



m i n n e s o t a
clean energy

community



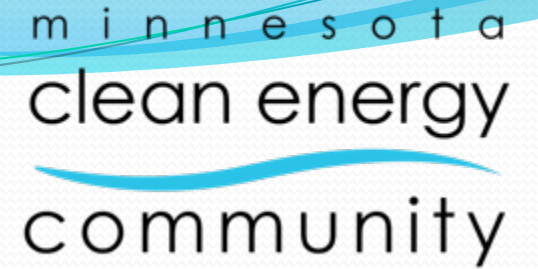
Important Stuff

In accordance with the Department of Labor and Industry's statute 326.0981, Subd. 11,

“This educational offering is recognized by the Minnesota Department of Labor and Industry as satisfying 1.5 hours of credit toward Building Officials and Residential Contractors continuing education requirements.”

For additional continuing education approvals, please see your credit tracking card.

Presenters



Terry Webster

- Project manager for Clean Energy Community Awards
Minnesota Department of Commerce, Division of Energy Resources

John Paulson

- Project/Environmental/Regulatory Manager, City of Hutchinson

Fernando Nacionales

- Deputy Base Civil Engineer, 133 Civil Engineer Squadron, MN ANG

Patrick Shea

- Director of Public Services, City of St. Cloud

What is CECA?

The **Clean Energy Community Awards** are an acknowledgment of the work done by Minnesota communities to further the state's clean energy goals by implementing programs, policies, and technologies that encourage energy efficiency, conservation, and renewable energy generation.

Minnesota Clean Energy Goals

minnesota
clean energy
community

Minnesota Next Generation Energy Act

Renewable Electricity Standard

Solar Electricity Standard

Petroleum Replacement Goal

Biofuel and Biodiesel Content Mandates

Why CECA?

Many programs evaluate important metrics

- kWh/therms/water saved
- Progress in efficiency over time
- Financial paybacks
- Number of participating households/businesses

Not a replacement for more rigorous programs

- Adjunct and feeder for other programs

Why CECA?

CECA provides public support for communities

- Recognizing efforts of communities and leaders
- Demonstrating the benefits to communities
- Offering opportunities for public engagement
- Positive media coverage

What is a CECA community?

Communities can consist of any group united in implementing clean energy goals.

- Must include a unit of government
 - City, county, tribe, school district, state or federal agency, or other jurisdiction
- Business, nonprofits, service organizations a (big) plus

Possible Initiatives

Initiatives may include the following...

- Clean Energy Planning
- Efficiency in Public Buildings
- Efficiency in Public Infrastructure
- Efficiency in Private Buildings
- Clean Energy Generation
- Transportation
 - Others will be considered

Possible Initiatives

- **Clean Energy Planning**
 - Comp plans
 - Zoning
 - Permitting
 - GESP
 - B3

Possible Initiatives

- Clean Energy Planning
- **Efficiency in Public Buildings**
 - Shell improvements
 - Lighting upgrades
 - Efficient HVAC
 - Efficient appliances
 - New construction to ENERGY STAR, SB 2030, LEED, or other recognized standards

Possible Initiatives

- Clean Energy Planning
- Efficiency in Public Buildings
- **Efficiency in Public Infrastructure**
 - LED street lighting
 - Sewage/water treatment efficiency upgrades
 - Storm water run-off controls

Possible Initiatives

- Clean Energy Planning
- Efficiency in Public Buildings
- Efficiency in Public Infrastructure
- **Efficiency in Private Buildings**
 - Updating codes and/or enforcement efforts
 - Streamlining permitting
 - Offering financing, incentive programs
 - Utility and/or other partners
 - Public engagement efforts

Possible Initiatives

- Clean Energy Planning
- Efficiency in Public Buildings
- Efficiency in Public Infrastructure
- Efficiency in Private Buildings
- **Clean Energy Generation (primarily solar)**
 - Revised land use ordinances
 - Updating codes and/or enforcement efforts
 - Streamlining permitting
 - Supporting financing, incentive programs

Possible Initiatives

- Clean Energy Planning
- Efficiency in Public Buildings
- Efficiency in Public Infrastructure
- Efficiency in Private Buildings
- Clean Energy Generation
- **Transportation**
 - Fleet conversions/replacement to alternative fuel vehicles
 - Install infrastructure on public sites for electric/other fueling stations

CECA Awards

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Achievement Award

Planning Award



CECA Achievement Award

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Winners will have implemented programs from among these criteria:

- Planning and policy development that streamlines or enhances reaching goals
- Broad-based partnerships, across several sectors
- Demonstrated success in underserved communities
- Replicable projects and programs

CECA Planning Award

Winners will have had success developing plans and organizing their community to implement clean energy efforts

- Based on the same criteria & possible initiatives as the Achievement Award
- Must include strong initiatives with high likelihood of successful implementation
- Can include initiatives with identified roadblocks, needing additional work or resources to implement

