



DOE Zero Energy Ready Home The Year Ahead and Beyond

SAM RASHKIN
Chief Architect
Building Technologies Office



The Year Ahead

How Far We've Come

1996

2006

2011

2020



v1

- Above MEC 93 Code
- HERS Infrastructure
- Low-E Windows
- Air-Sealing/Testing
- Duct Sealing/Testing

How Far We've Come

1996



v1

- Above MEC 93
- HERS Infrastructure
- Low-E Windows
- Air-Sealing/ Testing
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2006



v2

- Above 2006 IECC
- Thermal Bypass Checklist

2011

2020

How Far We've Come

1996



v1

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- Low-E Windows
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- Duct Sealing/ Testing

2006



v2

- Above 2006 IECC
- Thermal Bypass Checklist

2011



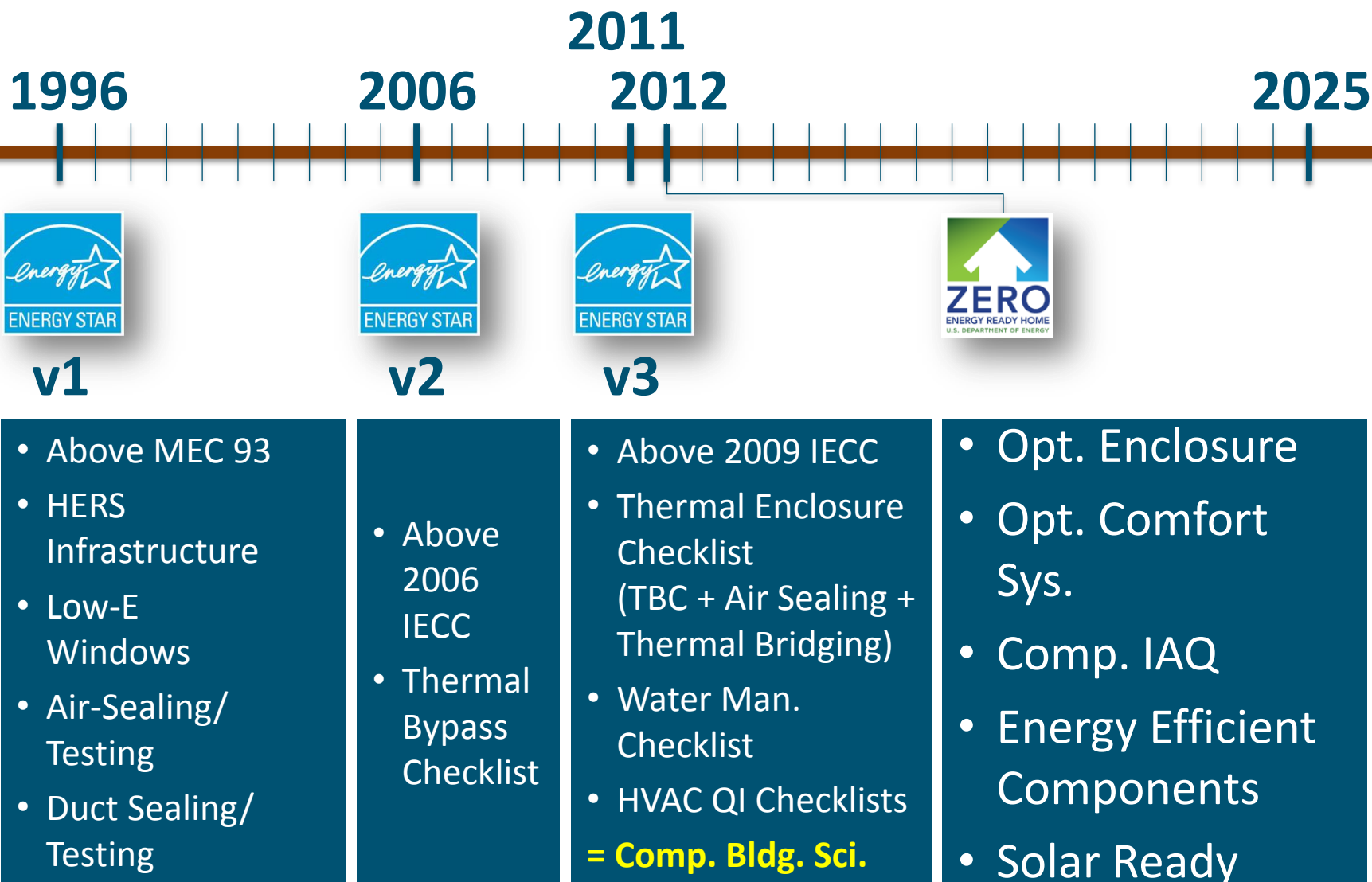
v3

- Above 2009 IECC
- Thermal Enclosure Checklist (TBC + Air Sealing + Thermal Bridging)
- Water Man. Checklist
- HVAC QI Checklists

Comprehensive Bldg. Science

2025

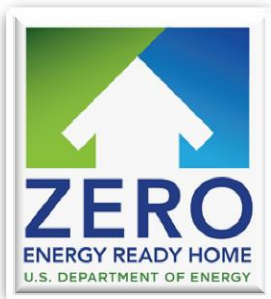
How Far We've Come



Zero Energy Ready Home Product



Energy Efficiency &
Renewable Energy



Advanced Enclosure



Risk Management:

Optimized Comfort System
Complete Water Protection
Comprehensive IAQ System



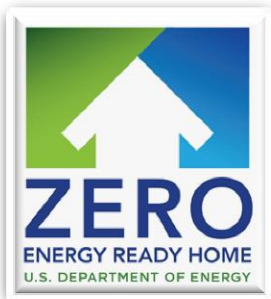
Differentiation:

Optimized Enclosure
Efficient Components
Solar Ready Construction

Zero Energy Ready Home Product



Energy Efficiency &
Renewable Energy



Advanced Enclosure



Risk Management:

Optimized Comfort System
Complete Water Protection
Comprehensive IAQ System



Differentiation:

Optimized Enclosure
Efficient Components
Solar Ready Construction



Consumer Awareness

Housing Innovation Awards - 2013

U.S. DEPARTMENT OF
ENERGY

Energy Efficiency &
Renewable Energy



Housing Innovation Awards - 2014

U.S. DEPARTMENT OF
ENERGY

Energy Efficiency &
Renewable Energy



DOE CHALLENGE HOME CASE STUDY

e2 Homes Winter Park, Florida



BUILDER PROFILE

e2 Homes
President: Rob Smith
P.O. Box 3300
Winter Park, FL 32790
407-923-4229
rob@e2homes.com

FEATURED HOME/DEVELOPMENT:

- First Certified Challenge Home—October 2012, Wilson Residence, Winter Park, FL
- 4 bedrooms, 4 baths
- 4,305 conditioned space (8,000 with lanai, garage, etc.)
- Date completed: May/June 2012
- Performance Data: HERS Index without Solar PV: 57
- HERS Index with Solar PV: -7
- Modeled utility bills for a standard home of this size in this utility area: \$3,378
- Projected utility costs for this home: \$2,297
- Projected annual energy cost savings for this home (without solar): \$1,081 PV Production = \$2,420
- Projected annual energy cost savings for this home (with solar): \$-123



The Nation's First Certified DOE Challenge Home Leaves a BIG impression with a SMALL Footprint

The first certified DOE Challenge Home—the “Wilson Residence” in Winter Park, Florida—produces more energy than it uses with construction costs one-third less than originally proposed. Completed in May 2012, this 4-bedroom, 4-bath 8,000-ft² (4,305-ft² in conditioned space) custom home scores a HERS 57, which is well below the HERS 100 for a standard home built to code. With its photovoltaic system, the home produces better than net-zero energy, with a score of HERS -7, which translates into no electric utility bills and even \$123 annually in the homeowner's pocket from the utility.

The homeowner, Mr. Wilson, hired e2 Homes to build his dream home. From the start, Rob Smith (the president of e2 Homes) worked with the homeowner, his HERS rater, and his mechanical contractor to study how differing efficiency measures would impact cost, energy-efficiency, comfort, and durability. “The DOE Challenge Home is data driven and performance driven, based on all the standards...and it addresses concerns of different climates,” said Smith. The team used the Challenge Home requirements (along with specifications from LEED for Homes, the Florida Green Building Coalition, the Florida Water Star Gold, and other programs) to analyze best practices in their climate zone compared to costs.

