                       |                             |             |                              |
|--|-------------|---------------------------------------|-----------------------------|-------------|------------------------------|
| <b>Cell Heading</b>                      | <b>Code</b> | <b>Code Definition</b>                | <b>Cell Heading</b>         | <b>Code</b> | <b>Code Definition</b>       |
| <b>* Unit Status</b>                     | USE         | In-use                                | <b>** Unit Type</b>         | CS          | Combined Cycle               |
|  | STB         | Stand-by                              |                             | IC          | Internal Combustion (Diesel) |
|  | RET         | Retired                               |                             | GT          | Combustion (Gas) Turbine     |
|  | FUT         | Future                                |                             | HC          | Hydro                        |
|  | OTHER       | Other - provide description           |                             | ST          | Steam Turbine (Boiler)       |
|  |             |                                       |                             | NC          | Nuclear                      |
|  |             |                                       |                             | WI          | Wind                         |
|  |             |                                       |                             | OTHER       | Other - provide description  |
| <b>*** Energy Source &amp; Fuel Type</b> | BIT         | Bituminous Coal                       |                             |             |                              |
|  | COAL        | Coal (general)                        |                             |             |                              |
|  | DIESEL      | Diesel                                |                             |             |                              |
|  | FO2         | Fuel Oil #2 (Mid Distillate)          | <b>**** Unit of Measure</b> | GAL         | Gallons                      |
|  | FO6         | Fuel Oil #6 (Residual Fuel Oil)       |                             | MCF         | Thousand cubic feet          |
|  | LIG         | Lignite                               |                             | MMCF        | Million cubic feet           |
|  | LPG         | Liquefied Propane Gas                 |                             | TONS        | Tons                         |
|  | NG          | Natural Gas                           |                             | BBL         | Barrels                      |
|  | NUC         | Nuclear                               |                             | THERMS      | Therms                       |
|  | REF         | Refuse, Bagasse, Peat, Non-wood waste |                             |             |                              |
|  | STM         | Steam                                 |                             |             |                              |
|  | SUB         | Sub-Bituminous Coal                   |                             |             |                              |
|  | HYD         | Hydro (Water)                         |                             |             |                              |
|  | WIND        | Wind                                  |                             |             |                              |
|  | WOOD        | Wood                                  |                             |             |                              |
|  | SOLAR       | Solar                                 |                             |             |                              |
|  | OTHER       | Other - provide description           |                             |             |                              |

| <b>DEFINITIONS</b>                              |  |
|---|--|
| <b>Forced Outage Rate =</b><br>(percentage)     | $\frac{\text{Hours Unit Failed to be Available}}{\text{Hours Unit Called Upon to Produce}} \times 100$         |
| <b>Operating Availability =</b><br>(percentage) | 100 - Maintenance percentage - Forced Outage percentage  |
| <b>Capacity Factor =</b><br>(percentage)        | $\frac{\text{Total Annual MWh of Production}}{\text{Accredited Capacity Rating (MWh) of the Unit}} \times 100$ |

Note: Failure of a unit to be available does not include down time for scheduled maintenance.

Note: Maintenance percentage is the number of hours of scheduled maintenance divided by 8,760.

**MINNESOTA ELECTRIC UTILITY ANNUAL REPORT (Continued)**

## 7610.0430 FUEL REQUIREMENTS AND GENERATION BY FUEL TYPE

## POWER PLANT AND GENERATING UNIT DATA REPORT

INSTRUCTIONS: Complete one worksheet for each power plant

Scroll down below the data entry tables to see the ALLOWABLE CODES to be used for Unit Status, Unit Type, Energy Source, Fuel Type, and Unit of Measure fields

Scroll down below the ALLOWABLE CODES to see DEFINITIONS for Capacity Factor, Operating Factor and Forced Outage Rate.

| A. PLANT DATA  |                              |                 |       |
|----------------|------------------------------|-----------------|-------|
| PLANT NAME     | Sylvan Hydroelectric Station | PLANT ID        | 68014 |
| STREET ADDRESS | 13753 Sylvan Dam Rd          |                 |       |
| CITY           | Pillager                     |                 |       |
| STATE          | MN                           | NUMBER OF UNITS | 3     |
| ZIP CODE       | 56473                        |                 |       |
| COUNTY         | Cass                         |                 |       |
| CONTACT PERSON | Chris Rousseau               |                 |       |
| TEL FPHONE     | 218-725-2100                 |                 |       |

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| <b><i>ALLOWABLE CODES</i></b>                    |             |                                       |                                       |             |                              |
|--|-------------|---------------------------------------|---------------------------------------|-------------|------------------------------|
| <b>Cell Heading</b>                              | <b>Code</b> | <b>Code Definition</b>                | <b>Cell Heading</b>                   | <b>Code</b> | <b>Code Definition</b>       |
| <b>* Unit Status</b>                             | USE         | In-use                                | <b>** Unit Type</b>                   | CS          | Combined Cycle               |
|  | STB         | Stand-by                              |                                       | IC          | Internal Combustion (Diesel) |
|  | RET         | Retired                               |                                       | GT          | Combustion (Gas) Turbine     |
|  | FUT         | Future                                |                                       | HC          | Hydro                        |
|  | OTHER       | Other - provide description           |                                       | ST          | Steam Turbine (Boiler)       |
| <b>*** Energy Source<br/>    &amp; Fuel Type</b> | BIT         | Bituminous Coal                       |                                       | NC          | Nuclear                      |
|  | COAL        | Coal (general)                        |                                       | WI          | Wind                         |
|  | DIESEL      | Diesel                                |                                       | OTHER       | Other - provide description  |
|  | FO2         | Fuel Oil #2 (Mid Distillate)          | <b>**** Unit of<br/>      Measure</b> | GAL         | Gallons                      |
|  | FO6         | Fuel Oil #6 (Residual Fuel Oil)       |                                       | MCF         | Thousand cubic feet          |
|  | LIG         | Lignite                               |                                       | MMCF        | Million cubic feet           |
|  | LPG         | Liquefied Propane Gas                 |                                       | TONS        | Tons                         |
|  | NG          | Natural Gas                           |                                       | BBL         | Barrels                      |
|  | NUC         | Nuclear                               |                                       | THERMS      | Therms                       |
|  | REF         | Refuse, Bagasse, Peat, Non-wood waste |                                       |             |                              |
|  | STM         | Steam                                 |                                       |             |                              |
|  | SUB         | Sub-Bituminous Coal                   |                                       |             |                              |
|  | HYD         | Hydro (Water)                         |                                       |             |                              |
|  | WIND        | Wind                                  |                                       |             |                              |
|  | WOOD        | Wood                                  |                                       |             |                              |
|  | SOLAR       | Solar                                 |                                       |             |                              |
|  | OTHER       | Other - provide description           |                                       |             |                              |

| <b>DEFINITIONS</b>                              |  |
|---|--|
| <b>Forced Outage Rate =</b><br>(percentage)     | $\frac{\text{Hours Unit Failed to be Available}}{\text{Hours Unit Called Upon to Produce}} \times 100$         |
| <b>Operating Availability =</b><br>(percentage) | 100 - Maintenance percentage - Forced Outage percentage  |
| <b>Capacity Factor =</b><br>(percentage)        | $\frac{\text{Total Annual MWh of Production}}{\text{Accredited Capacity Rating (MWh) of the Unit}} \times 100$ |

Note: Failure of a unit to be available does not include down time for scheduled maintenance.

Note: Maintenance percentage is the number of hours of scheduled maintenance divided by 8,760.

**MINNESOTA ELECTRIC UTILITY ANNUAL REPORT (Continued)**

## 7610.0430 FUEL REQUIREMENTS AND GENERATION BY FUEL TYPE

## POWER PLANT AND GENERATING UNIT DATA REPORT

INSTRUCTIONS: Complete one worksheet for each power plant

Scroll down below the data entry tables to see the ALLOWABLE CODES to be used for Unit Status, Unit Type, Energy Source, Fuel Type, and Unit of Measure fields

Scroll down below the ALLOWABLE CODES to see DEFINITIONS for Capacity Factor, Operating Factor and Forced Outage Rate.

| A. PLANT DATA  |                              |                 |       |
|----------------|------------------------------|-----------------|-------|
| PLANT NAME     | Winton Hydroelectric Station | PLANT ID        | 68019 |
| STREET ADDRESS | PO Box 156                   |                 |       |
| CITY           | Winton                       |                 |       |
| STATE          | MN                           | NUMBER OF UNITS | 2     |
| ZIP CODE       | 55796                        |                 |       |
| COUNTY         | Lake                         |                 |       |
| CONTACT PERSON | Chris Rousseau               |                 |       |
| TELEPHONE      | 218-725-2100                 |                 |       |

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| ALLOWABLE CODES                  |        |                                       |              |                         |                              |                     |
|----------------------------------|--------|---------------------------------------|--------------|-------------------------|------------------------------|---------------------|
| Cell Heading                     | Code   | Code Definition                       | Cell Heading | Code                    | Code Definition              |                     |
| * Unit Status                    | USE    | In-use                                | ** Unit Type | CS                      | Combined Cycle               |                     |
|                                  | STB    | Stand-by                              |              | IC                      | Internal Combustion (Diesel) |                     |
|                                  | RET    | Retired                               |              | GT                      | Combustion (Gas) Turbine     |                     |
|                                  | FUT    | Future                                |              | HC                      | Hydro                        |                     |
|                                  | OTHER  | Other - provide description           |              | ST                      | Steam Turbine (Boiler)       |                     |
| *** Energy Source<br>& Fuel Type | BIT    | Bituminous Coal                       | WI           | NC                      | Nuclear                      |                     |
|                                  | COAL   | Coal (general)                        |              | WI                      | Wind                         |                     |
|                                  | DIESEL | Diesel                                |              | OTHER                   | Other - provide description  |                     |
|                                  | FO2    | Fuel Oil #2 (Mid Distillate)          |              | **** Unit of<br>Measure | GAL                          | Gallons             |
|                                  | FO6    | Fuel Oil #6 (Residual Fuel Oil)       |              |                         | MCF                          | Thousand cubic feet |
|                                  | LIG    | Lignite                               | MMCF         |                         | Million cubic feet           |                     |
|                                  | LPG    | Liquefied Propane Gas                 | TONS         |                         | Tons                         |                     |
|                                  | NG     | Natural Gas                           | BBL          |                         | Barrels                      |                     |
|                                  | NUC    | Nuclear                               | THERMS       |                         | Therms                       |                     |
|                                  | REF    | Refuse, Bagasse, Peat, Non-wood waste |              |                         |                              |                     |
|                                  | STM    | Steam                                 |              |                         |                              |                     |
|                                  | SUB    | Sub-Bituminous Coal                   |              |                         |                              |                     |
|                                  | HYD    | Hydro (Water)                         |              |                         |                              |                     |
|                                  | WIND   | Wind                                  |              |                         |                              |                     |
|                                  | WOOD   | Wood                                  |              |                         |                              |                     |
|                                  | SOLAR  | Solar                                 |              |                         |                              |                     |
|                                  | OTHER  | Other - provide description           |              |                         |                              |                     |

### ***DEFINITIONS***

|  |  |
|--|--|
| <b>Forced Outage Rate =</b><br><b>(percentage)</b>     | <u>Hours Unit Failed to be Available</u> X <u>100</u><br>Hours Unit Called Upon to Produce                 |
| <b>Operating Availability =</b><br><b>(percentage)</b> | 100 - Maintenance percentage - Forced Outage percentage  |
| <b>Capacity Factor =</b><br><b>(percentage)</b>        | <u>Total Annual MWh of Production</u> X <u>100</u><br>Accredited Capacity Rating (MWh) of the Unit X 8,760 |

Note: Failure of a unit to be available does not include down time for scheduled maintenance.

Note: Maintenance percentage is the number of hours of scheduled maintenance divided by 8,760.

