

# GreenStar Qualification Training

## Module 4



Version 6.1.d WT

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# Moderator

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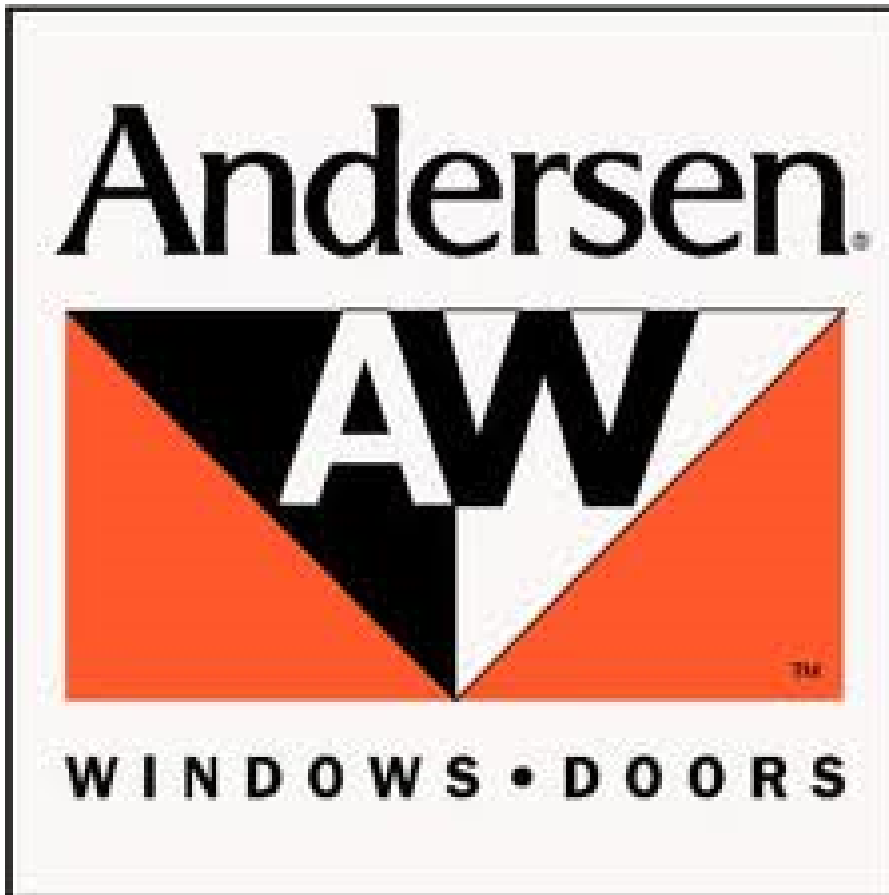
CINDY OJCZYK



# More Than A BEAUTIFUL HOME



# Platinum + Sponsor



Renewal  
by Andersen<sup>®</sup>



WINDOW REPLACEMENT

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an Andersen Company

Panasonic

**WhisperRecessed**<sup>™</sup>  
VENTILATION FAN

**WhisperGreen** *Select*<sup>™</sup>  
VENTILATION FAN

**ecovent**<sup>™</sup>



**WhisperCeiling**<sup>™</sup>  
VENTILATION FAN

**WhisperValue**<sup>™</sup>  
VENTILATION FAN



## Brought to you by:

- 501 c3 non profit
- Celebrating 15 years!
- Midwest green home education, **training and programs**
  - **LEED**
- Oversees GreenStar program

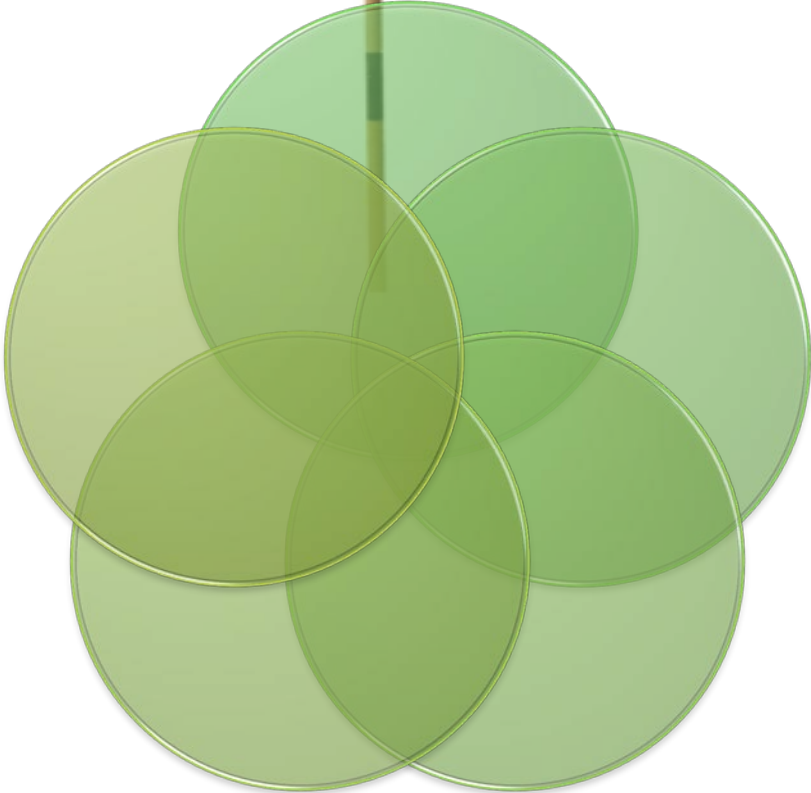




# Materials

Land

Energy



Water

Health

## Core Principles of Green: Materials

**“Buildings consume 40% of the raw stone, gravel, and sand and 25% of virgin wood.”**      *-USGBC*

3 billion tons of raw materials are used in construction annually in the US

*-NY Times 6/2007*





# Materials - Durability



## Durability (Bathrooms & moisture areas)

- **Required – Non paper face backer in shower and tub surround**
- **No vinyl wall coverings (Including kitchen and laundry rooms)**
- **Tile / Stone for shower floor**