As specified in the Challenge Home requirements, the envelope was designed to meet all ENERGY STAR Version 3 requirements and 2012 IECC insulation levels. Final blower door tests show a tight envelope at 1.77 ACH 50.

The exterior walls were constructed of Aconon Autoclaved Aerated Concrete (AAC) blocks. “My client wanted AACs to avoid using drywall [in this hot humid climate],” said Smith. Like concrete block, AAC is also mold-resistant, non-combustible, and not penetrable by termites or pests, but the unique foam-like structure of the AAC also makes it insulating (R-8 for an 8-inch block), sound resistant, lightweight (one-fifth the weight of concrete), easy to saw or drill, and strong (AAC blocks and panels come structurally reinforced with rebar).

The window package they ultimately selected is ENERGY STAR, low-E 366 glass (blocks 95% of ultraviolet and infrared light), double-pane, and vinyl with a U-factor of 0.27.

The roof is light-colored Galvalume standing-seam metal assembled over engineered roof trusses that are spray foamed underneath to R-20, to create a sealed, conditioned attic that keeps summer temperatures down to 85°F instead of a typical 150°F.

DOE CHALLENGE HOME e2 HOMES

All of the 962-square-foot porch roof is comprised of solar panels with a 13.4-Kw solar array system. The 69 panels don't sit on top of the roof, they are the roof. The completely water-tight structure allows about 15% of natural light to filter through the panels, lighting the space below. The panels are dual surface meaning they can produce power from any sunlight reflected up onto their lower surface, for up to 30% greater than rated power production. All wiring is hidden within the canopy's aluminum support beams.



CHALLENGE HOME CERTIFIED:

- 1 BASELINE**
Certified ENERGY STAR home
- 2 ENVELOPE**
meets or exceeds 2012 IECC levels
- 3 DUCT SYSTEM**
located with the home's thermal boundary
- 4 WATER EFFICIENCY**
meets or exceeds the EPA WaterSense Section 3.3 specs
- 5 LIGHTING AND APPLIANCES**
ENERGY STAR qualified
- 6 INDOOR AIR QUALITY**
meets or exceeds the EPA Indoor airPLUS Verification Checklist
- 7 RENEWABLE READY**
meets EPA Renewable Energy-Ready Home Solar Electric and Thermal Checklist

Every DOE Challenge Home combines building science specified by ENERGY STAR for Homes and advanced technologies and practices from DOE's Building America research program.



As required by the Challenge Home, the ducts and air handler are located within conditioned space—in the unvented, insulated attic. The home is heated and cooled by three systems: on the first floor a heat pump (SEER-18, HSPF 9.5), in the master bedroom a ducted mini-split heat pump (SEER 16, HSPF 10), and on the second floor another heat pump (SEER 16.5, HSPF 9).

The team designed the ventilation system to create a slight positive pressure in the house to help control humidity. The “economy ventilation system” includes a fresh air duct to the outside of the home that is set to an electric damper regulated by the thermostat to meet ASHRAE ventilation standards.

The home is water efficient in several ways. Two tankless, propane-fired water heaters are located as close to their points of use as possible to minimize water and energy waste (i.e., one near the master bedroom and the other near the kitchen, laundry room, and other bedrooms). Also, the house is double piped so that a 7,000-gallon cistern collects and supplies rain water to all toilets, urinals, and plants in the backyard.

With the home designed for maximum energy and water conservation, the 13.5-kw Sanyo photovoltaic system completes the house. Rather than mounting the 69 solar panels on the roof, the company Superior Solar, fit them together to form a watertight structure that literally is the roof of the home's 962-ft² lanai. The Sanyo HIT Double 195 Watt solar panels are bifacial, meaning they can generate some electricity from reflected light that hits the bottom side of the panels. The panels also permit about 15% of the daylight to filter through them, lighting the porch area beneath. The hybrid inverter, a SolarEdge Power Optimizer and Inverter system, converts the panel-produced direct current power into a utility-compatible alternating current, using a unique technology that overcomes the limitations of traditional central string inverter systems but at a much lower cost than micro-inverter systems.

“At the end of the day, my message for builders considering [building to] Challenge Home is that this program is very rigorous, so it should help builders stand out from the crowd,” said Smith. “If you start early in the process, there doesn't have to be a cost differential to implement high-performance building.”

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New Town Builders
The ArtZEN Plan
Denver, CO
303-767-4400
Newtownbuilders.com

"NOW THAT WE'VE LIVED IN A DOE ZERO ENERGY READY HOME, WE COULDN'T IMAGINE LIVING ANYWHERE ELSE. IT'S SO QUIET AND COMFORTABLE. WE LOVE OUR NEW HOME!"
- New Town homeowners

ZERO ENERGY READY HOME
U.S. DEPARTMENT OF ENERGY
KEY FEATURES

- High-performance insulation system for enhanced quiet and comfort
- Comprehensive draft protection
- Fresh air system for cleaner, healthier indoor air
- High-efficiency HVAC, appliances, and lighting to save energy and water

[Read more.](#)

2,115 ft²
3 Bedroom, 2 Bath
2 Floors
color adaptable

HERS -3
This home's score
(100 = typical new code home
130 = average existing home)

-\$0
avg. monthly energy bill

\$1,902
saves per year

\$58,772
saves over life of mortgage

I want one!

U.S. DEPARTMENT OF **ENERGY**

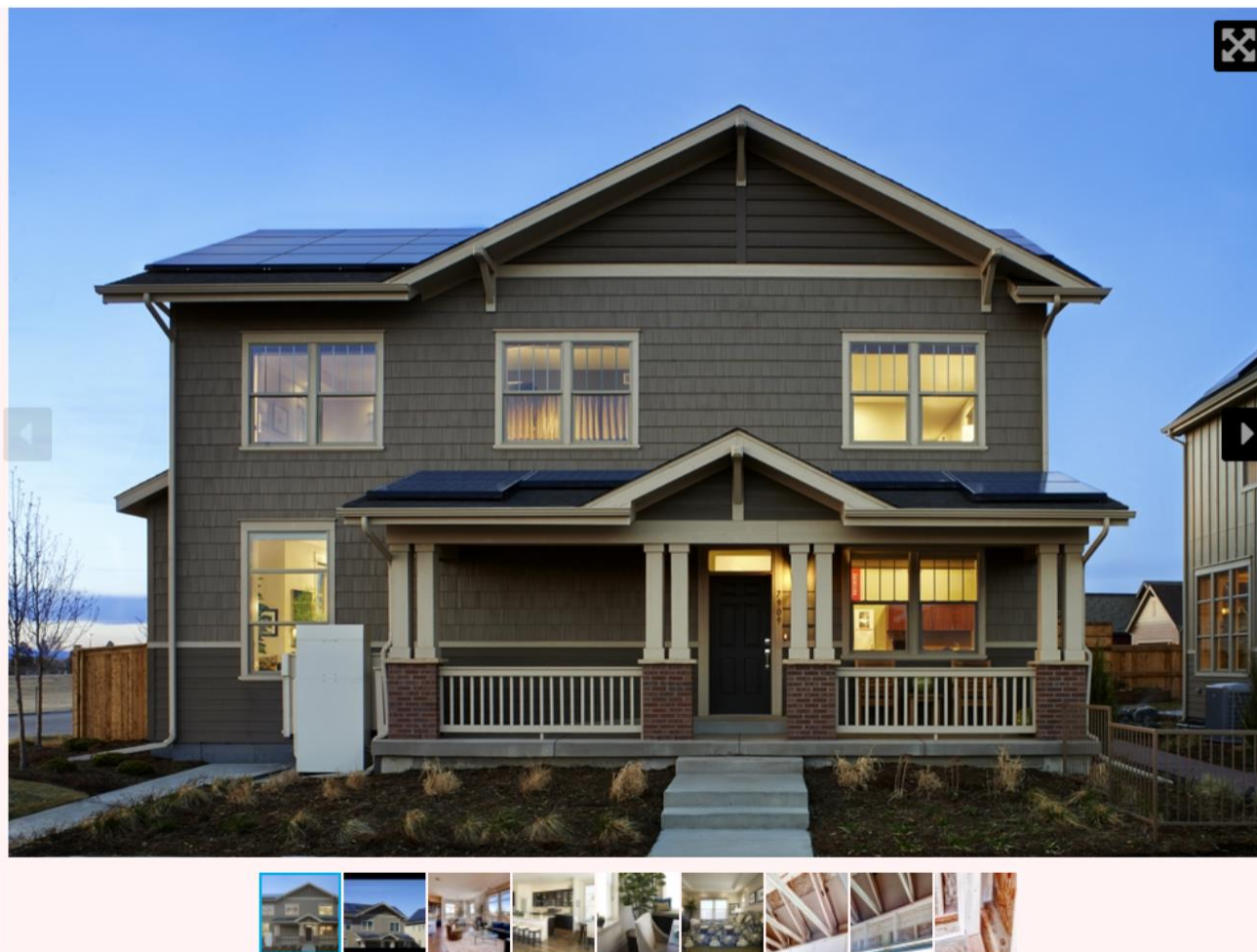
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ENERGY

