

DOE Zero Energy Ready Homes Version 2 Overview

Presented By Robby Schwarz

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Thinking **ZERO** to 360°

BUILD*Tank*inc.

What does ZERH Mean?

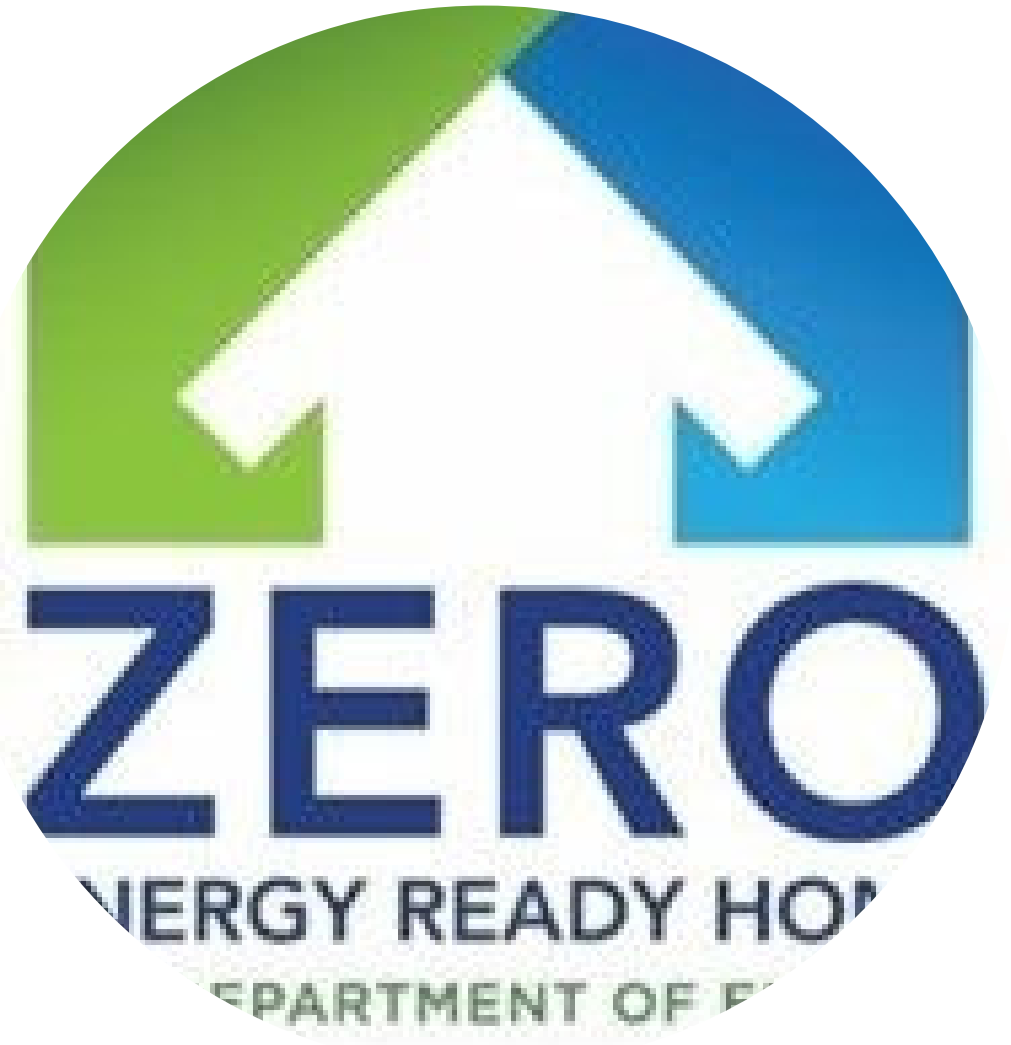
Technical Strategy

Step One: Optimize Efficiency	Step Two: Do No Harm	Step Three: Ensure Future Ready
Energy Efficient Enclosure	Comprehensive Water Protection	Solar Ready Construction
Energy Efficient Components	Ensured Comfort System	
Systems Thinking Applied Building Science	Comprehensive Indoor Air Quality	



ZERH Defined

“A high-performance home which is so energy efficient, that a renewable energy system can offset all or most of its annual energy consumption.”



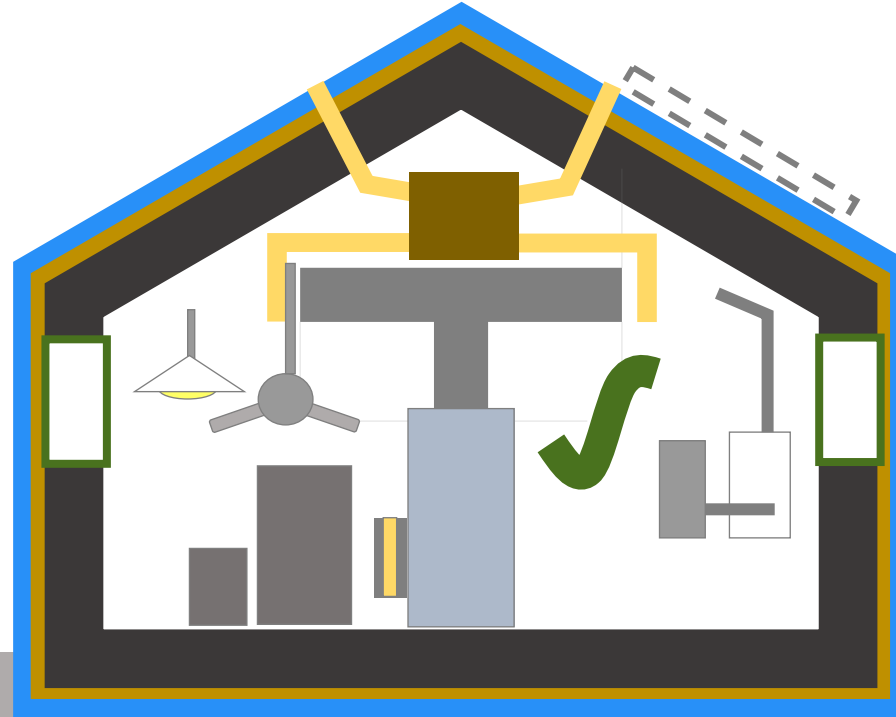
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What does the ZERH Definition Mean?

- A pathway to achieve Zero Energy
- At a minimum every home is “future proofed” to be able to achieve zero net energy as technology advances
- For example, we see PV panel generation and efficiency improve
 - Therefore, we know that in the future, small roof areas will be able to generate more power to achieve this goal



Zero Energy Ready Home Spec



Optimized
Enclosure
System

Optimized
Comfort
System

Water
Protection
System

Complete
IAQ
System

Efficient
Comps
System

Solar
Ready
System

ZERH is the Home of the Future Available Now

- **Future Ready** - Optimized Thermal Protection that meets and exceeds code
- **Moisture Ready** - Whole-House Water Protection
- **Comfort Ready** - High-Performance Heating and Cooling Systems
- **Tech Ready** - High-Efficiency Components
- **Health Ready** - Comprehensive Indoor Air using EPA Indoor airPLUS
- **Zero Ready** - Solar Ready Construction minimizes the cost of adding it in the future