# Materials - Appropriate



# Materials - Products

- There are NO Green products!
- There are Products with **GREEN FEATURES**
  - **Recycled Content**
  - **Recyclable**
  - **Bio Based Materials**
  - **Reusable**
  - **Refinishable**
  - **Salvaged**
  - **FSC Certified**
  - **Certified Sustainable Manufacturing**
  - **Location of materials**
  - **Life Cycle Impact Assessment**
  - **Low emitting/NAUF – no added urea formaldehyde**



# Green Product Labels

## Living Product Challenge



# Waste & Landfill Diversion

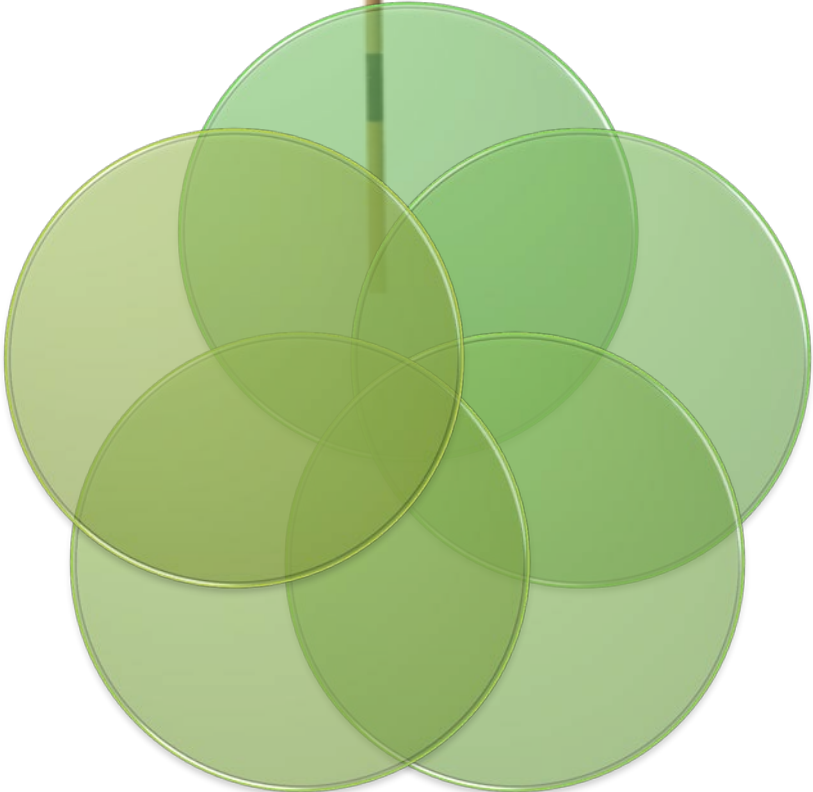
- Waste Management Plan Required
  - **Template provided**
- Points for sign offs on waste diversion rates of many different types
- Credit for Deconstruction
- Easy way to divert and track waste?
  - **Waste auditing slips from companies**



Materials

Land

Energy



Water

Health

## Core Principles of Green - Land

- ✓ Site management
- ✓ Erosion and storm water control
- ✓ Impact on community – immediate
- ✓ Impact on the community - global



## Core Principles of Green - Land

- “Woodbury fears catastrophic flooding, makes plan to dispose of storm water from 100-year rain” – Bob Shaw, Pioneer Press, 1/14/2012  
[http://www.twincities.com/washington/ci\\_19739185](http://www.twincities.com/washington/ci_19739185)
- One, 6 ½” rain event in 24 hours
- \$20 million project to divert excess storm water to Mississippi River

# Land: Site Management

- ✓ Protection of site during construction
- ✓ “...200,000 public trees in Minneapolis provide a total gross annual benefit of \$24.9 million in energy savings...”  
-USFS
- ✓ Tree roots hold water - Storm water mitigation



# Land

- Permeable Vs Impermeable Site (4.2.3)
- Drought Tolerant & Native Landscape % (4.4.4)
- Soil testing (4.2.1)
- Wildlife conservation program (4.3.8)
- Keeping plants away from the house (4.3.14)
- Landscape + watering plan (4.4.1)
- Food gardens (4.3.11)
- Deck / porch & patio considerations





# Compost / Scrap Bin (4.3.9)



# Land

## 5 Easy Steps

- ✓ Design and grade to hold storm water on site
- ✓ Reduce impervious surfaces on the site
- ✓ Choose FSC
- ✓ Compost
- ✓ Raingardens



**GREEN**

**Materials**

**Land**

**Energy**

**Water**

**Health**

## Core Principles of Green - Health

Anything that impacts the quality of indoor environmental condition with negative results for the occupant:

**a. Air quality** - indoor air is \_\_\_\_\_ more polluted than outside air?

- *US Environmental Protection Agency*

**b. Thermal comfort**

**c. Humidity**

**d. Access to natural views and daylight**





Architecture: Acacia Architects  
Construction: Swanke Design+Build





greenstar

gold remodel I

## GreenStar® Certified Green Homes and Remodeling

HEREBY CERTIFIES THAT

Lino Lakes, MN 55014

WAS COMPLETED IN COMPLIANCE WITH MN GREENSTAR STANDARDS AND  
HAS EARNED MN GREENSTAR PROJECT CERTIFICATION AT THE FOLLOWING LEVEL

# GOLD

A handwritten signature in black ink, appearing to read 'Christine Bleyhl'.

Christine Bleyhl  
Chair, MN GreenStar Technical Committee

February 2013

A handwritten signature in black ink, appearing to read 'Marc Sloat'.

