

# New Pathways to LEED Certification: Production Builder Streamlining & DOE Zero Energy Ready Home

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# Learning Objectives

- Basic requirements of the DOE Zero Energy Ready Home program
- Program requirements of LEED v4 rating system
- DOEZERH alternative compliance path to meet LEED prerequisites and credits.
- DOEZERH pathway can streamline certification process, specifically for production builders



# LEED FOR HOMES

Southern Living Idea Home  
Photo by Rob Moody

**3.1 BILLION** <sup>SQ.</sup>  
<sup>FT.</sup>

OF COMMERCIAL  
LEED® CERTIFIED  
PROJECTS

(CUMULATIVE)

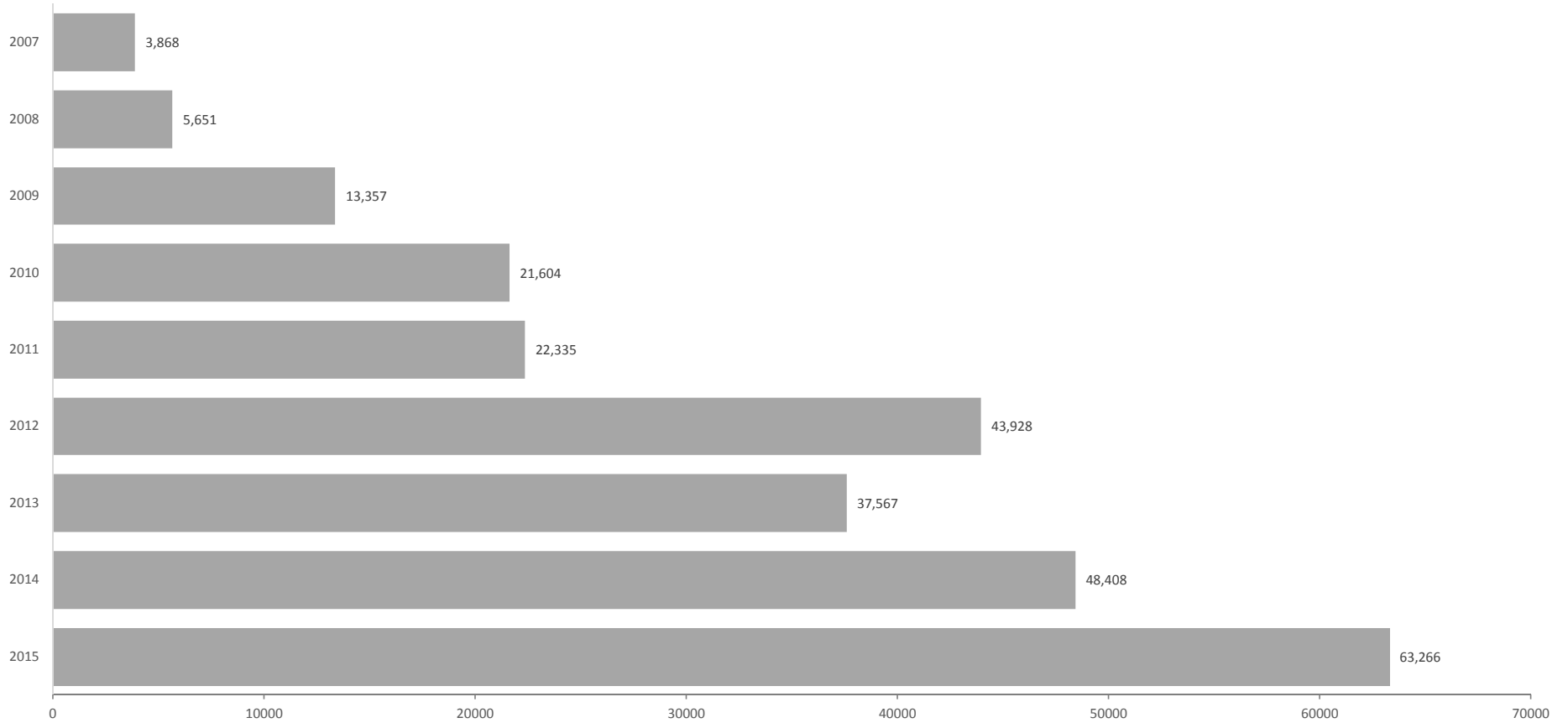


1.7 MILLION

square feet certifies to LEED<sup>®</sup>  
**EACH DAY**

1,250,000

## LEED HOMES CERTIFIED UNITS GROWTH



\*Annual certified units, not cumulative

## Slide 7

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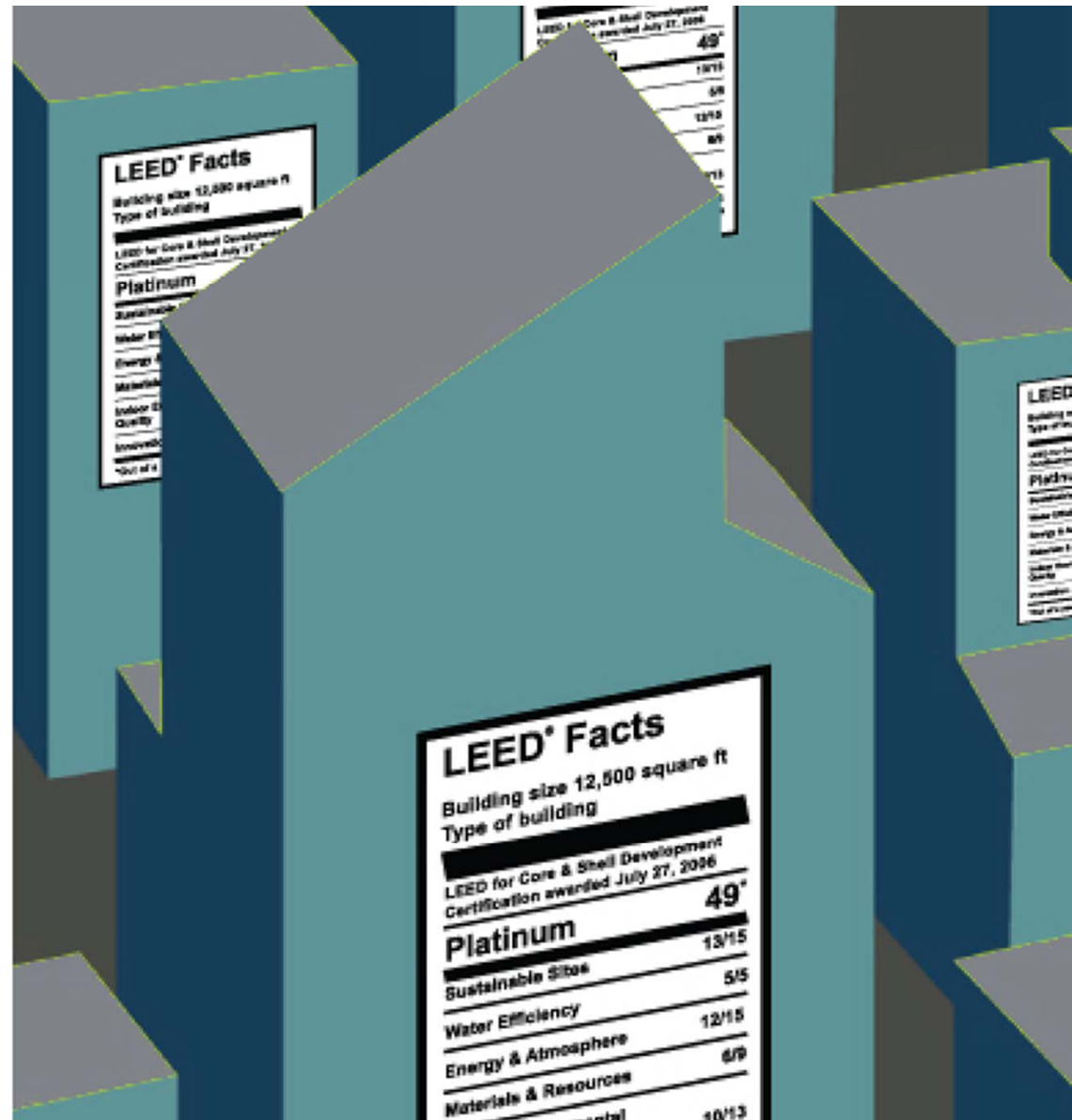
**RB1** Any multi-family and single-family, certified...keep info from 2007, others decide what to keep  
Rachel Brittenham, 8/4/2016