2016 Achievement Awards

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City of Hutchinson

Minnesota Air National Guard
133rd Air Wing

City of St. Cloud

City of Minneapolis

City of Morris



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133rd Air Wing

City of St. Cloud

City of Minneapolis

City of Morris



2016 Planning Awards

Cities of Pelican Rapids and Fergus Falls

Chisago County

Leech Lake Band of Ojibwe



2016 Events

Eco Experience at Minnesota State Fair

- Gate passes for representatives from finalist communities
- Public display of program & finalists in Commerce's Energy Exhibit
- Stage recognition event for finalist communities



2016 Events

CECA Awards Presentation

- At Science Museum of Minnesota
 - Luncheon presentation from Commerce Commissioner Mike Rothman
 - Keynote address from Will Steger
 - Panel discussion from technical assistance experts
 - Panel discussion from award recipients
 - LED-lit glass awards

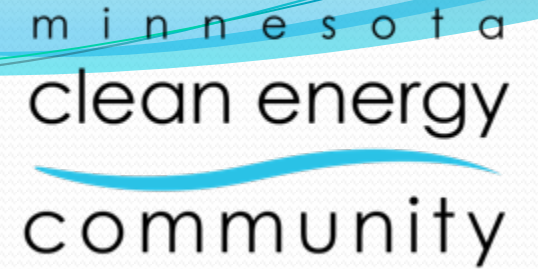




Application Process

- Application information distributed widely
 - Commerce e-letters, website, grantees, personal contacts
 - Through partner organizations
- Communities apply through online application
- Selection committee reviews applications, makes recommendations
 - Broad-based representatives from CECA supporters

2016 support provided by:



The McKnight Foundation

Clean Energy Resource Teams

**Climate Generation: A Will Steger
Legacy**

Great Plains Institute

League of Minnesota Cities

Minnesota Pollution Control Agency

**Southwest Regional Development
Commission**

**U.S. Department of Energy;
Office of Energy Efficiency and
Renewable Energy**

**U.S. Environmental Protection Agency;
Office of Sustainable Communities**

**University of Minnesota;
Center for Sustainable Building
Research**

**University of Minnesota;
Institute on the Environment**

Application Process

- To learn more:
 - energy.info@state.mn.us
 - 800-657-3710
 - You will be added to a distribution list