Marc Sloat  
President, MN GreenStar Board

# Health

Cabinetry and Furniture - **Formaldehyde**

Floor and wall coverings – **Multiple VOC, mites**

Finishes – **Multiple VOC, Lead, Asbestos**

Appliances – **Ozone, carbon monoxide**

Mechanical Systems – **Mold, mildew, lack of  
occupant ventilation**

Cracked foundation/slab systems – **radon**

Wet wall systems – **mold**

Cleaning supplies – **chlorine, ammonia**

# Cabinets, Flooring, Wall/Ceilings, Millwork, Doors

- **No Added Urea Formaldehyde (NAUF)**
- **Formaldehyde Free (bamboo)**
- **CARB**

# Opportunities Flooring

- **No wall to wall carpet in kitchen, entryways or utility rooms**
- **No carpet installed at all**
- **Low/No VOC carpet glue**
- **Finished floor underlayment: no added urea formaldehyde**

# Required for carpeting





# Green Product Labels







**GREEN**

**Materials**

**Land**

**Energy**

**Water**

**Health**

# Water Basics

- Inside
  - **Low Flow rates on fixtures & toilets**
  - **Controls on sinks**
  - **Remove or do not add garbage disposal**
  - **Greywater**
- Landscaping (outside)
  - **Drought tolerant plants**
  - **Maintained soils**
  - **Reduced turf**
  - **Water Catchment Systems**
  - **Better irrigation**

# Water Conservation Plan Pilot

- **Mike Collignon - Green Builder® Coalition**





# Project Information Inputs

Water Efficiency Rating Score					
Project Information					
<i>Please complete the information in the white boxes.</i>			Report Date:	4/1/2015	
<i>Orange boxes are pull-downs that require a response. (DO NOT USE COPY/PASTE)</i>			This report is for:	Frank U. Newby	
<i>Purple boxes and grey boxes need no action.</i>			Need help? Send an email to: <a href="mailto:LB@GreenbuilderCoalition.org">LB@GreenbuilderCoalition.org</a>		
<i>Cells with a small red triangle have additional guidance provided in a "fly-out" box.</i>					
Project Location					Coalition Project Number
Project Name	F.U.N. Residence				
Project Address(es)	123 Elation Dr.	Building Code		Water \$/1K	\$3.00
City	Santa Fe	Building Program		Sewer \$/1K	\$3.00
State	NM	Rainfall Region (select closest)	NM: Santa Fe	Annual Rainfall (average)	16.07
Zip	87501				
Verification Team					
Company	WERS Raters 'R' Us		Contact	Robert Kreiger	
Email	bob@wersrus.com		Phone	505-670-5555	
Builder / Developer					
Company	Acme Construction		Contact	William Ross	
Email	wross@acmecon.com		Phone	505-670-1234	
Building Information					
New or Existing?	NEW	# of bedrooms	3	House footprint in sf	1,800.00



# Project Information Inputs (Cont'd)

\*\*\* PLEASE DO NOT USE "COPY AND PASTE" ANYWHERE IN THIS TABLE \*\*\*

Fixture or Appliance	Industry Baseline GPF / GPM / GPC /	Prescriptive Path? N	Program Minimum Prescriptive Path Units GPF / GPM / GPC / etc.	Proposed Units GPF / GPM / GPC /	Applicable to Project?	Proposed or Actual Daily Use in Gallons	Gallons Saved Over Baseline	Percent Saved Per Fixture (Baseline vs. Proposed)	Installation or Testing Confirmed?	Notes	
											<b>A</b>
<b>B</b>	Showerhead (GPM)	2.50	2.00	2.00	Y	40.00	10.00	20.00%	N		
<b>C</b>	Lavatory (GPM)	2.20	1.50	1.00	Y	5.00	6.00	54.55%	N		
<b>D</b>	Kitchen Faucet (GPM)	2.20	2.20	1.50	Y	24.00	11.20	31.82%	N		
<b>E</b>	Dishwasher (GPC)	6.50	4.25	6.50	Y	6.50	0.00	0.00%	N		
<b>F1</b>	Washer Size in CF			0.00					N		
<b>F2</b>	Washer WF	9.50	9.50	9.50	Y	0.00	0.00	0.00%	N		
<b>G</b>	Water used to reach 100 degrees (GPU)	2.00	1.50	1.00		15.00	15.00	50.00%	N		
							Total	106.50	58.20		
							AVERAGE Rainwater reuse gal/day credit:	0.00			
							AVERAGE Greywater reuse gal/day credit:	0.00			
							AVERAGE Adjusted usage gal/day:	106.50			

VALUES AND CREDITS FOR RAINWATER  
OR GREYWATER REUSE WILL NOT  
APPEAR UNTIL BOTH THE INDOOR TAB  
AND THE CAPTURE & USAGE TAB ARE  
COMPLETE

MINIMUM PERSCRPTIVE  
INDOOR WERS

82.0

Project INDOOR WERS SUBTOTAL

64.7

NOT FINAL

The WERS (Water Efficiency Rating Score) is based on 0 to 100 with 0 being the best performing home.

# Project Information Inputs (Cont'd)

## 2.1 OPTION ONE: Landscape / Water Requirement

Use of the following pull-downs affects the "Average Peak ALLOWABLE Rainfall" percentage.

Rain Sensor present? (10%)
  Smart Controller present? (10%)

Please complete the table below with the information that best describes the proposed outdoor design.

Zone	Hydrozone / Area (sf)	Plant / Feature Type & Water Requirement	K <sub>L</sub>	Irrigation Type	DU <sub>LQ</sub>	LWR <sub>H</sub> (G/M) average
1	3000.00	Turfgrass - Low	0.6	No Irrigation	0.65	124.46
2	2000.00	Shrubs - Medium	0.5	Drip/Micro	0.8	17.07
3	500.00	Permeable Hardscape	0		0	0.00
4	1000.00	Pool, Spa, or Water Feature	0.8	No Irrigation	0.65	170.32
5		<select plant / feature type>	0		0	0.00
6		<select plant / feature type>	0		0	0.00
7		<select plant / feature type>	0		0	0.00
8		<select plant / feature type>	0		0	0.00

Activity: 15 minutes

# **RETURN TO CHECKLIST**

1. Filter
2. Selected Measures Overview
3. Selected Measures Guide
4. Accountability Forms
5. Upload Documents
6. Submit for Approval

