Residential Free Resources for the new report format

By: Sandra K. Adomatis, SRA, LEED Green Assoc., GREEN, CDEI™

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Fall of 2019 Release

New White Paper by Freddie Mac

Summary of Findings

Using a national random sample, we conducted an analysis of energy-efficient homes rated between 2013 and 2017 and found:

- From the property value analysis, rated homes are sold for, on average, 2.7% more than comparable unrated homes
- Better-rated homes are sold for 3-5% more than lesser-rated homes.
- From the loan performance analysis, the default risk of rated homes is not, on average, different from unrated homes, once borrower and underwriting characteristics are considered.
- Loans in the high debt-to-income (DTI) bucket (45% and above) that have ratings, however, appear to have a lower delinquency rate than unrated homes.

- Source: ***Energy Efficiency: Valued Added to Properties and Loan Performance***, Freddie Mac, Dated October 2019
  https://sf.freddiemac.com/articles/insights/energy-efficient-home-improvements-can-increase-home-value

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Overview of Studies on Green Features

No.	Study Name	Date Published & Author	Data Period Covered & Market Area	Sales Price Premium Range
1.	*"What is Green Worth? Unveiling High-Performance Home Premiums in Washington, D.C."*	September 2015 Sandra K. Adomatis, SRA Donald Boucher, SRA and Tamora Pappas, SRA Real estate Appraisers	February 2013 – July 2015 Washington, D.C.	Range of 2% to 5%
2.	*"An Early Look at Energy Efficiency and Contributory Value: Case Studies of Residential Properties in the Greater Denver Metro Area"*	Lisa Desmarais, SRA A real estate appraiser Published in 2015	2006 through 2014 data Greater Denver Metro Area	An overall range of 1% to 15% Excluding outliers, the range is 2% to 5%
3.	*"The Market Valuation of Energy Efficient and Green Certified Northwest Homes"*	Taylor Watkins and other appraisers Published May 2013	2014-2015 data (30 pairs) Northwest U.S. Oregon, Washington	A range of -0.2% to 8%
4.	*"An Empirical Assessment of the Value of Green in Residential Real Estate"*	Anjelita Cadena, PhD and Thomas A. Thomson, PhD Published in Appraisal Journal – Winter 2015	October 2008-September 2013 data Bexar County-San Antonio, TX	1% increase for a green certification, 2% increase for green components, and 6% increase for energy efficient features.

Overview of Studies on Green Features

No.	Study Name	Date Published & Author	Data Period Covered & Market Area	Sales Price Premium Range
5.	*"The Value of LEED Homes in the Austin-Round Rock Real Estate Market,"*	Greg Hallman of McCombs School of Business Published 2017	2008-2016 data Austin-Round Rock, TX	A house with a green designation sells for 6% more than one without, and a house with a LEED certification sells for 8% more
6.	*"Appraisers Analyze Data on Pearl Home Certified Sales"*	Sandra K. Adomatis, SRA, LEED Green Assoc.; Donald Boucher, SRA, and Woody Fincham, SRA, AI-RRS; Betsy Hughes, SRA; real estate appraisers Published Fall 2017	2016 and 2017 data Mostly Virginia sales with one sale in Maryland	The Pearl Home Certification Premium study found an average (mean) premium of 5% in the market area where Pearl has established a presence and where agents are marketing the certification effectively. For Pearl-certified homes in all market areas, the average (mean) premium was just over 2%
7.	*Green Homes Sales Prices in Northern California*	Sandra K. Adomatis, SRA, LEED Green Assoc., Denis DeSaix, MAI, SRA -Published January 2018	2015-2017 Sales data in the San Francisco Bay Area	2.19% average sales price premium identified for green features. Marketing of the features needs improvement.

http://www.adomatisappraisalservice.com/

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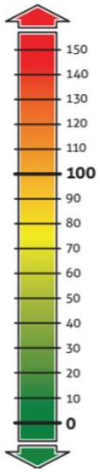
Introducing the RESNET HERS Index



- The national standard by which a home's energy efficiency is inspected, tested and rated.
- A simple, easy to understand system to compare the energy performance of homes.
- A lower HERS Index Score means a home uses less energy.
- A typical home built to 2006 energy efficiency standards scores 100 on the HERS Index.
- A 1-Point change in the HERS Index represents a 1% change in energy use.
- Requires Quality Assurance.