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New Town Builders

The ArtIZEN Plan
Denver, CO
303-707-4400
Newtownbuilders.com



KEY FEATURES

- High-performance insulation system for enhanced quiet and comfort
- Comprehensive draft protection
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[Read more.](#)

Click

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DOE ZERO ENERGY READY HOME™



New Town Builders

The ArtIZEN Plan
Denver, CO



BUILDER PROFILE

New Town Builders, Denver, CO
Bill Rectanus
brectanus@newtownbuilders.com
303-707-4400
Newtownbuilders.com
Rater: EnergyLogic, Inc., Peter Oberhammer,
www.nrglogic.com

FEATURED HOME/DEVELOPMENT:

Project Data:

- Name: The ArtIZEN Plan
- Location: Denver, CO
- Layout: 3 bedrooms, 2.5 baths, 2 floors
- Conditioned Space: 2,115 ft²
- Climate Zone: IECC S8, cold
- Completion: September 2013
- Category: Production

Modeled Performance Data:

- HERS Index: without PV 38, with PV -3
- Projected Annual Utility Costs: without PV \$1,414, with PV \$5
- Projected Annual Energy Cost Savings (compared to a home built to the 2009 IECC): without PV \$493, with PV \$1,902
- Builder's Added Cost Over 2009 IECC: without PV \$22,000, with PV \$5,000
- Annual Energy Savings: without PV 48.5 MMBtu/yr, 2588 kWh, 203 therms; with PV 8 MMBtu/yr, 14,476 kWh, 203 therms

New Town Builders has committed to a new way of building. The Denver area production builder hopes to convert all of its product lines to zero energy-ready construction by the end of next year.

"Our goal is to be 100% U.S. Department of Energy (DOE) Zero Energy Ready certified on all of our single-family homes," said Bill Rectanus, vice president of New Town Builders, which plans to build 150 single-family homes in the Denver metro area next year.

The builder constructed its first home to DOE's Zero Energy Ready Home program criteria in 2013 and has been gradually moving toward certification across the board since then. New Town was in the process of building 29 homes in its Solaris community when it learned about the DOE program. Most of the 29 homes in the first phase of Solaris are certified and all 34 homes in the next phase of Solaris will be certified. All of the homes come with at least a 2.75-kW photovoltaic system on the roof. In phase 2 the goal is to install 5-kW systems and homebuyers will have the option to add more PV to achieve a true net zero energy home, a home that produces as much power as it uses in a year.

In New Town's Z.E.N. (Zero Energy Now) community, which has 30 homes at or near completion and 33 more homes scheduled for a second phase, all of the homes are true zero energy. New Town is in the planning stages on two additional projects—Hyland Village, a development of 75 single-family detached homes, and Perrin's Row, a development of 26 attached homes. Both communities will be 100% DOE Zero Energy Ready.



The U.S. Department of Energy invites home builders across the country to meet the extraordinary levels of excellence and quality specified in DOE's Zero Energy Ready Home program (formerly known as Challenge Home). Every DOE Zero Energy Ready Home starts with ENERGY STAR Certified Homes Version 3.0 for an energy-efficient home built on a solid foundation of building science research. Advanced technologies are designed in to give you superior construction, durability, and comfort; healthy indoor air; high-performance HVAC, lighting, and appliances; and solar-ready components for low or no utility bills in a quality home that will last for generations to come.

Power of Zero Home Tour

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Power of Zero Home Tour -- New Town Builders Floorplans

POWER OF ZERO HOME TOUR -- NEW TOWN BUILDERS FLOORPLANS

Upper Level

Optional Bedroom 4 in lieu of Loft

Bedroom 2 10' x 11' 6"

Laundry

Master Bath

Master Suite 14' x 12'

Bedroom 3 10' x 11' 6"

Bath 2

Loft

Living Level

2-Car Garage

Garden Shed

Family Foyer

Dining 10' 9" x 11' 6"

Great Room 15' x 15' 9"

Study 9' 10" x 10' 4"

Foyer

Kitchen 12' 5" x 12' 3"

Covered Porch

Optional Finished Basement

Rec Room

Bath 3

Bedroom 5

U.S. DEPARTMENT OF ENERGY

Office of Energy Efficiency & Renewable Energy

Forestral Building

1000 Independence Avenue, SW

Washington, DC 20585

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No Fear Act

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EERE Home

Contact EERE

More ...

2,115 ft²

3 bedroom, 2 bath

2 floors

cold climate

HERS -3

This home's score

(100 = typical new code home)

(130 = average existing home)

140

130

100

90

80

70

60

50

40

30

20

10

0

~\$0

avg. monthly energy bill

\$1,902

saved per year

\$58,772

saved over 30-yr mortgage

29 | INNOVATION & INTEGRATION: Transforming the Energy Efficiency Market

Buildings.Energy.gov

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Building Technologies Office

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Building America

Home Energy Score

Home Performance with ENERGY STAR

Better Buildings Neighborhood Program

Zero Energy Ready Home

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DOE Zero Energy Ready Home: Partner Profile

New Town Builders

NEW TOWN BUILDERS

U.S. DEPARTMENT OF ENERGY
ENERGY EFFICIENCY & RENEWABLE ENERGY
DOE ZERO ENERGY READY HOME

Partner ID:

619

Organization Type:

Builder

Main Contact:

Bill Rectanus

Address:

1553 PLATTE STREET
DENVER, CO 80202
(303) 707-4400

Primary Phone Number:

41

Certified DOE Zero Energy Ready Homes (2012 - Present):

0

Certified Builders Challenge Homes (2008 - 2012):

0

Website:

www.newtownbuilders.com

DOE Zero Energy Ready Home

New Town Builders


Denver, CO

DOE Zero Energy Ready Home

New Town Builders


Denver, CO

All Places of Business



CO

Commitments



DOE Zero Energy Ready Home Version 4.5.1

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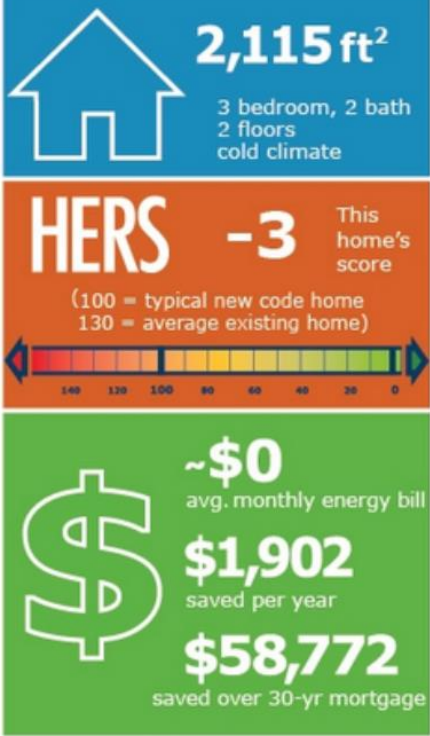
Content Last Updated: 1-07-2014



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Appraisal Recognition

ZERH Lender Partnership



Energy Efficiency & Renewable Energy

Lender Partners Agree to:

- Select Appraiser from Appraisal Institute Green Appraiser List
- Hand-Off Appraisal Institute Populated Green Appraisal Addendum Form to Appraiser

Home > Find An Appraiser > Professional Development Program Registry > Valuation of Sustainable Buildings: Residential

Find an Appraiser

Professional Development Program Registry
Valuation of Sustainable Buildings: Residential

NOTE: This Registry only lists Appraisal Institute Designated Members who have successfully passed the Valuation of Sustainable Buildings Professional Development Program examinations.

