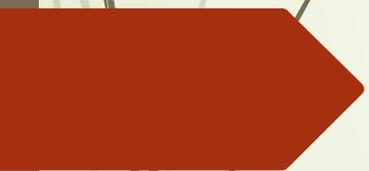




It's All In The Details!



Energy Design Conference & Expo

February 20, 2018

Duluth, Minnesota

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 code /1 hour energy** continuing education requirements.”

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



Initial Requirements



- Meets the 2012 International Energy Conservation Code – not the washed down amended Iowa version for zone 6
- Meets Energy Star standards
- Meets Touchstone Energy Home standards
- Follows Iowa Green Streets Criteria
- Simple easily replicated methods
- Meets owner's budget



Location

- Town or Rural
- Covenants or freedom
- Services – Who provides what?
 - Water, sewer, gas, electric, propane
 - Road maintenance, dues
 - Garbage, internet etc.
- School system
- Fire and law enforcement
- Neighbors, noise, dust, odors, Scared?



Results

- 2012 IECC NOT Iowa amended version
- Energy Star
- Iowa Green Streets Criteria
- Net Zero Ready
- \$95 per square foot with finished basement (4,000sq.ft)

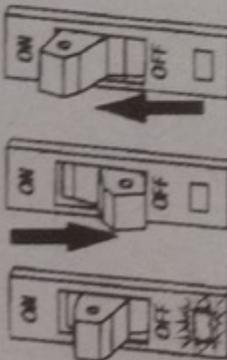
DANGER

D'ÉLECTROCUTION, D'EXPLOSION OU D'ÉCLAIR D'ARC
Équipement de protection personnel (EPP) approprié et observez les
travail électrique sécuritaire. Voir NFPA 70E.
Personnel qualifié doit effectuer l'installation et l'entretien de cet
équipement de cet appareil avant d'y travailler.
Un dispositif de détection de tension à valeur nominale
pour s'assurer que l'alimentation est coupée.
Sur les dispositifs, les portes et les couvercles avant de mettre
sous tension.

Si les précautions ne sont pas respectées, cela entraînera la mort ou des
blessures graves.

132712

Circuit Breaker Reset /
Restablecimiento del
interruptor automático



Series Rating /
Clase nominal de
línea principal
Clase Tipo 1

Label / Placa de

ENERGY EFFICIENCY CERTIFICATE

Permit #: _____
Address: 101 ARROWHEAD RIDGE

INSULATION RATINGS

R-VALUE

Roof Ceiling

With Attic: R-49 CELLULOSE

Without Attic: _____

Walls

Frame: R-28

Mass: R-23 BLOWN FIBERGLASS

~~Basement:~~ R-5 1" FOAM

~~crawlspace:~~ R-23 = R-10 2" FOAM R-13

Floor

Over Unconditional Space: _____

Slab Edge: R-10

Duct

Outside of Conditioned Space: _____

FENESTRATION

U-FACTOR

Windows: ANDERSON 400 SERIES LOWE

Skylight: _____

EQUIPMENT RATINGS

EFFICIENCY

Heating system: ELECTRIC 5.0 COP

Cooling system: ELECTRIC 20.1 PER W/DSH

Building Designer: _____

Certified By: _____ Date _____

Adopted Code Edition: _____



Performance

- 4,000 plus square foot living area
- HERS 36
- 32.61 kWh per day
- 11, 903 kWh per year
- \$2.98 cost per day billed
- 4 years old



Geo Performance

- 9.06 kWh per day average
- \$0.78 cost per day average
- Average percentage geo to total usage – 24.5%
- Percentage of monthly total home usage ranges:
 - Up to 44% - Heating months
 - 10-19% - Cooling months
 - 5-6% - Shoulder months



House Plans

- Owner selected the plans after 2 years of research.
- Open floor plan with walk-out basement
- 3 bedroom, 2 ½ baths on main level
- Large 3 stall insulated garage
- Basement roughed in for extra bedroom, workout room, full bath, “Daughter Cave”, mechanical room and “safe” room
- A local builder chosen for his knowledge energy efficient construction,
- The builder is a manufactured home dealer’



Contractors That Were Eliminated From Contention

- Didn't read the directions – which pretty much explains everything, doesn't it?
- Untrained crews
- “Don't give a rip” about codes. “Damn government makin' it hard for me to build”
- Would revert back to their old ways – 1970 Stoners – if not watched closely.
- It's not in the contractor's “toolbox”.



Required!!!!

- Assessment
- Pre-test
- Research Proper Methods & Materials
- Building Science
- Wholehouse Concept
- READ THE DIRECTIONS
- Hire Competent Craftsman
- Post-test





Remind The Owner – “They Are The Boss!”