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John Paulson

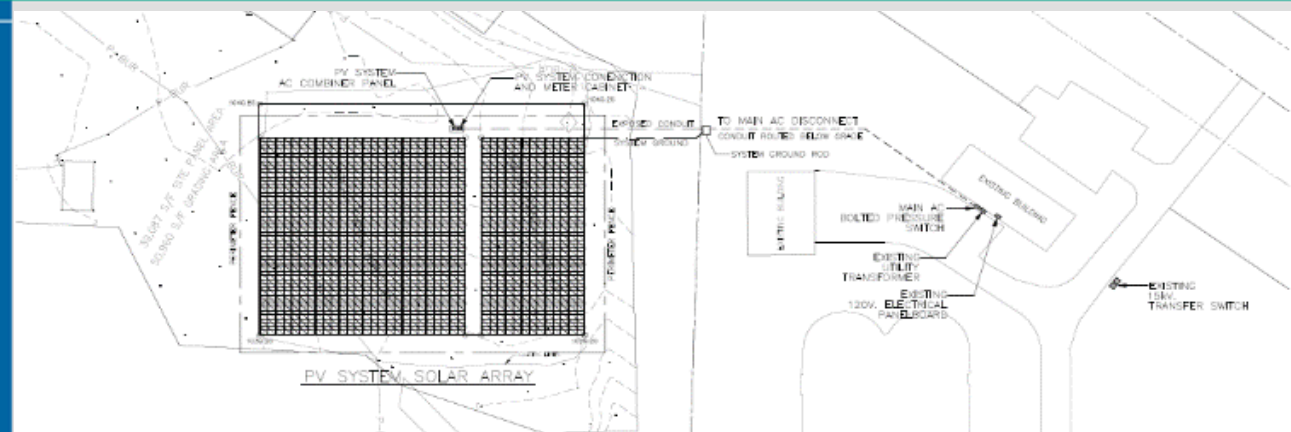
Hutchinson WWTF Solar PV EP4-41



John Paulson

Project/Environmental/Regulatory
Manager

Energy Design
Conference & Expo
February 22, 2017





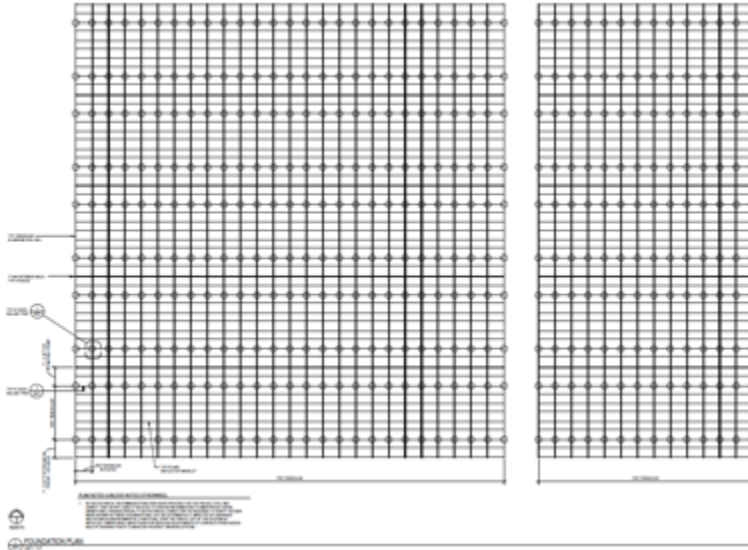
Site Preparation Panoramic



Site Preparation Aerial

Ballast Piers 18"H x 30"D - 410 total

Pier Layout





Ballasted Fence Installation

Ballast Material Placed





Reflective Panels

- Maximize output to minimize area needed

Independent Rails

- Allows for minor movement of piers
- Includes flexible conduit



City of Hutchinson Solar PV Project History

- **January 2010: City Council** Includes renewable energy in Ends Statement Goals
- **October, 2011: Westwood:** Renewable Energy Suitability Study
- **June – Sept, 2012:** Staff and Council discussions regarding Solar PV project
- **October, 2012:** Signed “**Agreement Letter**” to Develop a Solar PV System
- **March 2013:** Xcel Energy RDF Proposal Submitted
- **March 12, 2014:** [Xcel Award Letter received by the City](#)
- **April 23, 2014:** Planning meeting to move forward
- **May – September:** Updated Xcel Award requirements
 - Further developments per the Term Sheet and site requirements
- **October 14, 2014:** Term Sheet executed with AMERESCO
- **December 23, 2014:** Energy Service Agreement w/AMERESCO
- **June 19, 2015:** Xcel Grant Contract approved
- **October – November 2015:** Construction of System **11/25/15 Commissioned**

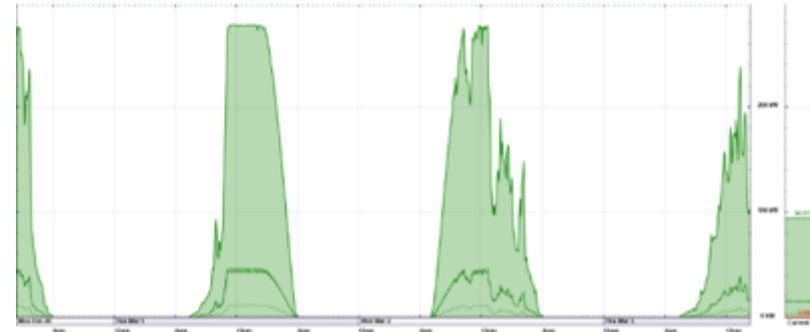


Solar PV Project Specifics

- Solar PV size = 400 KW = 470,070 kwh/year guaranteed (80% derated from actual) (Actual = 587,587 kwh/year) ~15% of the WWTP Annual Load

- E-Gauge continuous monitoring

- Great tool to identify production issues
- Used to track consumption



- Utility costs = 0.737/kwh and annual increases = 1.5%
- Solar System Payback = 18 years (~14 years using higher than guaranteed system output)
- At year 30, system has generated \$370,000 – after paying for itself
- Pricing = \$1,467,000
 - Xcel Grant = \$958,360

Solar PV Site Land Use Challenges

- **Emergency Services Training Site (Police & Fire)**
- **Stockpiling Public Works Materials**
- **State Bonding \$ used for improvements 1999**
 - Office of M&B approval to proceed
- **City Dump Site 1950-1980**
 - Phase I Assessment 1999
 - VIC Program April 2002
 - Phase II Assessment June 2002
 - Additional Assessment September 2002
 - Restrictive Covenant July 2007
 - *No disturbance without MPCA approval*
 - RAP November 2007
 - Solar Project – Construction Contingency Plan & Site Health and Safety Plan



Solar PV Site Land Use Challenges

- **RAP and Covenant Requirements**
 - Construction Contingency Plan
 - Site Health and Safety Plan
 - Routine inspections of site and LEL monitoring
 - **NO PENETRATIONS!**
- **Design Considerations**
 - Compacted clay fill over existing cover
 - Geotextile
 - Clean granular over Geotextile
 - **DIFFERENTIAL SETTLEMENT**
 - *Undisturbed 10 years (Manufacturer White Paper)*
 - Density Testing

Clean Energy Community Award Project



- **Awards Process**
 - New Awards Program – Didn't know what to expect
 - Simple application process
 - Staff prepared application w/internal review feedback
 - Project is interwoven into City goals – short and long term
- **Benefits**
 - ***RECOGNITION FOR YOUR PROJECT/EFFORTS***
 - Free marketing and awareness of these efforts
 - Receive questions by others interested in doing a similar project
 - Promotes engagement between agencies to replicate success
 - Participate in awards event
 - Access to Eco Experience at the State Fair
 - Opportunity to network with other communities with similar goals