**RB8** 8/5 Updated data  
Rachel Brittenham, 8/5/2016



# LEADERSHIP IN ENERGY AND ENVIRONMENTAL DESIGN

A leading-edge system  
for certifying the greenest  
performing buildings in the  
world.



# CREDIT CATEGORIES



Sustainable Sites (SS)



Awareness & Education (AE)



Location & Linkage (LL)



Materials & Resources (MR)



Water Efficiency (WE)



Indoor Environmental Quality (IEQ)



Energy & Atmosphere (EA)



Innovation & Design Process (ID)

**1** **Project team** selects Verification Team



**2** **Green Rater** performs onsite verification, helps project team submit required documentation, and completes LEED for Homes Workbook



**3** **LEED for Homes Provider** performs quality assurance over the on-site verification and handles submittal to GBCI for final certification



**4** **Verification and Certification** given by GBCI.





# LEED<sup>®</sup> for Homes

## Multi-Family Housing

Gish Apartments— is a LEED for Homes case study



Southern Living Idea Home  
Photo by Rob Moody

# A Rater's Perspective on DOEZERH

- What is Zero Energy **Ready**?
- Interesting Findings
- Sticking Points
- Results



# What does DOE mean by Zero Energy Ready?

- Can a HERS 55 home get to Zero Energy?
  - Sure, with enough roof area
- 12.5kW pV = HERS 0
  - 1000 - 1250 sq ft of pV



# DOEZE Ready H

- DOEZERH uses HERS targets
- Future Proof
  - Rock solid envelope
  - Easy energy neutral later







# What is Zero Energy Ready?

## Maximize

- Thermal Envelope
- Mechanicals
- Everything else

- Lowest HERS is ~40
- 8kW pV = HERS 0
  - 650 sq ft of pV



# DOEZERH isn't Rocket Science



**Exhibit 1: DOE Zero Energy Ready Home Mandatory Requirements for All Labeled Homes**

Area of Improvement	Mandatory Requirements
<b>1. ENERGY STAR for Homes Baseline</b>	<input type="checkbox"/> Certified under ENERGY STAR Qualified Homes Version 3 or 3.1 <sup>9,10</sup>
<b>2. Envelope<sup>11</sup></b>	<input type="checkbox"/> Fenestration shall meet or exceed ENERGY STAR requirements <sup>12,13</sup> <input type="checkbox"/> Ceiling, wall, floor, and slab insulation shall meet or exceed 2012 or 2015 IECC levels <sup>14,15</sup>
<b>3. Duct System</b>	<input type="checkbox"/> Duct distribution systems located within the home's thermal and air barrier boundary or optimized to achieve comparable performance <sup>16</sup>
<b>4. Water Efficiency</b>	<input type="checkbox"/> Hot water delivery systems shall meet efficient design requirements <sup>17</sup>
<b>5. Lighting &amp; Appliances<sup>18</sup></b>	<input type="checkbox"/> All installed refrigerators, dishwashers, and clothes washers are ENERGY STAR qualified. <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
<b>6. Indoor Air Quality</b>	<input type="checkbox"/> Certified under EPA Indoor airPLUS <sup>10</sup>
<b>7. Renewable Ready</b>	<input type="checkbox"/> Provisions of the DOE Zero Energy Ready Home PV-Ready Checklist are Completed; (Solar Hot Water Ready provisions are encouraged but not required) <sup>19</sup>