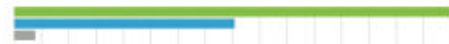


Zero Ready vs. Zero



A Symbol of Excellence

HEALTHFUL ENVIRONMENT



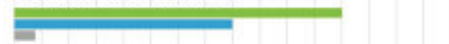
COMFORT PLUS



ADVANCED TECHNOLOGY



ULTRA EFFICIENT



QUALITY BUILT



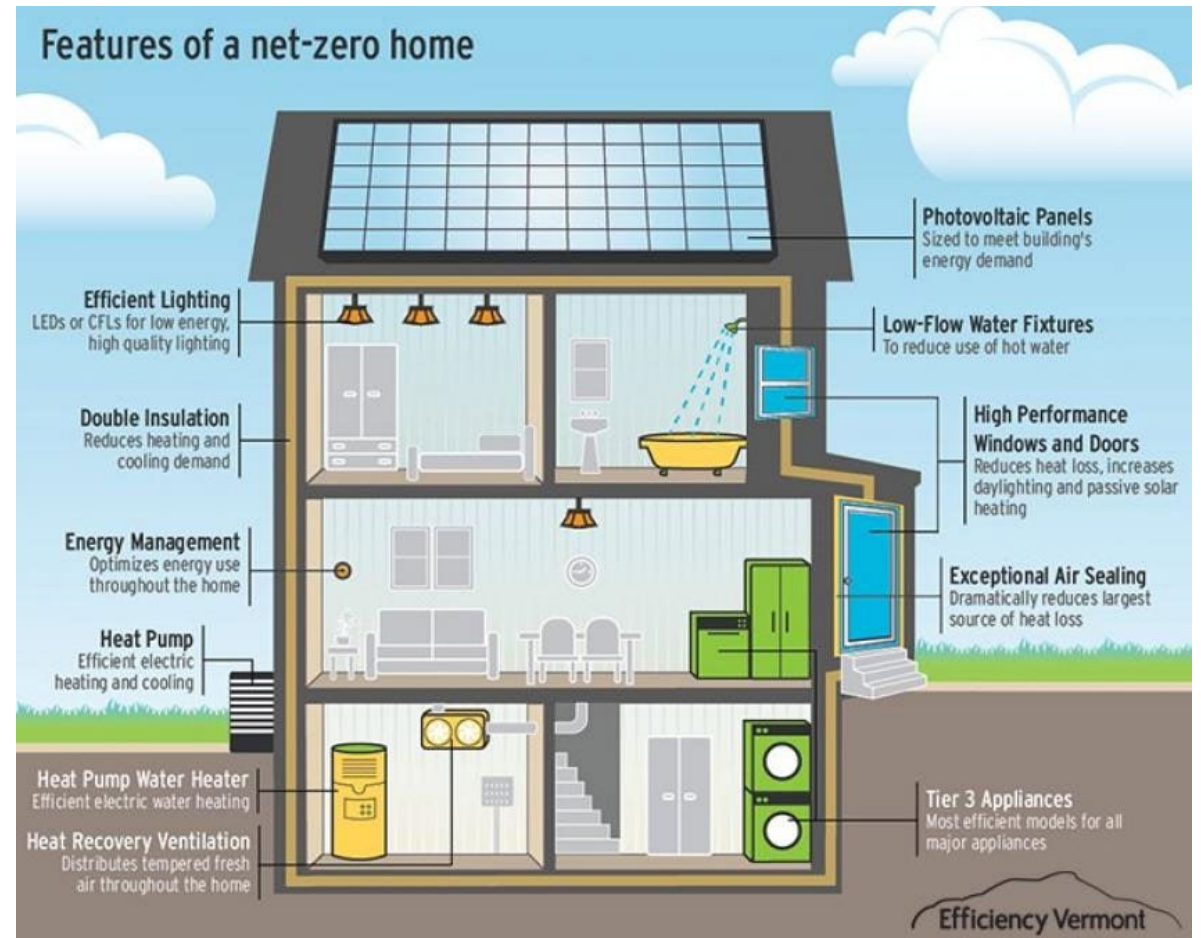
DURABILITY



KEY

- DOE Zero Energy Ready Home
- ENERGY STAR Certified Home
- Existing Home

Features of a net-zero home



<https://www.24hplans.com/cost-to-build-a-net-zero-energy-home/>

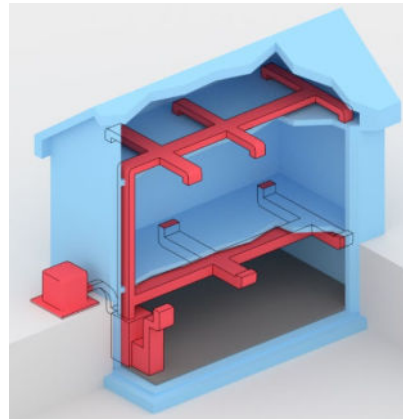
Market-Ready Innovations



Aerosol envelope sealing for new construction



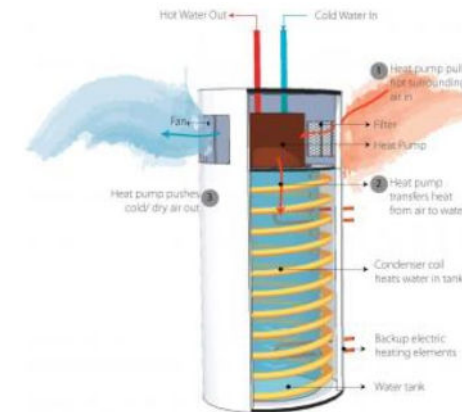
Testing and validation of smart ventilation controls



"Plug-n-Play" Air Delivery Systems




Validation and application guidance for High-R wall systems



Heat Pump Water Heater field testing and application guidance

Increasing Demand for ZERHs in Programs, Policies, and Incentive Programs

Affordable Housing	State & Utility Rebates	Codes	Green Financing
Colorado	CenterPoint (TX)	Many CO jurisdictions going to the 2021	Fannie Mae
Connecticut	Dominion Energy (UT)	Oregon 2023	Federal Home Loan Bank of NY
Delaware	Eversource (CT)	RI Stretch Code	
Maryland	NJ (statewide)	Summit County, CO	
Minnesota	Oncor (TX)		
New Jersey	Rhode Island (statewide)		
Pennsylvania			
Virginia			
Washington D.C.			


Xcel Energy

ZERH v2 Compliance

Prescriptive Compliance

Moving to Sunset the Prescriptive Compliance Option



- Least use and least flexible compliance option

Performance



Eligible Building Types – Looking Ahead

Single-Family Detached



- Performance Compliance
- ESSFNH **Version 3.2** & IAP as prerequisites

Single-Family Attached



Multifamily (Any Height)

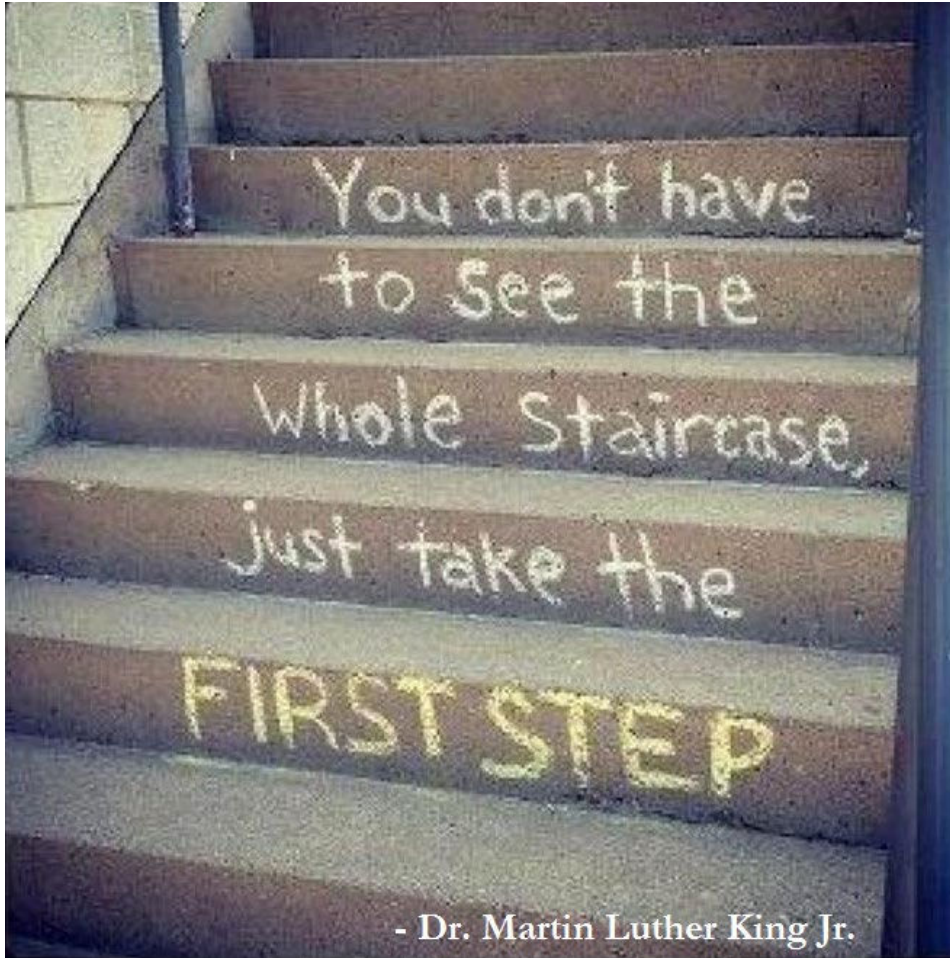


- ERI or Prescriptive Compliance
- ESMFNC & IAP as prerequisites

DOE ZERH – Version 2

DOE ZERH – Multifamily V1

Step 1 demonstrate projected compliance



WHAT is **HERS**?

HERS = Home energy rating system

HERS is the most well known and nationally recognized energy rating system for residential construction builders. It was established in 2006 by Residential Energy Services Network (RESNET).