## POWER PLANT AND GENERATING UNIT DATA REPORT

2018

Scroll down below the ALLOWABLE CODES to see DEFINITIONS for Capacity Factor, Operating Factor and Forced Outage Rate.

| A. PLANT DATA  |                                   |                 |       |
|----------------|-----------------------------------|-----------------|-------|
| PLANT NAME     | Knife Falls Hydroelectric Station | PLANT ID        | 68006 |
| STREET ADDRESS |                                   |                 |       |
| CITY           | Cloquet                           |                 |       |
| STATE          | MN                                | NUMBER OF UNITS | 3     |
| ZIP CODE       | 55720                             |                 |       |
| COUNTY         | Carlton                           |                 |       |
| CONTACT PERSON | Chris Rousseau                    |                 |       |
| TEL FPHONE     | 218-725-2100                      |                 |       |

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| ALLOWABLE CODES                  |        |                                       |                         |        |                              |
|----------------------------------|--------|---------------------------------------|-------------------------|--------|------------------------------|
| Cell Heading                     | Code   | Code Definition                       | Cell Heading            | Code   | Code Definition              |
| * Unit Status                    | USE    | In-use                                | ** Unit Type            | CS     | Combined Cycle               |
|                                  | STB    | Stand-by                              |                         | IC     | Internal Combustion (Diesel) |
|                                  | RET    | Retired                               |                         | GT     | Combustion (Gas) Turbine     |
|                                  | FUT    | Future                                |                         | HC     | Hydro                        |
|                                  | OTHER  | Other - provide description           |                         | ST     | Steam Turbine (Boiler)       |
| *** Energy Source<br>& Fuel Type | BIT    | Bituminous Coal                       |                         | NC     | Nuclear                      |
|                                  | COAL   | Coal (general)                        |                         | WI     | Wind                         |
|                                  | DIESEL | Diesel                                |                         | OTHER  | Other - provide description  |
|                                  | FO2    | Fuel Oil #2 (Mid Distillate)          | **** Unit of<br>Measure | GAL    | Gallons                      |
|                                  | FO6    | Fuel Oil #6 (Residual Fuel Oil)       |                         | MCF    | Thousand cubic feet          |
|                                  | LIG    | Lignite                               |                         | MMCF   | Million cubic feet           |
|                                  | LPG    | Liquefied Propane Gas                 |                         | TONS   | Tons                         |
|                                  | NG     | Natural Gas                           |                         | BBL    | Barrels                      |
|                                  | NUC    | Nuclear                               |                         | THERMS | Therms                       |
|                                  | REF    | Refuse, Bagasse, Peat, Non-wood waste |                         |        |                              |
|                                  | STM    | Steam                                 |                         |        |                              |
|                                  | SUB    | Sub-Bituminous Coal                   |                         |        |                              |
|                                  | HYD    | Hydro (Water)                         |                         |        |                              |
|                                  | WIND   | Wind                                  |                         |        |                              |
|                                  | WOOD   | Wood                                  |                         |        |                              |
|                                  | SOLAR  | Solar                                 |                         |        |                              |
|                                  | OTHER  | Other - provide description           |                         |        |                              |

| <b>DEFINITIONS</b>                              |  |
|---|--|
| <b>Forced Outage Rate =</b><br>(percentage)     | $\frac{\text{Hours Unit Failed to be Available}}{\text{Hours Unit Called Upon to Produce}} \times 100$         |
| <b>Operating Availability =</b><br>(percentage) | 100 - Maintenance percentage - Forced Outage percentage  |
| <b>Capacity Factor =</b><br>(percentage)        | $\frac{\text{Total Annual MWh of Production}}{\text{Accredited Capacity Rating (MWh) of the Unit}} \times 100$ |

Note: Maintenance percentage is the number of hours of scheduled maintenance divided by 8,760.

**MINNESOTA ELECTRIC UTILITY ANNUAL REPORT (Continued)**

## 7610.0430 FUEL REQUIREMENTS AND GENERATION BY FUEL TYPE

## POWER PLANT AND GENERATING UNIT DATA REPORT

INSTRUCTIONS: Complete one worksheet for each power plant

Scroll down below the data entry tables to see the ALLOWABLE CODES to be used for Unit Status, Unit Type, Energy Source, Fuel Type, and Unit of Measure fields

Scroll down below the ALLOWABLE CODES to see DEFINITIONS for Capacity Factor, Operating Factor and Forced Outage Rate.

| A. PLANT DATA  |                                   | PLANT ID        |
|----------------|-----------------------------------|-----------------|
| PLANT NAME     | Fond Du Lac Hydroelectric Station | 68005           |
| STREET ADDRESS | 14302 Oldenberg Pkwy              |                 |
| CITY           | Duluth                            |                 |
| STATE          | MN                                | NUMBER OF UNITS |
| ZIP CODE       | 55808                             | 1               |
| COUNTY         | Saint Louis                       |                 |
| CONTACT PERSON | Chris Rousseau                    |                 |
| TELEPHONE      | 218-725-2100                      |                 |

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| ALLOWABLE CODES                  |        |                                       |                         |        |                              |
|----------------------------------|--------|---------------------------------------|-------------------------|--------|------------------------------|
| Cell Heading                     | Code   | Code Definition                       | Cell Heading            | Code   | Code Definition              |
| * Unit Status                    | USE    | In-use                                | ** Unit Type            | CS     | Combined Cycle               |
|                                  | STB    | Stand-by                              |                         | IC     | Internal Combustion (Diesel) |
|                                  | RET    | Retired                               |                         | GT     | Combustion (Gas) Turbine     |
|                                  | FUT    | Future                                |                         | HC     | Hydro                        |
|                                  | OTHER  | Other - provide description           |                         | ST     | Steam Turbine (Boiler)       |
| *** Energy Source<br>& Fuel Type |        |                                       |                         | NC     | Nuclear                      |
|                                  |        |                                       |                         | WI     | Wind                         |
|                                  | BIT    | Bituminous Coal                       |                         | OTHER  | Other - provide description  |
|                                  | COAL   | Coal (general)                        |                         |        |                              |
|                                  | DIESEL | Diesel                                |                         |        |                              |
|                                  |        |                                       | **** Unit of<br>Measure | GAL    | Gallons                      |
|                                  | FO2    | Fuel Oil #2 (Mid Distillate)          |                         | MCF    | Thousand cubic feet          |
|                                  | FO6    | Fuel Oil #6 (Residual Fuel Oil)       |                         | MMCF   | Million cubic feet           |
|                                  | LIG    | Lignite                               |                         | TONS   | Tons                         |
|                                  | LPG    | Liquefied Propane Gas                 |                         | BBL    | Barrels                      |
|                                  | NG     | Natural Gas                           |                         | THERMS | Therms                       |
|                                  | NUC    | Nuclear                               |                         |        |                              |
|                                  | REF    | Refuse, Bagasse, Peat, Non-wood waste |                         |        |                              |
|                                  | STM    | Steam                                 |                         |        |                              |
|                                  | SUB    | Sub-Bituminous Coal                   |                         |        |                              |
|                                  | HYD    | Hydro (Water)                         |                         |        |                              |
|                                  | WIND   | Wind                                  |                         |        |                              |
|                                  | WOOD   | Wood                                  |                         |        |                              |
|                                  | SOLAR  | Solar                                 |                         |        |                              |
|                                  | OTHER  | Other - provide description           |                         |        |                              |

### ***DEFINITIONS***

|  |  |
|--|--|
| <b>Forced Outage Rate =</b><br><b>(percentage)</b>     | <u>Hours Unit Failed to be Available</u> X <u>100</u><br>Hours Unit Called Upon to Produce                 |
| <b>Operating Availability =</b><br><b>(percentage)</b> | 100 - Maintenance percentage - Forced Outage percentage  |
| <b>Capacity Factor =</b><br><b>(percentage)</b>        | <u>Total Annual MWh of Production</u> X <u>100</u><br>Accredited Capacity Rating (MWh) of the Unit X 8,760 |

Note: Failure of a unit to be available does not include down time for scheduled maintenance.

Note: Maintenance percentage is the number of hours of scheduled maintenance divided by 8,760.

**MINNESOTA ELECTRIC UTILITY ANNUAL REPORT (Continued)**

## 7610.0430 FUEL REQUIREMENTS AND GENERATION BY FUEL TYPE

## POWER PLANT AND GENERATING UNIT DATA REPORT

INSTRUCTIONS: Complete one worksheet for each power plant

Scroll down below the data entry tables to see the ALLOWABLE CODES to be used for Unit Status, Unit Type, Energy Source, Fuel Type, and Unit of Measure fields

Scroll down below the ALLOWABLE CODES to see DEFINITIONS for Capacity Factor, Operating Factor and Forced Outage Rate.

| A. PLANT DATA  |                                     | PLANT ID        |
|----------------|-------------------------------------|-----------------|
| PLANT NAME     | Prairie River Hydroelectric Station | 68012           |
| STREET ADDRESS |                                     |                 |
| CITY           | Grand Rapids                        |                 |
| STATE          | MN                                  | NUMBER OF UNITS |
| ZIP CODE       | 55734                               | 2               |
| COUNTY         | Itasca                              |                 |
| CONTACT PERSON | Chris Rousseau                      |                 |
| TELEPHONE      | 218-725-2100                        |                 |

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| ALLOWABLE CODES                  |        |                                       |                         |        |                              |
|----------------------------------|--------|---------------------------------------|-------------------------|--------|------------------------------|
| Cell Heading                     | Code   | Code Definition                       | Cell Heading            | Code   | Code Definition              |
| * Unit Status                    | USE    | In-use                                | ** Unit Type            | CS     | Combined Cycle               |
|                                  | STB    | Stand-by                              |                         | IC     | Internal Combustion (Diesel) |
|                                  | RET    | Retired                               |                         | GT     | Combustion (Gas) Turbine     |
|                                  | FUT    | Future                                |                         | HC     | Hydro                        |
|                                  | OTHER  | Other - provide description           |                         | ST     | Steam Turbine (Boiler)       |
| *** Energy Source<br>& Fuel Type |        |                                       |                         | NC     | Nuclear                      |
|                                  |        |                                       |                         | WI     | Wind                         |
|                                  | BIT    | Bituminous Coal                       |                         | OTHER  | Other - provide description  |
|                                  | COAL   | Coal (general)                        |                         |        |                              |
|                                  | DIESEL | Diesel                                |                         |        |                              |
|                                  | FO2    | Fuel Oil #2 (Mid Distillate)          | **** Unit of<br>Measure | GAL    | Gallons                      |
|                                  | FO6    | Fuel Oil #6 (Residual Fuel Oil)       |                         | MCF    | Thousand cubic feet          |
|                                  | LIG    | Lignite                               |                         | MMCF   | Million cubic feet           |
|                                  | LPG    | Liquefied Propane Gas                 |                         | TONS   | Tons                         |
|                                  | NG     | Natural Gas                           |                         | BBL    | Barrels                      |
|                                  | NUC    | Nuclear                               |                         | THERMS | Therms                       |
|                                  | REF    | Refuse, Bagasse, Peat, Non-wood waste |                         |        |                              |
|                                  | STM    | Steam                                 |                         |        |                              |
|                                  | SUB    | Sub-Bituminous Coal                   |                         |        |                              |
|                                  | HYD    | Hydro (Water)                         |                         |        |                              |
|                                  | WIND   | Wind                                  |                         |        |                              |
|                                  | WOOD   | Wood                                  |                         |        |                              |
|                                  | SOLAR  | Solar                                 |                         |        |                              |
|                                  | OTHER  | Other - provide description           |                         |        |                              |

### ***DEFINITIONS***

|  |   |
|--|---|
| <b>Forced Outage Rate =<br/>(percentage)</b>     | <u>Hours Unit Failed to be Available</u> X <u>100</u><br>Hours Unit Called Upon to Produce                |
| <b>Operating Availability =<br/>(percentage)</b> | 100 - Maintenance percentage - Forced Outage percentage   |
| <b>Capacity Factor =<br/>(percentage)</b>        | <u>Total Annual MWH of Production</u> X <u>100</u><br>Accredited Capacity Rating (MW) of the Unit X 8,760 |

Note: Failure of a unit to be available does not include down time for scheduled maintenance.

Note: Maintenance percentage is the number of hours of scheduled maintenance divided by 8,760.