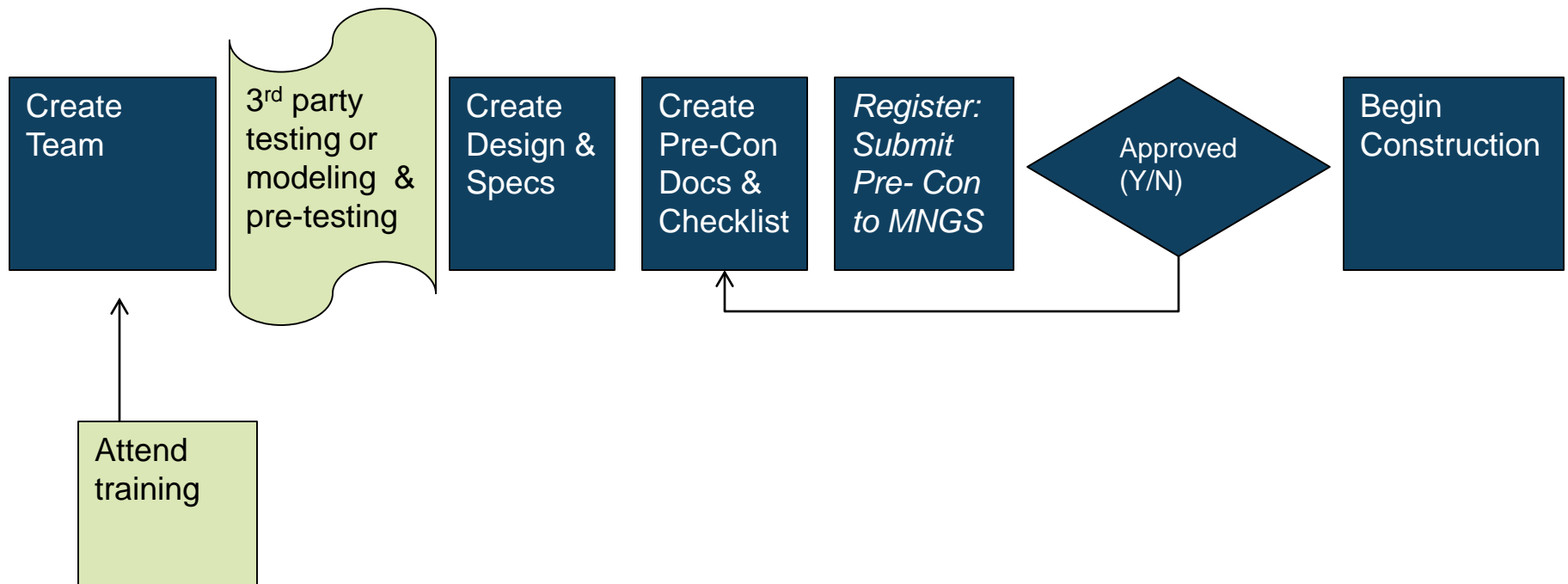


# How to (Re) Build Green?

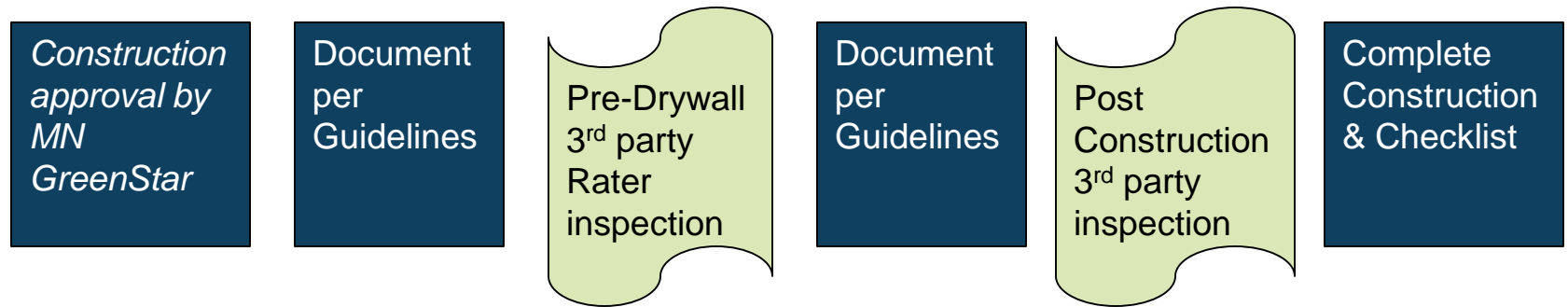
- 1. Understand the core principles that govern Green building & remodeling in homes**
2. Become educated on Green process
3. Understand the language of Green
4. Talk to your client, staff, subcontractors, realtor, appraiser, lender and inspectors
5. (Re) Design Green!
6. (Re) Build Green!



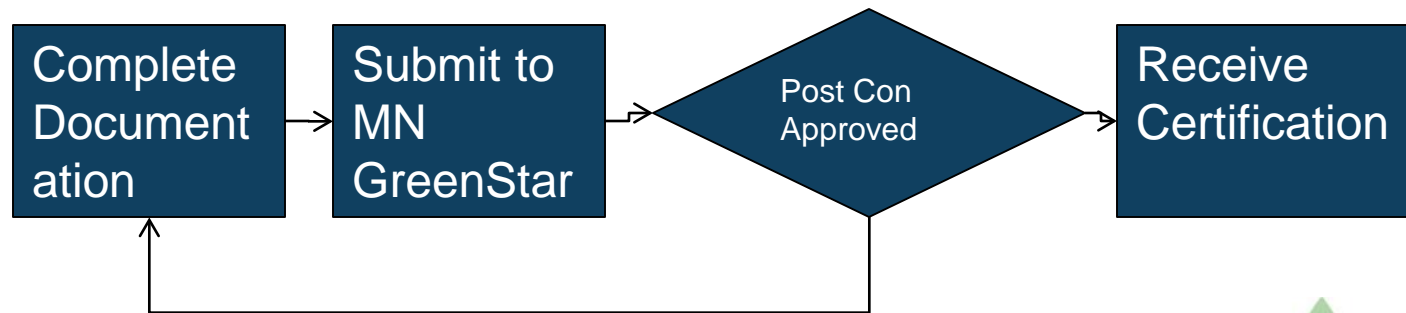
# Pre-Construction Process



# During Construction Process



# Post Construction Review



# What is this going to cost me?

- Certification / Registration Pilot Fee
  - **\$ 350 members, \$450 non-members**
  - **\$100 / unit Multifamily**
- 3<sup>rd</sup> Party rating / Inspection
  - **\$500 to \$1500 or more\* (may be subsidized)**
  - **Depending upon number and amount of tests**
- Internal Documentation & Time Costs
  - **1<sup>st</sup> time – change in process**
  - **2<sup>nd</sup> and more – becomes efficient**