How it works



A rating of **100** is referred to as the **HERS Reference Home baseline** and is based on the 2006 International Energy Conservation Code (IECC)



The **lower** the score the **more efficient** the home

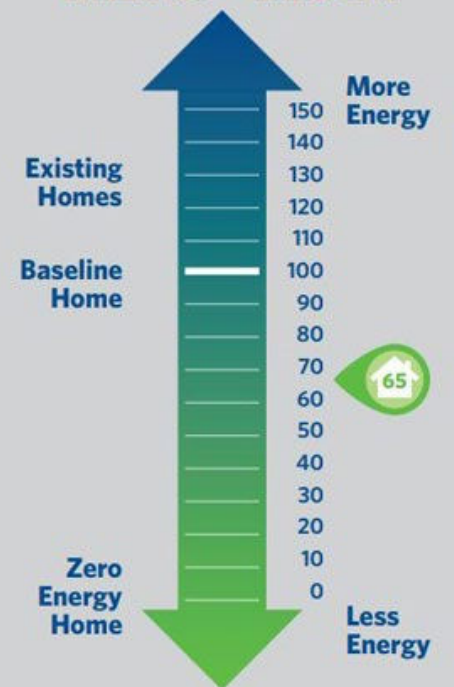


A home with a **HERS Index of 70** uses **30% less energy** than a code-minimum home of the same size and shape



A **certified RESNET Home Energy Rater** determines a home energy rating

HERS® Index



<http://www.resnet.us>

<http://www.volunteerweekly.org/the-first-step/>

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ENERGY STAR & DOE ZERH

- Same rater network
- Same modeling software (at least 3 different options)
- Same plan review & site inspection protocol



IECC & Energy Star used as foundation



			Solar Ready
			Eff. Comps.& H ₂ O Distrib.
			EPA Indoor Air Package
			Optimized Duct Location
	HVAC QI with WHV	HVAC QI with WHV	HVAC QI with WHV
	Water Management	Water Management	Water Management
	Independent Verification	Independent Verification	Independent Verification
IECC 2015 Enclosure	IECC 2009 Enclosure	IECC 2021 Enclosure	IECC 2021 Enclosure +
HERS 70-80	HERS 65-75	HERS 55-65	HERS 45-55
IECC 2015	ENERGY STAR v3	ENERGY STAR v3.2	ZERH

Minimum Required Energy Efficiency Threshold

Version 1 ZERH ERI Target Home specifications

- Energy Rating Index (ERI) scores to qualify for ZERH in the 50s
- **V2 ZERH Target Home** achieves increased energy savings
- Resulting ERI Targets to qualify for ZERH in the 40s



Minimum Required Energy Efficiency Threshold

Software has not been updated for modeling ZERH v2

DOE guidance

Achieve an ERI of 45 or lower to prequalify the home for certification

Comply with all ZERH v2 requirements

Verification

Xcel Energy DOE ZERH v2 minimum requirement for incentive payment

Achieve an ERI of 50 or lower to prequalify the home

Comply with all ZERH v2 requirements

Verification



EnergyStar Single Family New Homes V3.2

1. Version 3.2 only used in Marshall Fire reconstruction
2. Colorado will transition to version 3.1 in 2023
1. Same program structure designed to achieve 10% savings over 2021 IECC
2. EnergyStar companion labels
 - Electrification Technologies
 - Technologies that are impactful today and tomorrow



Efficiency Target Updates



Program Component	ZERH Version 1	ZERH Version 2.0 Proposed	Rationale
Minimum Required Energy Efficiency Threshold	Based on the Version 1 ZERH ERI Target Home specifications - circa 2013. ERI scores in the 50s.	Updated ZERH Target Home achieves increased energy savings of 20% beyond 2021 IECC. Resulting ERI Targets in the 40s.	Reflect recent innovations in the ZERH efficiency threshold.



~~Size Adjustment Factor (SAF)~~ / Removed



- SAF will sunset
- EnergyStar v3.1 has eliminated SAF
- **EnergyStar v3.2 will not include SAF**
- Homes built under ZERH v2 will be efficient regardless of SAF
- **Removing SAF simplifies program requirements**
- Homes under ZERH V2 will be very efficient regardless of SAF.

Exhibit 3: Benchmark Home Size²⁹

Bedrooms in Home to be Built	0	1	2	3	4	5	6	7
Conditioned Floor Area Benchmark Home	1,000	1,000	1,600	2,200	2,800	3,400	4,000	4,600

Doe ZERH V2



Energy Star v3.2 Revision

- HVAC Commissioning Track B ANSI 310

Indoor airPLUS v1 revision 4

- Moving to v2 maybe in 2022
- ZERH will phase it
 - Balanced ventilation in cold climates (6-8)
 - MERV 13 filtration

1 It clarifies

2 It simplifies

3 It improves



Mandatory Requirements



ZERH v1 rev7

Area of Improvement	Mandatory Requirements
1. ENERGY STAR for Homes Baseline	<input type="checkbox"/> Certified under ENERGY STAR Qualified Homes Program Version 3, 3.1, or 3.2 (depending on state), or under ENERGY STAR Multifamily New Construction program Version 1.0 or 1.1 (depending on state) ^{8, 9, 10}
2. Envelope	<input type="checkbox"/> Fenestration shall meet or exceed ENERGY STAR requirements. See End Note for specific U, SHGC values, and exceptions. ¹¹ <input type="checkbox"/> Ceiling, wall, floor, and slab insulation shall meet or exceed 2015 IECC levels ^{12,13}
3. Duct System	<input type="checkbox"/> Duct distribution systems located within the home's thermal and air barrier boundary or an optimized location to achieve comparable performance. ¹⁴ <input type="checkbox"/> HVAC air handler is located within the home's thermal and air barrier boundary.
4. Water Efficiency	<input type="checkbox"/> Hot water delivery systems (distributed and central) shall meet efficient design requirements ¹⁵ or <input type="checkbox"/> Water heaters and fixtures shall meet efficiency criteria ¹⁶
5. Lighting & Appliances	<input type="checkbox"/> All installed refrigerators, dishwashers, and clothes washers are ENERGY STAR qualified. ¹⁷ <input type="checkbox"/> 80% of lighting fixtures are ENERGY STAR qualified or ENERGY STAR lamps (bulbs) in minimum 80% of sockets <input type="checkbox"/> All installed bathroom ventilation and ceiling fans are ENERGY STAR qualified
6. Indoor Air Quality	<input type="checkbox"/> Certified under EPA Indoor airPLUS ¹⁰
7. Renewable Ready	<input type="checkbox"/> Provisions of the DOE Zero Energy Ready Home PV-Ready Checklist are Completed ¹⁸

ZERH v2

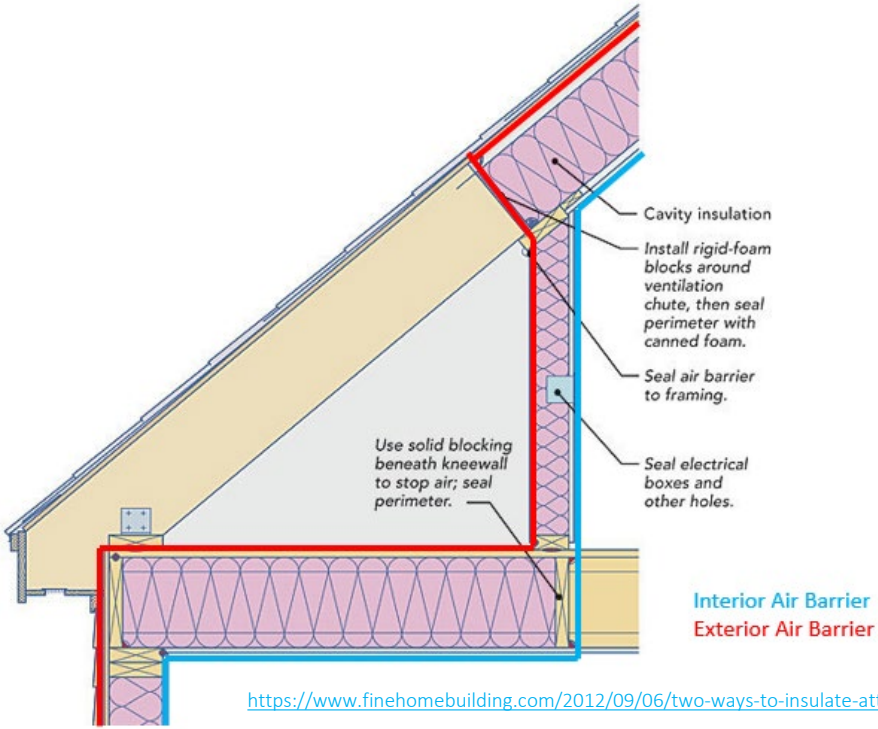
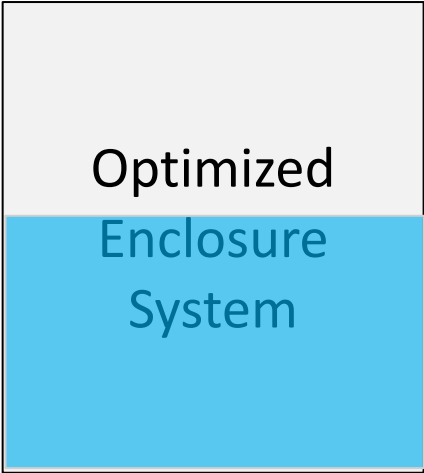
Area of Improvement	Mandatory Requirements
1. ENERGY STAR Single Family New Homes Baseline	<input type="checkbox"/> Certified under ENERGY STAR Single Family New Homes Version 3.2 ¹¹
2. Envelope	<input type="checkbox"/> Ceiling, wall, floor, & slab insulation meet or exceed 2021 IECC R, U, or UA levels ^{12,13} <input type="checkbox"/> Above Grade Walls in Mixed and Cold Climates provide thermal breaks ¹⁴ <input type="checkbox"/> Windows meet high performance requirements based on climate zone ¹⁵ <i>Advisory:</i> DOE is monitoring the development of the planned update to the ENERGY STAR product specifications for residential windows (V7.0), and plans to adopt these in a future program update ¹⁶
3. Duct System	<input type="checkbox"/> All ducts and heating and cooling air-handling equipment are located within the thermal and air barrier boundary ¹⁷
4. Water Heating Efficiency	<input type="checkbox"/> Hot water delivery systems meet efficient design requirements ¹⁸ or <input type="checkbox"/> Water heater and fixtures meet efficiency criteria ¹⁹
5. Lighting & Appliances	<input type="checkbox"/> All installed refrigerators, dishwashers, clothes washers, and clothes dryers are ENERGY STAR qualified ^{20, 21} <input type="checkbox"/> 95% of builder-installed lighting fixtures are ENERGY STAR qualified or ENERGY STAR lamps (bulbs) in minimum 95% of sockets <input type="checkbox"/> All installed bathroom ventilation and ceiling fans are ENERGY STAR qualified
6. Indoor Air Quality	<input type="checkbox"/> Certified under EPA Indoor airPLUS ²² <input type="checkbox"/> MERV 13 (minimum) filter is installed on all ducted heating and cooling systems and accounted for in system design ²³ <input type="checkbox"/> Energy efficient balanced ventilation (HRV or ERV) is provided in Climate Zones 6-8 ²⁴
7. Renewable Ready	<input type="checkbox"/> Provisions of the DOE Zero Energy Ready Home PV-Ready Checklist Version 2 are Completed ²⁵