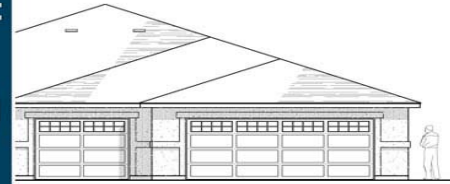
# Interesting Findings

- “Mandatory” 2012 IECC insulation levels
  - Envelope U-factor is tradable in DOEZERH
    - “God is in the footnotes.”
- Mandatory Windows
  - is *actually* Mandatory is *actually mandatory*
- 100% Ducts inside envelope
  - Or footnote 16 if you want to make your life difficult



air requirements  
it or exceed 2012 or 2015 IECC levels<sup>14, 15</sup>

# ZERH Builder Sticking Points



Maybe tricky  
Indoor Air Plus items

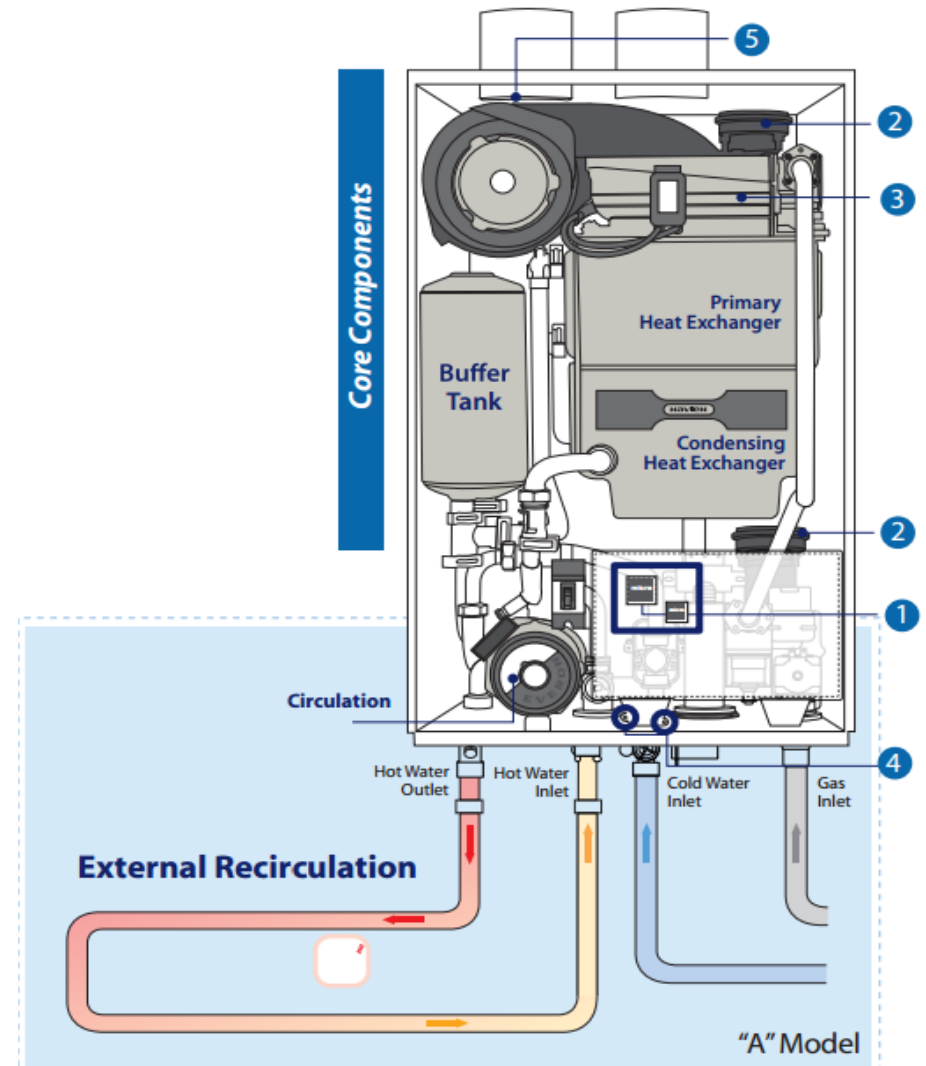
- **Moisture control**
  - Aggregate under slabs?
- **Radon System**
  - Poly / pipe / \*plug\*
- **Duct system**
  - Protection / Cleaning
  - 100% in conditioned space (?)
- **Attached garages**
  - Test the connection or (big!) fan
- **Materials**
  - Paints, carpets, cabinets, wood



# ZERH Builder Sticking Points

## Hot water delivery systems

- Meet WaterSense, more or less
- Might be easier to just do WaterSense!