# Achieving Certification

1. Meet all prerequisites
2. Achieve points for desired greenness

**Bronze**

**Silver**

**Gold**

**Zero Energy Certified Home**

# Achieving Certification

## New Homes

- Based on square feet & # bedrooms
- Based on award level
- All prerequisites
- Minimum TOTAL points required
- Minimum points required in each of the 5 Pillars

## Remodeling

- Based on project type
- Based on award level
- All prerequisites
- Minimum TOTAL points required
- Minimum points required in each of 5 Pillars

# Back Certification

- New & Existing Homes can be certified after completion
- Not ideal for success
- Documentation or site visual verification must exist
- Some credits for older existing homes may be exempt
  - **Example – Waste Management Plan.**
- Ask us first to confirm

# Credit Interpretation and Waivers

- Every credit and prerequisite is on the table to discuss
- Submit a quick for to tech committee
- 1 – 2 weeks for follow up or ask for more information
- Potentially lead tech discussion and voting



# Innovation in design

- Do you have something innovative that affects one of the 5 pillars of green?
- Submit your idea showing it's either missing on GS checklist or perhaps can be rewarded
- Tech committee will vote for approval or request more information
- If rejected you will get a detailed version as why

# Don't re-invent the wheel

- All submitted ideas will be put online to review.
- Please review to see if something similar is posted and reference it if you have a new idea.

# Continual Improvement

- Greenstar is a continuously improving program.
- If you see an inaccurate or missing resource, credit or even wording please let us know and we will fix it.
- We need your help!

# 4 Step Process

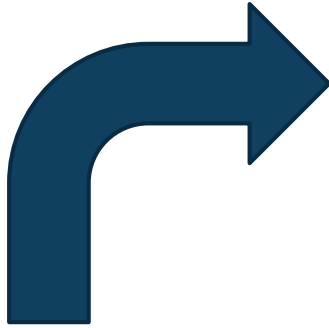


**YOU  
ARE  
HERE.**



**REQUIRED FOR PROJECT REGISTRATION**

# Professional Designation



# How to become a professional

- Obtain Associates
  - **Currently on demand / just in time webinar format**



# Building Science Basics on demand

Introduction  
BUILDING SCIENCE 101

The House as a System

The graphic illustrates a house as a system, centered around a cutaway diagram of a house. Surrounding the house are several circular icons representing different building science components: insulation, windows, doors, roofs, and HVAC systems. The house is framed by a rainbow-colored circle, and the text 'The House as a System' is displayed in a rounded rectangle below the house.

# Up to date green building science webinars

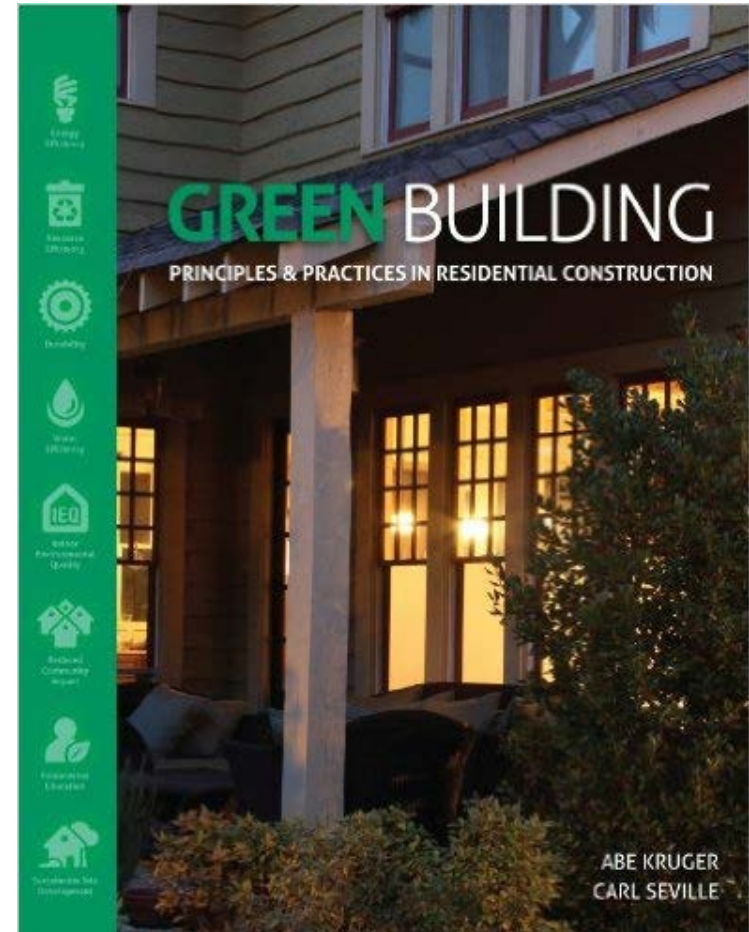
- **Almost Passive House Documentary**
- **Introduction to ZeroStep Accessibility**
- **GreenHome Labels & Certifications 101**
- **Valuing & Financing Green Homes**
- **World's oldest net positive home remodel how to**



# Green Building Practices & Principals

Read chapters & complete quizzes

10. Outdoor Living Spaces.
11. Landscaping.
12. Interior Finishes.
13. HVAC.
14. Electrical.
15. Plumbing.
16. Renewable Energy.



# How to become a professional

- **Obtain Associates**
  - **Currently on demand / just in time webinar format**
  - **Complete all 3 areas**
  - **Open book / note exams**
  - **Receive Certificate!**
  - **Build / Remodel / Certify! =**



# Become a master

- Certify 10 projects



# Maintaining your credentials

**You must maintain 10 - 15 hours every year. Five of the 10 required hours must be from relevant GreenHome course education & articles. Self-reporting is done online and you will be audited.**

- **Volunteering on GHI board, on a GHI committee and/or staffing an exhibit on GreenStar**
- **Teaching GHI Courses**
- **Mentoring another person to be GHI Associate & Professional**
- **Read and comment on GreenHome Articles – Two (2) per half hour (GreenBuilding Adviser, Green Home Guide, Home Energy Magazine, etc.)**
- **Pros – certify 1 project every 2 years**

# Benefits

- Set yourself apart as a residential green professional
- Score extra points on GreenStar projects
- Get the job!
- Stay up to date on the latest in green building science