1. Building Envelope Updates

Program Component	ZERH Version 1	ZERH Version 2.0 Proposed	Rationale
Building Envelope Insulation Levels	2015 IECC insulation levels for opaque areas	<u>2021 IECC insulation levels</u> for opaque areas. Thermal breaks in walls in CZs 4-8.	Deliver most robust code-based building envelope with an additional, targeted provision for Above Grade Walls.



Mandatory - Envelope



<https://www.finehomebuilding.com/2012/09/06/two-ways-to-insulate-attic-kneewalls>



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2021 IECC Envelope
Insulation
Tighter Construction
High Performance Windows

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2021 IECC Insulation Values

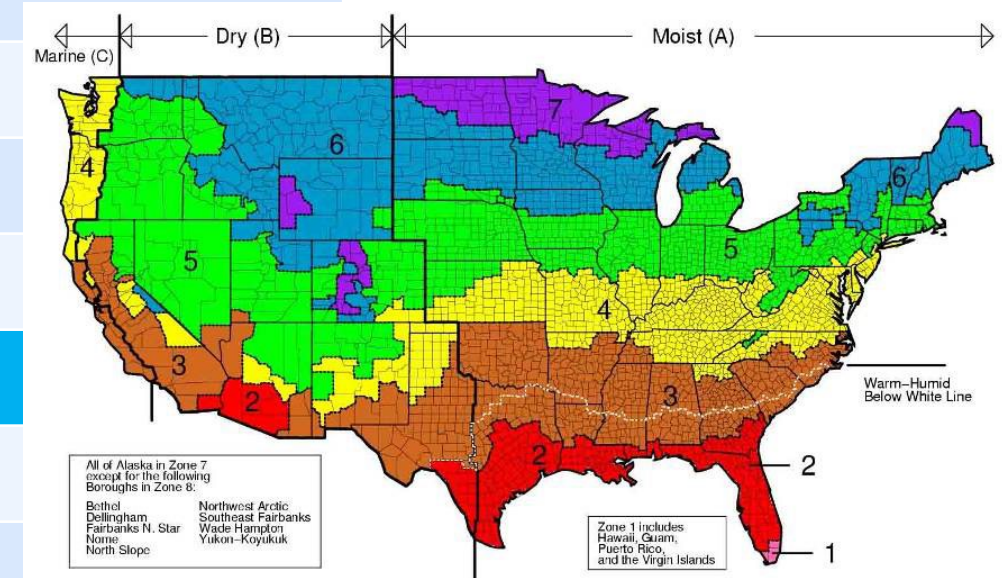


CZ	Ceiling	Wood-framed Wall	Mass Wall	Floor	Basement	Slab	Crawl Space Wall
1	30	13 or 0+10	3/4	13	0	0	0
2	49	13 or 0+10	4/6	13	0	0	0
3	49	20 or 13+5 or 0+15	8/13	19	5/13	10, 2ft	5/13
4	60	20+5 or 13+10 or 0+15	8/13	19	10/13	10, 4ft	10/13
5	60	30 or 20+5 or 13+10 or 0+15	13/17	30	15/19 or 13+5	10, 4ft	15/19 or 13+5
6	60	20+5 or 13+10 or 0+20	15/20	30	15/19 or 13+5	10, 4ft	15/19 or 13+5
7/8	60	20+5 or 13+10 or 0+20	19/21	38	15/19 or 13+5	10, 4ft	15/19 or 13+5

Envelope Efficiency Improvements



Climate Zone	2021 IECC UA Stringency Compared to DOE ZERH V1 UA Requirements ^A
1	+ 0%
2	+ 5%
3	+16%
4	+8%
5	+8%
6	+1%
7	+1%



A. Based on 4 prototype models per Climate Zone: 1-story slab (CZ 1-3) or basement (CZ4+) foundation; 1-story crawlspace; 2-story slab or basement foundation (depending on CZ); 2-story interior TH unit on slab or basement foundation (depending on CZ)

UA Tradeoffs Offer Flexibility

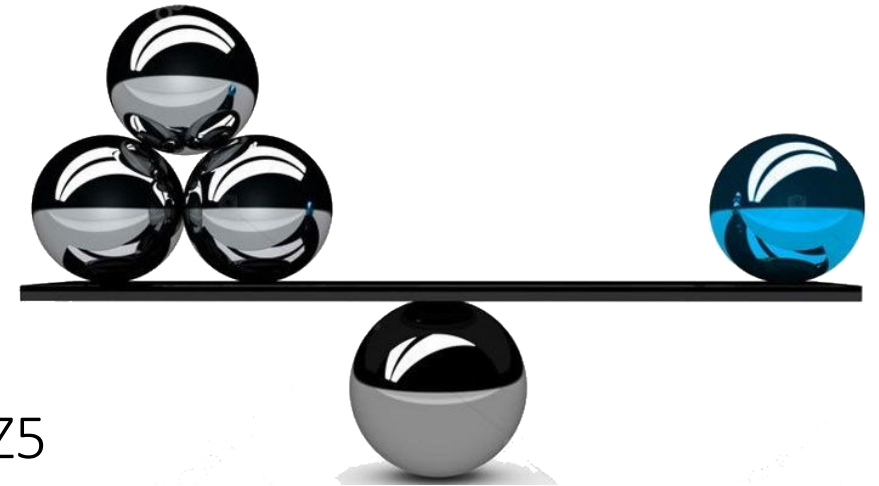
- ZERH allows the use of a UA tradeoff



<https://www.viprealtyinfo.com/blog/pros-and-cons-of-a-pre-listing-home-inspection.html>

Tradeoff

- A trade off refers to putting something **more in one** assembly so you can put something **less in another**
- HOWEVER, **in the IECC's case the energy performance scale remains balanced**
- You can tradeoff R-values, U-values, air tightness, duct leakage, etc. depending on the compliance path you are using



- The **blue ball is attic insulation R38**
- The prescriptive R-value path says it must be R60 in CZ5
- The **3 silver balls balanced the energy equation because they represent better windows, air tightness, and reduced duct leakage** than is required by the IECC
- Therefore, I traded off less attic R-value for better windows, air tightness and duct leakage

Thermal Breaks

Above Grade Walls

Climate Zones 4-8

Must provide thermal breaks



Windows

Windows meet high performance requirements based on climate

- Based on ENERGY STAR v6.0 specs
- *Advisory:* DOE is monitoring the development of the planned update to the **ENERGY STAR product specifications for residential windows (v7.0)**, and plans to adopt these in a future program update

Windows					
	2021 IECC Climate Zones				
	1 – 2	3	4 (except Marine)	4 Marine and 5	6 – 8
U-Value	0.40	0.30	0.30	0.27	0.25
SHGC	0.23	0.25	0.40	Any	Any



Window Updates

Program Component	ZERH Version 1	ZERH Version 2.0 Proposed	Rationale
Window U/SHGC Values	Based on ENERGY STAR V5.0 or V6.0 specs	Based on ENERGY STAR V6.0 specs; Very Cold Climates (6-8) more rigorous at U 0.25	Updates minimum window requirements. Higher performance windows will likely be used as part of UA tradeoff strategies.