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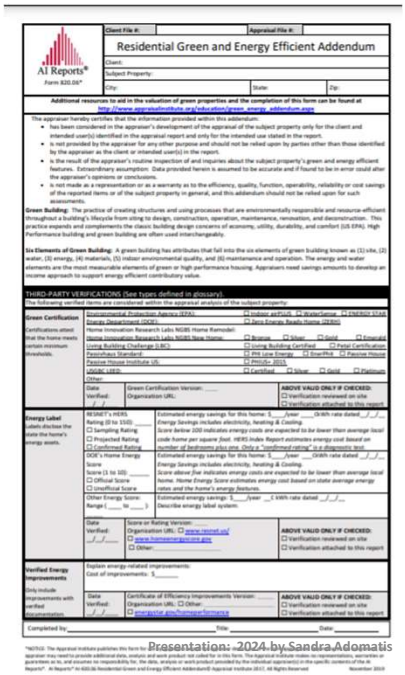
HES versus HERS Reports

- Home Energy score (HES)
  - Typically applied to existing homes –Can't be done on proposed construction
  - Does not give estimated energy cost or savings amount based on a reference home
  - Is not diagnostically tested – more of an inventory of energy assets
  - Gives itemized upgrade list to improve energy efficiency
  - Cost less than a HERS Report
  - No public database to find a HES rated home.

- Home Energy Ratings System (HERS)
  - Can be done from plans & specs or on existing or newly constructed home.
  - Gives an estimated energy cost and savings compared to a 2006 IECC reference home.
  - Requires diagnostic testing – blower door and duct blaster
  - Can provide upgrades for existing homes to improve the efficiency.
  - Cost more than HES.
  - Publicly available by address a https://www.hersindex.com/hers-rated-home-search/



Residential Green and Energy Efficient Addendum

Appraisal Institute Residential Green and Energy Efficient Addendum

RESNET's HERS Rating (0 to 150): _____ ☐ Sampling Rating ☐ Projected Rating ☐ Confirmed Rating	Estimated energy savings for this home: $____/year ____¢kWh rate dated__/__/__ *Energy Savings includes electricity, heating & Cooling.* *Score below 100 indicates energy costs are expected to be lower than average local code home per square foot. HERS Index Report estimates energy cost based on number of bedrooms plus one. Only a "confirmed rating" is a diagnostic test.*
DOE's Home Energy Score Score (1 to 10): _____ ☐ Official Score ☐ Unofficial Score	Estimated energy savings for this home: $____/year ____¢kWh rate dated __/__/__ *Energy Savings includes electricity, heating & Cooling.* *Score above five indicates energy costs are expected to be lower than average local home. Home Energy Score estimates energy cost based on state average energy rates and the home's energy features.*
Other Energy Score: Range (____ to ____):	Estimated energy savings: $____/year __¢ kWh rate dated __/__/__ Describe energy label system:
Date Verified: __/__/____	Score or Rating Version: ____ Organization URL: ☐ www.resnet.us/ ☐ www.homeenergyscore.gov ☐ Other:_____
	ABOVE VALID ONLY IF CHECKED: ☐ Verification reviewed on site ☐ Verification attached to this report

https://www.appraisalinstitute.org/assets/1/7/ResidentialGreenandEnergyEfficientAddendum.pdf

Appraisal Institute Residential Green and Energy Efficient Addendum (AIREEA)

1. Who completes it?

2. Does the completion of one given to an appraiser mean an automatic energy premium?

3. Is the appraiser required to verify the information on the AIRGEEA?

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Support Market Reaction and Acceptance to Energy Features

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View Rated Homes by City or Zip Code

Home Address	City	State	HERS Score	Builder Name	HERS Rating Company	Annual Energy Costs	Annual Savings	Year of Constr.	Energy Star Certified
1 Maple St	Hartford	CT	53	Viking Construction, Inc.	Steven Winter Associat	$1075.86	$619.68	201	Yes
10 Berkeley Dr	Hartford	CT	53	Viking Construction, Inc.	Steven Winter Associat	$1075.86	$619.68	201	Yes
10 Liberty St Fl 1	Hartford	CT	54	CIL	RPM Energy Solutions,	$1402	$529	201	Yes
10 Liberty St Fl 2	Hartford	CT	48	CIL	RPM Energy Solutions,	$1809	$810	201	Yes
10 Nahum Dr Apt A	Hartford	CT	52	Viking Construction, Inc.	Steven Winter Associat	$1217.71	$674.34	201	Yes
10 Nahum Dr Apt B	Hartford	CT	52	Viking Construction, Inc.	Steven Winter Associat	$1217.75	$674.3	201	Yes
10 Nahum Dr Apt C	Hartford	CT	48	Viking Construction, Inc.	Steven Winter Associat	$1111.86	$706.72	201	Yes
10 Nahum Dr Apt D	Hartford	CT	49	Viking Construction, Inc.	Steven Winter Associat	$1128.97	$689.61	201	Yes
100 Crescent St	Hartford	CT	50	Kirchhoff Campus Properties	Steven Winter Associat	$2395	$1597	201	Yes
1001 Carrie Perry Way	Hartford	CT	38	Pennrose, LLC	Innova Building Advisor	$552	$463	201	Yes
1002 Carrie Perry Way	Hartford	CT	42	Pennrose, LLC	Innova Building Advisor	$632	$519	201	Yes
1003 Carrie Perry Way	Hartford	CT	42	Pennrose, LLC	Innova Building Advisor	$589	$459	201	Yes
1004 Carrie Perry Way	Hartford	CT	40	Pennrose, LLC	Innova Building Advisor	$569	$445	201	Yes
1005 Carrie Perry Way	Hartford	CT	42	Pennrose, LLC	Innova Building Advisor	$589	$459	201	Yes
1006 Carrie Perry Way	Hartford	CT	42	Pennrose, LLC	Innova Building Advisor	$632	$519	201	Yes
1007 Carrie Perry Way	Hartford	CT	40	Pennrose, LLC	Innova Building Advisor	$569	$445	201	Yes
1008 Carrie Perry Way	Hartford	CT	42	Pennrose, LLC	Innova Building Advisor	$589	$459	201	Yes
1009 Carrie Perry Way	Hartford	CT	42	Pennrose, LLC	Innova Building Advisor	$632	$519	201	Yes
1010 Carrie Perry Way	Hartford	CT	40	Pennrose, LLC	Innova Building Advisor	$569	$445	201	Yes