# Case Studies + Marketing

Copyright Minnesota  
GreenStar 2009

# Get the word out

- Professionals are listed on our website as go to resources for homeowners
- Professionals are promoted at local home shows
- Create project profiles, case studies, videos and webinars from successful projects.
- Promote to up to 10,000 people across newsletter, postings and social media



GreenStar® Certified Green Homes and Remodeling

HEREBY CERTIFIES THAT

Address S Hazelwood  
Project Name: Nooping

Newaygo, Michigan

Was completed in compliance with GreenStar standards and has earned the following level:

**G O L D**

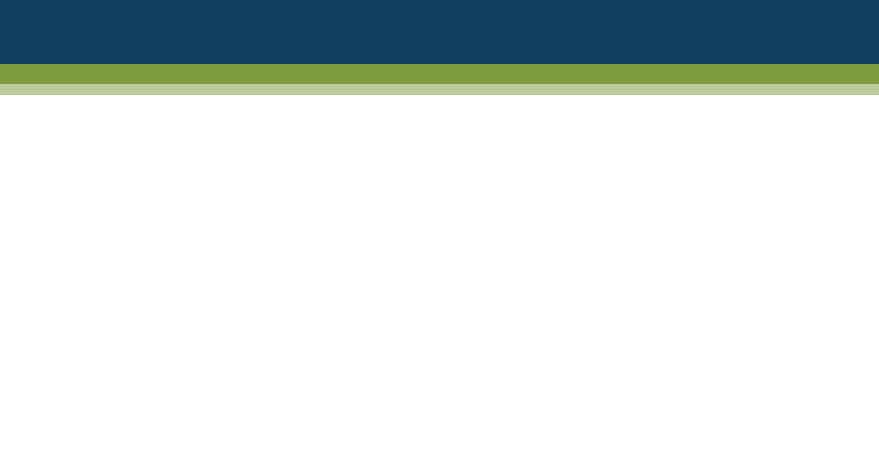
7/8/2015

Name: Marc Sloom  
Quality Assurance Director

Name: Harvey Sherman  
Chair, GreenStar Technical Committee





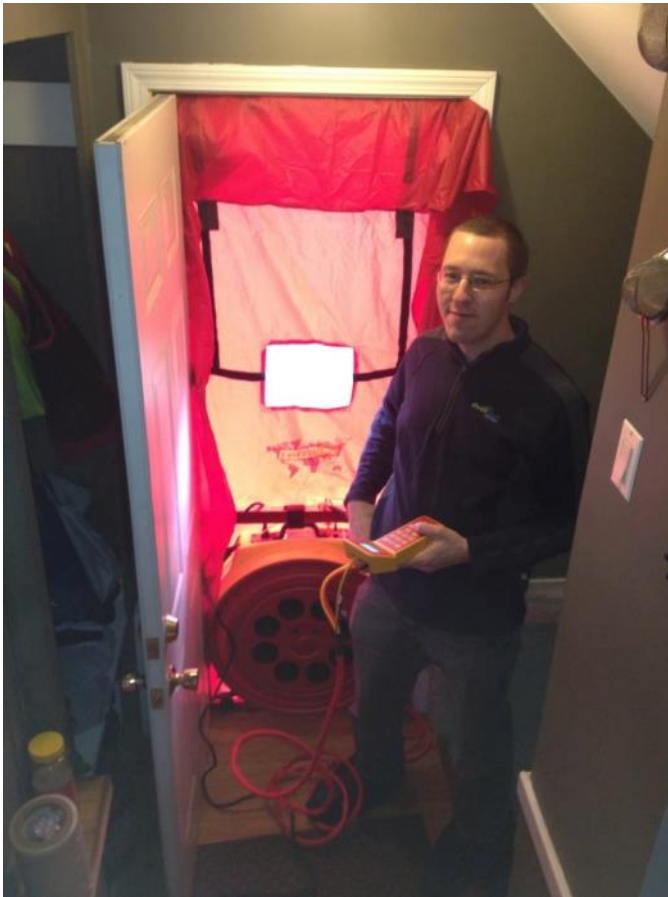




# Grand Rapids Green Home Retrofit



# Test in - Document Existing Conditions



# Test In Audit

- **175 - HERS**

- **Incandescent Lights**
- **Rim band Joist / Walls uninsulated**
- **Attic – minor rockwool + fiberglass**
- **Old wood windows**
- **80% Efficient Furnace**
- **60% Eff – Water Heater**
- **Old – Noisy Bath fan**
- **Blower door @ 10.1 ACH**
- **Uninsulated Water Pipes & Ducts**
- **SEER 10 AC**
- **Oversized Furnace**