3. HVAC

Optimized
Comfort
System



<https://www.kriegermechanical.com/residential.php>



+

- Optimized Duct Location
- RH Control In Hot/Humid Climates

=



Duct Systems — no significant change

All ducts and heating and cooling air-handling equipment are located within the thermal and air barrier boundary

- Some exceptions apply



<https://www.greenbuildingadvisor.com/article/how-to-get-your-ducts-inside-the-building-enclosure>

HVAC Design Updates

Program Component	ZERH Version 1	ZERH Version 2.0 Proposed	Rationale
HVAC and Duct Location	Requires ducts & HVAC equipment to be located in an optimized location	Same as V1. Clarification: only applies to equipment & ducts serving heating/cooling systems.	Improve HVAC efficiency, reduce demand, and improve comfort.

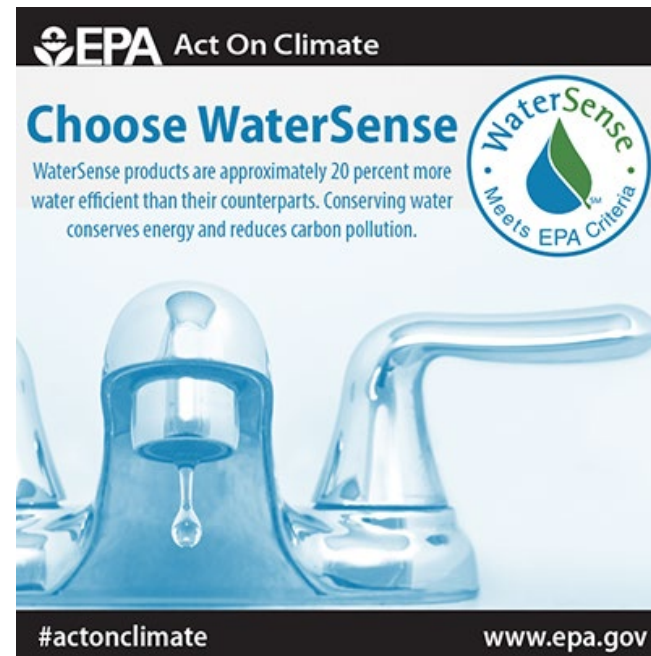


4. Water Efficiency - no significant change

Hot water delivery systems meet efficient design requirements

or

Water heater and fixtures meet efficiency criteria



Water Efficiency Mandatory



Hot water circulation systems requirements

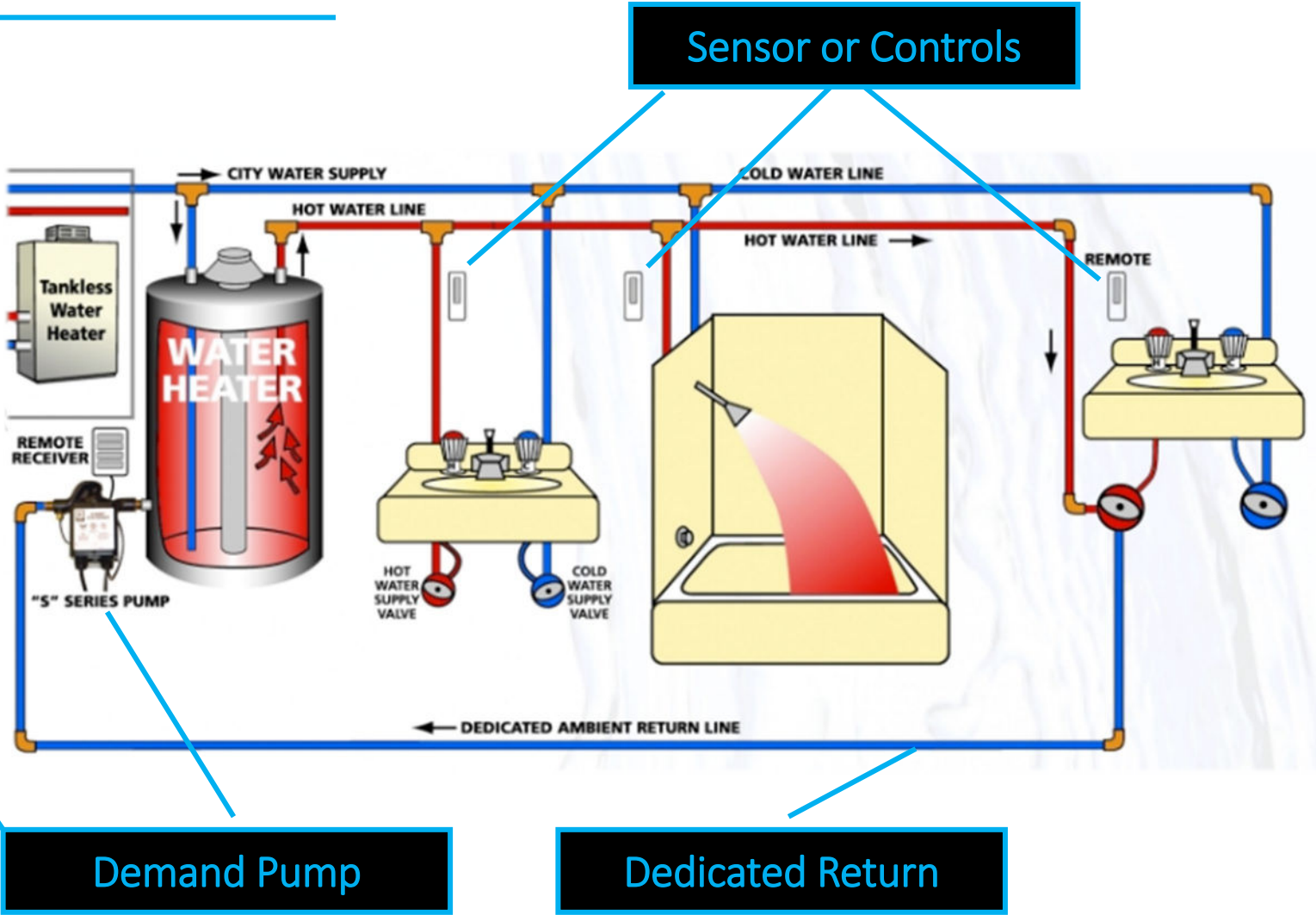
- Based on EPA WaterSense Specifications:
 - ≤ 0.5 gallons of water in any piping/manifold between hot water source and any hot water fixture
- Tested:
 - By the time the flow at the furthest fixture has + 10F temp increase, no more than 0.6 gallons of water has been delivered

OR

- Water heaters and fixtures shall meet efficiency criteria
 - Gas water heaters - Energy Factor ≥ 0.90 or a Uniform Energy Factor ≥ 0.87
 - Electric water heaters - Energy Factor ≥ 2.2 or a Uniform Energy Factor ≥ 2.2
 - All Water fixtures shall be WaterSense labeled
 - The hot water distribution system shall store no more than 1.2 gallons between the hot water source and the furthest fixture



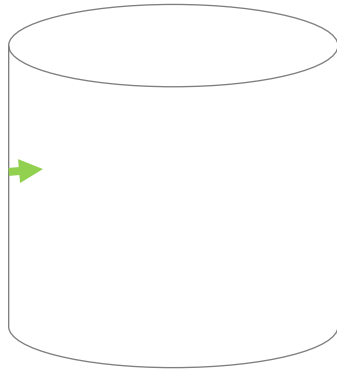
Demand Pumping System



Verifying Efficient Hot Water Distribution



0.6 gal

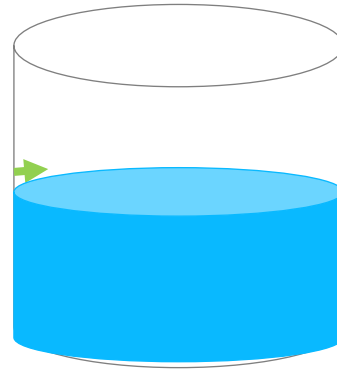


Prime loop (if applicable)

Start flow

Take T_{init} (of flow)

0.6 gal



Stop at 0.6 gallons

Take T_{fin} (of flow)

$T_{fin} - T_{init}$
must be at least 10 F

5. Lights and Appliances

Efficient
Comps



<https://www.retrofoamofmichigan.com/blog/energy-star-appliances>



ENERGY STAR:

- Appliances
- Exhaust Fans
- Ceiling Fans
- Water Heating*



Efficient:

- Lighting
- Hot Water Distribution
- Equipment*



Efficient Components



- Zero Energy Ready Home requires:
- **ENERGY STAR Certified Appliances*:**
refrigerators, dishwashers, clothes washers & Dryers
- **ENERGY STAR Certified Fans*:**
bathroom ventilation, ceiling fans
- **ENERGY STAR Certified Lighting:**
Min. 95% of fixtures or lamps (CFL or LED)
 - 2015 IECC requires 75%
 - 2018 IECC requires 90%
 - 2021 IECC requires 100%

*Only when installed by builder



Lighting Updates

Program Component	ZERH Version 1	ZERH Version 2.0 Proposed	Rationale
High Efficiency Lighting	80% requirement	95% requirement	<p>Recognize cost-effectiveness of LEDs and increase ZERH efficiency, while providing a little flexibility.</p> <p>Note that the Target Home assumes 100% high efficiency lighting.</p>