Identifying homes with energy ratings and ENERGY STAR Label.

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https://portal.resnet.us/

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Proving Market Reaction = Market Acceptance of Green Features

Search the database by address, city, zip, or state. The populated AI Residential Green and Energy Efficient Addendum can be downloaded from this site.

Source: Green Building Registry

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PV VALUE	Beta Version 0.8.1	File #:	Appraiser Indicated Value:	$14,976.00	$1.30	/watt
	01/22/24 12:55:50 PM	NA	Report Prepared By:	Solar Appraiser		

Subject Property Data							
Address:							
City:		State:	FL	Zip Code:	33980		
Property Type:	Commercial	PV Project Type:	Existing	PV Ownership:	Owned		

Cost Approach Method | Physical Age / Life | Depreciated Cost						
Source:	User 1-22-24 FL	Gross Replacement Cost New:	$18,777.60	$1.63	/watt	
Life:	25	Straight Line Depreciation:	$0.00	$0.00	/watt/yr	
Age:	12	Accumulated SL Depreciation:	$0.00	$0.00	/watt	
Additional Depreciation:		None	$	$ 0.40	/watt	
Additional Depreciation:		None	$	$	/watt	
Estimated Depreciated Value		Cost Approach:	$18,777.60	$1.23	/watt	

Income Approach Method | Energy Value DCF								
Solar Resource		O & M Expense			Utility Rate			
System Size Watts:	11,520	Inverter Size Watts:	11,400		NREL Utility Co:	Florida Power & Light Co		
Module Warranty Yrs:	30	Inverter Warranty Yrs:	10		NREL Utility Rate:	8.72	¢/kWh	
System Age Yrs:	12	Inverter Age Yrs:	12		User Provided Utility Rate:	11.50	¢/kWh	
Remaining Yrs:	18	Inverter Replaced:	No		Utility Rate Used:	11.50	¢/kWh	
Derate Factor:	0.79	Inverter Replacement Cycle Yrs:	15		EIA Escalation Rate:	2.24%	CAGR	
Degradation Rate:	0.50%	Inverter Replacement Cost			User Provided Esc Rate:	- %	CAGR	
Array Tilt:	18.4 °	Survey Data:	55	¢/W	Escalation Rate Used:	2.24%	CAGR	
Array Azimuth:	180 °	User Provided:	-	¢/W	Comments:			
Annual kWh Est:	15,691	Replacement Cost Used:	55	¢/W				
		O & M Exp (future):	$6,336.00					
		O & M Exp (discounted):	$5,189.50					

Cost of Capital		WACC Used	+ Risk Premium	= Discount Rate ➡	Estimated Energy Value / Income Aproach		
Fannie Mae Date:	January 22, 2024		125 Basis Points	7.25%	$14,855.58	$1.29	/watt
Fannie Mae Rate: 30 Yr 90 day	6.10%	6.00%	87.5 Basis Points	6.88%	$15,355.50	$1.33	/watt
User Provided Interest Rate:	6.00%		50 Basis Points	6.50%	$15,890.60	$1.38	/watt

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https://www.pvvalue.com/

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Prepare for the next assignment

Professional Development Program Registry

Interested in connecting with appraisers and other professionals who have successfully completed the courses in the Valuation of Sustainable Buildings program? View either the commercial or residential list below.

Commercial Registry **Residential Registry**

https://www.appraisalinstitute.org/education/professional-development-programs/valuation-of-sustainable-buildings

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Residential Free Resources for the New Report Form, with expert voices from Freddie Mac, the Department of Veterans Affairs, and the Federal Housing Administration.