**MINNESOTA ELECTRIC UTILITY ANNUAL REPORT (Continued)**

## 7610.0430 FUEL REQUIREMENTS AND GENERATION BY FUEL TYPE

## POWER PLANT AND GENERATING UNIT DATA REPORT

INSTRUCTIONS: Complete one worksheet for each power plant

Scroll down below the data entry tables to see the ALLOWABLE CODES to be used for Unit Status, Unit Type, Energy Source, Fuel Type, and Unit of Measure fields

Scroll down below the ALLOWABLE CODES to see DEFINITIONS for Capacity Factor, Operating Factor and Forced Outage Rate.

| A. PLANT DATA  |                  | PLANT ID        |   |
|----------------|------------------|-----------------|---|
| PLANT NAME     | Taconite Ridge 1 | 68027           |   |
| STREET ADDRESS | County Road 102  |                 |   |
| CITY           | Mountain Iron    |                 |   |
| STATE          | MN               |                 |   |
| ZIP CODE       | 55768            |                 |   |
| COUNTY         | St. Louis        | NUMBER OF UNITS | 1 |
| CONTACT PERSON | Todd Simmons     |                 |   |
| TEI FBHONR     | 708-333-4430     |                 |   |

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| ALLOWABLE CODES                  |        |                                       |                         |        |                              |
|----------------------------------|--------|---------------------------------------|-------------------------|--------|------------------------------|
| Cell Heading                     | Code   | Code Definition                       | Cell Heading            | Code   | Code Definition              |
| * Unit Status                    | USE    | In-use                                | ** Unit Type            | CS     | Combined Cycle               |
|                                  | STB    | Stand-by                              |                         | IC     | Internal Combustion (Diesel) |
|                                  | RET    | Retired                               |                         | GT     | Combustion (Gas) Turbine     |
|                                  | FUT    | Future                                |                         | HC     | Hydro                        |
|                                  | OTHER  | Other - provide description           |                         | ST     | Steam Turbine (Boiler)       |
| *** Energy Source<br>& Fuel Type |        |                                       |                         | NC     | Nuclear                      |
|                                  |        |                                       |                         | WI     | Wind                         |
|                                  | BIT    | Bituminous Coal                       |                         | OTHER  | Other - provide description  |
|                                  | COAL   | Coal (general)                        |                         |        |                              |
|                                  | DIESEL | Diesel                                |                         |        |                              |
|                                  |        |                                       | **** Unit of<br>Measure | GAL    | Gallons                      |
|                                  | FO2    | Fuel Oil #2 (Mid Distillate)          |                         | MCF    | Thousand cubic feet          |
|                                  | FO6    | Fuel Oil #6 (Residual Fuel Oil)       |                         | MMCF   | Million cubic feet           |
|                                  | LIG    | Lignite                               |                         | TONS   | Tons                         |
|                                  | LPG    | Liquefied Propane Gas                 |                         | BBL    | Barrels                      |
|                                  | NG     | Natural Gas                           |                         | THERMS | Therms                       |
|                                  | NUC    | Nuclear                               |                         |        |                              |
|                                  | REF    | Refuse, Bagasse, Peat, Non-wood waste |                         |        |                              |
|                                  | STM    | Steam                                 |                         |        |                              |
|                                  | SUB    | Sub-Bituminous Coal                   |                         |        |                              |
|                                  | HYD    | Hydro (Water)                         |                         |        |                              |
|                                  | WIND   | Wind                                  |                         |        |                              |
|                                  | WOOD   | Wood                                  |                         |        |                              |
|                                  | SOLAR  | Solar                                 |                         |        |                              |
|                                  | OTHER  | Other - provide description           |                         |        |                              |

### ***DEFINITIONS***

|  |  |
|--|--|
| <b>Forced Outage Rate =</b><br><b>(percentage)</b>     | <u>Hours Unit Failed to be Available</u> X <u>100</u><br>Hours Unit Called Upon to Produce                 |
| <b>Operating Availability =</b><br><b>(percentage)</b> | 100 - Maintenance percentage - Forced Outage percentage  |
| <b>Capacity Factor =</b><br><b>(percentage)</b>        | <u>Total Annual MWh of Production</u> X <u>100</u><br>Accredited Capacity Rating (MWh) of the Unit X 8,760 |

Note: Failure of a unit to be available does not include down time for scheduled maintenance.

Note: Maintenance percentage is the number of hours of scheduled maintenance divided by 8,760.

## 7610.0430 FUEL REQUIREMENTS AND GENERATION BY FUEL TYPE

## 2018

Scroll down below the ALLOWABLE CODES to see DEFINITIONS for Capacity Factor, Operating Factor and Forced Outage Rate.

| A. PLANT DATA  |              |                 |       |
|----------------|--------------|-----------------|-------|
| PLANT NAME     | Bison 1      | PLANT ID        | 68028 |
| STREET ADDRESS | 5198 30th St |                 |       |
| CITY           | New Salem    |                 |       |
| STATE          | ND           | NUMBER OF UNITS | 1     |
| ZIP CODE       | 58563        |                 |       |
| COUNTY         | Morton       |                 |       |
| CONTACT PERSON | Todd Simmons |                 |       |
| TEL FPHONE     | 718-313-4430 |                 |       |

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| ALLOWABLE CODES                  |        |                                       |                         |        |                              |
|----------------------------------|--------|---------------------------------------|-------------------------|--------|------------------------------|
| Cell Heading                     | Code   | Code Definition                       | Cell Heading            | Code   | Code Definition              |
| * Unit Status                    | USE    | In-use                                | ** Unit Type            | CS     | Combined Cycle               |
|                                  | STB    | Stand-by                              |                         | IC     | Internal Combustion (Diesel) |
|                                  | RET    | Retired                               |                         | GT     | Combustion (Gas) Turbine     |
|                                  | FUT    | Future                                |                         | HC     | Hydro                        |
|                                  | OTHER  | Other - provide description           |                         | ST     | Steam Turbine (Boiler)       |
| *** Energy Source<br>& Fuel Type |        |                                       | **** Unit of<br>Measure | NC     | Nuclear                      |
|                                  | BIT    | Bituminous Coal                       |                         | WI     | Wind                         |
|                                  | COAL   | Coal (general)                        |                         | OTHER  | Other - provide description  |
|                                  | DIESEL | Diesel                                |                         |        |                              |
|                                  | FO2    | Fuel Oil #2 (Mid Distillate)          |                         | GAL    | Gallons                      |
|                                  | FO6    | Fuel Oil #6 (Residual Fuel Oil)       |                         | MCF    | Thousand cubic feet          |
|                                  | LIG    | Lignite                               |                         | MMCF   | Million cubic feet           |
|                                  | LPG    | Liquefied Propane Gas                 |                         | TONS   | Tons                         |
|                                  | NG     | Natural Gas                           |                         | BBL    | Barrels                      |
|                                  | NUC    | Nuclear                               |                         | THERMS | Therms                       |
|                                  | REF    | Refuse, Bagasse, Peat, Non-wood waste |                         |        |                              |
|                                  | STM    | Steam                                 |                         |        |                              |
|                                  | SUB    | Sub-Bituminous Coal                   |                         |        |                              |
|                                  | HYD    | Hydro (Water)                         |                         |        |                              |
|                                  | WIND   | Wind                                  |                         |        |                              |
|                                  | WOOD   | Wood                                  |                         |        |                              |
|                                  | SOLAR  | Solar                                 |                         |        |                              |
|                                  | OTHER  | Other - provide description           |                         |        |                              |

| <b>DEFINITIONS</b>                              |  |
|---|--|
| <b>Forced Outage Rate =</b><br>(percentage)     | $\frac{\text{Hours Unit Failed to be Available}}{\text{Hours Unit Called Upon to Produce}} \times 100$           |
| <b>Operating Availability =</b><br>(percentage) | 100 - Maintenance percentage - Forced Outage percentage  |
| <b>Capacity Factor =</b><br>(percentage)        | $\frac{\text{Total Annual MWh of Production}}{\text{Accredited Capacity Rating (MWh) of the Unit}} \times 8,760$ |

Note: Maintenance percentage is the number of hours of scheduled maintenance divided by 8,760.

## POWER PLANT AND GENERATING UNIT DATA REPORT

2018

Scroll down below the ALLOWABLE CODES to see DEFINITIONS for Capacity Factor, Operating Factor and Forced Outage Rate.

|                |  |                   |                 |       |
|----------------|--|-------------------|-----------------|-------|
| PLANT NAME     |  | Temp Ripley Solar | PLANT ID        | 68029 |
| STREET ADDRESS |  | 15000 Highway 115 | NUMBER OF UNITS | 1     |
| CITY           |  | Little Falls      |                 |       |
| STATE          |  | MN                |                 |       |
| ZIP CODE       |  | 56345             |                 |       |
| COUNTY         |  | Morrison          |                 |       |
| CONTACT PERSON |  | Todd Simmons      |                 |       |
| TELEPHONE      |  | 218-313-4430      |                 |       |

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| ALLOWABLE CODES                  |        |                                       |                              |        |                              |
|----------------------------------|--------|---------------------------------------|------------------------------|--------|------------------------------|
| Cell Heading<br>* Unit Status    | Code   | Code Definition                       | Cell Heading<br>** Unit Type | Code   | Code Definition              |
|                                  | USE    | In-use                                |                              | CS     | Combined Cycle               |
|                                  | STB    | Stand-by                              |                              | IC     | Internal Combustion (Diesel) |
|                                  | RET    | Retired                               |                              | GT     | Combustion (Gas) Turbine     |
|                                  | FUT    | Future                                |                              | HC     | Hydro                        |
|                                  | OTHER  | Other - provide description           |                              | ST     | Steam Turbine (Boiler)       |
|                                  |        |                                       |                              | NC     | Nuclear                      |
|                                  |        |                                       |                              | WI     | Wind                         |
|                                  |        |                                       |                              | OTHER  | Other - provide description  |
| *** Energy Source<br>& Fuel Type | BIT    | Bituminous Coal                       | **** Unit of<br>Measure      | GAL    | Gallons                      |
|                                  | COAL   | Coal (general)                        |                              | MCF    | Thousand cubic feet          |
|                                  | DIESEL | Diesel                                |                              | MMCF   | Million cubic feet           |
|                                  | FO2    | Fuel Oil #2 (Mid Distillate)          |                              | TONS   | Tons                         |
|                                  | FO6    | Fuel Oil #6 (Residual Fuel Oil)       |                              | BBL    | Barrels                      |
|                                  | LIG    | Lignite                               |                              | THERMS | Therms                       |
|                                  | LPG    | Liquefied Propane Gas                 |                              |        |                              |
|                                  | NG     | Natural Gas                           |                              |        |                              |
|                                  | NUC    | Nuclear                               |                              |        |                              |
|                                  | REF    | Refuse, Bagasse, Peat, Non-wood waste |                              |        |                              |
|                                  | STM    | Steam                                 |                              |        |                              |
|                                  | SUB    | Sub-Bituminous Coal                   |                              |        |                              |
|                                  | HYD    | Hydro (Water)                         |                              |        |                              |
|                                  | WIND   | Wind                                  |                              |        |                              |
|                                  | WOOD   | Wood                                  |                              |        |                              |
|                                  | SOLAR  | Solar                                 |                              |        |                              |
|                                  | OTHER  | Other - provide description           |                              |        |                              |

| DEFINITIONS                              |  |
|--|--|
| Forced Outage Rate =<br>(percentage)     | $\frac{\text{Hours Unit Failed to be Available} \times 100}{\text{Hours Unit Called Upon to Produce}}$                     |
| Operating Availability =<br>(percentage) | 100 - Maintenance percentage - Forced Outage percentage  |
| Capacity Factor =<br>(percentage)        | $\frac{\text{Total Annual MWH of Production} \times 100}{\text{Accredited Capacity Rating (MW) of the Unit} \times 8,760}$ |

Note: Failure of a unit to be available does not include down time for scheduled maintenance.

Note: Maintenance percentage is the number of hours of scheduled maintenance divided by 8,760.




# MINNESOTA ELECTRIC UTILITY INFORMATION REPORTING - FORECAST SECTION

## INSTRUCTIONS

These worksheet tabs correspond closely to the tables in the forecast instructions received by the utility. The forecast instructions pertain to the data to be entered in each of the worksheet tabs.

**PLEASE DO NOT CHANGE THE NAME OR ORDER OF ANY OF THE WORKSHEET TABS OR CHANGE THE NAME OF THIS WORKBOOK.**

In general, the following color scheme is used on each worksheet:

-  Cells shown with a light green background correspond to headings for sections, columns, row, or individual fields on each worksheet tab.
-  **Cells shown with a light yellow background require data to be entered by the utility.**
-  Cells shown with a light brown background generally correspond to fields that are calculated from the data entered, or correspond to fields that are informational and not to be modified by the utility.