Why DOEZERH?



27 / 40



## LEED v4 for Homes - DOE Zero Energy Ready Home Path

Credit	Integrative Process	2
<b>0</b>	<b>Location and Transportation</b>	<b>8</b>
Y	Prereq Floodplain Avoidance	Required
Credit	LEED for Neighborhood Development Location	7
Credit	Site Selection (Access to Open Space)	8
Credit	Compact Development	3
Credit	Community Resources	2
Credit	Access to Transit	2
<b>1</b>	<b>Sustainable Sites</b>	<b>7</b>
Y	Prereq Construction Activity Pollution Prevention	Required
Y	Prereq No Invasive Plants	Required
Credit	Heat Island Reduction	2
Credit	Rainwater Management	3
1	Credit Non-Toxic Pest Control	2
<b>0</b>	<b>Water Efficiency</b>	<b>12</b>
Y	Prereq Water Metering	Required
Credit	Total Water Use	12
0	Credit Indoor Water Use	6
Credit	Outdoor Water Use	4
<b>20</b>	<b>Energy and Atmosphere</b>	<b>9</b>
Y	Prereq Minimum Energy Performance	Required
Y	Prereq Energy Metering	Required
Y	Prereq Education of the Homeowner, Tenant or Building Manager	Required
15	Credit Annual Energy Use (DOE Zero Energy Ready Home)	29
3	Credit Efficient Hot Water Distribution System	5
Credit	Advanced Utility Tracking	2
1	Credit Active Solar Ready Design	1
1	Credit HVAC Start-Up Credentialing	1

Key: The calls in green need to be verified

<b>1</b>	<b>Materials and Resources</b>	<b>10</b>
Y	Prereq Certified Tropical Wood	Required
Y	Prereq Durability Management	Required
1	Credit Durability Management Verification	1
Credit	Environmentally Preferable Products	4
Credit	Construction Waste Management	3
Credit	Material Efficient Framing	2
<b>3</b>	<b>Indoor Environmental Quality</b>	<b>16</b>
Y	Prereq Ventilation	Required
Y	Prereq Combustion Venting	Required
Y	Prereq Garage Pollutant Protection	Required
Y	Prereq Radon-Resistant Construction	Required
Y	Prereq Air Filtering	Required
N/A	Prereq Environmental Tobacco Smoke	Required
N/A	Prereq Compartmentalization	Required
Credit	Enhanced Ventilation	3
1	Credit Contaminant Control	2
Credit	Balancing of Heating and Cooling Distribution Systems	3
Credit	Enhanced Compartmentalization	1
1	Credit Enhanced Combustion Venting	2
1	Credit Enhanced Garage Pollutant Protection	2
Credit	Low Emitting Products	3
<b>2</b>	<b>Innovation</b>	<b>6</b>
Y	Prereq Preliminary Rating	Required
2	Credit Innovation (1pt IAP, 1pt ZERH)	5
Credit	LEED AP Homes	1
	<b>Regional Priority</b>	<b>4</b>
Credit	Regional Priority	4
<b>27</b>	<b>TOTALS</b>	<b>Possible Points: 110</b>

**Certified:** 40 to 49 points, **Silver:** 50 to 59 points, **Gold:** 60 to 79 points, **Platinum:** 80 to 110

# ZERH + Water Efficiency $\approx$ LEED

To earn 3 water efficiency points, install WaterSense qualified products, such as:

1.5 gpm lavatory faucets for 1 point or 1.0 gpm faucets for 2 points

1.75 gpm showers for 1 point or 1.5 gpm for 2 points

1.1 gpf toilets for 1 point

or ENERGY STAR qualified clothes washers for 1 point

Projects may also earn up to 4 points by installing water savings landscaping, specifically minimizing turf area