There may be other qualified Appraisal Institute Designated members, Candidates for Designation, or Practicing Affiliates who may handle green/sustainability assignments but have not taken the Valuation of Sustainable Buildings Professional Development Program. Visit the Find an Appraiser directory to find Designated members, Candidates for Designation, or Practicing Affiliates who have identified green/sustainability as a specialty.

[View Program FAQs](#)

Please read this notice regarding Professional Development Programs

* Has not completed the Residential and Commercial Valuation of Solar course. Those on the registry have until May 1, 2014 to complete Residential and Commercial Valuation of Solar to remain on the registry.

Select State/Province:

Name	Company	City, State	Accepts Fee Assignments
SELECT Sandra K. Adamatis, SRA	Adamatis Appraisal Service	Punta Gorda, FL	Yes
SELECT John T. Ashworth, III, SRA *	Ashworth Appraisal Services	Auburn, CA	Yes
SELECT Robert D. Binkow, MAI *	Principal Real Estate Investors	Des Moines, IA	Yes
SELECT David P. Bouverat, SRA *	Key Appraisal Services	Sarasota, FL	Yes
SELECT Donald N. Briggs, MAI, SRA	Briggs Associates, Inc.	Emmitsburg, MD	Yes
SELECT Thadde W. Chappell, MAI	Sustainable Values, Inc.	Park City, UT	Yes
SELECT Lynn N. Christensen, SRA *	Lynn Christensen Appraising Inc.	Laport, UT	Yes
SELECT Steven D. Chissem, MAI	Real Estate Science, Inc.	Washington, DC	Yes
SELECT Michael D. Colias, SRA *	JF Morgan Chase	Tampa, FL	No
SELECT Benjamin B. Davidson, MAI *	Blake and Associates, LLC	Conifer, CO	Yes
SELECT Lisa K. Desmarais, SRA *	Peak to Peak Appraising, LLC	Broomfield, CO	Yes
SELECT Christopher B. Dorland, MAI *		Skilman, NJ	Yes
SELECT Lamar H. Ellis, II, SRA *		Atlanta, GA	Yes
SELECT Anthony L. Gress, Jr., MAI *	Real Property Consultants, Inc.	Clerk, NJ	Yes
SELECT Karen L. Guforth, MAI *	Wells Fargo Bank - RETECHS	St. Paulsburg, FL	Yes
SELECT Franklin Frederick Griffin, SRA *	Griffin Real Estate & Appraisals	Tampa, FL	Yes
SELECT Steve L. Hales, SRA *	Residential Appraisal Services, LLC	Ogden, UT	Yes
SELECT Margaret A. Hambleton, SRA *	Hambleton, Inc.	Columbus, OH	Yes
SELECT Christopher T. Hansen, MAI *	Appraisal Group, Inc.	Mishawaka, UT	Yes
SELECT Michael H. Hatch, SRA *	Michael Hatch Real Estate Appraisal, Inc.	Las Vegas, NV	Yes
SELECT Craig S. Heaton, SRA *	C. S. Heaton Appraisals, Inc.	Mesa, AZ	Yes

AI Reports®
Form 820.04*

Client File #: _____ Appraisal File #: _____

Residential Green and Energy Efficient Addendum

Client: Joe Doe
Subject Property: Climate Zone 5a
City: Anytown State: USA Zip: 12345

Additional resources to aid in the valuation of green properties and the completion of this form can be found at http://www.appraisalinstitute.org/education/green_energy_addendum.aspx

The appraiser hereby certifies that the information provided within this addendum:

- has been considered in the appraiser's development of the appraisal of the subject property only for the client and intended user(s) identified in the appraisal report and only for the intended use stated in the report.
- is not provided by the appraiser for any other purpose and should not be relied upon by parties other than those identified by the appraiser as the client or intended user(s) in the report.
- is the result of the appraiser's routine inspection of and inquiries about the subject property's green and energy efficient features. Extraordinary assumption: Data provided herein is assumed to be accurate and if found to be in error could alter the appraiser's opinions or conclusions.
- is not made as a representation or as a warranty as to the efficiency, quality, function, operability, reliability or cost savings of the reported items or of the subject property in general, and this addendum should not be relied upon for such assessments.

Green Building: The practice of creating structures and using processes that are environmentally responsible and resource-efficient throughout a building's lifecycle from siting to design, construction, operation, maintenance, renovation, and deconstruction. This practice expands and complements the classic building design concerns of economy, utility, durability, and comfort. High Performance building and green building are often used interchangeably.

Six Elements of Green Building: A green building has attributes that fall into the six elements of green building known as (1) site, (2) water, (3) energy, (4) materials, (5) indoor air quality, and (6) maintenance and operation. A Green Building will be energy efficient but an energy efficient building is not synonymous with Green Building.

Green Features

The following items are considered within the appraised value of the subject property:

Certification: DOE Challenging a Home	Year Certified: 2013	Certifying Organization: <input type="checkbox"/> Home Innovation Research Labs (ICC-700) <input checked="" type="checkbox"/> USGBC (LEED) <input type="checkbox"/> Other:	<input checked="" type="checkbox"/> Verification Reviewed on site	<input checked="" type="checkbox"/> Certification attached to this report
Rating Certified:	Score: N/A	<input type="checkbox"/> LEED Certified: <input type="checkbox"/> LEED Silver <input type="checkbox"/> LEED Gold <input type="checkbox"/> LEED Platinum <input type="checkbox"/> ICC-700 National Green Building Standard Certified: <input type="checkbox"/> Bronze <input type="checkbox"/> Silver <input type="checkbox"/> Gold <input type="checkbox"/> Emerald Green Certifying Organization URL (website) www1.eere.energy.gov/buildings/residential/ch_index.html		
Additions	Explain any additions or changes made to the structure since it was certified: N/A			

Do changes require recertification to verify rating is still applicable? ☐ Yes ☐ No



Building Science Translator

Power Words:

Marketing

Recognition

Knowledge

Words Matter

Power Words:

Marketing

Recognition

Knowledge

It's really difficult to sell...

Patagonian **Toothfish**

Power Words:

Marketing

Recognition

Knowledge

It's much easier to sell an...

Chilean Sea Bass

Power Words:

Marketing

Recognition

Knowledge

It's difficult to rally public opinion against an...

Estate Tax

Power Words:

Marketing

Recognition

Knowledge

It's much easier to rally public opinion against a...

Death Tax

Power Words:

Marketing

Recognition

Knowledge

It's really difficult to sell an...

Energy **Audit**

Power Words:

Marketing

Recognition

Knowledge

It's much easier to sell an...

Energy **Check-up**

Power Words:

Marketing

Recognition

Knowledge

It's really difficult to sell a...

Transfer Grill



Power Words:

Marketing

Recognition

Knowledge

It's much easier to sell a...

Comfort Vent



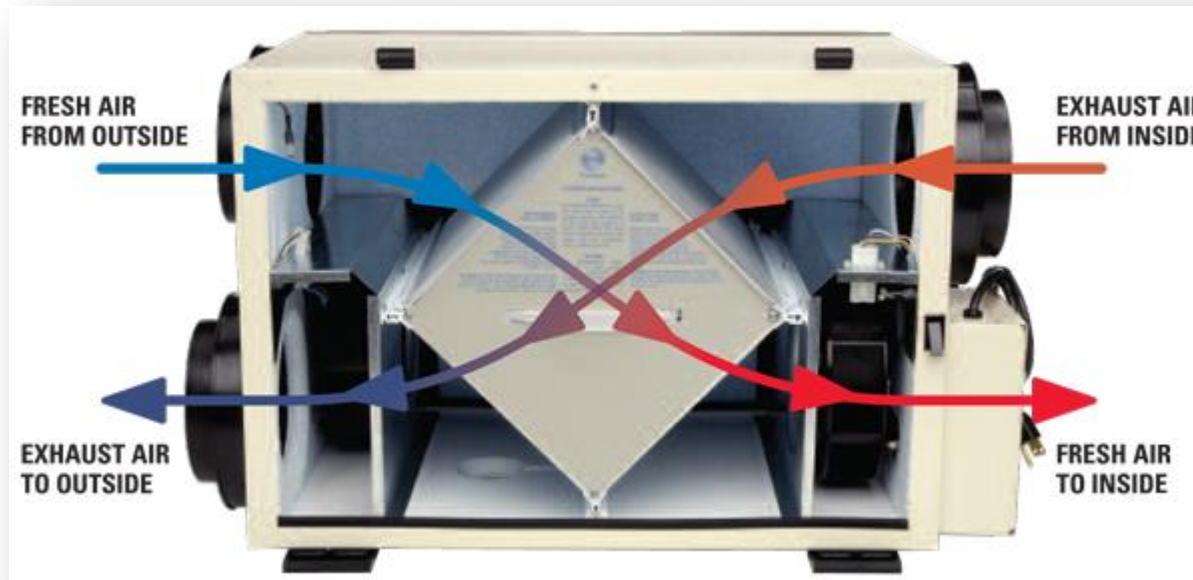
Marketing

Recognition

Knowledge

It's really difficult to sell a...