Each worksheet tab contains a section labeled "Comments" below the main data entry area.

You may enter any comments in that section to provide an explanation or clarification on the data entered; OR why data IS NOT being entered on the worksheet tab (for example: cells left blank).

Cells with automatic calculations (typically totals) are provided on some worksheets to assist with the accuracy of the data provided by the utility. It is recognized that there may be circumstances in which the data entered by the utility is more appropriate or accurate than the value in the corresponding automatically-calculated cell. If the value in the automatically-calculated cell does not match the value that your utility entered, please provide an explanation in the Comments area at the bottom of the worksheet tab.

Please complete the required worksheet tabs and save the completed workbook to your local computer.

Then attach the completed workbook to an email message, include your contact information, and send it to the following email address:

[rule7610.reports@state.mn.us](mailto:rule7610.reports@state.mn.us)

If you have any questions please contact:

Anne Sell

MN Department of Commerce

[rule7610.reports@state.mn.us](mailto:rule7610.reports@state.mn.us)

(651) 539-1851

MINNESOTA ELECTRIC UTILITY ANNUAL REPORT - FORECAST SECTION

7610.0120 REGISTRATION

|                           |   |            |
|---------------------------|---|------------|
| ENTITY ID#<br>REPORT YEAR |   | 68<br>2018 |
| UTILITY DETAILS           |   |            |
| UTILITY NAME              | Minnesota Power Company                               |            |
| STREET ADDRESS            | 30 W Superior St                                      |            |
| CITY                      | Duluth  |            |
| STATE                     | MN  |            |
| ZIP CODE                  | 55802-2093  |            |
| TELEPHONE                 | 218-722-5642 x3865                                    |            |
| * UTILITY TYPE            | Scroll down to see allowable UTILITY TYPES<br>PRIVATE |            |
| COMMENTS                  |   |            |
|                           |   |            |

|                          |                                |        |
|--------------------------|--------------------------------|--------|
| RILS ID#                 |                                | U10680 |
| CONTACT INFORMATION      |                                |        |
| CONTACT NAME             | Benjamin Levine                |        |
| CONTACT TITLE            | Senior Utility Load Forecaster |        |
| CONTACT STREET ADDRESS   | 30 W Superior St               |        |
| CITY                     | Duluth                         |        |
| STATE                    | MN                             |        |
| ZIP CODE                 | 55802-2093                     |        |
| TELEPHONE                | 218-355-3120                   |        |
| CONTACT E-MAIL           | blevine@mnpower.com            |        |
| PREPARER INFORMATION     |                                |        |
| PERSON PREPARING FORMS   | (do not type "Same as Above")  |        |
| PREPARER'S TITLE         | Benjamin Levine                |        |
| DATE                     | Senior Utility Load Forecaster |        |
| PREPARER'S EMAIL ADDRESS | 7/17/2019                      |        |
|                          | blevine@mnpower.com            |        |

ALLOWABLE UTILITY TYPES

- Code
- Private
- Public
- Co-op

## MINNESOTA ELECTRIC UTILITY INFORMATION REPORTING - FORECAST SECTION (Continued)

### 7610.0310 Item A. SYSTEM FORECAST OF ANNUAL ELECTRIC CONSUMPTION BY ULTIMATE CONSUMERS

Provide actual data for your entire system for the past year, your estimate for the present year and all future forecast years.  
Please remember that the number of customers should reflect the *number of customers at year's end, not the number of meters.*

|                       | FARM | NON-FARM<br>RESIDENTIAL | COMMERCIAL      | MINING *             | INDUSTRIAL          | STREET &<br>HIGHWAY<br>LIGHTING | OTHER       | SYSTEM<br>TOTALS | Calculated<br>System<br>Totals |
|-----------------------|------|-------------------------|-----------------|----------------------|---------------------|---------------------------------|-------------|------------------|--------------------------------|
| Past Year             | 2018 | No. of Customers<br>MWH | 2,273<br>36,299 | 120,233<br>1,016,502 | 22,834<br>1,233,117 | 5,039,138<br>1,638,753          | 9<br>14,206 | 371<br>14,206    | 146,690<br>9,027,899           |
| Present Year          | 2019 | No. of Customers<br>MWH | 2,273<br>36,299 | 120,369<br>1,016,948 | 23,011<br>1,236,911 | 5,039,138<br>4,972,959          | 9<br>334    | 366<br>1,681,033 | 147,001<br>9,006,820           |
| 1st Forecast<br>Year  | 2020 | No. of Customers<br>MWH | 2,273<br>36,299 | 120,634<br>1,017,176 | 23,184<br>1,255,436 | 5,039,138<br>5,205,308          | 9<br>534    | 357<br>1,640,855 | 147,428<br>9,217,447           |
| 2nd Forecast<br>Year  | 2021 | No. of Customers<br>MWH | 2,273<br>36,299 | 120,910<br>1,014,422 | 23,382<br>1,259,858 | 5,196,724<br>5,196,724          | 9<br>331    | 351<br>1,645,371 | 147,902<br>9,214,779           |
| 3rd Forecast<br>Year  | 2022 | No. of Customers<br>MWH | 2,273<br>36,299 | 121,126<br>1,016,242 | 23,571<br>1,269,402 | 5,196,724<br>5,405,168          | 9<br>139    | 344<br>1,613,385 | 148,303<br>9,402,245           |
| 4th Forecast<br>Year  | 2023 | No. of Customers<br>MWH | 2,273<br>36,299 | 121,348<br>1,019,182 | 23,758<br>1,283,122 | 5,405,168<br>5,564,801          | 9<br>322    | 332<br>1,614,724 | 148,702<br>9,579,805           |
| 5th Forecast<br>Year  | 2024 | No. of Customers<br>MWH | 2,273<br>36,299 | 121,555<br>1,025,607 | 23,943<br>1,297,983 | 5,564,801<br>5,594,392          | 9<br>998    | 324<br>1,619,445 | 149,089<br>9,635,206           |
| 6th Forecast<br>Year  | 2025 | No. of Customers<br>MWH | 2,273<br>36,299 | 121,733<br>1,025,523 | 24,128<br>1,301,607 | 5,594,392<br>5,592,946          | 9<br>491    | 320<br>1,614,560 | 149,446<br>9,631,366           |
| 7th Forecast<br>Year  | 2026 | No. of Customers<br>MWH | 2,273<br>36,299 | 121,928<br>1,029,202 | 24,314<br>1,311,799 | 5,592,946<br>5,605,255          | 9<br>203    | 317<br>1,615,127 | 149,823<br>9,657,604           |
| 8th Forecast<br>Year  | 2027 | No. of Customers<br>MWH | 2,273<br>36,299 | 122,132<br>1,034,122 | 24,501<br>1,323,531 | 5,605,255<br>5,611,691          | 9<br>139    | 311<br>1,615,213 | 150,208<br>9,680,516           |
| 9th Forecast<br>Year  | 2028 | No. of Customers<br>MWH | 2,273<br>36,299 | 122,344<br>1,042,722 | 24,690<br>1,337,735 | 5,611,691<br>5,634,340          | 9<br>217    | 305<br>1,623,583 | 150,602<br>9,734,190           |
| 10th Forecast<br>Year | 2029 | No. of Customers<br>MWH | 2,273<br>36,299 | 122,551<br>1,044,427 | 24,878<br>1,341,957 | 5,634,340<br>5,620,356          | 9<br>721    | 298<br>1,626,189 | 150,992<br>9,728,030           |
| 11th Forecast<br>Year | 2030 | No. of Customers<br>MWH | 2,273<br>36,299 | 122,763<br>1,050,076 | 25,069<br>1,352,312 | 5,620,356<br>5,616,364          | 9<br>05     | 292<br>1,633,771 | 151,389<br>9,747,299           |
| 12th Forecast<br>Year | 2031 | No. of Customers<br>MWH | 2,273<br>36,299 | 122,972<br>1,056,488 | 25,264<br>1,363,953 | 5,616,364<br>5,610,289          | 9<br>114    | 285<br>1,640,388 | 151,788<br>9,765,716           |
| 13th Forecast<br>Year | 2032 | No. of Customers<br>MWH | 2,273<br>36,299 | 123,165<br>1,067,821 | 25,458<br>1,380,261 | 5,610,289<br>5,615,263          | 9<br>152    | 279<br>1,651,157 | 152,169<br>9,809,070           |
| 14th Forecast<br>Year | 2033 | No. of Customers<br>MWH | 2,273<br>36,299 | 123,386<br>1,074,286 | 25,652<br>1,387,973 | 5,615,263<br>5,586,514          | 9<br>223    | 272<br>1,651,475 | 152,580<br>9,794,544           |

\* MINING needs to be reported as a separate category only if annual sales are greater than 1,000 GWH. Otherwise, include MINING in the INDUSTRIAL category.

#### COMMENTS

|  |
|--|
|  |
|--|

## MINNESOTA ELECTRIC UTILITY INFORMATION REPORTING - FORECAST SECTION (Continued)

### 7610.0310 Item A. MINNESOTA-ONLY FORECAST OF ANNUAL ELECTRIC CONSUMPTION BY ULTIMATE CONSUMER:

Provide actual data for your Minnesota service area only, for the past year, your best estimate for the present year and all future forecast years. Please remember that the number of customers should reflect the **actual number of customers** the utility has in that category at year's end, **not the number of meters**.