## LEED v4 for Homes - DOE Zero Energy Ready Home Path

<b>2</b>	Credit	Integrative Process	<b>2</b>
<b>5 Location and Transportation 8</b>			
Y	Prereq	Floodplain Avoidance	Required
	Credit	LEED for Neighborhood Development Location	7
5	Credit	Site Selection (Access to Open Space)	8
	Credit	Compact Development	3
	Credit	Community Resources	2
	Credit	Access to Transit	2
<b>1 Sustainable Sites 7</b>			
Y	Prereq	Construction Activity Pollution Prevention	Required
Y	Prereq	No Invasive Plants	Required
	Credit	Heat Island Reduction	2
	Credit	Rainwater Management	3
1	Credit	Non-Toxic Pest Control	2
<b>4 Water Efficiency 12</b>			
Y	Prereq	Water Metering	Required
	Credit	Total Water Use	12
4	Credit	Indoor Water Use	6
	Credit	Outdoor Water Use	4
<b>25 Energy and Atmosphere 9</b>			
Y	Prereq	Minimum Energy Performance	Required
Y	Prereq	Energy Metering	Required
Y	Prereq	Education of the Homeowner, Tenant or Building Manager	Required
20	Credit	Annual Energy Use (DOE Zero Energy Ready Home)	29
3	Credit	Efficient Hot Water Distribution System	5
	Credit	Advanced Utility Tracking	2
1	Credit	Active Solar Ready Design	1
1	Credit	HVAC Start-Up Credentialing	1

<b>3 Materials and Resources 10</b>			
Y	Prereq	Certified Tropical Wood	Required
Y	Prereq	Durability Management	Required
1	Credit	Durability Management Verification	1
	Credit	Environmentally Preferable Products	4
	Credit	Construction Waste Management	3
2	Credit	Material Efficient Framing	2
<b>5 Indoor Environmental Quality 16</b>			
Y	Prereq	Ventilation	Required
Y	Prereq	Combustion Venting	Required
Y	Prereq	Garage Pollutant Protection	Required
Y	Prereq	Radon-Resistant Construction	Required
Y	Prereq	Air Filtering	Required
N/A	Prereq	Environmental Tobacco Smoke	Required
N/A	Prereq	Compartmentalization	Required
	Credit	Enhanced Ventilation	3
1	Credit	Contaminant Control	2
2	Credit	Balancing of Heating and Cooling Distribution Systems	3
	Credit	Enhanced Compartmentalization	1
1	Credit	Enhanced Combustion Venting	2
1	Credit	Enhanced Garage Pollutant Protection	2
	Credit	Low Emitting Products	3
<b>2 Innovation 6</b>			
Y	Prereq	Preliminary Rating	Required
2	Credit	Innovation (1pt IAP, 1pt ZERH)	5
	Credit	LEED AP Homes	1
<b>3 Regional Priority 4</b>			
3	Credit	Regional Priority	4

**50 TOTALS** Possible Points: **110**

**Certified:** 40 to 49 points, **Silver:** 50 to 59 points, **Gold:** 60 to 79 points, **Platinum:** 80 to 110

Key: The cells in green need to be verified  
The cells in grey are automatically met by DOE ZERH



RESIDENTIAL FEES	SILVER, GOLD AND PLATINUM LEVEL MEMBERS	ORGANIZATIONAL OR NON-MEMBERS
<b>SINGLE FAMILY (COST PER HOME)</b>		
Registration (1-25 homes)	\$150	\$225
Registration (> 25 homes)	\$50	\$125
Certification (1 home)	\$225	\$300
Certification (per batch submittal)	\$175 per batch	\$225 per batch
	plus \$50 per home	plus \$75 per home





# Resources

- Article explaining LEED v4 Homes and ZERH overlap

<http://www.usgbc.org/articles/doe-and-epa-labels-help-earn-credits-leed-v4-bdc-homes>

- LEED Homes rating system: <http://www.usgbc.org/resources/leed-v4-homes-and-midrise-ballot-version>

- LEED Homes scorecard: <http://www.usgbc.org/resources/leed-v4-homes-design-and-construction-checklist>