Appliance Updates

Program Component	ZERH Version 1	ZERH Version 2.0 Proposed	Rationale
Energy Efficient Appliances	All builder-installed refrigerators, dishwashers, and clothes washers are ENERGY STAR qualified	All builder-installed refrigerators, dishwashers, clothes washers, <u>and clothes dryers</u> are ENERGY STAR qualified	Recognize ENERGY STAR labeling of clothes dryers and increase ZERH efficiency



6. Indoor Air Plus

Indoor Air
Quality



+



- Radon Resistant
- Low Emission Materials
- Combustion Safe
- High MERV Filter

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Indoor Air Quality Updates

Program Component	ZERH Version 1	ZERH Version 2.0 Proposed	Rationale
Indoor Air Quality	Certify under Indoor airPLUS (IAP) V1	<p>Phase in certification under an updated IAP version over time. IAP Version 1 will be allowed through 2022.</p> <p>H/ERVs in Very Cold Climates (6-8)</p> <p>MERV 13 (minimum) filter installed on ducted heating and cooling systems</p>	<p>Maintain requirement to certify under the federal government's residential IAQ label for new homes.</p> <p>Accelerate the MERV 13 filter requirement (likely to appear in the updated IAP specs)</p>

7. Renewable Ready

Solar Ready



<https://rmi.org/zero-energy-homes/>



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DOE ZERH
PV-Ready Checklist

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ZERH v2 PV-Ready Checklist

ZERH v2 eliminates the exception for sites with lower annual solar resources

Also updates provisions based on current technologies

- Increases PV Readiness in ZERH homes
- Recognizes the major increases in PV cost effectiveness

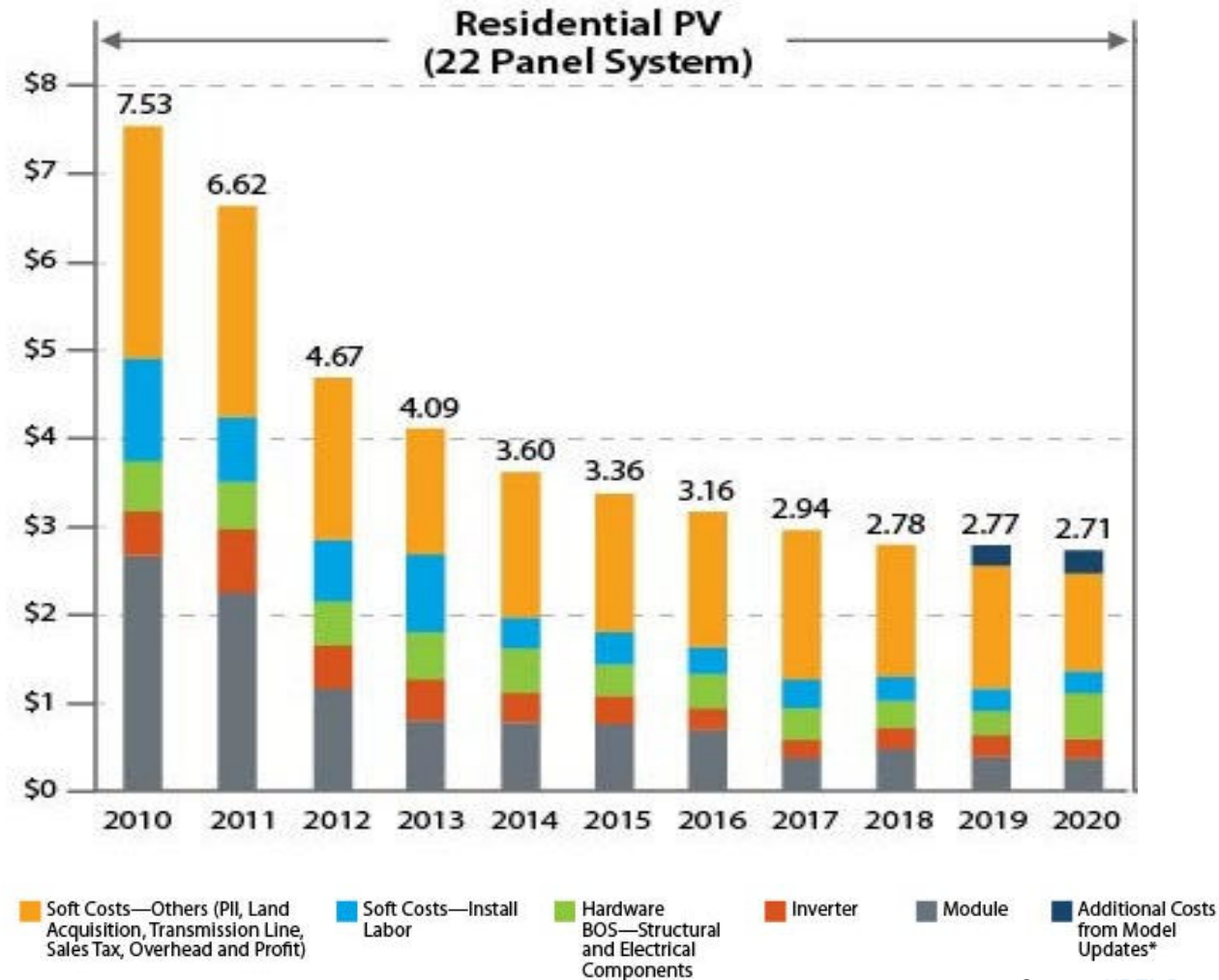


PV Ready Updates

Program Component	ZERH Version 1	ZERH Version 2.0 Proposed	Rationale
Photovoltaic (PV) Readiness	Implement the ZERH PV-Ready Checklist	Same as V1, but eliminates the exception for sites with lower annual solar resources. Also updates provisions based on current technologies.	Increase PV Readiness in ZERH homes and recognize the steady increases in PV cost effectiveness.



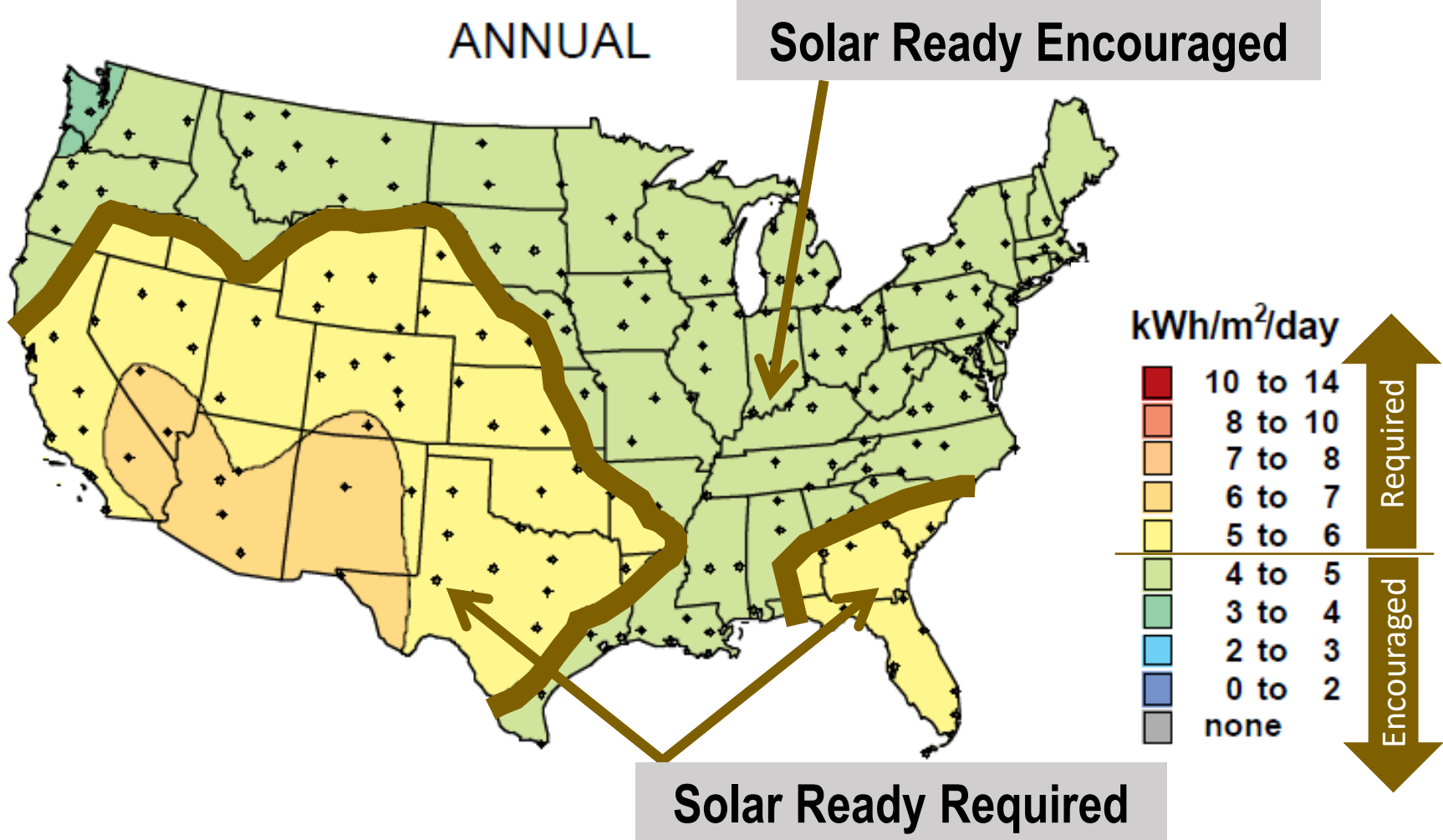
Residential PV System Costs Down 64%



Source: [NREL Documenting a Decade of Cost Decline for PV Systems](#), 2021.