Webinar: July 18, 2024

Sandra K Adomatis, SRA

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Uniform Residential Appraisal Report Page 4 of 21

Energy Efficient and Green Features

Known Renewable Energy Components	None
Known Building Certifications	None

Green/Energy Efficiency Rating Organization	Rating	Score
RESNET	HERS	62

Energy Efficient and Green Features Impact to Value/Marketability

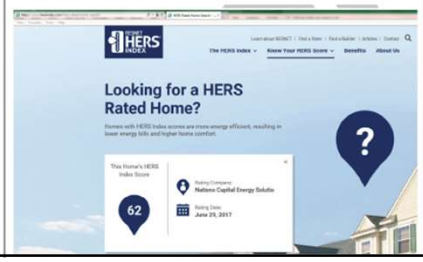
Impact to Value/Marketability	Neutral

Energy Efficient and Green Features Commentary

On average, homes with a HERS Index rating of 62 are 38% more energy efficient than a standard new house.

Energy Efficient and Green Features Exhibits

RESNET HERS Score



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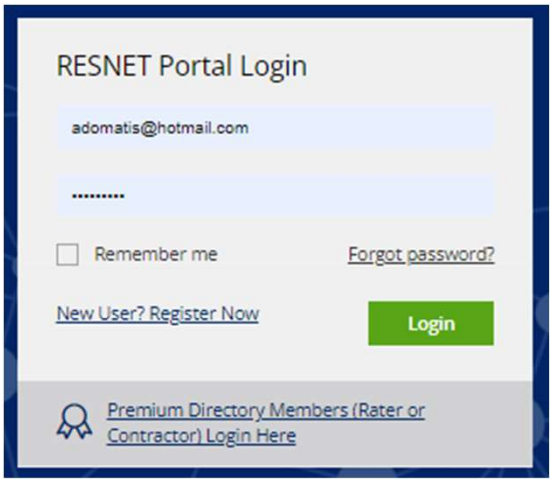
HERS Energy Rating Database



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info@resnet.us to register

3600 appraisers are currently registered out of the 30,000 appraisers doing GSE lending work in 2023.

3 https://portal.resnet.us/

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Knowledge of the HERS Ratings is important!

Differences in HERS Ratings

	Sampling	Projected	Confirmed
Random Testing of a number of houses built by same builder.	X		
Rating based on plans and specifications – preliminary – not tested		X	
Diagnostically tested with blower door and duct blaster			X

A Sampling or Projected rating requires an extraordinary assumption in an appraisal report. Builders should provide a Projected Rating for mortgage lending work to allow appraisers to understand the energy efficiency. A Confirmed Rating cannot be compleIted until the house is completed.

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View Rated Homes by City or Zip Code

Download Excel File

Home Address	City	State	HERS Score	Builder Name	HERS Rating Company Name	Annual Energy Costs	Annual Savings	Year of Constr.	Energy Star Certified	Type of Rating
8032 Quail Creek Rd	Nashville	TN	14	Innovative Building Specialtie	E3 Innovate, LLC	$834	$2874	2015	No	Confirmed Rating
5933 Asberry Ct	Nashville	TN	27	John D Minton Construction Com	E3 Innovate, LLC	$1213	$2549	2016	No	Confirmed Rating
824 Glen Leven Dr	Nashville	TN	37	Bryan and Myers Construction	E3 Innovate, LLC	$2349	$2847	2013	No	Confirmed Rating
615 Old Hickory Blvd Unit 744	Nashville	TN	37	Beazer Homes - Nashville	SkyeTec Energy Rating Services	$792.95	$985	2024	Yes	Confirmed Rating
615 Old Hickory Blvd Unit 745	Nashville	TN	38	Beazer Homes - Nashville	SkyeTec Energy Rating Services	$823.69	$966.58	2024	Yes	Confirmed Rating
615 Old Hickory Blvd Unit 514	Nashville	TN	39	Beazer Homes - Nashville	SkyeTec Rating Services	$800.29	$860.92	2024	Yes	Confirmed Rating
2421 Bear Rd	Nashville	TN	40	Custer Brothers Construction	E3 Innovate, LLC	$2373	$2191	2014	No	Confirmed Rating
615 Old Hickory Blvd Unit 510	Nashville	TN	40	Beazer Homes - Nashville	SkyeTec Rating Services	$794.52	$865.13	2024	Yes	Confirmed Rating
615 Old Hickory Blvd Unit 513	Nashville	TN	40	Beazer Homes - Nashville	SkyeTec Rating Services	$796.69	$863.26	2024	Yes	Confirmed Rating
615 Old Hickory Blvd Unit 733	Nashville	TN	40	Beazer Homes - Nashville	SkyeTec Energy Rating Services	$838.39	$939.86	2024	Yes	Confirmed Rating
615 Old Hickory Blvd Unit 736	Nashville	TN	40	Beazer Homes - Nashville	SkyeTec Energy Rating Services	$801.53	$860.15	2024	Yes	Confirmed Rating
615 Old Hickory Blvd Unit 738	Nashville	TN	40	Beazer Homes - Nashville	SkyeTec Rating Services	$852.58	$914.73	2024	Yes	Confirmed Rating
615 Old Hickory Blvd Unit 511	Nashville	TN	41	Beazer Homes - Nashville	SkyeTec Rating Services	$794.8	$848.82	2024	Yes	Confirmed Rating
615 Old Hickory Blvd Unit 512	Nashville	TN	41	Beazer Homes - Nashville	SkyeTec Rating Services	$821	$840.23	2024	Yes	Confirmed Rating
615 Old Hickory Blvd Unit 515	Nashville	TN	41	Beazer Homes - Nashville	SkyeTec Rating Services	$810.78	$832.97	2024	Yes	Confirmed Rating
615 Old Hickory Blvd Unit 734	Nashville	TN	41	Beazer Homes - Nashville	SkyeTec Energy Rating Services	$800.93	$849.8	2024	Yes	Confirmed Rating
400 Hathaway Ct	Nashville	TN	42		E3 Innovate, LLC	$1915	$1515	2015	No	Confirmed Rating
615 Old Hickory Blvd Unit 516	Nashville	TN	42	Beazer Homes - Nashville	SkyeTec Rating Services	$906.48	$904.6	2024	Yes	Confirmed Rating