- **IEQ/WC/SC**

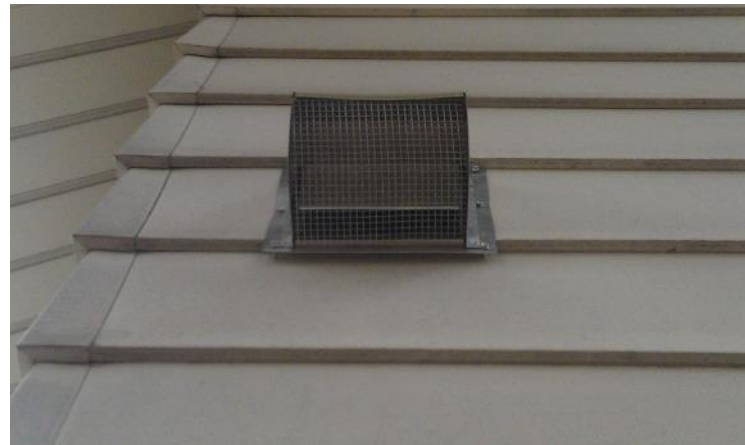
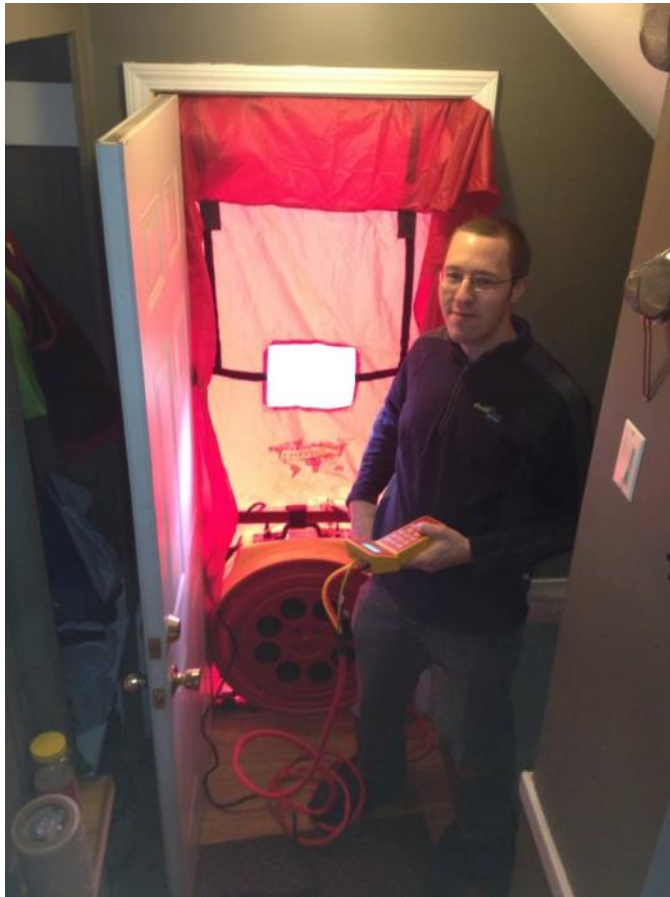
- **1.6 gpf toilet**
- **2.5 GPM Shower head**
- **2.2 GPM bathroom faucet**
- **90% Kentucky bluegrass for landscape**
- **Hood Range re circulates**
- **Atmospherically Vented – Furnace & Water Heater**
- **MERV 4 Filter**
- **No Recycling or Compost**



# Test During

- Not all ducts were sealed
- Insulation cracked and was missing in some spots
- CFM rating on ERV correct at setting
- Door not sealed
- Wood door – major thermal bridge
- Certain LEDs flickered with dimmers
- ***Found Asbestos on a duct boot!***
- ***Detected a gas leak!***
- ***Toilet water leak***
- Discomfort upstairs without returns

# Test Out - Where did we score?



# Test Out + completed items

## **HERS – 66 (was 175)**

- ACH 5 (50% improvement!)
- LEDs, Drill n Fill Cellulous, 10 inches foam attic, 3 inches rim band, foam/eco cell basement walls, 96% modulated & sealed furnace with MERV 10, SEER 16 A/C, Panasonic Bath Fan – Whisper Green
- 90% sealed hybrid water heater
- Ultimate Air Energy Recovery Ventilator
- Vented Hood Range in Kitchen
- Sealed Ducts & water pipes
- Energy Star Low E Storms
- Sealed, weather stripped door – Fiberglass
- .8 GPF Toilet
- .5 GPM Faucet
- 1.6 GPM Showerhead
- Whole House Carbon Water Filter
- Zero VOC paint
- Low VOC caulk
- Garden Installed



# Post Occupancy Assessment

1 year documentation during upgrades

- **Confirmed 50% utility reduction vs old homeowners (\$1,000 per year saved)**
- **Verified 50% reduction vs homes of the same size and type**
- **\$20 per square foot cost**
- **4.3 % more water efficient based on assumptions**

# Re Achieving Certification

**What can be done in the next year or two jump a level?**

**Now Bronze** – Painting exterior with non carcinogenic paint, add more natives and larger garden and **install rain barrels**

**Silver**, In the following years they may **remodel the bathroom**, put in point source water heater, add non paper face drywall behind shower and tub surround and add in **lower flow shower head** to get to

**Gold**

# Reeves Residence - GreenStar Gold





## GreenStar Home Details



Noopiming - New Home  
Certification Awarded **Gold**

Energy	283
Water	55
Health	114
Materials	147
Site & Community	102
<b>TOTAL</b>	<b>701</b>

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# Opportunities & Innovation in GreenStar

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GreenStar 2009

**Accessibility**

**Electromagnetic Avoidance**

**Zero Energy**

**What are your ideas?**



zero steps  
zero boundaries

<http://www.alliancees.org/wp-content/uploads/2015/04/ZeroStep-Guidelines-and-checklist.pdf>

# Accessibility in home

- Are non accessible homes still Green?
- 20% and growing is the # of American's who cannot access existing homes.
- Group Exercise
  - **What are some ways you can or do design or re design homes to be more accessible?**



# ZeroStep™

## benefits

### Halls and Doors

- Wide hallways
- Spacious appearance
- Easy to move furniture
- Better traffic flow



# ZeroStep™

## benefits

- 60" turning radius
- Under sink chair access
- Comfort height toilet
- Walk / roll in shower
- Hand held shower on slide bar
- Reinforced walls for grab bars
- Lever handles for faucets