I'M NOT
THE BRIGHTEST
BULB IN THE
BUNCH.
I'M ENERGY
EFFICIENT



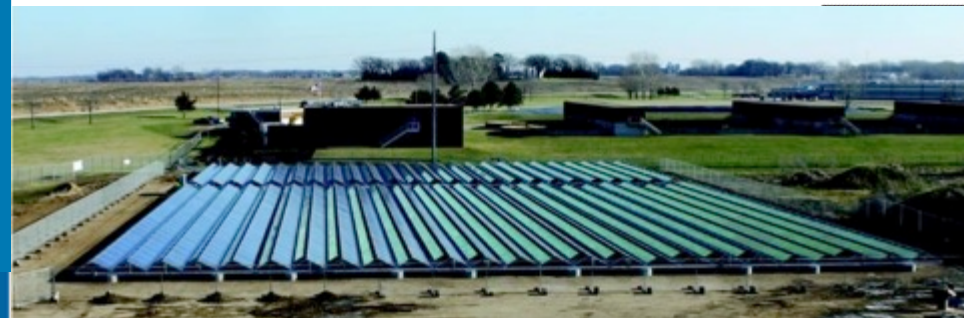
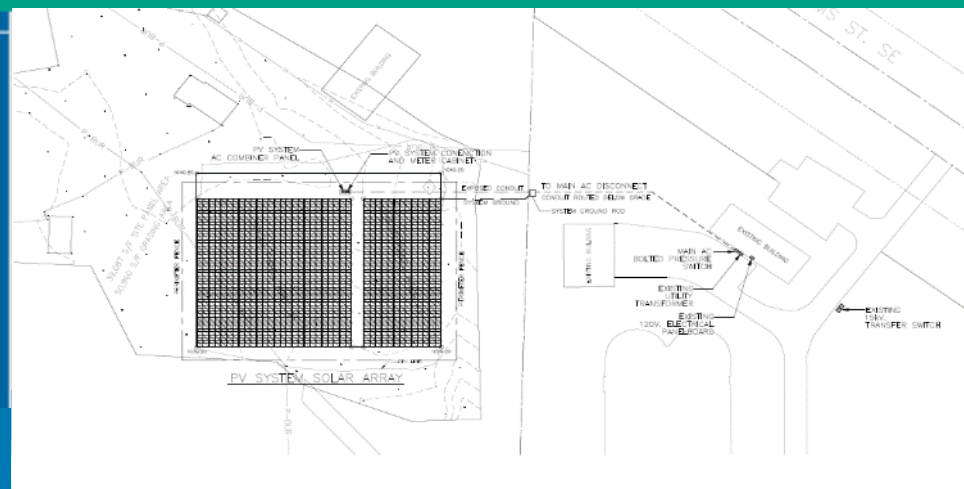
City of Hutchinson

Questions and Comments

(hold until end)



“Project funding provided, in part, by customers of Xcel Energy through a grant from the Renewable Development Fund.”





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Fernando Nacionales



CITIZEN AIRMEN *Strengthening* FREEDOM

MINNESOTA AIR NATIONAL GUARD



133 Airlift Wing MN Air National Guard

Fernando Nacionales
Deputy Base Civil Engineer





Keys to Success

Leadership Support from DOD down to each shop

Robust Proactive Preventative Maintenance

- Wing Energy Management Plan
- Base Civil Engineer approach
- Engaged Unit Leaders/Building Managers

Technical support/partnerships (CETSC, XCEL, etc)

Wing Energy Management Plan

- Signed by the Wing Commander
- Based on Executive Orders and mandates from higher
- Provides actionable directives
- Sets achievable goals

4.2.9. Return Air Registers

Dirty return air registers can reduce the cooling/heating effect and lower efficiency of the system. These return air registers need to be cleaned periodically, and should never be blocked by furniture or equipment. Building occupants should work cooperatively with CE staff to ensure that air returns are clean.

Season	Office Thermostat Setting	Shop/Warehouse Thermostat Setting
Winter (Max)	70°F	62°F
Summer (Min)	74°F	Not applicable





Base Civil Engineer Approach

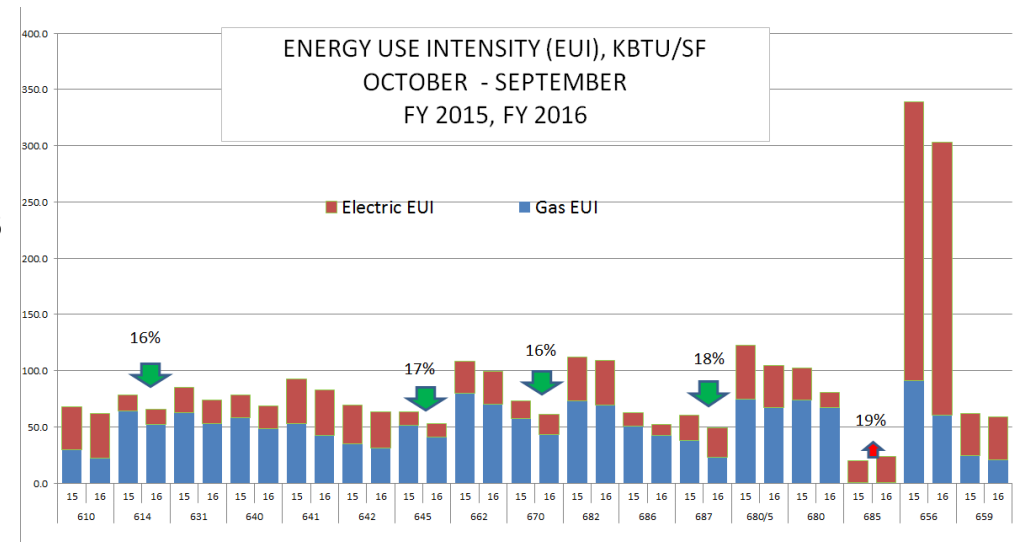
Building Automation (Direct Digital Control, DDC)