|                       | FARM | NON-FARM<br>RESIDENTIAL | COMMERCIAL      | MINING *             | INDUSTRIAL          | STREET &<br>HIGHWAY<br>LIGHTING | OTHER            | MN-ONLY<br>TOTALS            | Calculated<br>MN-Only<br>Totals |
|-----------------------|------|-------------------------|-----------------|----------------------|---------------------|---------------------------------|------------------|------------------------------|---------------------------------|
| Past Year             | 2018 | No. of Customers<br>MWH | 2,273<br>36,299 | 120,233<br>1,016,502 | 22,834<br>1,233,117 | 9<br>5,039,138                  | 371<br>1,638,753 | 692,916,667<br>14,206        | 146,690<br>9,027,899            |
| Present Year          | 2019 | No. of Customers<br>MWH | 2,273<br>36,299 | 120,369<br>1,016,948 | 23,011<br>1,236,911 | 9<br>4,972,959,334              | 366<br>1,681,033 | 694,754,8653<br>14,775,7505  | 147,001<br>9,006,820            |
| 1st Forecast<br>Year  | 2020 | No. of Customers<br>MWH | 2,273<br>36,299 | 120,634<br>1,017,176 | 23,184<br>1,255,436 | 9<br>5,205,308,534              | 357<br>1,640,855 | 693,584,8673<br>15,086,5101  | 147,428<br>9,217,447            |
| 2nd Forecast<br>Year  | 2021 | No. of Customers<br>MWH | 2,273<br>36,299 | 120,910<br>1,014,422 | 23,382<br>1,259,858 | 9<br>5,196,724,331              | 351<br>1,645,371 | 699,048,4755<br>14,990,26578 | 147,902<br>9,214,779            |
| 3rd Forecast<br>Year  | 2022 | No. of Customers<br>MWH | 2,273<br>36,299 | 121,126<br>1,016,242 | 23,571<br>1,269,402 | 9<br>5,405,168,139              | 344<br>1,613,385 | 701,106,8668<br>14,922,86583 | 148,303<br>9,402,245            |
| 4th Forecast<br>Year  | 2023 | No. of Customers<br>MWH | 2,273<br>36,299 | 121,348<br>1,019,182 | 23,758<br>1,283,122 | 9<br>5,564,801,322              | 332<br>1,614,724 | 704,148,6712<br>14,825,48924 | 148,702<br>9,579,805            |
| 5th Forecast<br>Year  | 2024 | No. of Customers<br>MWH | 2,273<br>36,299 | 121,555<br>1,025,607 | 23,943<br>1,297,983 | 9<br>5,594,392,998              | 324<br>1,619,445 | 705,662,9138<br>14,789,48295 | 149,089<br>9,635,206            |
| 6th Forecast<br>Year  | 2025 | No. of Customers<br>MWH | 2,273<br>36,299 | 121,733<br>1,025,523 | 24,128<br>1,301,607 | 9<br>5,592,946,491              | 320<br>1,614,560 | 704,507,5378<br>14,704,61949 | 149,446<br>9,631,366            |
| 7th Forecast<br>Year  | 2026 | No. of Customers<br>MWH | 2,273<br>36,299 | 121,928<br>1,029,202 | 24,314<br>1,311,799 | 9<br>5,605,255,203              | 317<br>1,615,127 | 703,960,613<br>14,650,07874  | 149,823<br>9,657,604            |
| 8th Forecast<br>Year  | 2027 | No. of Customers<br>MWH | 2,273<br>36,299 | 122,132<br>1,034,122 | 24,501<br>1,323,531 | 9<br>5,611,691,139              | 311<br>1,615,213 | 703,387,4323<br>14,613,88864 | 150,208<br>9,680,516            |
| 9th Forecast<br>Year  | 2028 | No. of Customers<br>MWH | 2,273<br>36,299 | 122,344<br>1,042,722 | 24,690<br>1,337,735 | 9<br>5,634,340,217              | 305<br>1,623,583 | 702,987,8534<br>14,629,01646 | 150,602<br>9,734,190            |
| 10th Forecast<br>Year | 2029 | No. of Customers<br>MWH | 2,273<br>36,299 | 122,551<br>1,044,427 | 24,878<br>1,341,957 | 9<br>5,620,356,721              | 298<br>1,626,189 | 703,571,1736<br>14,531,24697 | 150,992<br>9,728,030            |
| 11th Forecast<br>Year | 2030 | No. of Customers<br>MWH | 2,273<br>36,299 | 122,763<br>1,050,076 | 25,069<br>1,352,312 | 9<br>5,616,364,05               | 292<br>1,633,771 | 704,419,7142<br>14,488,9953  | 151,389<br>9,747,299            |
| 12th Forecast<br>Year | 2031 | No. of Customers<br>MWH | 2,273<br>36,299 | 122,972<br>1,056,488 | 25,264<br>1,363,953 | 9<br>5,610,289,114              | 285<br>1,640,388 | 705,285,0972<br>14,450,73411 | 151,788<br>9,765,716            |
| 13th Forecast<br>Year | 2032 | No. of Customers<br>MWH | 2,273<br>36,299 | 123,165<br>1,067,821 | 25,458<br>1,380,261 | 9<br>5,615,263,152              | 279<br>1,651,157 | 705,282,7661<br>14,461,25243 | 152,169<br>9,809,070            |
| 14th Forecast<br>Year | 2033 | No. of Customers<br>MWH | 2,273<br>36,299 | 123,386<br>1,074,286 | 25,652<br>1,387,973 | 9<br>5,586,6514,223             | 272<br>1,651,475 | 707,318,4365<br>14,375,38523 | 152,580<br>9,794,544            |

\* MINING needs to be reported as a separate category only if annual sales are greater than 1,000 GWH. Otherwise, include MINING in the INDUSTRIAL category.

### COMMENTS

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# MINNESOTA ELECTRIC UTILITY INFORMATION REPORTING - FORECAST SECTION (Continued)

7610.0310 Item B. FORECAST OF ANNUAL SYSTEM CONSUMPTION AND GENERATION DATA (Express in MWH)

**NOTE:** (Column 1 + Column 2) = (Column 3 + Column 5) - (Column 4 + Column 6)

It is recognized that there may be circumstances in which the data entered by the utility is more appropriate or accurate than the value in the corresponding automatically-calculated cell. If the value in the automatically-calculated cell does not match the value that your utility entered, please provide an explanation in the Comments area at the bottom of the worksheet tab.

| Column 1   | Column 2  | Column 3   | Column 4   | Column 5  | Column 6   | Column 7   | Column 8   | CALCULATED<br>(GENERATION +<br>RECEIVED)<br>MINUS<br>(RESALE + LOSSES)<br>MINUS<br>(CONSUMPTION)<br>SHOULD EQUAL ZERO |
|--|---|--|--|---|--|--|--|---|
| CONSUMPTION<br>BY ULTIMATE<br>CONSUMERS IN<br>MINNESOTA<br>MWH<br>[7610.0310 B(1)] | CONSUMPTION<br>BY ULTIMATE<br>CONSUMERS<br>OUTSIDE OF<br>MINNESOTA<br>MWH<br>[7610.0310 B(2)] | RECEIVED FROM<br>OTHER<br>UTILITIES<br>MWH<br>[7610.0310 B(3)] | DELIVERED FOR<br>RESALE<br>MWH<br>[7610.0310 B(4)] | TOTAL ANNUAL<br>GENERATION<br>MWH<br>[7610.0310 B(5)] | TRANSMISSION<br>LINE<br>AND<br>DISTRIBUTION<br>LOSSES<br>MWH<br>[7610.0310 B(6)] | TOTAL WINTER<br>CONSUMPTION<br>MWH<br>[7610.0310 B(7)] | TOTAL SUMMER<br>CONSUMPTION<br>MWH<br>[7610.0310 B(7)] |   |
| Past Year 2018   | 9,027,899   | 0  | 6,471,821  | 8,638,425   | 518,993  | 5,374,580  | 5,178,919  | 0   |
| Present Year 2019  | 9,006,820   | 0  | 4,301,162  | 8,434,263   | 662,659  | 5,310,121  | 5,115,789  | 0   |
| 1st Forecast<br>Year 2020  | 9,217,447   | 0  | 3,221,453  | 9,216,251   | 673,608  | 5,365,354  | 5,223,241  | 0   |
| 2nd Forecast<br>Year 2021  | 9,214,779   | 0  | 3,110,548  | 9,067,972   | 681,449  | 5,411,144  | 5,289,052  | 0   |
| 3rd Forecast<br>Year 2022  | 9,402,245   | 0  | 2,962,135  | 9,335,532   | 696,026  | 5,590,782  | 5,440,139  | 0   |
| 4th Forecast<br>Year 2023  | 9,579,805   | 0  | 2,846,708  | 9,602,159   | 707,962  | 5,642,209  | 5,501,794  | 0   |
| 5th Forecast<br>Year 2024  | 9,635,206   | 0  | 3,087,701  | 9,425,978   | 711,932  | 5,627,611  | 5,519,106  | 0   |
| 6th Forecast<br>Year 2025  | 9,631,366   | 0  | 2,306,016  | 10,522,601  | 712,786  | 5,643,984  | 5,534,283  | 0   |
| 7th Forecast<br>Year 2026  | 9,657,604   | 0  | 2,226,560  | 10,507,390  | 714,703  | 5,658,889  | 5,548,691  | 0   |
| 8th Forecast<br>Year 2027  | 9,680,516   | 0  | 2,132,956  | 10,683,654  | 716,586  | 5,708,070  | 5,565,579  | 0   |
| 9th Forecast<br>Year 2028  | 9,734,190   | 0  | 2,200,727  | 10,637,914  | 721,034  | 5,692,365  | 5,582,424  | 0   |
| 10th Forecast<br>Year 2029   | 9,728,030   | 0  | 2,262,720  | 10,527,655  | 720,571  | 5,712,681  | 5,596,464  | 0   |
| 11th Forecast<br>Year 2030   | 9,747,299   | 0  | 2,285,388  | 10,489,579  | 723,062  | 5,724,253  | 5,609,317  | 0   |
| 12th Forecast<br>Year 2031   | 9,765,716   | 0  | 2,253,610  | 10,624,921  | 724,431  | 5,772,038  | 5,621,165  | 0   |
| 13th Forecast<br>Year 2032   | 9,809,070   | 0  | 2,279,668  | 10,653,142  | 728,411  | 5,753,943  | 5,633,771  | 0   |
| 14th Forecast<br>Year 2033   | 9,794,544   | 0  | 2,238,634  | 10,710,783  | 727,756  | 1,954,054  | 5,645,615  | 0   |

COMMENTS



MINNESOTA ELECTRIC UTILITY INFORMATION REPORTING - FORECAST SECTION (Continued)

7610.0310 Item C. PEAK DEMAND BY ULTIMATE CONSUMERS AT THE TIME OF ANNUAL SYSTEM PEAK (in MW)

|                         | FARM | NON-FARM<br>RESIDENTIAL | COMMERCIAL | MINING | INDUSTRIAL | STREET &<br>HIGHWAY<br>LIGHTING | OTHER | SYSTEM<br>TOTALS | Calculated<br>System Totals |
|-------------------------|------|-------------------------|------------|--------|------------|---------------------------------|-------|------------------|-----------------------------|
| Last Year Peak Day 2018 | 6.8  | 221.7                   | 205.9      | 661.9  | 332.3      | 3.0                             | 305.1 | 1,736.7          | 1736.7                      |

7610.0310 Item D. PEAK DEMAND BY MONTH FOR THE LAST CALENDAR YEAR (in MW)

|           | JANUARY | FEBRUARY | MARCH  | APRIL  | MAY    | JUNE   | JULY   | AUGUST | SEPTEMBER | OCTOBER | NOVEMBER | DECEMBER |
|-----------|---------|----------|--------|--------|--------|--------|--------|--------|-----------|---------|----------|----------|
| Last Year | 1736.7  | 1718.3   | 1633.9 | 1626.6 | 1622.4 | 1666.2 | 1635.6 | 1727.7 | 1587.6    | 1582.2  | 1697.7   | 1684.4   |

| COMMENTS   |
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| Coincident non-Large Power load at peak hour is approximated by scaling by class energy consumption in peak month. |

MINNESOTA ELECTRIC UTILITY INFORMATION REPORTING - FORECAST SECTION (Continued)

7610.0310 Item E. PART 1: FIRM PURCHASES

(Express in MegaWatts)

| NAME OF OTHER UTILITY ==> |      | Oliver Cty Wind<br>(ND FPLE 1&2) | Wing River Wind<br>(CBED) | Manitoba Hydro<br>(MHEB) | Great River<br>Energy (GRE) | Nobles 2 | Contract Solar | Minnkota |
|---------------------------|------|----------------------------------|---------------------------|--------------------------|-----------------------------|----------|----------------|----------|
| Past Year                 | 2018 | Summer<br>17.0                   | 0.2                       | 100.0                    | 150.0                       |          | 0.3            | 50.0     |
|                           | 2019 | Winter<br>17.0                   | 0.2                       | 100.0                    | 150.0                       |          | 0.3            | 50.0     |
| Present Year              | 2019 | Summer<br>17.4                   | 0.2                       | 100.0                    | 150.0                       | -        | 7.5            | 50.0     |
|                           | 2020 | Winter<br>17.4                   | 0.2                       | 100.0                    | 150.0                       | -        | 7.5            | 50.0     |
| 1st Forecast<br>Year      | 2020 | Summer<br>17.4                   | 0.2                       | 250.0                    | -                           | -        | 7.5            |          |
|                           | 2021 | Winter<br>17.4                   | 0.2                       | 250.0                    | -                           | 37.5     | 7.5            |          |
| 2nd Forecast<br>Year      | 2021 | Summer<br>17.4                   | 0.2                       | 250.0                    | -                           | 37.5     | 7.5            |          |
|                           | 2022 | Winter<br>17.4                   | 0.2                       | 250.0                    | -                           | 37.5     | 7.5            |          |
| 3rd Forecast<br>Year      | 2022 | Summer<br>17.4                   | 0.2                       | 250.0                    | -                           | 37.5     | 7.5            |          |
|                           | 2023 | Winter<br>17.4                   | 0.2                       | 250.0                    | -                           | 37.5     | 7.5            |          |
| 4th Forecast<br>Year      | 2023 | Summer<br>17.4                   | 0.2                       | 250.0                    | -                           | 37.5     | 7.5            |          |
|                           | 2024 | Winter<br>17.4                   | 0.2                       | 250.0                    | -                           | 37.5     | 7.5            |          |
| 5th Forecast<br>Year      | 2024 | Summer<br>17.4                   | 0.2                       | 250.0                    | -                           | 37.5     | 10.7           |          |
|                           | 2025 | Winter<br>17.4                   | 0.2                       | 250.0                    | -                           | 37.5     | 10.7           |          |
| 6th Forecast<br>Year      | 2025 | Summer<br>17.4                   | 0.2                       | 250.0                    | -                           | 37.5     | 10.7           |          |
|                           | 2026 | Winter<br>17.4                   | 0.2                       | 250.0                    | -                           | 37.5     | 10.7           |          |
| 7th Forecast<br>Year      | 2026 | Summer<br>17.4                   | 0.2                       | 250.0                    | -                           | 37.5     | 10.7           |          |
|                           | 2027 | Winter<br>17.4                   | 0.2                       | 250.0                    | -                           | 37.5     | 10.7           |          |
| 8th Forecast<br>Year      | 2027 | Summer<br>17.4                   | 0.2                       | 250.0                    | -                           | 37.5     | 10.7           |          |
|                           | 2028 | Winter<br>17.4                   | 0.2                       | 250.0                    | -                           | 37.5     | 10.7           |          |
| 9th Forecast<br>Year      | 2028 | Summer<br>17.4                   | 0.2                       | 250.0                    | -                           | 37.5     | 10.7           |          |
|                           | 2029 | Winter<br>17.4                   | 0.2                       | 250.0                    | -                           | 37.5     | 10.7           |          |
| 10th Forecast<br>Year     | 2029 | Summer<br>17.4                   | 0.2                       | 250.0                    | -                           | 37.5     | 10.7           |          |
|                           | 2030 | Winter<br>17.4                   | 0.2                       | 250.0                    | -                           | 37.5     | 10.7           |          |
| 11th Forecast<br>Year     | 2030 | Summer<br>17.4                   | 0.2                       | 250.0                    | -                           | 37.5     | 10.7           |          |
|                           | 2031 | Winter<br>17.4                   | 0.2                       | 250.0                    | -                           | 37.5     | 10.7           |          |
| 12th Forecast<br>Year     | 2031 | Summer<br>17.4                   | 0.2                       | 250.0                    | -                           | 37.5     | 10.7           |          |
|                           | 2032 | Winter<br>17.4                   | 0.2                       | 250.0                    | -                           | 37.5     | 10.7           |          |
| 13th Forecast<br>Year     | 2032 | Summer<br>17.4                   | 0.2                       | 250.0                    | -                           | 37.5     | 10.7           |          |
|                           | 2033 | Winter<br>17.4                   | 0.2                       | 250.0                    | -                           | 37.5     | 10.7           |          |
| 14th Forecast<br>Year     | 2033 | Summer<br>17.4                   | 0.2                       | 250.0                    | -                           | 37.5     | 10.7           |          |
|                           |      | Winter<br>17.4                   | 0.2                       | 250.0                    | -                           | 37.5     | 10.7           |          |