Merge the Hers with the MLS to identify homes with HERS Ratings.

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Presentation: 2024 by Sandra Adomatis https://portal.resnet.us/APS/HERSIndexSearch

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Merging the MLS Sales with RESNET Rated Homes gives data to support value using group pairings.

HERS Ratings

Identifier	Sale Price	GLA/SF	HERS Rating
1.	$575,000	1,895	56
2.	$635,000	2,100	54
3.	$595,000	1,995	45
4.	$560,000	1,795	52
5.	$625,000	2,225	55
Avg Sale Price	**$598,000**	**2002**	**52**

No HERS Rating

Identifier	Sale Price	GLA/SF
1.	$570,000	1,825
2.	$585,000	1,900
3.	$625,000	2,100
4.	$555,000	1,765
5.	$615,000	2,250
Avg Sale Price	**$590,000**	**1968**

$8,000 attributed to Energy Efficiency or 1.36%

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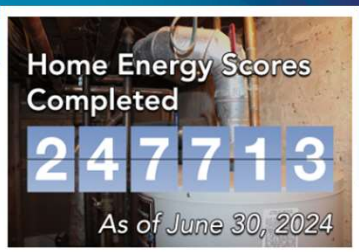
What is a HES?



- An energy efficiency score based on the home's envelope (foundation, roof, walls, insulation, windows) and heating, cooling, and hot water systems
- A total energy use estimate, as well as estimates by fuel type assuming standard operating conditions and occupant behavior
- Recommendations for cost-effective improvements and associated annual cost savings estimates
- A "Score with Improvements" reflecting the home's expected score if cost-effective improvements are implemented

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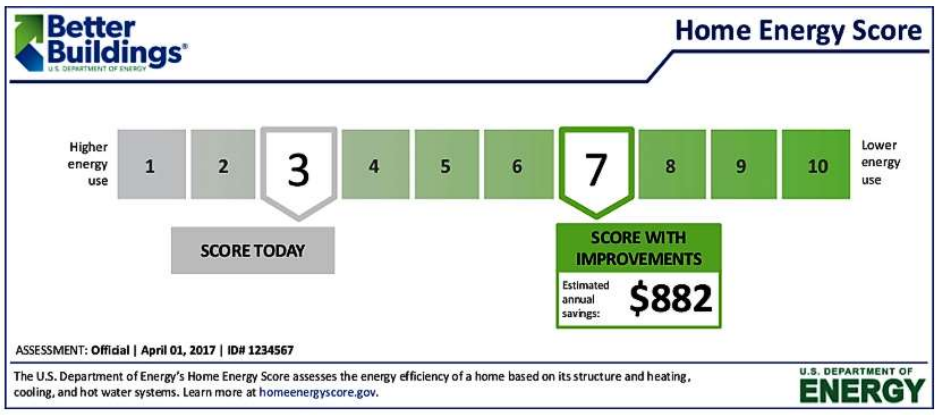
Home Energy Asset Score – Existing homes Ratings - NOT a HERS Rating



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Source. https://www.energy.gov/eere/buildings/

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Dwelling(s)							
Year Built	2004	2004		2004		2001	$0
Dwelling Style	Colonial	Colonial		Colonial		Colonial	
Heating	Forced Warm Air | Natural Gas	Forced Warm Air | Natural Gas		Forced Warm Air | Natural Gas		Forced Warm Air | Natural Gas	
Cooling	Centralized	Centralized		Centralized		Centralized	
Energy Efficient and Green Features			**$0**		**$0**		**$0**
Efficiency Rating	HERS | 62		None		HERS | 61		None
Unit(s)							
Bedrooms	5	4	$10,000	4	$10,000	4	$10,000
Baths - Full | Half	3 | 1	2 | 1	$10,000	2 | 2	$5,000	3 | 1	
Finished Area Above Grade	3,002 Sq. Ft.	3,260 Sq. Ft.	($10,300)	2,804 Sq. Ft.	$7,900	2,816 Sq. Ft.	$7,400
Finished Area Below Grade	1,300 Sq. Ft.	0 Sq. Ft.	$26,000	1,200 Sq. Ft.	$2,000	1,328 Sq. Ft.	$0
Unfinished Area Below Grade	230 Sq. Ft.	1,624 Sq. Ft.	($13,940)	66 Sq. Ft.	$1,640	148 Sq. Ft.	$0
Basement Access	Walk Out	Walk Up	$2,000	Walk Up	$2,000	Walk Out	