Ventilation System



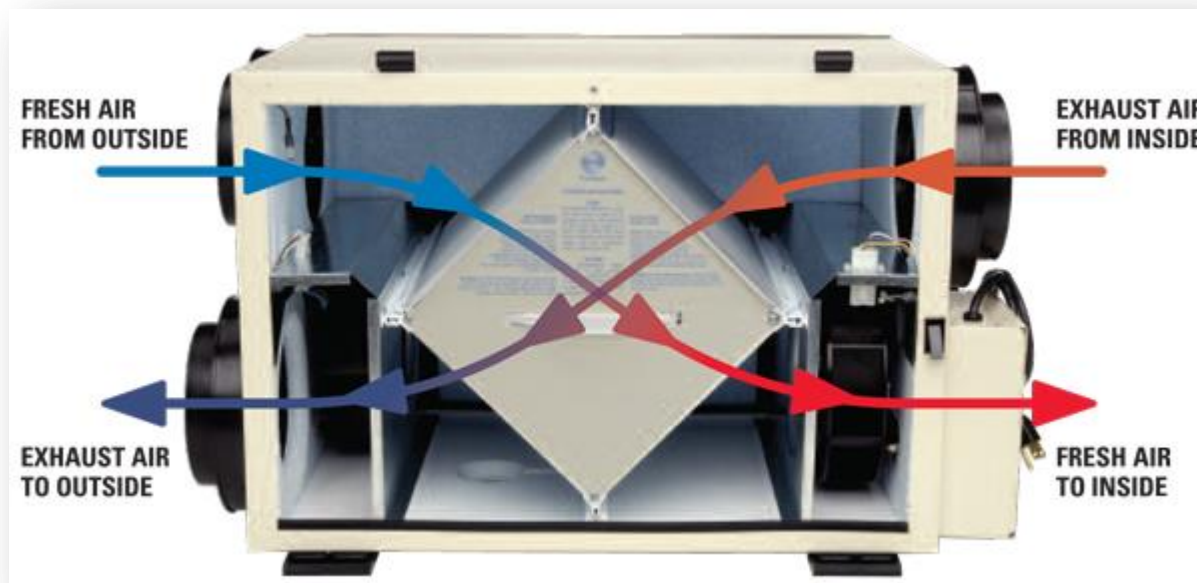
Marketing

Recognition

Knowledge

It's much easier to sell a...

Fresh-Air System



Power Words Summary:

Marketing

Recognition

Knowledge

It's hard to sell the...

Technical Function

Power Words Summary:

Marketing

Recognition

Knowledge

It's much easier to set the...

Customer Experience

Marketing

Recognition

Knowledge

It's difference between...

Technical Jargon

and a

Language of 'Value'

Marketing

Recognition

Knowledge

- Consistency
- Effectiveness
- Inclusiveness

Marketing

Recognition

Knowledge

HVAC System = Comfort System = Heating + Cooling + RH Control

- HVAC System = Comfort System
- HVAC Equipment = Comfort Equipment
- HVAC Ducts = Comfort Delivery System
- HVAC Terminals = Comfort Outlets
- HVAC Pressure Balancing = Comfort Balancing
- HVAC Transfer Grill = Comfort Vent
- HVAC Thermostat = Comfort Control System

Marketing

Recognition

Knowledge

High-Performance = Enhanced Efficiency + Ensured Quality Installation

- High-Performance Window
- High-Performance Insulation
- High-Performance Comfort System

Marketing

Recognition

Knowledge

Enhanced Efficiency:

High-Efficiency = $\sim 15\% \geq$ code/standard

Ultra-Efficient = $\sim 50\% \geq$ code/standard

- High-Efficiency vs. Ultra-Efficient Insulation
- High-Efficiency vs. Ultra-Efficient Window
- High-Efficiency vs. Ultra-Efficient Refrigerator

Marketing

Recognition

Knowledge

Ensured Quality Installation =

Professionally Installed =

compliant with industry and manufacturer standards

- Professionally-Installed Insulation
- Professionally-Installed Window
- Professionally-Installed Comfort System
- Professionally-Installed Comfort Delivery System

Marketing

Recognition

Knowledge

Alternate Terms:

Develop alternate terms for each measure that speak to multitude of consumer experiences to enhance ability to communicate value.

Low-E Window Becomes:

- Efficiency: ***High- or Ultra-Efficient Window***
- Comfort: ***Enhanced Comfort Window***
- Healthful Environment: ***Quiet Window***
- Advanced: ***Advanced Window Technology***
- Durability: ***Sun Protection Window***

Building Science Translator

Marketing

Recognition

Knowledge

Building America Building Science Translator – Page 1a

Building Science Measure	New Building Science Terminology	Alternate Terms					
		Lives Better		Works Better		Lasts Better	
		Engineered Comfort	Healthful Environment	Ultra-Efficient	Advanced Technology	Quality Built	Enhanced Durability
High-Performance Thermal Enclosure	High-Performance Thermal Enclosure	Enhanced Comfort Enclosure	Moisture Managed Enclosure	High-Efficiency Enclosure	Advanced Enclosure Technology	Professionally-Installed Thermal Enclosure	Low-Maintenance Enclosure
High-Performance Window System	High-Performance Window System	Enhanced Comfort Window System	Quiet Window System	High-Efficiency or Ultra-Efficient Window System	Advanced Window System Technology	Professionally-Installed Window System	Enhanced Durability Window System
High-R Window	High-Efficiency Window	Enhanced Comfort Window	Quiet Window	High-Efficiency or Ultra-Efficient Window	Advanced Window Technology		Sun Protection Window
Weather-Resistant and Flashed Window	Professionally-Installed Window	Draft-Free Window Installation	Moisture Managed Window Installation	Energy-Saving Window Installation	Advanced Window Installation	Professionally-Installed Window	Weather-Protected Window Installation
High-Performance Insulation System	High-Performance Insulation System	Enhanced Comfort Insulation System	Enhanced Quiet Insulation System	High-Efficiency or Ultra-Efficient Insulation System	Advanced Insulation System	Professionally-Installed Insulation System	Next-Gen Insulation System
High-R Insulation	High-Efficiency or Ultra-Efficient Insulation	Enhanced Comfort Insulation	Enhanced Quiet Insulation	High-Efficiency or Ultra-Efficient Insulation	Advanced Insulation Technology		
High-R Wall Insulation	High-Efficiency or Ultra-Efficient Wall Insulation	Enhanced Comfort Wall Insulation	Enhanced Quiet Wall Insulation	High-Efficiency or Ultra-Efficient Wall Insulation	Advanced Wall Insulation		
High-R Floor Insulation	High-Efficiency or Ultra-Efficient Floor Insulation	Enhanced Comfort Floor Insulation	Enhanced Quiet Floor Insulation	High-Efficiency or Ultra-Efficient Floor Insulation	Advanced Floor Insulation		
High-R Attic Insulation	High-Efficiency or Ultra-Efficient Attic Insulation	Enhanced Comfort Attic Insulation	Enhanced Quiet Ceiling Insulation	High-Efficiency or Ultra-Efficient Attic Insulation	Advanced Attic Insulation		
High-R Foundation Insulation	High-Efficiency or Ultra-Efficient Foundation Insulation	Enhanced Comfort Foundation Insulation	Enhanced Quiet Foundation Insulation	High-Efficiency or Ultra-Efficient Foundation Insulation	Advanced Foundation Insulation		
Insulation Quality Installation	Premium-Installed Insulation	Enhanced Comfort Insulation Installation	Enhanced Quiet Insulation Installation	Energy Saving Insulation Installation	Advanced Insulation Installation Practices	Professionally-Installed Insulation	Moisture Control Insulation Installation
Fully Aligned Air Barriers	Whole-House Draft Barrier	Whole-House Draft Barrier	Air Contaminant Barrier	Energy Saving Air Barrier	Advanced Air Barrier Technology	Professionally-Installed Draft Barrier	Moisture Control Air Barrier