COMMENTS

Minnesota Power long-term resource planning approach utilizes UCAP for unit accreditation. The accredited MW value of purchases in the table above are consistent with the "Load&GenCap" table.

MINNESOTA ELECTRIC UTILITY INFORMATION REPORTING - FORECAST SECTION (Continued)

7610.0310 Item E. PART 2: FIRM SALES

(Express in MegaWatts)

| NAME OF OTHER UTILITY => |      | Basin Electric Power Cooperative (BEPC) |       | NextEra (NEPM) |  | The Energy Authority (TEA) |  |  |  |  |
|--------------------------|------|---|-------|----------------|--|----------------------------|--|--|--|--|
| Past Year                | 2018 | Summer                                  | 200.0 |                |  | 17.0                       |  |  |  |  |
|                          |      | Winter                                  | 200.0 |                |  | 31.3                       |  |  |  |  |
| Present Year             | 2019 | Summer                                  | 100.0 |                |  |                            |  |  |  |  |
|                          |      | Winter                                  | 100.0 | 30.0           |  |                            |  |  |  |  |
| 1st Forecast Year        | 2020 | Summer                                  | -     |                |  |                            |  |  |  |  |
|                          |      | Winter                                  | -     |                |  |                            |  |  |  |  |
| 2nd Forecast Year        | 2021 | Summer                                  | -     |                |  |                            |  |  |  |  |
|                          |      | Winter                                  | -     |                |  |                            |  |  |  |  |
| 3rd Forecast Year        | 2022 | Summer                                  | 75.0  |                |  |                            |  |  |  |  |
|                          |      | Winter                                  | 75.0  |                |  |                            |  |  |  |  |
| 4th Forecast Year        | 2023 | Summer                                  | 125.0 |                |  |                            |  |  |  |  |
|                          |      | Winter                                  | 125.0 |                |  |                            |  |  |  |  |
| 5th Forecast Year        | 2024 | Summer                                  | 125.0 |                |  |                            |  |  |  |  |
|                          |      | Winter                                  | 125.0 |                |  |                            |  |  |  |  |
| 6th Forecast Year        | 2025 | Summer                                  | 100.0 |                |  |                            |  |  |  |  |
|                          |      | Winter                                  | 100.0 |                |  |                            |  |  |  |  |
| 7th Forecast Year        | 2026 | Summer                                  | 100.0 |                |  |                            |  |  |  |  |
|                          |      | Winter                                  | 100.0 |                |  |                            |  |  |  |  |
| 8th Forecast Year        | 2027 | Summer                                  | 100.0 |                |  |                            |  |  |  |  |
|                          |      | Winter                                  | 100.0 |                |  |                            |  |  |  |  |
| 9th Forecast Year        | 2028 | Summer                                  | -     |                |  |                            |  |  |  |  |
|                          |      | Winter                                  | -     |                |  |                            |  |  |  |  |
| 10th Forecast Year       | 2029 | Summer                                  | -     |                |  |                            |  |  |  |  |
|                          |      | Winter                                  | -     |                |  |                            |  |  |  |  |
| 11th Forecast Year       | 2030 | Summer                                  | -     |                |  |                            |  |  |  |  |
|                          |      | Winter                                  | -     |                |  |                            |  |  |  |  |
| 12th Forecast Year       | 2031 | Summer                                  | -     |                |  |                            |  |  |  |  |
|                          |      | Winter                                  | -     |                |  |                            |  |  |  |  |
| 13th Forecast Year       | 2032 | Summer                                  | -     |                |  |                            |  |  |  |  |
|                          |      | Winter                                  | -     |                |  |                            |  |  |  |  |
| 14th Forecast Year       | 2033 | Summer                                  | -     |                |  |                            |  |  |  |  |
|                          |      | Winter                                  | -     |                |  |                            |  |  |  |  |

COMMENTS

Minnesota Power long-term resource planning approach utilizes UCAP for unit accreditation. The accredited MW value of sales in the table above are consistent with the "Load&GenCap" table.

MINNESOTA ELECTRIC UTILITY INFORMATION REPORTING - FORECAST SECTION (Continued)

7610.0310 Item F. PART 1: PARTICIPATION PURCHASES

(Express in MegaWatts)

| NAME OF OTHER UTILITY => |      | Manitoba Hydro (MHEB) |       | TransAlta (TA) |      | Shell Energy North America (SENA) |  |  |  |
|--------------------------|------|-----------------------|-------|----------------|------|-----------------------------------|--|--|--|
| Past Year                | 2018 | Summer                | 150.0 | 100.0          | 50.0 |                                   |  |  |  |
|                          |      | Winter                | 150.0 | 100.0          | 50.0 |                                   |  |  |  |
| Present Year             | 2019 | Summer                | 150.0 | 100.0          | 50.0 |                                   |  |  |  |
|                          |      | Winter                | 150.0 |                |      |                                   |  |  |  |
| 1st Forecast Year        | 2020 | Summer                | 150.0 |                |      |                                   |  |  |  |
|                          |      | Winter                | 150.0 |                |      |                                   |  |  |  |
| 2nd Forecast Year        | 2021 | Summer                | 150.0 |                |      |                                   |  |  |  |
|                          |      | Winter                | 150.0 |                |      |                                   |  |  |  |
| 3rd Forecast Year        | 2022 | Summer                |       |                |      |                                   |  |  |  |
|                          |      | Winter                |       |                |      |                                   |  |  |  |
| 4th Forecast Year        | 2023 | Summer                |       |                |      |                                   |  |  |  |
|                          |      | Winter                |       |                |      |                                   |  |  |  |
| 5th Forecast Year        | 2024 | Summer                |       |                |      |                                   |  |  |  |
|                          |      | Winter                |       |                |      |                                   |  |  |  |
| 6th Forecast Year        | 2025 | Summer                |       |                |      |                                   |  |  |  |
|                          |      | Winter                |       |                |      |                                   |  |  |  |
| 7th Forecast Year        | 2026 | Summer                |       |                |      |                                   |  |  |  |
|                          |      | Winter                |       |                |      |                                   |  |  |  |
| 8th Forecast Year        | 2027 | Summer                |       |                |      |                                   |  |  |  |
|                          |      | Winter                |       |                |      |                                   |  |  |  |
| 9th Forecast Year        | 2028 | Summer                |       |                |      |                                   |  |  |  |
|                          |      | Winter                |       |                |      |                                   |  |  |  |
| 10th Forecast Year       | 2029 | Summer                |       |                |      |                                   |  |  |  |
|                          |      | Winter                |       |                |      |                                   |  |  |  |
| 11th Forecast Year       | 2030 | Summer                |       |                |      |                                   |  |  |  |
|                          |      | Winter                |       |                |      |                                   |  |  |  |
| 12th Forecast Year       | 2031 | Summer                |       |                |      |                                   |  |  |  |
|                          |      | Winter                |       |                |      |                                   |  |  |  |
| 13th Forecast Year       | 2032 | Summer                |       |                |      |                                   |  |  |  |
|                          |      | Winter                |       |                |      |                                   |  |  |  |
| 14th Forecast Year       | 2033 | Summer                |       |                |      |                                   |  |  |  |
|                          |      | Winter                |       |                |      |                                   |  |  |  |

COMMENTS

The participation purchases listed in the table above are energy-only transactions and do not affect the Company's Load/Capacity position.

MINNESOTA ELECTRIC UTILITY INFORMATION REPORTING - FORECAST SECTION (Continued)

7610.0310 Item F. PART 2: PARTICIPATION SALES (Express in MegaWatts)

| NAME OF OTHER UTILITY => |      | NextEra (NEPM)   | Shell Energy North America (SENA) | American Electric Power (AEPEP) | TransAlta (TA) |  |
|--------------------------|------|------------------|-----------------------------------|---------------------------------|----------------|--|
| Past Year                | 2018 | Summer<br>Winter | 67.0<br>45.0                      | 65.0                            |                |  |
| Present Year             | 2019 | Summer<br>Winter | 75.0<br>50.0                      |                                 | 85.0<br>85.0   |  |
| 1st Forecast Year        | 2020 | Summer<br>Winter | 50.0                              | 50.0<br>50.0                    |                |  |
| 2nd Forecast Year        | 2021 | Summer<br>Winter |                                   |                                 |                |  |
| 3rd Forecast Year        | 2022 | Summer<br>Winter |                                   |                                 |                |  |
| 4th Forecast Year        | 2023 | Summer<br>Winter |                                   |                                 |                |  |
| 5th Forecast Year        | 2024 | Summer<br>Winter |                                   |                                 |                |  |
| 6th Forecast Year        | 2025 | Summer<br>Winter |                                   |                                 |                |  |
| 7th Forecast Year        | 2026 | Summer<br>Winter |                                   |                                 |                |  |
| 8th Forecast Year        | 2027 | Summer<br>Winter |                                   |                                 |                |  |
| 9th Forecast Year        | 2028 | Summer<br>Winter |                                   |                                 |                |  |
| 10th Forecast Year       | 2029 | Summer<br>Winter |                                   |                                 |                |  |
| 11th Forecast Year       | 2030 | Summer<br>Winter |                                   |                                 |                |  |
| 12th Forecast Year       | 2031 | Summer<br>Winter |                                   |                                 |                |  |
| 13th Forecast Year       | 2032 | Summer<br>Winter |                                   |                                 |                |  |
| 14th Forecast Year       | 2033 | Summer<br>Winter |                                   |                                 |                |  |

COMMENTS

The participation sales listed in the table above are energy-only transactions and do not affect the Company's Load/ Capacity position.