Quality and Condition (Ratings: 1-6, 1 is highest)				
Exterior Quality and Condition				
Quality	**Q4**	**Q4**	**Q4**	**Q4**
Exterior Walls and Trim	Vinyl	Vinyl	Vinyl	Vinyl
Roof	Composition	Composition	Composition	Composition
Condition	**C4**	**C4**	**C4**	**C4**
Interior Quality and Condition				
Quality	**Q4**	**Q4**	**Q4**	**Q4**
Condition	**C4**	**C4**	**C4**	**C4**
Kitchen	Not Updated	Partially Updated	Not Updated	Not Updated
Overall Flooring	Not Updated	Not Updated	Not Updated	Not Updated

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AI Residential Green and Energy Efficient Addendum – Solar Page

Solar Panels

The following items are considered within the appraisal analysis of the subject property:

Solar Photovoltaic (Electric) System		
	Array # ___	Array # ___ (if applicable)
Type of Ownership	☐ Leased ☐ Owned ☐* Solar Loan with UCC Filing ☐ Power Purchase Agreement (PPA) *If solar loan has UCC Filing, it is considered personal property and should not be included in market value.	☐ Leased ☐ Owned ☐ Solar Loan ☐ UCC Filing ☐ Power Purchase Agreement (PPA)
Panel Specifications	System Size: ___ kW (1kW = 1000 Watts) Year Installed: ___ II: ___ Energy Production: ___ kWh Source of Energy Production Estimate: ___ Manufacturer: ___ Warranty on Panels: ___ years	System Size: ___ kW (1kW = 1000 Watts) Year Installed: ___ Energy Production: ___ kWh Source of Energy Production Estimate: ___ Manufacturer: ___ Warranty on Panels: ___ years
Array Placement Affects energy production. *Orientation	☐ Fixed Mount ☐ Tracking Mount Tilt / Slope: ___ *Azimuth: ___	Tilt / Slope: ___ Azimuth: ___
Inverter Specifications	Number of Inverters per Array: ___ Year Installed: ___ Wattage: ___ watts Manufacturer: ___ Warranty Term: ___ years	Number of Inverters per Array: ___ Year Installed: ___ Wattage: ___ watts Manufacturer: ___ Warranty Term: ___ years
Energy Storing Batteries	Battery Type: ☐ Lithium-ion ☐ Lithium-ion Polymer ☐ Lead Acid ☐ Lead Calcium ☐ AGM ☐ GEL Manufacturer: ___ Storage Capacity: ___ kWh Warranty Term: ___ years Year Installed: ___	
Name of Utility Company:		Charge / kWh from Utility: $ ___ / kWh

https://www.appraisalinstitute.org/search?query=AI+Residential+Green+and+Energy+Efficient+Addendum

Page 3 of AI Residential Green and Energy Eff. Addendum

This document provides

1. **Inspection checklist**
2. **Details to analysis energy production value**
3. **Communication tool**

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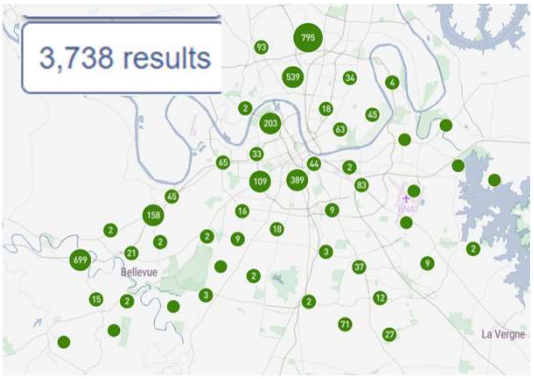
Energy & Green Features In Nashville, TN



Heat map exhibit to show market acceptance of these features and a database to find details on properties.

GBR

Single- and multi- unit properties

https://us.greenbuildingregistry.com/green-homes

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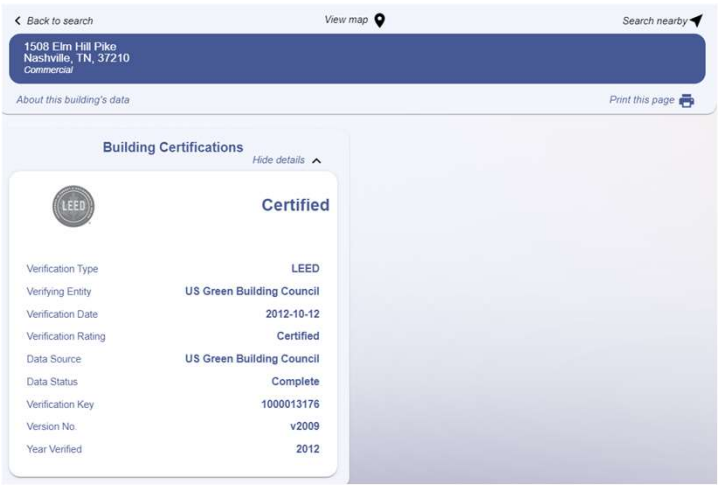
Green Building Registry Data



An exhibit for the appraisal report and confirmation of the standard or features.