# ZeroStep™ benefits



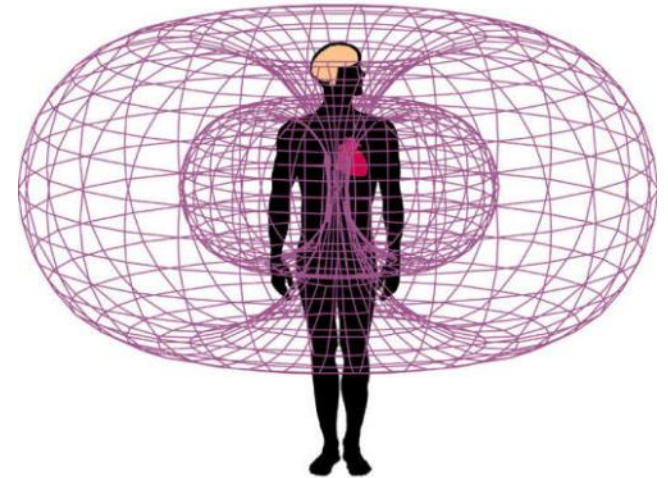
# ZeroStep™

benefits



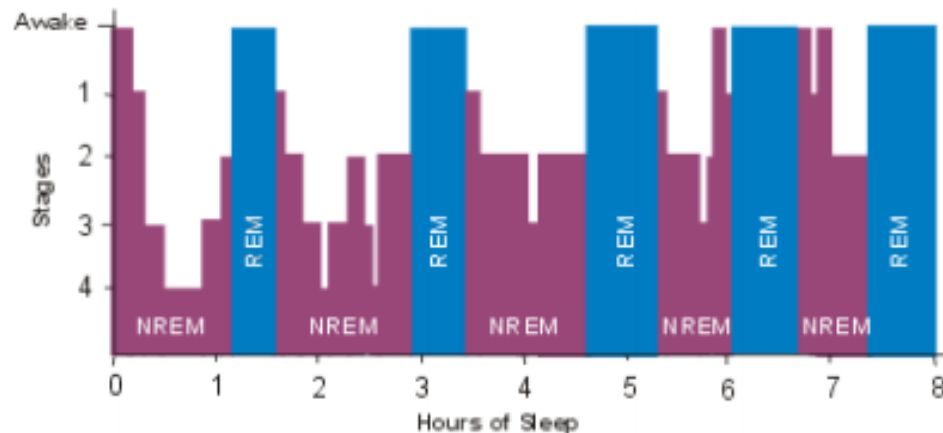
# *Electric & Magnetic Fields (EMF)*

- New IEQ issue
- GreenStar has recommendations to reduce EMF Exposure
- Follow the Precautionary Principal



# Health Effects from Exposure to Electric & Magnetic Fields

- ▶ Exposure prevents deep, Stage Four Sleep
- ▶ Increase in normal nighttime production of melatonin
- ▶ Causes allergies, asthma, rashes, chronic fatigue, fibromyalgia, sleep disorders
- ▶ Also hyperactivity, depression, headaches

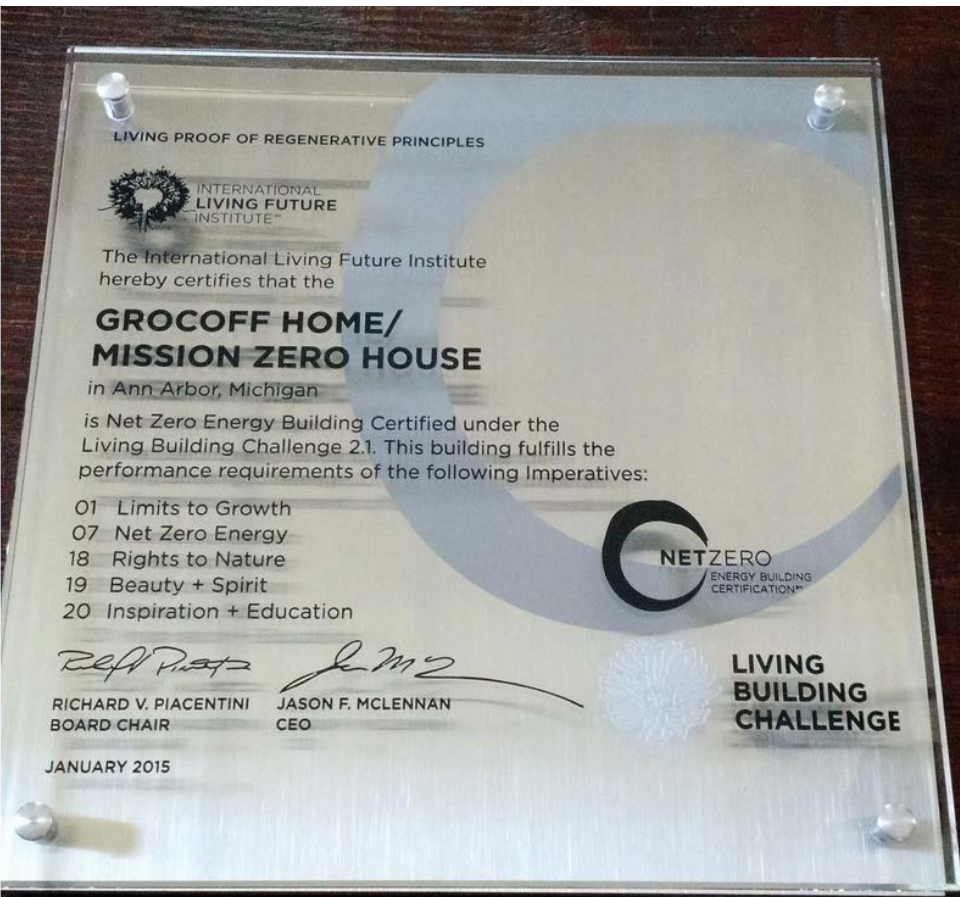


Sequences of states and stages of sleep on a typical night

## Simple EMF avoidance opportunities

- Fridge is 6 feet away from sleeping area
- No fluorescent fixtures or halogen transformers within 6 feet of sleeping area.
- Keep electric service panel 10 feet away from sleep area
- Avoid wifi if possible and hardwire all connections

# Zero Hero - Matt Grocoff





# Become a zero hero!

- 1 year after occupancy homeowner(s) or team leader submit required utility bills
- Show that they generated onsite more energy than used
- Detailed how they did it based on how they lived and the details of the home
- Be featured on our website and promoted

# Mission Zero Details

- 110 year old home remolded
- HERS 35
- Geothermal
- Photo/motion sensor
- Deep energy retrofit but no major rehab work done
- Target zero water hero club

 	
Mission Zero - Remodel 1	
Certification Awarded <b>GOLD</b>	
Energy	214
Water	29
Health	67
Materials	59
Site & Community	41
<b>TOTAL</b>	<b>410</b>

# Net Zero Energy Certified

- Based on low energy approved modeling
- Example – HERS index of 0
- Not based on actual utility bills
- Must obtain GreenStar Bronze at the least
  - **Avoid having a home that is only energy focused**
- Developing Greenstar guidance + credit track to achieving zero energy in (re)design
- Program under developed and seeking pilot

# Getting Qualified Certification of completion

- Live attendees – please complete evaluation form
- On demand viewers – Submit all 4 quizzes + eval
  - Follow up call with GHI Staff – 616 458 6733
- Raters – Submit credentials
  - BPI, HERS, Green Verifier and/or LEED green rater – info@greenhomeinstitute.org
  - Follow up call with GHI Staff

# Thank You!

## Questions?