MINNESOTA ELECTRIC UTILITY INFORMATION REPORTING - FORECAST SECTION (Continued)

7610.0310 Item G. LOAD AND GENERATION CAPACITY

(Express in Megawatts)

|               | Column 1                      | Column 2  | Column 3                  | Column 4                | Column 5                              | Column 6                          | Column 7                                 | Column 8   | Column 9                                | Column 10                             | Column 11                         | Column 12                                   | Column 13                             | Column 14                                   | Column 15  |
|---------------|-------------------------------|---|---------------------------|-------------------------|---------------------------------------|-----------------------------------|--|--|---|---------------------------------------|-----------------------------------|---|---------------------------------------|---|--|
|               | SEASONAL<br>DEMAND<br>MAXIMUM | SEASONAL<br>PURCHASE AT<br>THE TIME OF<br>SEASONAL<br>SYSTEM DEMAND | SEASONAL<br>SYSTEM DEMAND | ANNUAL SYSTEM<br>DEMAND | SEASONAL FIRM<br>PURCHASES<br>(TOTAL) | SEASONAL FIRM<br>SALES<br>(TOTAL) | ADJUSTED NET<br>DEMAND<br>(Column 3 - 6) | ANNUAL<br>ADJUSTED NET<br>DEMAND<br>(Column 4 - 8) | NET GENERATING<br>CAPABILITY<br>(TOTAL) | PARTICIPATION<br>PURCHASES<br>(TOTAL) | PARTICIPATION<br>SALES<br>(TOTAL) | ADJUSTED NET<br>CAPACITY<br>(Column 9 + 11) | NET RESERVE<br>CAPACITY<br>OBLIGATION | TOTAL FIRM<br>OBLIGATION<br>(Column 1 + 14) | SURPLUS (+)<br>OR<br>DEFICIT (-)<br>CAPACITY<br>(Column 12 - 14) |
| Past Year     | 1,654                         | 1,654   | 1,654                     | 1,654                   | 337                                   | 200                               | 1,463                                    | 1,526  | 1,746                                   | -                                     | -                                 | 1,746                                       | 140                                   | 1,687                                       | 79   |
| Present Year  | 1,600                         | 1,600   | 1,600                     | 1,604                   | 337                                   | 200                               | 1,463                                    | 1,526  | 1,746                                   | -                                     | -                                 | 1,746                                       | 140                                   | 1,687                                       | 139  |
| 1st Forecast  | 1,600                         | 1,600   | 1,602                     | 1,604                   | 325                                   | 130                               | 1,467                                    | 1,487  | 1,746                                   | -                                     | -                                 | 1,746                                       | 133                                   | 1,620                                       | 113  |
| 2nd Forecast  | 1,603                         | 1,603   | 1,622                     | 1,622                   | 275                                   | 130                               | 1,469                                    | 1,487  | 1,746                                   | -                                     | -                                 | 1,746                                       | 127                                   | 1,596                                       | 197  |
| 3rd Forecast  | 1,603                         | 1,603   | 1,622                     | 1,622                   | 313                                   | -                                 | 1,469                                    | 1,487  | 1,746                                   | -                                     | -                                 | 1,746                                       | 127                                   | 1,596                                       | 148  |
| 4th Forecast  | 1,603                         | 1,603   | 1,622                     | 1,622                   | 313                                   | -                                 | 1,469                                    | 1,487  | 1,746                                   | -                                     | -                                 | 1,746                                       | 127                                   | 1,596                                       | 167  |
| 5th Forecast  | 1,603                         | 1,603   | 1,622                     | 1,622                   | 313                                   | -                                 | 1,469                                    | 1,487  | 1,746                                   | -                                     | -                                 | 1,746                                       | 127                                   | 1,596                                       | 167  |
| 6th Forecast  | 1,603                         | 1,603   | 1,622                     | 1,622                   | 313                                   | -                                 | 1,469                                    | 1,487  | 1,746                                   | -                                     | -                                 | 1,746                                       | 127                                   | 1,596                                       | 167  |
| 7th Forecast  | 1,603                         | 1,603   | 1,622                     | 1,622                   | 313                                   | -                                 | 1,469                                    | 1,487  | 1,746                                   | -                                     | -                                 | 1,746                                       | 127                                   | 1,596                                       | 167  |
| 8th Forecast  | 1,603                         | 1,603   | 1,622                     | 1,622                   | 313                                   | -                                 | 1,469                                    | 1,487  | 1,746                                   | -                                     | -                                 | 1,746                                       | 127                                   | 1,596                                       | 167  |
| 9th Forecast  | 1,603                         | 1,603   | 1,622                     | 1,622                   | 313                                   | -                                 | 1,469                                    | 1,487  | 1,746                                   | -                                     | -                                 | 1,746                                       | 127                                   | 1,596                                       | 167  |
| 10th Forecast | 1,603                         | 1,603   | 1,622                     | 1,622                   | 313                                   | -                                 | 1,469                                    | 1,487  | 1,746                                   | -                                     | -                                 | 1,746                                       | 127                                   | 1,596                                       | 167  |
| 11th Forecast | 1,603                         | 1,603   | 1,622                     | 1,622                   | 313                                   | -                                 | 1,469                                    | 1,487  | 1,746                                   | -                                     | -                                 | 1,746                                       | 127                                   | 1,596                                       | 167  |
| 12th Forecast | 1,603                         | 1,603   | 1,622                     | 1,622                   | 313                                   | -                                 | 1,469                                    | 1,487  | 1,746                                   | -                                     | -                                 | 1,746                                       | 127                                   | 1,596                                       | 167  |
| 13th Forecast | 1,603                         | 1,603   | 1,622                     | 1,622                   | 313                                   | -                                 | 1,469                                    | 1,487  | 1,746                                   | -                                     | -                                 | 1,746                                       | 127                                   | 1,596                                       | 167  |
| 14th Forecast | 1,603                         | 1,603   | 1,622                     | 1,622                   | 313                                   | -                                 | 1,469                                    | 1,487  | 1,746                                   | -                                     | -                                 | 1,746                                       | 127                                   | 1,596                                       | 167  |
| 2018          | 1,654                         | 1,654   | 1,654                     | 1,654                   | 337                                   | 200                               | 1,463                                    | 1,526  | 1,746                                   | -                                     | -                                 | 1,746                                       | 140                                   | 1,687                                       | 79   |
| 2019          | 1,600                         | 1,600   | 1,602                     | 1,604                   | 325                                   | 130                               | 1,467                                    | 1,487  | 1,746                                   | -                                     | -                                 | 1,746                                       | 133                                   | 1,620                                       | 113  |
| 2020          | 1,603                         | 1,603   | 1,622                     | 1,622                   | 275                                   | 130                               | 1,469                                    | 1,487  | 1,746                                   | -                                     | -                                 | 1,746                                       | 127                                   | 1,596                                       | 197  |
| 2021          | 1,603                         | 1,603   | 1,622                     | 1,622                   | 313                                   | -                                 | 1,469                                    | 1,487  | 1,746                                   | -                                     | -                                 | 1,746                                       | 127                                   | 1,596                                       | 148  |
| 2022          | 1,603                         | 1,603   | 1,622                     | 1,622                   | 313                                   | -                                 | 1,469                                    | 1,487  | 1,746                                   | -                                     | -                                 | 1,746                                       | 127                                   | 1,596                                       | 167  |
| 2023          | 1,603                         | 1,603   | 1,622                     | 1,622                   | 313                                   | -                                 | 1,469                                    | 1,487  | 1,746                                   | -                                     | -                                 | 1,746                                       | 127                                   | 1,596                                       | 167  |
| 2024          | 1,603                         | 1,603   | 1,622                     | 1,622                   | 313                                   | -                                 | 1,469                                    | 1,487  | 1,746                                   | -                                     | -                                 | 1,746                                       | 127                                   | 1,596                                       | 167  |
| 2025          | 1,603                         | 1,603   | 1,622                     | 1,622                   | 313                                   | -                                 | 1,469                                    | 1,487  | 1,746                                   | -                                     | -                                 | 1,746                                       | 127                                   | 1,596                                       | 167  |
| 2026          | 1,603                         | 1,603   | 1,622                     | 1,622                   | 313                                   | -                                 | 1,469                                    | 1,487  | 1,746                                   | -                                     | -                                 | 1,746                                       | 127                                   | 1,596                                       | 167  |
| 2027          | 1,603                         | 1,603   | 1,622                     | 1,622                   | 313                                   | -                                 | 1,469                                    | 1,487  | 1,746                                   | -                                     | -                                 | 1,746                                       | 127                                   | 1,596                                       | 167  |
| 2028          | 1,603                         | 1,603   | 1,622                     | 1,622                   | 313                                   | -                                 | 1,469                                    | 1,487  | 1,746                                   | -                                     | -                                 | 1,746                                       | 127                                   | 1,596                                       | 167  |
| 2029          | 1,603                         | 1,603   | 1,622                     | 1,622                   | 313                                   | -                                 | 1,469                                    | 1,487  | 1,746                                   | -                                     | -                                 | 1,746                                       | 127                                   | 1,596                                       | 167  |
| 2030          | 1,603                         | 1,603   | 1,622                     | 1,622                   | 313                                   | -                                 | 1,469                                    | 1,487  | 1,746                                   | -                                     | -                                 | 1,746                                       | 127                                   | 1,596                                       | 167  |
| 2031          | 1,603                         | 1,603   | 1,622                     | 1,622                   | 313                                   | -                                 | 1,469                                    | 1,487  | 1,746                                   | -                                     | -                                 | 1,746                                       | 127                                   | 1,596                                       | 167  |
| 2032          | 1,603                         | 1,603   | 1,622                     | 1,622                   | 313                                   | -                                 | 1,469                                    | 1,487  | 1,746                                   | -                                     | -                                 | 1,746                                       | 127                                   | 1,596                                       | 167  |
| 2033          | 1,603                         | 1,603   | 1,622                     | 1,622                   | 313                                   | -                                 | 1,469                                    | 1,487  | 1,746                                   | -                                     | -                                 | 1,746                                       | 127                                   | 1,596                                       | 167  |

**COMMENTS**  
Minnesota Power long-term resource planning approach reflected in the "Load&GenCap" table (above) utilizes LCAP for unit accreditation, and a MISO-Coincident peak demand forecast instead of the MP System peak (Non-Coincident Peak). The Net Reserve Capacity Obligation of 7.8% is assumed for both summer and winter.  
Note: the "Past Year 2018" is reported using LCAP and actual MISO Coincident loads for summer and winter peak. Inclusion of actual (as opposed to forecast) loads in 2018 will result in a surplusedeficit position that varies from was entered in MISO Module E for PY 18-19.

MINNESOTA ELECTRIC UTILITY INFORMATION REPORTING - FORECAST SECTION (Continued)

| 7610.0310 Item H. ADDITIONS AND RETIREMENTS (Express in MegaWatts) |           |             |     |
|--|-----------|-------------|-----|
|  | ADDITIONS | RETIREMENTS |     |
| Past Year 2018   |           |             | 135 |
| Present Year 2019  |           |             |     |
| 1st Forecast Year 2020   |           |             |     |
| 2nd Forecast Year 2021   |           |             |     |
| 3rd Forecast Year 2022   |           |             |     |
| 4th Forecast Year 2023   |           |             |     |
| 5th Forecast Year 2024   |           |             |     |
| 6th Forecast Year 2025   | 233       |             |     |
| 7th Forecast Year 2026   |           |             |     |
| 8th Forecast Year 2027   |           |             |     |
| 9th Forecast Year 2028   |           |             |     |
| 10th Forecast Year 2029  |           |             |     |
| 11th Forecast Year 2030  |           |             |     |
| 12th Forecast Year 2031  |           |             |     |
| 13th Forecast Year 2032  |           |             |     |
| 14th Forecast Year 2033  |           |             |     |

| COMMENTS |
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MINNESOTA ELECTRIC UTILITY INFORMATION REPORTING - FORECAST SECTION (Continued)  
7610.0430 FUEL REQUIREMENTS AND GENERATION BY FUEL TYPE  
[TRADE SECRET DATA BEGINS

Please use the appropriate code for the fuel type as shown in the list at the bottom of this worksheet tab.