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https://us.greenbuildingregistry.com/green-homes/TN10014874

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Energy Rating Index (ERI)

The Energy Rating Index (ERI) is an optional compliance path, incorporated in the International Energy Conservation Code (IECC) since 2015. In the 2018 IECC, ANSI/RESNET/ICC Standard 301 serves as the basis for the ERI calculation methodology. The 2015 and 2018 IECC specify an ERI Target Score for each climate zone, as follows:

Climate Zone	2015 IECC	2018 IECC
1	52	57
2	52	57
3	51	57
4	54	62
5	55	61
6	54	61
7	53	58
8	53	58

Nearly all states and local jurisdictions use the IECC as the basis for their residential energy code. The ERI has been adopted in at least 15 States and over 300 local jurisdictions, as an energy code compliance option. RESNET's HERS® Index is the most common program for demonstrating compliance with the ERI.

https://www.resnet.us/about/code-officials/adoption-of-hers-index-and-eri/

Some states use ERI as the energy code compliance option. If your state has adopted this option, the ERI is found on the building permit documents.

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Questions?

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AI Green Registry Course Requirements

Valuation of Sustainable Buildings Registry

Residential Series	Commercial Series
Introduction to Green Buildings: Principles & Concepts *(classroom/online)*	Introduction to Green Buildings: Principles & Concepts *(classroom/online)*
Case Studies in Appraising Green Residential Buildings *(classroom/online)*	Practical Applications in Appraising Green Commercial Properties OR Case Studies in Appraising Green Commercial Buildings *(online)*
Residential & Commercial Valuation of Solar *(classroom/online)*	Residential & Commercial Valuation of Solar *(classroom/online)*

https://www.appraisalinstitute.org/assets/1/7/Green_FAQs.pdf

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Thank you for attending!

Sandra K Adomatis, SRA, LEED Green Assoc, GREEN, IDEC
Sadomatis@appraisalinstitute.org

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Client File #:		Appraisal File #:	

Residential Green and Energy Efficient Addendum

Appraisal Institute™
AI Reports®
Form 820.06*

Client:		
Subject Property:		
City:	State:	Zip:

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

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 (US EPA). 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 environmental quality, and (6) maintenance and operation. The energy and water elements are the most measurable elements of green or high performance housing. Appraisers need savings amounts to develop an income approach to support energy efficient contributory value.

THIRD PARTY VERIFICATIONS (See types defined in glossary).

The following verified items are considered within the appraisal analysis of the subject property:

Green Certification

Certifications attest that the home meets certain minimum thresholds.

Environmental Protection Agency (EPA): ☐ Indoor airPLUS ☐ WaterSense ☐ ENERGY STAR
Energy Department (DOE): ☐ Zero Energy Ready Home (ZERH)
Home Innovation Research Labs NGBS Home Remodel:
Home Innovation Research Labs NGBS New Home: ☐ Bronze ☐ Silver ☐ Gold ☐ Emerald
Living Building Challenge (LBC): ☐ Living Building Certified ☐ Petal Certification
Passivhaus Standard: ☐ PHI Low Energy ☐ EnerPhit ☐ Passive House
Passive House Institute US: ☐ PHIUS+ 2015
USGBC LEED: ☐ Certified ☐ Silver ☐ Gold ☐ Platinum
Other:

Date Verified: __/__/____	Green Certification Version: ____ Organization URL: _____	**ABOVE VALID ONLY IF CHECKED:** ☐ Verification reviewed on site ☐ Verification attached to this report

Energy Label

Labels disclose the state the home's energy assets.

RESNET's HERS Rating (0 to 150): _____ ☐ Sampling Rating ☐ Projected Rating ☐ Confirmed Rating	Estimated energy savings for this home: $____/year ____¢kWh rate dated__/__/__ *Energy Savings includes electricity, heating & Cooling.* *Score below 100 indicates energy costs are expected to be lower than average local code home per square foot. HERS Index Report estimates energy cost based on number of bedrooms plus one. Only a "confirmed rating" is a diagnostic test.*
DOE's Home Energy Score Score (1 to 10): _____ ☐ Official Score ☐ Unofficial Score	Estimated energy savings for this home: $____/year ___¢kWh rate dated __/__/__ *Energy Savings includes electricity, heating & Cooling.* *Score above five indicates energy costs are expected to be lower than average local home. Home Energy Score estimates energy cost based on state average energy rates and the home's energy features.*
Other Energy Score: Range (____ to ____): _____	Estimated energy savings: $____/year __¢ kWh rate dated __/__/__ Describe energy label system:

Date Verified: __/__/____	Score or Rating Version: ____ Organization URL: ☐ www.resnet.us/ ☐ www.homeenergyscore.gov ☐ Other:_____	**ABOVE VALID ONLY IF CHECKED:** ☐ Verification reviewed on site ☐ Verification attached to this report

Verified Energy Improvements

Only include improvements with verified documentation.