- Uses Wing Management Plan Directives
- Monitors and Optimizes heating and cooling system
- Allows for by-building tracking

Structured Preventative Maintenance Plan

- Integrated Engineering Management System (iEMS)
 - Tracks PM requirements/schedules and more

Quarterly Briefs



Engaged Unit Leaders/Building Managers

- BLDG MGRs are the eyes and ears

- Unit Leadership backing is critical

- Healthy competition between buildings

Building Energy Audit

Building: 642 – Medical Group

Date:

Conducted by: Jane Smith – Building Manager

The following checklist items are based on the 133 Airlift Wing's Energy Management Plan.

Item	Compliant	Non-Complaint	Notes (location, room number, etc.)
4.1.1 Occupancy Sensors are present in areas with 10 or more fixtures		x	Lobby - lights are rarely utilized
4.1.1 Light sensors are in place to utilize natural lighting in entrances, lobbies, perimeter offices, and areas with sky lights		x	Lobby – lights are rarely utilized
4.1.4. Lighting fixtures are clean and free of dust	x		
4.1.5 Vending machine lights have been turned off	x		
4.2.1 Office Thermostats are set at no more than 72 F in winter and no less than 74 F in the summer	x		
4.2.1 Shop/ Warehouse thermostats are set at no more than 65 F in Winter	x		
4.2.6 Space heaters are not present	x		
4.2.8 Air diffusers are not blocked or obstructed	x		
4.2.9 Return Air Registers are clean and free of dust	x		
4.3 Windows and doors are kept closed	x		
4.5 Fax machines and copiers are turned off during non-business hours	x		
4.5 Personal refrigerators are not present	x		



What's Next?

- **Air Force Institute of Technology (AFIT) Global Photovoltaic Power Potential Laboratory (GP3L) study on pavement PVs**
- **Feasibility study for roof-top and ground PV's on base**
- **Continued energy-related sustainment projects**



Technical Support/Partners

Resource Efficiency Managers (REM)

Civil Engineering Technical Services Center (CETSC)

Air Force Civil Engineer Center (AFCEC)

Utility Partners (Centerpoint, XCEL)



Summary

Keys to Success

- Leadership Support
- Robust Proactive Preventative Maintenance
 - Wing Management Plan
 - Base Civil Engineer Approach
 - Engaged Leaders and Building Managers
- Technical Support/Partners





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Patrick Shea



Patrick Shea,
Public Services Director
Patrick.Shea@ci.stcloud.mn.us



Energy Reduced, Renewable Energy Produced or Solar Energy Purchased



28,300,000
Kilowatt
Hours



2,100

Homes' Electricity
(Use for one year)