Expand PV-Readiness

Average Daily Solar Radiation Per Month



Update PV Ready Requirements

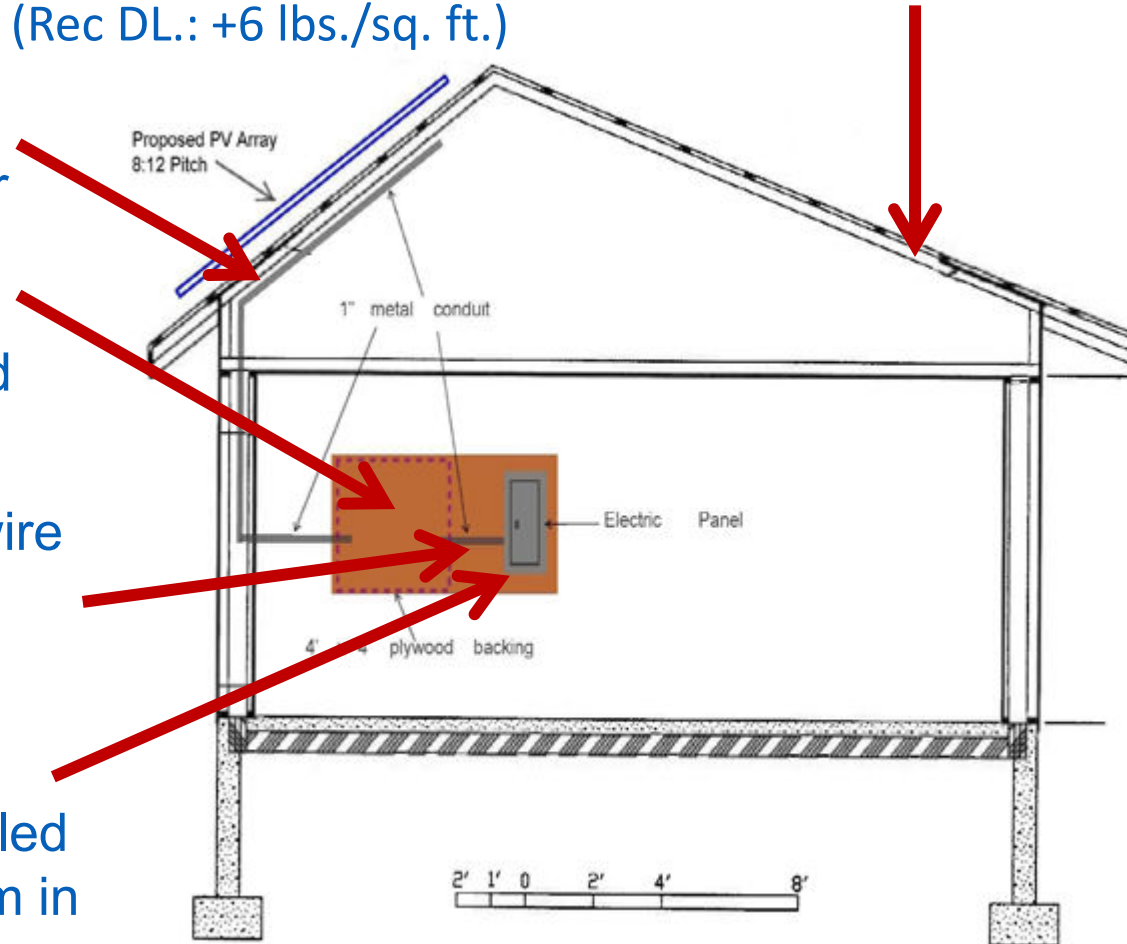
Documentation of the maximum allowable dead load and live load ratings of the existing roof (Rec DL.: +6 lbs./sq. ft.)

Conduit to run DC wire from roof to inverter

Dedicated Area for installing inverter and balance of system

Conduit to run AC wire from inverter location to electric panel

Circuit Breaker designated and/or installed for use by the PV system in the electric panel



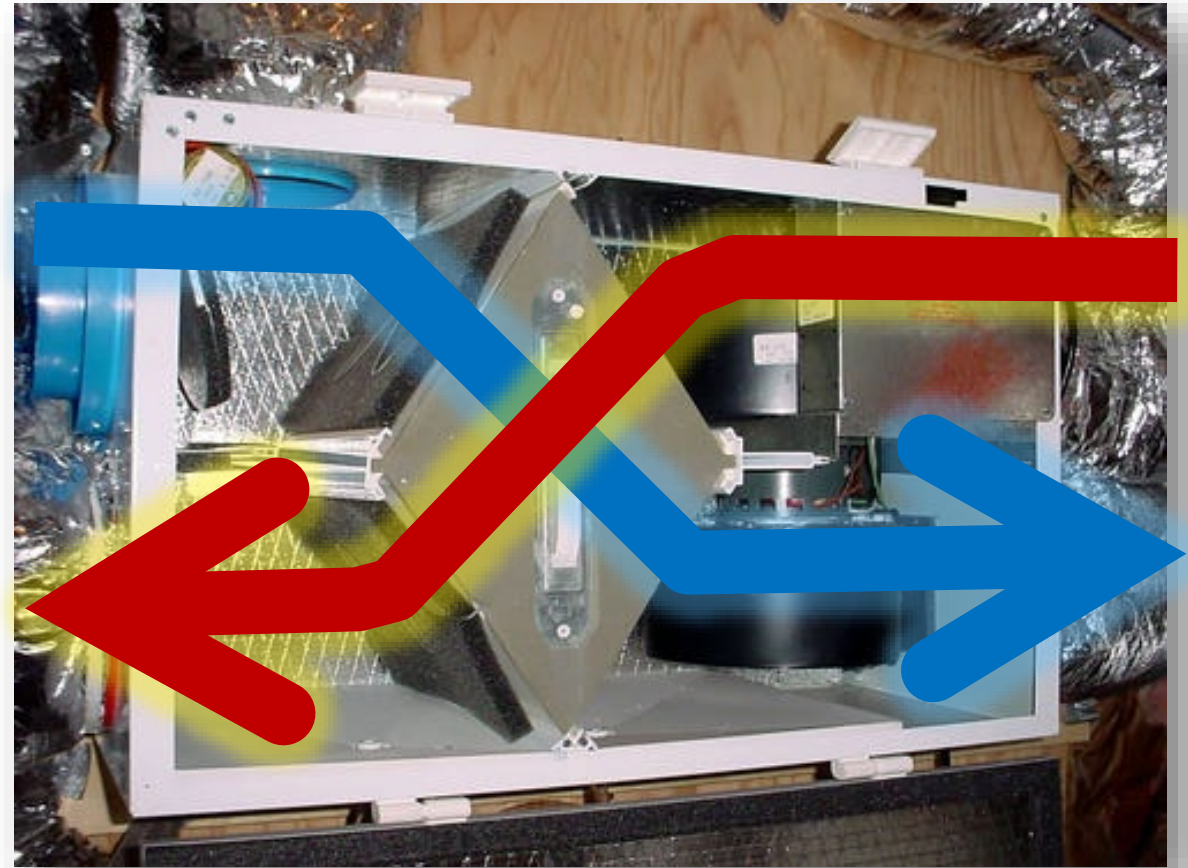
Integration of Clean Energy Technologies

- The ZERH program is committed to working with the EPA to ensure that all home and equipment certification programs continue to evolve towards zero-emission
- They are committed to providing value to both builders and homebuyers in the market



H/ERVs in Cold Climates

- Required in Very Cold Climates Zones 6 – 8
- Provide whole-house ventilation while reducing impact on heating load
- Numerous technology options available



ERV or HRV

ZERH Multifamily Certification

ZERH v1

- Like EnergyStar multifamily 5 stories and less may be certified/labeled



ZERH v2

- **Multifamily buildings will migrate to a new ZERH Multifamily spec**
 - Currently under development to be more efficient than ESMFNC
 - When released it will be phased in
 - Anticipated to be used for any size multifamily project
 - Anticipated to release same time as single family v2.



Builder Incentives

ENERGY STAR New Homes



©2022

Thinking [ZERO](#) to 360°

BUILD *Tank* inc.