Building Science Translator

Marketing

Recognition

Knowledge

Building America Building Science Translator – Page 1a

Building Science Measure	New Building Science Terminology	Alternate Terms					
		Lives Better		Works Better		Lasts Better	
		Engineered Comfort	Healthful Environment	Ultra-Efficient	Advanced Technology	Quality Built	Enhanced Durability
High-Performance Thermal Enclosure	High-Performance Thermal Enclosure	Enhanced Comfort Enclosure	Moisture Managed Enclosure	High-Efficiency Enclosure	Advanced Enclosure Technology	Professionally-Installed Thermal Enclosure	Low-Maintenance Enclosure
High-Performance Window System	High-Performance Window System	Enhanced Comfort Window System	Quiet Window System	High-Efficiency or Ultra-Efficient Window System	Advanced Window System Technology	Professionally-Installed Window System	Enhanced Durability Window System
High-R Window	High-Efficiency Window	Enhanced Comfort Window	Quiet Window	High-Efficiency or Ultra-Efficient Window	Advanced Window Technology		Sun Protection Window
Draft-Free and Flashed Window	Professionally-Installed Window	Draft-Free Window Installation	Moisture Managed Window Installation	Energy-Saving Window Installation	Advanced Window Installation	Professionally-Installed Window	Weather-Protected Window Installation
High-Performance Insulation System	High-Performance Insulation System	Enhanced Comfort Insulation System	Enhanced Quiet Insulation System	High-Efficiency or Ultra-Efficient Insulation System	Advanced Insulation System	Professionally-Installed Insulation System	Next-Gen Insulation System
High-R Insulation	High-Efficiency or Ultra-Efficient Insulation	Enhanced Comfort Insulation	Enhanced Quiet Insulation	High-Efficiency or Ultra-Efficient Insulation	Advanced Insulation Technology		
High-R Wall Insulation	High-Efficiency or Ultra-Efficient Wall Insulation	Enhanced Comfort Wall Insulation	Enhanced Quiet Wall Insulation	High-Efficiency or Ultra-Efficient Wall Insulation	Advanced Wall Insulation		
High-R Floor Insulation	High-Efficiency or Ultra-Efficient Floor Insulation	Enhanced Comfort Floor Insulation	Enhanced Quiet Floor Insulation	High-Efficiency or Ultra-Efficient Floor Insulation	Advanced Floor Insulation		
High-R Attic Insulation	High-Efficiency or Ultra-Efficient Attic Insulation	Enhanced Comfort Attic Insulation	Enhanced Quiet Ceiling Insulation	High-Efficiency or Ultra-Efficient Attic Insulation	Advanced Attic Insulation		
High-R Foundation Insulation	High-Efficiency or Ultra-Efficient Foundation Insulation	Enhanced Comfort Foundation Insulation	Enhanced Quiet Foundation Insulation	High-Efficiency or Ultra-Efficient Foundation Insulation	Advanced Foundation Insulation		
Insulation Quality Installation	Premium-Installed Insulation	Enhanced Comfort Insulation Installation	Enhanced Quiet Insulation Installation	Energy Saving Insulation Installation	Advanced Insulation Installation Practices	Professionally-Installed Insulation	Moisture Control Insulation Installation
Fully Aligned Air Barriers	Whole-House Draft Barrier	Whole-House Draft Barrier	Air Contaminant Barrier	Energy Saving Air Barrier	Advanced Air Barrier Technology	Professionally-Installed Draft Barrier	Moisture Control Air Barrier

Converting Power Words into Lists

Marketing

Recognition

Knowledge





Fresh Air:

- Supply Fresh Air System
- Odor and Moisture Control Fans
- High-Capture Filtration Technology

Quiet:

- Quiet Window Technology
- Quiet Wall Technology

Moisture Control:

- Dry-by-Design Construction
- Moisture Control System – Whole House
- Moisture Controlled Comfort System
- Moisture Controlled Windows
- Moisture Controlled Lower Level

Pest Control:

- Bug Control Barrier
- Pest Screened Home

Outdoor Contaminant Control:

- Contaminant Sealed Construction
- Contaminant Sealed Comfort Delivery
- Dust and Pollen Barrier
- Radon Controlled Home

Chemical Control:

- Formaldehyde Controlled Home
- VOC Controlled Home

Fume Control:

- Carbon Monoxide Controlled Equipment
- Carbon Monoxide Controlled Fireplace
- Fume Controlled Garage

BASC Sales Tool Coming Soon

U.S. DEPARTMENT OF
ENERGY

Energy Efficiency &
Renewable Energy

U.S. DEPARTMENT OF
ENERGY | Energy Efficiency &
Renewable Energy

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Zero Energy Ready Home

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Transfer Grills

Power Word landing page with intro text and any other description desired. Power Word slide will display on the page, within the BASC interface. The PDF/Print option will be available , along with Field Kit functionality

[Feedback](#)

 [Belongs to 0 Field Kits](#)

 [Print this page](#)

 [PDF version](#)

BUILDING SCIENCE-TO-SALES TRANSLATOR

Transfer Grill = Comfort Vent



TECHNICAL DESCRIPTION

Most new homes only have a central return. When doors are closed, conditioned bedroom air cannot flow adequately to the central return which can block air flow from the ducts. This can compromise comfort and pressurize the room so warm humid air is driven into wall assemblies for added risk of moisture damage. Transfer Grills are a through-wall vent sized to allow adequate flow of air to the hallway central return while also including baffles for sound and visual privacy.

RELATED BUILDING SCIENCE MEASURES

- [Jump Duct](#)
- [Pressure Balancing](#)
- [HVAC Room-by-Room Return Ducts](#)

COMFORT VENT SALES MESSAGE



Comfort vents at each bedroom ensure a continuous flow of heating and cooling even when the doors are closed. What this means to you is that you will no longer have to compromise comfort when you keep your bedroom doors closed. Wouldn't you agree bedroom doors shouldn't have to kept open to maintain comfort?

MY FIELD KITS

[North Portland Residential](#)

12 items

[General Air Sealing Guidance](#)

4 items

[San Francisco Challenge Home Project #1](#)

12 items

 [New Field Kit](#)

Customizable Point-of-Sale Material

U.S. DEPARTMENT OF
ENERGY

Energy Efficiency &
Renewable Energy



Garçon Homes Enhanced Durability



Low-Maintenance Enclosure

- Enhanced Durability Window System
- Sun Protection Window Glazing
- Next-Gen Insulation System
- Moisture Control Air Barrier
- Moisture Control Insulation Blanket
- Moisture Sealed Construction

Whole-House Water Protection

- Foundation Water Barrier System
- Anti-Clog Foundation Drain
- Wall Water Barrier System
- Window Water Barrier
- Roof Water Barrier System
- Interior Moisture Control Materials

Low-Maintenance Comfort System

- Extended-Life Comfort System
- Moisture Control Duct Sealing
- Moisture Control Comfort Balancing

Enhanced Durability Components

- Ultra-Low Maintenance Lighting
- Reduced Wear Clothes Washer

Disaster Resistant Home

- Wind Resistant Home
- Hurricane Resistant Home
- Termite Detection System
- Termite Resistant Home