21,223,000

Pounds of Coal



47,666,000

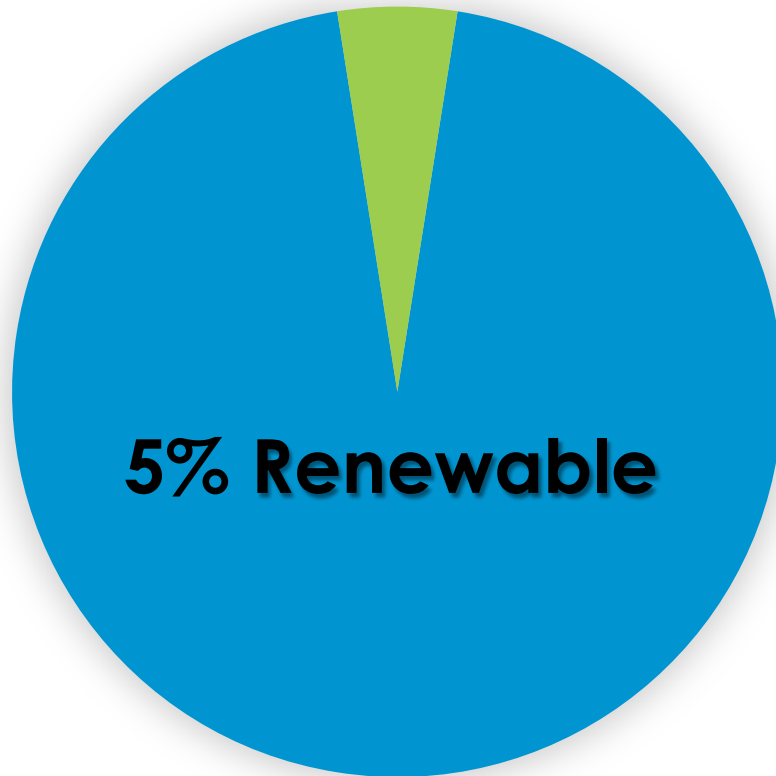
Miles Driven
*(By a passenger
vehicle)*



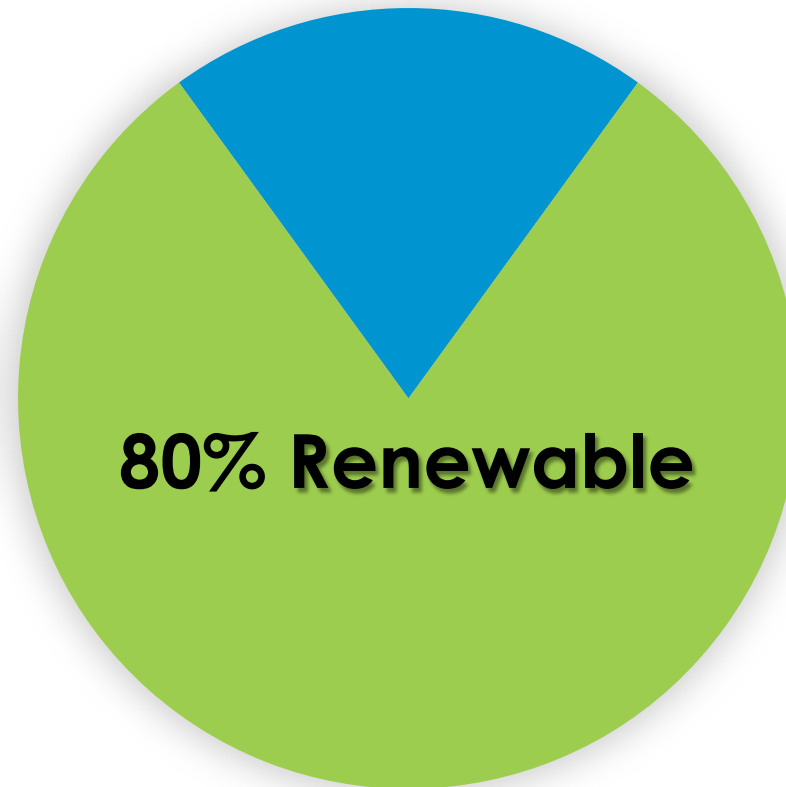
ST.CLOUD GREATER

Renewable Energy & Efficiency Initiative

2015



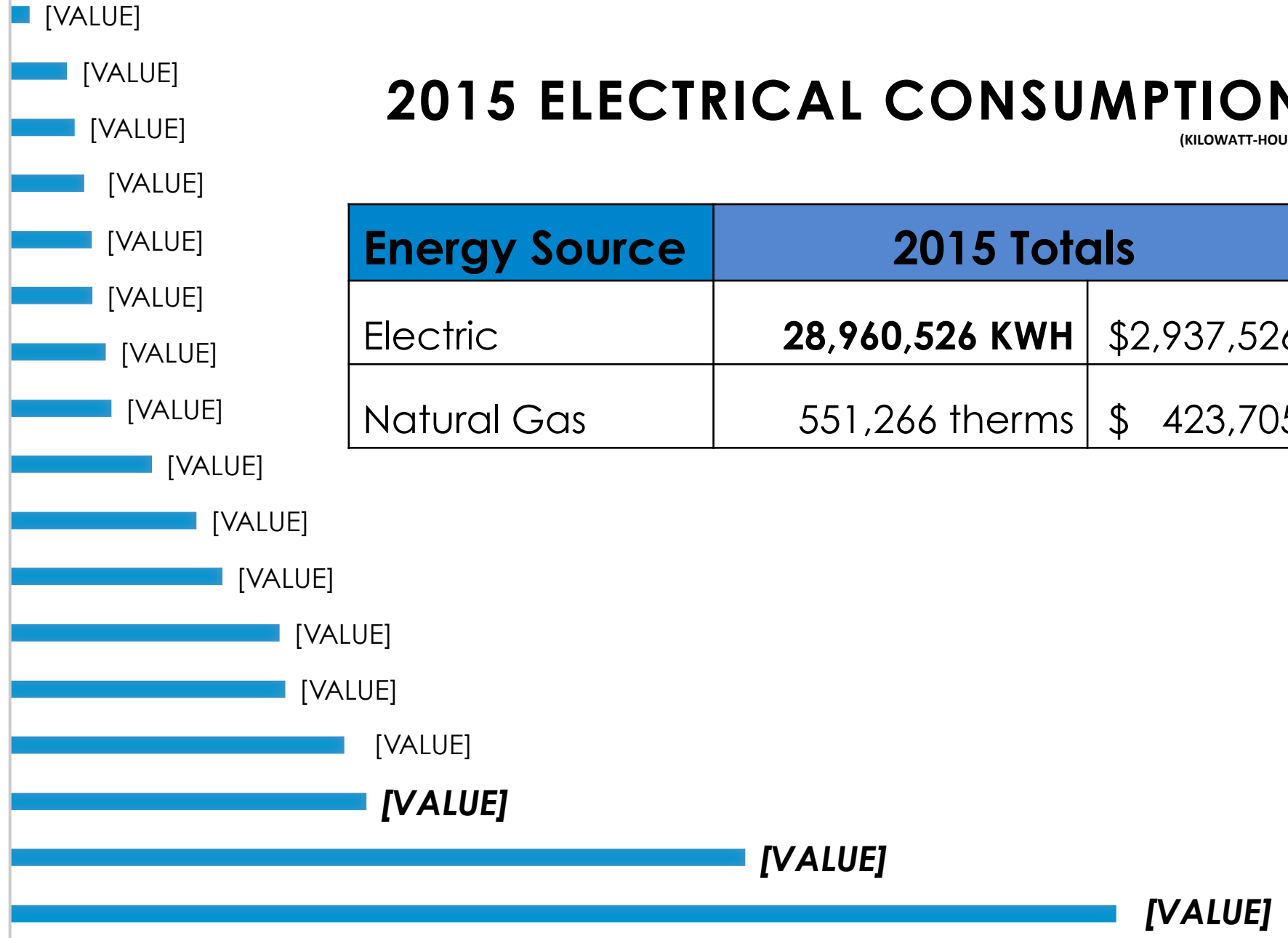
2018



CONVERSION TO RENEWABLE ENERGY SOURCES



Emergency Mgmt Sirens
 Fire Stations
 Central Services
 Paramount Theater
 St. Cloud Airport
 City Hall
 Parking Ramps
 Whitney Senior Center
 Traffic Signals
 Park Department