Program Requirements

1. Xcel is the gas utility or no gas utility
2. Homes are HERS Rated
3. At least 10% better than adopted IECC code



Builder Incentives - Performance

ENERGY STAR CERTIFIED REBATE – COMBO AND ALL-ELECTRIC HOMES (NO CHANGE)

ENERGY STAR Certified

\$100

REBATES FOR COMBINATION GAS AND ELECTRIC HOMES

2009 IECC OR LOWER AND PERCENT BTC	
Percent BTC	Rebate
10% – 14.999%	\$200
15% – 19.999%	\$350
20% – 24.999%	\$500
25% – 29.999%	\$650
30% – 34.999%	\$800
35% – 39.999%	\$1,000
40% and higher	\$1,400

2012–2018 IECC AND PERCENT BTC	
Percent BTC	Rebate
10% – 14.999%	\$250
15% – 19.999%	\$400
20% – 24.999%	\$600
25% – 29.999%	\$900
30% – 34.999%	\$1,300
35% – 39.999%	\$2,000
40% and higher	\$2,550

2021 IECC AND PERCENT BTC	
Percent BTC	Rebate
10% – 14.999%	\$300
15% – 19.999%	\$550
20% – 24.999%	\$1,000
25% – 29.999%	\$1,500
30% – 34.999%	\$2,500
35% – 39.999%	\$4,000
40% and higher	\$4,750

REBATES FOR GAS-ONLY HOMES (NEW INCENTIVES)

2009 IECC OR LOWER AND PERCENT BTC	
Percent BTC	Rebate
10% – 14.999%	\$100
15% – 19.999%	\$175
20% – 24.999%	\$250
25% – 29.999%	\$325
30% – 34.999%	\$400
35% – 39.999%	\$500
40% and higher	\$700

2012–2018 IECC AND PERCENT BTC	
Percent BTC	Rebate
10% – 14.999%	\$125
15% – 19.999%	\$200
20% – 24.999%	\$300
25% – 29.999%	\$450
30% – 34.999%	\$650
35% – 39.999%	\$1,000
40% and higher	\$1,275

2021 IECC AND PERCENT BTC	
Percent BTC	Rebate
10% – 14.999%	\$150
15% – 19.999%	\$275
20% – 24.999%	\$500
25% – 29.999%	\$750
30% – 34.999%	\$1,250
35% – 39.999%	\$2,000
40% and higher	\$2,375



Builder Incentives – Performance All Electric

REBATES FOR ELECTRIC-ONLY HOMES

IECC 2018 OR LOWER AND PERCENT BTC		2021 IECC AND PERCENT BTC	
Percent BTC	Rebate	Percent BTC	Rebate
10% – 14.999%	\$500	10% – 14.999%	\$600
15% – 19.999%	\$800	15% – 19.999%	\$1,100
20% – 24.999%	\$1,200	20% – 24.999%	\$2,000
25% – 29.999%	\$2,800	25% – 29.999%	\$3,000
30% – 34.999%	\$3,900	30% – 34.999%	\$5,000
35% – 39.999%	\$5,200	35% – 39.999%	\$8,000
40% and higher	\$6,700	40% and higher	\$9,500

Note: Electric-only homes incentives require electric space heating and water heating. Homes with gas cooking appliances, fireplaces, or other secondary gas appliances will still qualify for the electric-only incentives.



Builder Incentives – Prescriptive

APPLIANCE REBATES

Note that the ENERGY STAR smart thermostat and heat pump water heater measures have Qualified Products Lists.

APPLIANCE REBATE LEVELS FOR QUALIFYING HOMES	
Appliance	Rebate
ENERGY STAR clothes washer	\$40
ENERGY STAR clothes dryer	\$30
Heat pump water heater	\$600
Heat pump water heater with CTA2045 port	\$800
ENERGY STAR certified smart thermostat	\$50
ENERGY STAR radon fan	\$20
High efficiency shower head (1.5 GPM)	\$3.50
High efficiency kitchen aerator (1.5 GPM)	\$1.25
High efficiency lavatory aerator (0.5 GPM)	\$1.50



Rater Incentives

HERS RATER PERFORMANCE REBATES	
Percent BTC	Rebate
10% – 19.999%	\$75
20% – 29.999%	\$150
30% and higher	\$225



Contact Information

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- erik.straite@residentialscience.com



Possible 45L changes

- The current credit expired on December 31, 2020
- The 45L Credit allowed Builders to claim a \$2,000 tax credit for each newly constructed residence that was 50% more efficient than the 2006 IECC
- It applies to single family homes, apartments, condominiums, assisted living homes, student housing, and other types of residences



Possible 45L changes

- Extend the credit from December 31, 2020, to December 31, 2025
- Changes the benchmark from 50% more efficient than the 2006 IECC to 15% more efficient than the 2018 IECC
- Increases the credit from \$2,000 to \$2,500
- Single family and manufactured homes.
 - Single-family homes could demonstrate that they meet the most recent EnergyStar Single-Family New Homes Program requirements
 - Manufactured homes could demonstrate they meet the most recent EnergyStar Manufactured Home National Program requirements



Possible 45L changes (DOE ZERH)

- This provision would provide a higher tier credit of **\$5,000**
 - For eligible single-family and manufactured new homes certified as zero-energy ready under the Department of Energy Zero Energy Ready Home Program



Possible 45L changes Multi Family

- Multifamily homes eligible to participate in the ENERGY STAR Multifamily New Construction Program could receive a base credit of \$500 and a bonus credit of \$2,500 for multifamily units that meet:
 - The most recent **EnergyStar multifamily New Construction Program**
- DOE ZERH higher tier:
 - Base credit of \$1,000 or a bonus credit of \$5,000 for eligible multifamily units certified as a zero-energy ready under the U.S. Department of Energy Zero Energy Ready Home Program



<https://www.usgbc.org/education/sessions/how-use-energy-star-multifamily-new-construction-program-12233028>

How to Communicate Zero?

Marketing benefits



Leverage ZERH 'Brand'



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Take the zero energy
ready home tour.

energy.gov/zero-energy-home-tour

is partnering with the
U.S. Department of Energy
to bring homes of the future
to families today.



Customize Marketing Resources

Homes to the Power of **ZERO**



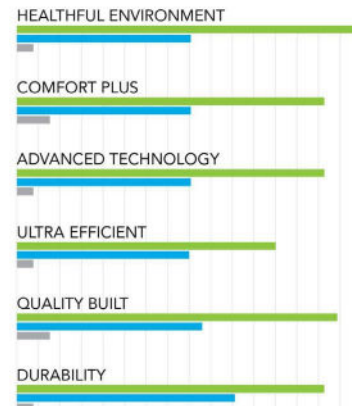
What is the DOE Zero Energy Ready Home™ Label?

It is a Symbol of Excellence for energy savings, comfort, health, quality, and durability met by a select group of leading builders meeting U.S. Department of Energy Guidelines.

What is a Zero Energy Ready Home?

It is a high-performance home so energy efficient, all or most annual energy consumption can be offset with renewable energy. In other words, it is the Home of the Future.

A Symbol of Excellence



KEY
■ DOE Zero Energy Ready Home
■ ENERGY STAR® Certified Home
■ Existing Home

This graphic comparison chart demonstrates relative performance of this DOE Zero Energy Ready Home to existing homes (built between 1990 and 2010) and ENERGY STAR Certified Homes. Actual performance may vary.



Tim O'Brien Homes

DOE Zero Energy Ready Home Partner



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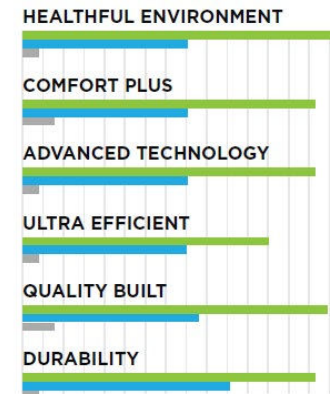
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A Symbol of Excellence



KEY
■ DOE Zero Energy Ready Home
■ ENERGY STAR Certified Home
■ Existing Home

This label indicates relative performance of this DOE Zero Energy Ready Home to existing homes (built between 1990 and 2010) and ENERGY STAR Certified Homes. Actual performance may vary.



A Symbol of Excellence

Every Zero Energy Ready Home offers a cost-effective, high performance package of energy savings, comfort, health, and durability unparalleled in today's marketplace.

ZERH Partner Process



- Become a partner online (builder/developer or rater)
- Identify potential verifier partners at ZERH website
- No pre-registration of projects
- No program certification fees
- Recommend integrated design process (MEPs)
- Rater: plan review & site inspections
- Project Certification – generated by the Rater’s modeling report, once it is uploaded to the RESNET Registry
- Builder credited with certified home on DOE website



Thank You



Thank you!

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@ buildtankinc




On Anchor, Apple, and Spotify




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Analyst . Synergist . Catalyst

Thinking ZERO to 360°




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From Inspection and diagnostics, to IECC or program compliance, our applied building science approach in the field influences everything we do.

Think Tank



We learn from our field work to effect meaningful change in the construction industry in order to take sustainable building to mainstream building.

About



Spending time outside rejuvenates the soul and is part of my story. Find out more....

Thinking ZERO to 360°

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Q&A



Survey