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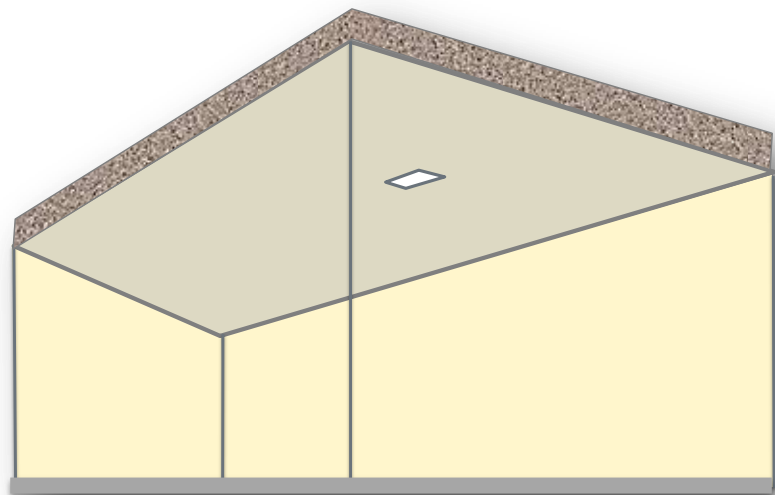
equipment
replace



Beyond Next Year

1. High-R Windows
2. Moisture Managed High-R Assemblies
3. Optimized Low-Load Comfort Systems
4. Smart Ventilation
5. High-Capture Range Hoods

Why Thermal Holes Are a Big Deal



1, 000 sq. ft. R-38 Attic

$U = .026$

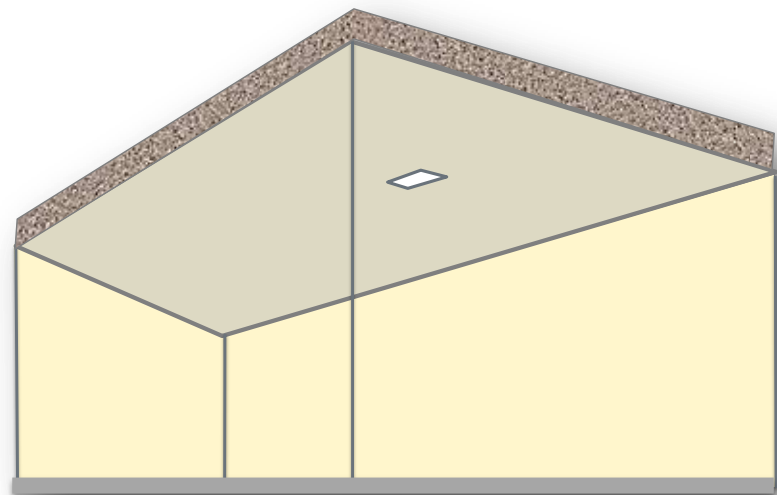
Drop-Down Stair = R-1

R-1, $U = 1.0$

10 sq. ft. = 1% of area

What Percent Loss in
Attic R-Value?

Why Thermal Holes Are a Big Deal



$$\text{Average } U = \frac{U_1 \times A_1 + U_2 \times A_2 + \dots}{\text{Total Area (A)}}$$

$$= \frac{(.026 \times 990) + (1 \times 10)}{1,000}$$

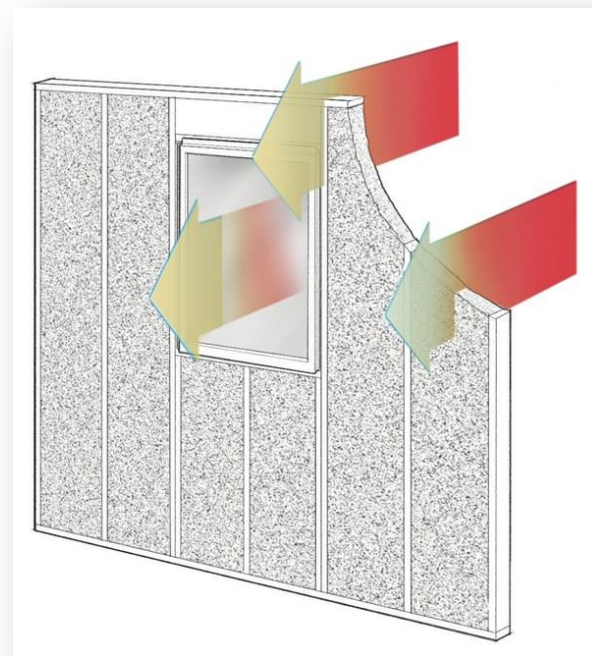
$$= \frac{35.74}{1,000} = .036$$

$$= \mathbf{R-28}$$

$$= \mathbf{27\% < R-38}$$

Why Windows Are a Big Deal

Window 15% of Wall Area	Wall R-Value with Windows w/Variied Wall Insulation Levels			
U-Value	R-0	R-18	R-39	R-60
0.30	R-5	R-11	R-15	R-17
0.20	R-5	R-13	R-19	R-23
0.15	R-5	R-14.5	R-23	R-28
0.10	R-5.5	R-16	R-27	R-34



Sources:

“Holes in the Wall: To Improve the Energy Performance of Walls, Look at the Total R-Value,”
Journal of Light Construction, February 2014;

Multi-Assembly R-Value / U-Value Calculator – Cascadia Windows and Doors;
Michael Blasnik Presentation, 2014 ACI Conference

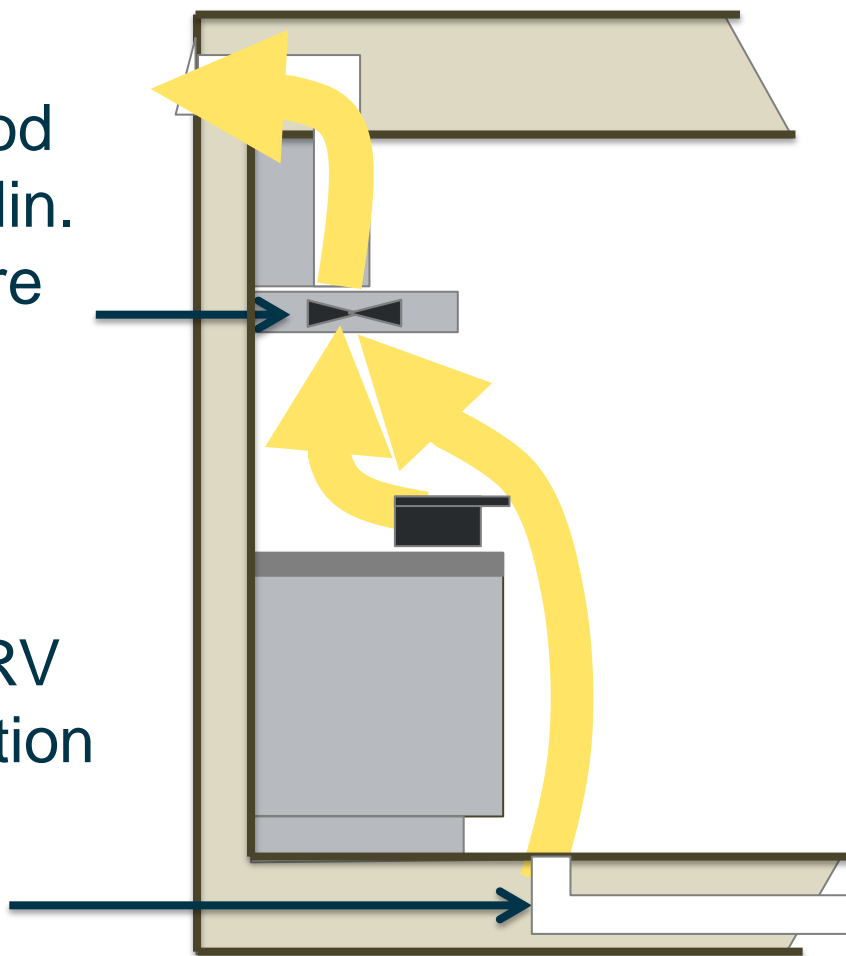
- Bulk Moisture Protection
- Cold Surface Protection:
 - Maintain Above Dew Point
or
 - Bullet-Proof Vapor Flow Management

- Ultra-Efficient
- Ensured Air Flow
- Ensured Mixing
- Heating, Cooling, and RH Control
- Integrated Whole-House Ventilation
- Advanced 'Smart' Controls
- Self Diagnosing