 Law Enforcement Center
 Rivers Edge
 Regional Library
 Municipal Athletic Center
 Street Lighting
 Water & Towers
 Wastewater & Liftstations



2015 ELECTRICAL CONSUMPTION

(KILOWATT-HOURS)

Energy Source	2015 Totals	
Electric	28,960,526 KWH	\$2,937,526
Natural Gas	551,266 therms	\$ 423,705

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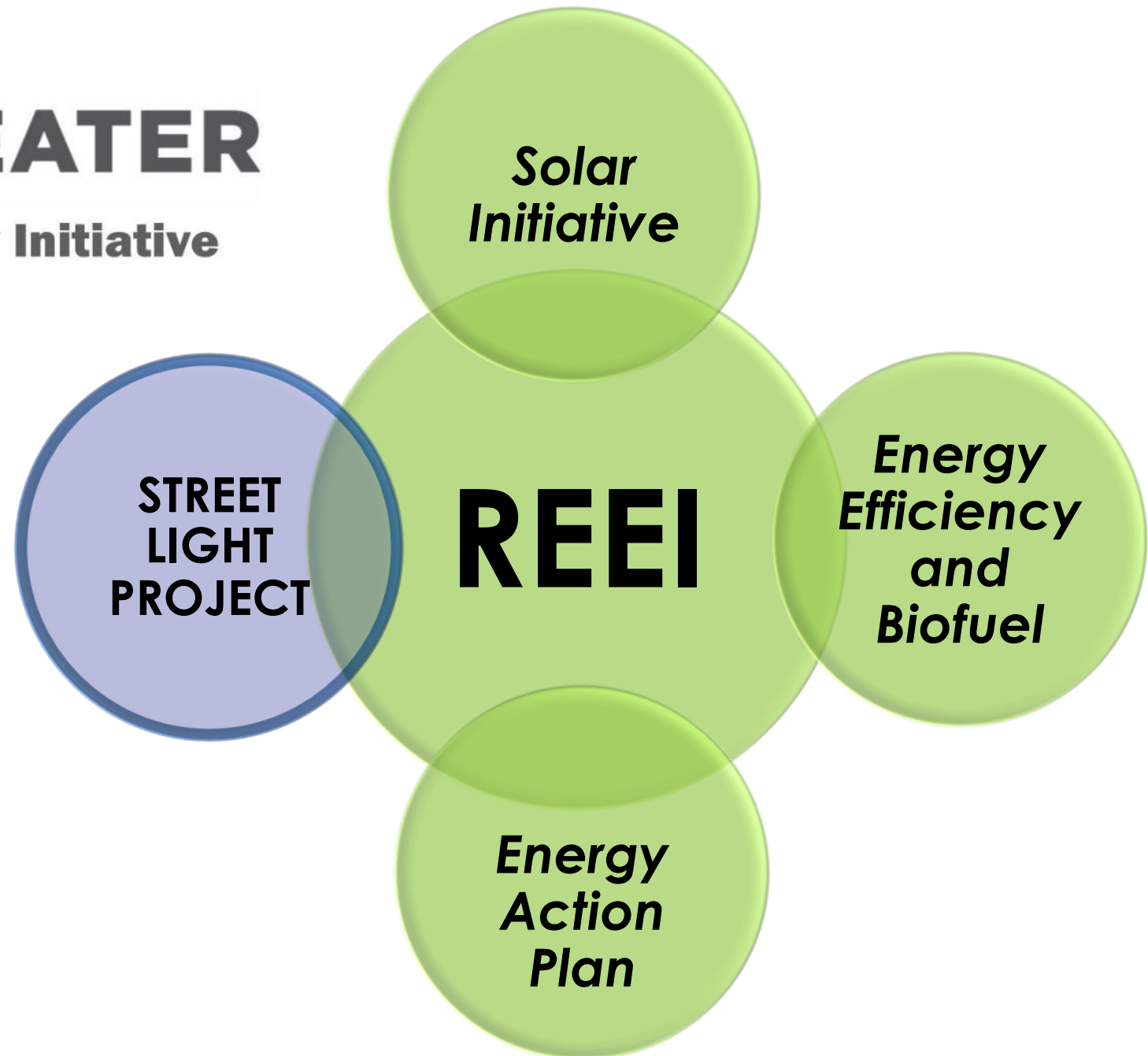
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ST.CLOUD  **GREATER**
Renewable Energy & Efficiency Initiative