- Learned the “lingo” to ask educated questions.
- Researched everywhere to get ideas and opinions.
- Compiled all of their ideas into a file and cost estimates on Excel.
- Were there any special needs or requirements?
- Their finances met the scope of work



Finished Product

- Met all applicable codes and standards
 - Universal Design
 - Met their quality standards
 - Comfortable
 - Durable low maintenance construction
 - Energy efficient – net zero ready?
 - Controlled indoor air quality
 - Quiet and safe
- 

Topics For Pre-Construction Meeting And Owner's Manual

- Review questions from contractor interviews
- Review your expectations
- Show them the code books
- Hand out your furniture layout
- Hand out contact numbers for everyone
- Decide who will handle results from the required blower door test.
- Remember-Manual J and S are required before start.



Sample Question





Plans Overview Examples

- Window selection – call Paul
- Advanced framing - 6 house rule
- Furniture placement – windows and supplies
- Floor joist layout – work with me, please!
- Newel post attachment – not a shift stick
- Chaseways – when did we forget them
- 9 foot foundations/flat pans for interior
- Universal design – zero step entry
- Roof design - simplification



Planning

- Meet with code officials.
- Complete set of plans and specifications – Code requirement.
- Rebate and Energy Star paperwork before excavation.
- Establish communication tree.
- Documentation – Repeat again can't say it enough!
- Site visits by owner every day if possible.
- 3rd party visits HERS raters, utility reps and friends



Plus...

- You get the rebates
- Radon system installed
- Low VOC paints and finishes
- Reduced outside noise
- SAFE and CLEAN worksite
- Owners manual with all product sheets and warranties updated daily
- Educational final walk through to discuss owner involvement in ongoing performance



No Excuses!!

It's In The Paperwork

- Truss uplift – in the truss packet
- Insulation installation – on every bag
- Attic insulation documentation - on the bag
- Air sealing requirements – in the code book
- Window installation – supplier, Google
- Housewrap - supplier and common sense



Extra Reinforcement – It Worked, Except For The Siding Contractor

- It's a Model Home!
 - I'll be using it in presentations!
 - My grandkids will live here. I know where you live!
 - I often work with the State Fire Marshall's office.
 - To the drywallers – “We're testing before the rock. For every hole you make and do not repair I will take off \$500 for each hole! Adjust the Roto-Zips or use a knife to cut around openings. Agree or leave now!
- 





Results



- Concrete to pretty to cover up!
- SQUARE and Level foundation.
- Premium materials.
- HVAC and plumbers – the best I have ever worked with.
- Electrician – phenomenal
- Trim carpenter – super
- Drywallers – NO Repairs. A lot of pride shown
- Insulators – I will always be recommending them
- On Time – On Budget!

Get Started!

Have
Fun!





Discuss These Issues With
The Entire Building Crew –
Not Just The Supervisors.

Some Details To Think About

What Is It?



Copper, Moisture And Steel Do Not Mix – 7 years



Capillary Action



Capillary Break



Why Use Such An Expensive Poly?



Frost Free Isn't Just For Foundations







What's The Problem?



RESISTANCE TO HEAT FLOW. THE HIGHER THE
POWER TO GET

Owner And Builder Problem





Two Things To Scratch Your Head Over

















Moisture Related Damage Discussion

- Mold, mildew
- Rot (window sills, framing, siding, wall failures, etc.)
- Health (Poor indoor air quality)
- Dissolution of adhesives
- Insulation loses R-value when wet
- Concrete breaks from freeze-thaw cycle
- Absorption of water can cause materials to become flexible and lose strength
- Water stains
- Erosion (around foundation)
- Rodents and insects attracted to moisture









Panasonic
FV-08VFL3

Cimpor
With Polymer













Main Ideas

- ▶ 16", 24" or 19.2" on center stud spacing
- ▶ Better load path
- ▶ Eliminate or design headers
- ▶ Smart corners and partitions
- ▶ Engineered materials
- ▶ Better performance
- ▶ Blocking for bars, handles, etc.
- ▶ Correct fasteners
- ▶ Emphasis on DETAILS























Certain

11



Sheathing – Education

- OSB
- OSB/Tape
- Plywood
- Continuous foam – thickness and strapping
- Combination
- Horizontal
- Vertical
- Nailing



Secondary Weather Barrier

- Seams taped on extruded foam.
- Other joints caulked or taped
- Housewrap installed per manufacturers instructions.
- All tapes and flashing installed per code and product recommendations.
- Drainage plane behind stone.
- Rainscreen if wood, cement, or LP
- Required vinyl siding per covenant



STUDENT CENTER