- Account for all Fan Operation
 - Clothes Dry
 - Exhaust Fans
 - Range Hoods
 - Central Vacuums
- Account for Outdoor Conditions
 - Temperature
 - RH
 - Pollutant Level
- Account for Occupancy
- Self Diagnosing

High-Capture,
Quiet Exhaust Hood
Technology with Min.
80% Rated Capture
Efficiency

Intake Air From HRV
Synched to Operation
of Exhaust Hood
at 70% CFM





Moisture-Managed High-R Assemblies

Walls
Roofs
Foundations

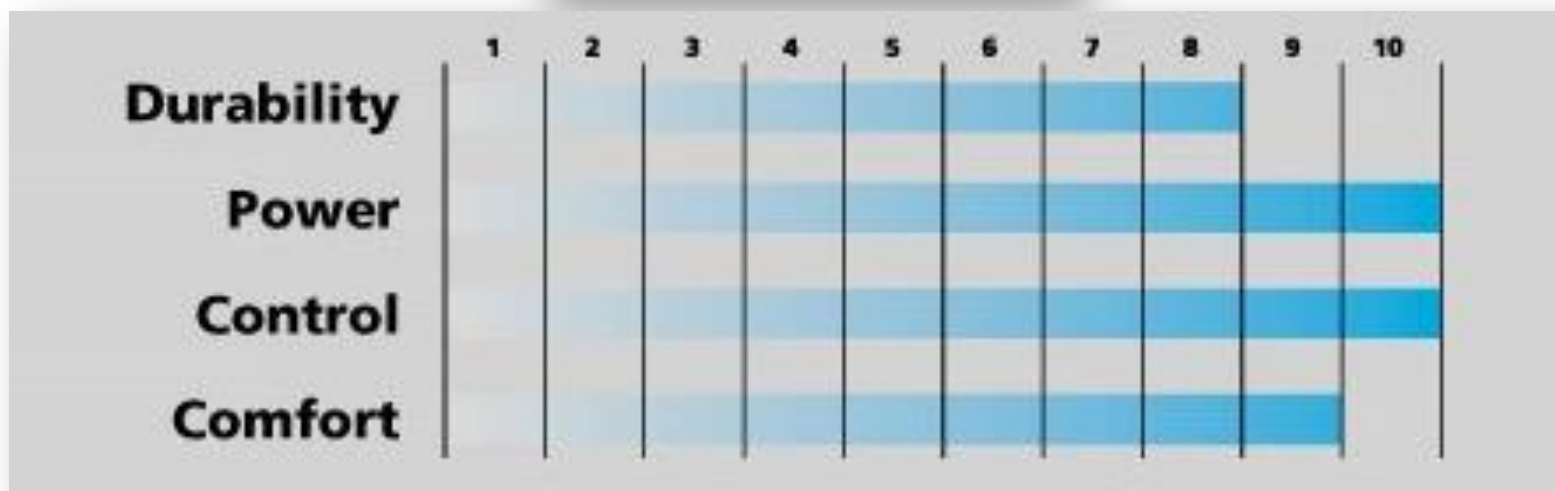
Optimized Low-Load Comfort Systems

Heating
Cooling
Humidity

Whole-House and Spot Ventilation Systems

Smart Ventilation
High-Capture
Cook-Top Exhaust

You Take Inspiration Wherever You Can Find It...



Durability

Mold
Dry Rot

Health

Source Control
Dilution
Filtration

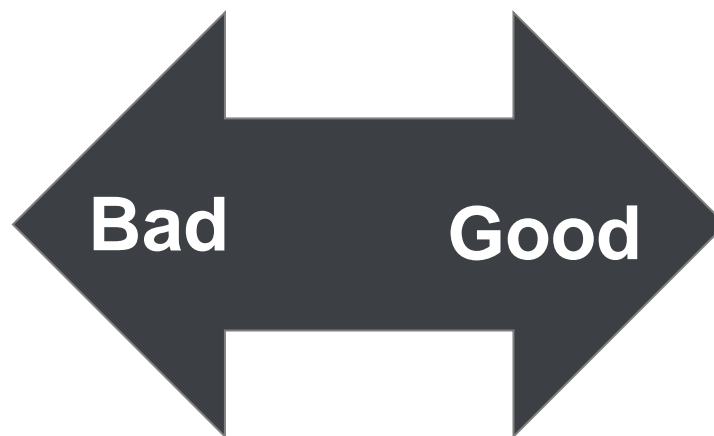
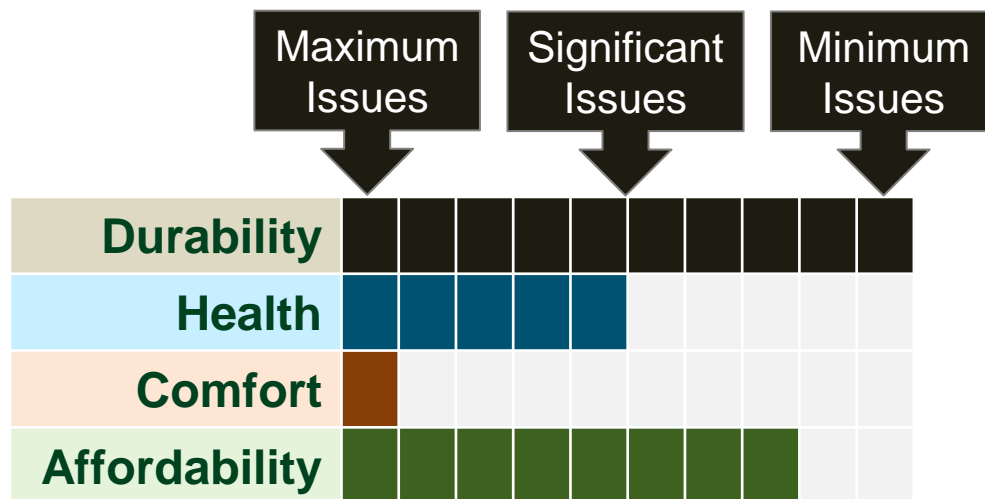
Comfort

Heating
Cooling
Relative Humidity

Affordability

Mortgage
Energy
Maintenance

Building Science Score Card

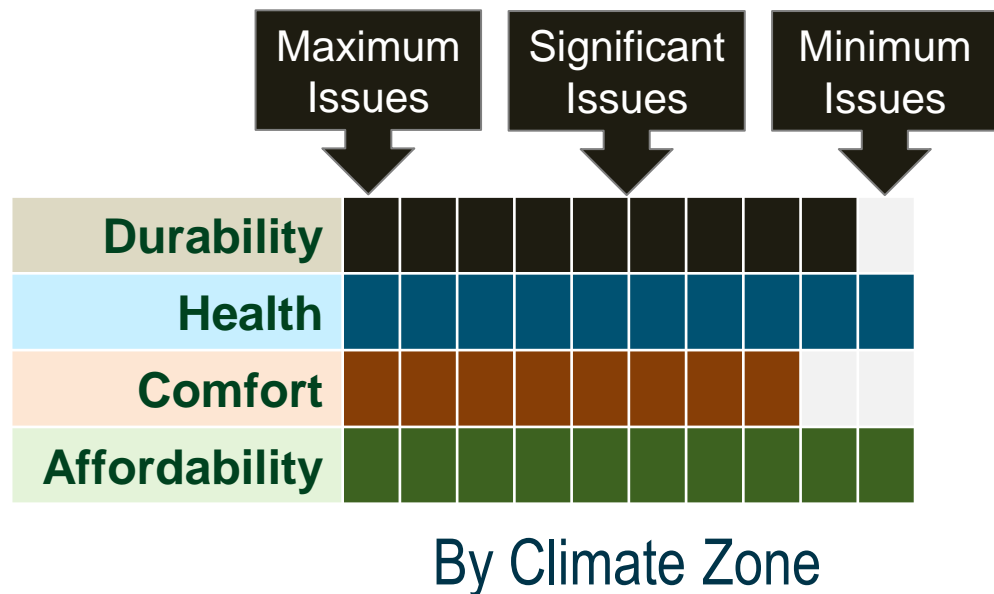




**Moisture Managed
Assemblies**

**Optimized Low-Load
Comfort Systems**

**Whole-House and
Spot Ventilation IAQ**



Thank You



For More Information:

www.buildings.energy.gov/zero

Email:

zero@newportpartnersllc.com