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2016



ST.CLOUD > GREATER

STREET LIGHT IMPROVEMENT PROJECT



Financing



City Owned Street Lights



City Facilities



Smart Street Lights Downtown



PROJECT DETAILS

- Performance Contract
- \$7.1M Tax Abatement Bond
- Project Status – Completion July 2017
- \$250,000 Energy Rebates (2016 – 2018)
- Payback <15 years



PROJECT DETAILS

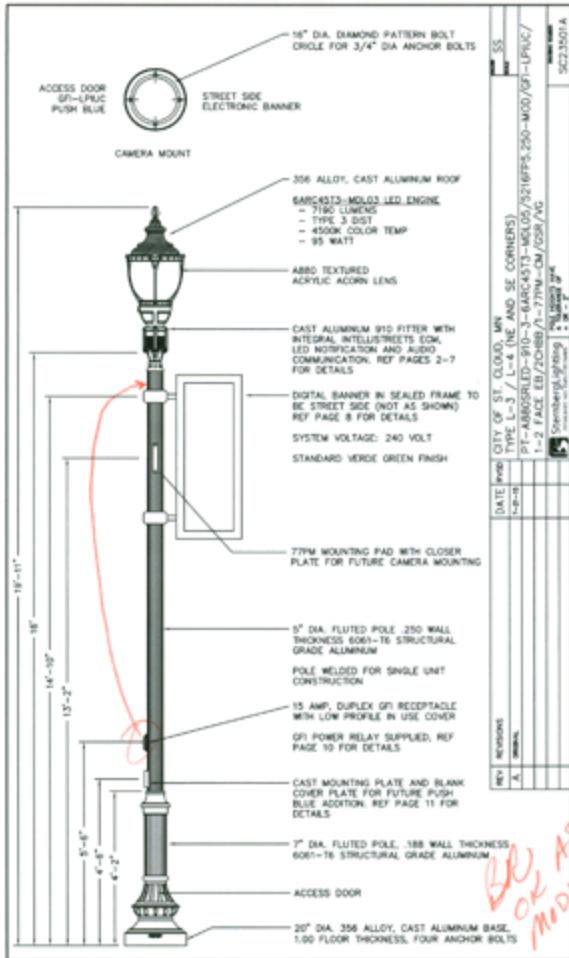
- 2,050 Street Lights
- 48 New or Replaced Services
- 3,190 Traffic Indicators
- 525 Pedestrian Crossing Signals



PROJECT DETAILS

- 9 City Facilities
- 5 Parking Ramps
- Smart Control System
- Occupancy Sensors
- Daylight Harvesting





BE OK AS MODIFIED

PROJECT DETAILS

- Central Business District
- Energy Efficient LED
- Announcements and Wayfinding
- Synchronized Audio (messaging/music)
- Security Enhancements



- Light Quality Improvement
- 40% More Efficient
- Reduced O&M

Street Light Improvement Project Energy Savings



2,873,000
Kilowatt
Hours



258

Homes' Electricity
(Use for one year)



2,130,760

Pounds of Coal



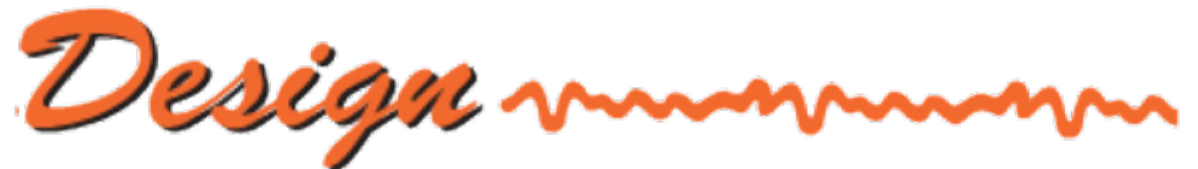
4,737,971

Miles Driven
*(By a passenger
vehicle)*

ST.CLOUD > GREATER

Renewable Energy & Efficiency Initiative

PROJECT PARTNERS



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Questions?

To learn more:

minnesota
clean energy
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energy.info@state.mn.us

800-657-3710

- You will be added to a distribution list