|                    | FUEL TYPE 1  |                 | FUEL TYPE 2   |                 | FUEL TYPE 3   |   | FUEL TYPE 4  |   | FUEL TYPE 5  |   | FUEL TYPE 6  |   | FUEL TYPE 7  |   |
|--------------------|--------------|-----------------|---|-----------------|---------------|---|--------------|---|--------------|---|--------------|---|--------------|---|
|                    | Name of Fuel | Unit of Measure | Name of Fuel  | Unit of Measure | Name of Fuel  | Unit of Measure                                     | Name of Fuel | Unit of Measure                                     | Name of Fuel | Unit of Measure                                     | Name of Fuel | Unit of Measure                                     | Name of Fuel | Unit of Measure                                     |
| Past Year          | 2018         | TONS            | NET <span style="color: red;">MMWH</span> GENERATED | FUEL USED       | FO2 - GALLONS | NET <span style="color: red;">MMWH</span> GENERATED | WOOD - TONS  | NET <span style="color: red;">MMWH</span> GENERATED | NG - MCF     | NET <span style="color: red;">MMWH</span> GENERATED | HYD          | NET <span style="color: red;">MMWH</span> GENERATED | WIND         | NET <span style="color: red;">MMWH</span> GENERATED |
| Present Year       | 2019         |                 |   |                 |               |   |              |   |              |   |              |   |              |   |
| 1st Forecast Year  | 2020         |                 |   |                 |               |   |              |   |              |   |              |   |              |   |
| 2nd Forecast Year  | 2021         |                 |   |                 |               |   |              |   |              |   |              |   |              |   |
| 3rd Forecast Year  | 2022         |                 |   |                 |               |   |              |   |              |   |              |   |              |   |
| 4th Forecast Year  | 2023         |                 |   |                 |               |   |              |   |              |   |              |   |              |   |
| 5th Forecast Year  | 2024         |                 |   |                 |               |   |              |   |              |   |              |   |              |   |
| 6th Forecast Year  | 2025         |                 |   |                 |               |   |              |   |              |   |              |   |              |   |
| 7th Forecast Year  | 2026         |                 |   |                 |               |   |              |   |              |   |              |   |              |   |
| 8th Forecast Year  | 2027         |                 |   |                 |               |   |              |   |              |   |              |   |              |   |
| 9th Forecast Year  | 2028         |                 |   |                 |               |   |              |   |              |   |              |   |              |   |
| 10th Forecast Year | 2029         |                 |   |                 |               |   |              |   |              |   |              |   |              |   |
| 11th Forecast Year | 2030         |                 |   |                 |               |   |              |   |              |   |              |   |              |   |
| 12th Forecast Year | 2031         |                 |   |                 |               |   |              |   |              |   |              |   |              |   |
| 13th Forecast Year | 2032         |                 |   |                 |               |   |              |   |              |   |              |   |              |   |
| 14th Forecast Year | 2033         |                 |   |                 |               |   |              |   |              |   |              |   |              |   |

TRADE SECRET DATA ENDS]

| LIST OF FUEL TYPES                    |   |                     |  |
|---------------------------------------|---|---------------------|--|
| BIT - Bituminous Coal                 | LPG - Liquefied Propane Gas                 | HYD - Hydro (Water) |  |
| COAL - Coal (General)                 | NG - Natural Gas                            | WIND - Wind         |  |
| DIESEL - Diesel                       | NUC - Nuclear                               | WOOD - Wood         |  |
| FO2 - Fuel Oil #2 (Mid-Distillate)    | REF - Refuse, Bagasse, Peat, Non-wood waste | SOLAR - Solar       |  |
| FO6 - Fuel Oil #6 (Residual Fuel Oil) | STM - Steam                                 |                     |  |
| LIG - Lignite                         | SUB - Sub-bituminous coal                   |                     |  |
| COMMENTS                              |   |                     |  |



MINNESOTA ELECTRIC UTILITY INFORMATION REPORTING - FORECAST SECTION (Continued)

7610.0500 TRANSMISSION LINES

Subpart 1. **Existing transmission lines.** Each utility shall report the following information in regard to each transmission line of 200 kilovolts now in existence:

A. a map showing the location of each line;

B. the design voltage of each line;

C. the size and type of conductor;

D. the approximate location of d.c. terminals or a.c. substations; and

E. the approximate length of each line in Minnesota.

Subpart 2. **Transmission line additions.** Each generating and transmission utility, as defined in part 7610.0100, shall report the information required in subpart 1 for all future transmission lines over 200 kilovolts that the utility plans to build within the next 15 years.

Subpart 3. **Transmission line retirements.** Each generating and transmission utility, as defined in part 7610.0100, shall identify all present transmission lines over 200 kilovolts that the utility plans to retire within the next 15 years.

| In Use<br>(enter X for selection) | To Be Built<br>(enter X for selection) | To Be Retired<br>(enter X for selection) | DESIGN VOLTAGE | SIZE OF CONDUCTOR | TYPE OF CONDUCTOR | D.C. OR A.C. (specify) | LOCATION OF D.C. TERMINALS OR A.C. SUBSTATIONS       | INDICATE YEAR IF "TO BE BUILT" OR "RETIRED" | LENGTH IN MINNESOTA (miles) |
|-----------------------------------|--|--|----------------|-------------------|-------------------|------------------------|--|---|-----------------------------|
| X                                 |  |  | 230.           | 954               | ACSR              | AC                     | Forbes - Minntac                                     |   | 25.5                        |
| X                                 |  |  | 230.           | 795               | ACSR              | AC                     | Arrowhead - Bear Creek                               |   | 55.24                       |
| X                                 |  |  | 230.           | 1431/1590         | ACSR              | AC                     | Boswell - Blackberry                                 |   | 18.19                       |
| X                                 |  |  | 230.           | 954               | ACSR              | AC                     | Arrowhead - Forbes                                   |   | 47.49                       |
| X                                 |  |  | 230.           | 795               | ACSR              | AC                     | Riverton - Badoura                                   |   | 46.4                        |
| X                                 |  |  | 230.           | 795               | ACSR              | AC                     | Riverton - Blackberry                                |   | 67.2                        |
| X                                 |  |  | 230.           | 954               | ACSR              | AC                     | Blackberry - Forbes                                  |   | 34.3                        |
| X                                 |  |  | 230.           | 1590              | ACSR              | AC                     | Shannon - McCarthy Lake                              |   | 16.4                        |
| X                                 |  |  | 230.           | 1431/1590         | ACSR              | AC                     | Boswell - Blackberry                                 |   | 18.81                       |
| X                                 |  |  | 230.           | 954               | ACSR              | AC                     | Shannon - Minntac                                    |   | 23.12                       |
| X                                 |  |  | 230.           | 795               | ACSR              | AC                     | Riverton - Wing River (Staples) <sup>1</sup>         |   | 35.97                       |
| X                                 |  |  | 230.           | 954               | ACSR              | AC                     | Blackberry - 98 Line Tap                             |   | 64.05                       |
| X                                 |  |  | 230.           | 954               | ACSR              | AC                     | Arrowhead - 98 Line Tap                              |   | 0.74                        |
| X                                 |  |  | 230.           | 954               | ACSR              | AC                     | Hilltop - 98 Line Tap                                |   | 7.02                        |
| X                                 |  |  | 230.           | 795               | ACSR              | AC                     | Badoura - Hubbard                                    |   | 14.98                       |
| X                                 |  |  | 230.           | 1590              | ACSR              | AC                     | Calumet - McCarthy Lake                              |   | 3.32                        |
| X                                 |  |  | 230.           | 1590              | ACSR              | AC                     | Boswell - Calumet                                    |   | 25.84                       |
| X                                 |  |  | 230.           | 795               | ACSR              | AC                     | Bear Creek - Rock Creek (Twin Lakes) <sup>1</sup>    |   | 11.8                        |
| X                                 |  |  | 230.           | 795               | ACSS              | AC                     | Boswell - Zemple <sup>3</sup>                        |   | 0.68                        |
| X                                 |  |  | 230.           | 795               | ACSS              | AC                     | Zemple - Cass Lake <sup>3</sup>                      |   | 4.11                        |
| X                                 |  |  | 230.           | 954               | ACSR              | AC                     | Shannon - Littlefork                                 |   | 81.61                       |
| X                                 |  |  | 230.           | 795               | ACSR              | AC                     | Hubbard - Audubon (Shell River) <sup>1</sup>         |   | 4.53                        |
| X                                 |  |  | 230.           | 954               | ACSR              | AC                     | Littlefork - Woranville (Little Fork) <sup>1</sup>   |   | 7.5                         |
| X                                 |  |  | 230.           | 795               | ACSS              | AC                     | Cass Lake - Wilton <sup>3</sup>                      |   | 1.77                        |
| X                                 |  |  | 250.           | 2839              | ACSR              | DC                     | Arrowhead - Square Pointe (ND) <sup>2</sup>          |   | 231.56                      |
| X                                 |  |  | 345.           | 2-954             | ACSS/TW           | AC                     | Monticello - Quarry <sup>1</sup>                     |   | 4.23                        |
| X                                 |  |  | 345.           | 2-954             | ACSS/TW           | AC                     | Quarry - Riverview Road <sup>1</sup>                 |   | 4.55                        |
| X                                 |  |  | 345.           | 2-954             | ACSS/TW           | AC                     | Riverview Road - Alexandria <sup>1</sup>             |   | 4.93                        |
| X                                 |  |  | 345.           | 2-954             | ACSS/TW           | AC                     | Quarryville - Switching Station - Bison <sup>1</sup> |   | 19.85                       |
| X                                 |  |  | 500.           | 3-1192            | ACSR              | AC                     | Chisago (Kettle River) - Forbes <sup>1</sup>         |   | 7.79                        |
|                                   | X                                      |  | 500.           | 3-1192            | ACSR              | AC                     | Iron Range - Dorsey (MB Border) <sup>2,5</sup>       | 2020  | 225                         |

| COMMENTS |
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|          |

MINNESOTA ELECTRIC UTILITY INFORMATION REPORTING - FORECAST SECTION (Continued)

7610.0600, item A. 24 - HOUR PEAK DAY DEMAND

Each utility shall provide the following information for the last calendar year:  
A table of the demand in megawatts by the hour over a 24-hour period for:  
1. the 24-hour period during the summer season when the megawatt demand on the system was the greatest; and  
2. the 24-hour period during the winter season when the megawatt demand on the system was the greatest.

| TIME<br>OF DAY | DATE OF PEAK<br>DAY DEMAND       | DATE OF PEAK<br>DAY DEMAND       |
|----------------|----------------------------------|----------------------------------|
|                | 8/13/18                          | 1/5/18                           |
|                | MW USED ON<br>SUMMER PEAK<br>DAY | MW USED ON<br>WINTER PEAK<br>DAY |
| 0100           | 1414                             | 1625                             |
| 0200           | 1384                             | 1601                             |
| 0300           | 1395                             | 1598                             |
| 0400           | 1396                             | 1580                             |
| 0500           | 1406                             | 1622                             |
| 0600           | 1440                             | 1609                             |
| 0700           | 1480                             | 1661                             |
| 0800           | 1525                             | 1696                             |
| 0900           | 1564                             | 1699                             |
| 1000           | 1622                             | 1693                             |
| 1100           | 1646                             | 1666                             |
| 1200           | 1690                             | 1702                             |
| 1300           | 1677                             | 1680                             |
| 1400           | 1702                             | 1676                             |
| 1500           | 1728                             | 1670                             |
| 1600           | 1719                             | 1674                             |
| 1700           | 1719                             | 1706                             |
| 1800           | 1689                             | 1737                             |
| 1900           | 1659                             | 1734                             |
| 2000           | 1636                             | 1733                             |
| 2100           | 1640                             | 1735                             |
| 2200           | 1604                             | 1715                             |
| 2300           | 1541                             | 1680                             |
| 2400           | 1500                             | 1670                             |

| COMMENTS |
|----------|
|          |

| REMEMBER TO SEND/UPLOAD THE FOLLOWING ATTACHMENTS: |  |
|--|--|
| DO NOT INSERT THE ATTACHMENT INTO THIS WORKBOOK    |  |
| 1  | <div>Each utility shall report the following information in regard to each transmission line of 200 kilovolts now in existence:<div>a. a map showing the location of each line;<div>b. the design voltage of each line;<div>c. the size and type of conductor;<div>d. the approximate location of d.c. terminals or a.c. substations; and<div>e. the approximate length of each line in Minnesota.</div></div></div></div></div></div> |

(pursuant to MN Rules Chapter 7610.0500 Subpart 1, Existing transmission lines)