Explain energy-related improvements:
Cost of improvements: $_____

Date Verified: __/__/____	Certificate of Efficiency Improvements Version: _____ Organization URL: ☐ Other: _____ ☐ energystar.gov/homeperformance	**ABOVE VALID ONLY IF CHECKED:** ☐ Verification reviewed on site ☐ Verification attached to this report

Completed by:_____ Title:_____ Date:_____

Client:			

EFFICIENCY FEATURES (Water, Energy, and Environmental. See types defined in glossary).

The following items are considered within the appraisal analysis of the subject property:

Insulation	☐ Fiberglass Blown-In ☐ Foam Insulation ☐ Cellulose ☐ Fiberglass Batt Insulation ☐ R-Value ____Wall ____Ceiling ☐ Other (Describe): _____					
Building Envelope	Envelope Tightness: _____ Unit: ☐ __CFM25 ☐__ CFM50 ☐__ ACH50 ☐__ ACH natural Instructions: Insert the rating as a number that could be 0.5 to 7ACH50 or higher. The lower the number, the more air tight the envelope. Building Codes for area show maximum Envelope Tightness allowed based on the climate zone. Not all areas have adopted a building code. https://www.gbca.org.au/uploads/68/34884/Building%20Air%20Tightness.pdf					
Windows	☐ ENERGY STAR®	☐ Low E	☐ High Impact	☐ Storm	☐ Double Pane ☐ Triple Pane	☐ Tinted	☐ Solar Shades
Day Lighting	☐ # Of Skylights: ____	☐ # Of Solar Tubes: ____	☐ Other (Describe): _____ (% Of lighting LEDs): _____				
ENERGY STAR® Appliances	ENERGY STAR®: ☐ Dishwasher ☐ Refrigerator ☐ Washer/Dryer ☐ Other: _____ Energy Source: ☐ Propane ☐ Electric ☐ Natural Gas ☐ Other: _____ **Note:** ENERGY STAR® appliances do not result in an ENERGY STAR® Home.					
Water Heater	☐ ENERGY STAR®	Size: _____ gallons ☐ Tankless	☐ Solar (next page) ☐ Heat Pump ☐ Coil			
HVAC & Related Equipment Describe in comments area.	☐ High Efficiency HVAC SEER: _____ Efficiency Rating: _____% AFUE* _____% *Annual Fuel-Utilization Efficiency	☐ Heat Pump Efficiency Rating: COP: _____ HSPF: _____ SEER: _____ EER: _____	Thermostat/Controllers? ☐ Yes ☐ No Programmable Thermostat? ☐ Yes ☐ No Auxiliary heat source? ☐ Yes ☐ No Radiant Floor Heat? ☐ Yes ☐ No Geothermal? ☐ Yes ☐ No Electric Vehicle Ready? (car charger) ☐ Yes ☐ No			
Indoor Environmental Quality	☐ Energy (ERV) or Heat Recovery Ventilator (HRV) ☐ Other Measured Whole-House Ventilation Device (See glossary) ☐ Humidity Monitoring Device installed		☐ Non Toxic Pest Control ☐ Radon System: ☐ Active ☐ Passive			
Water Efficiency	☐ Reclaimed Water System (Describe): _____ ☐ Greywater reuse system ☐ Water Saving Fixtures		☐ Rain Barrels Used in Irrigation Cistern size: _____ gallons Location of cistern: _____			
Utility Costs	Annual Utility Cost: $ _____/year, based on: __/__/____ to __/__/____ (full year). Includes (check all that apply): ☐ Electric ☐ Heating ☐ Water ☐ Other: _____		# Of Occupants: _____			
Comments Include source for information provided in this section.	If a property is built green but not formally certified, it still deserves proper description and analysis to value the features. The market analysis is of the structure's physical, economic, and locational attributes and not an analysis of its label alone. Provide additional information that illustrates how this property exceeds local building code. This document is intended for new construction or existing homes that have been retrofit to include higher energy or green features.					

The objective of this Addendum is to standardize the communication of the high performing features of residential properties. Identifying the features not found on the appraisal form provides a basis for comparable selection and analysis of the features. Builders, contractors, homeowners, and third party verifiers are encouraged to complete this Addendum and present to appraisers, agents, lenders, and homeowners. Complete the pages that apply to the property appraised and provide to appraiser prior to the completion of an appraisal. Provide the Addendum to the lender at the time of loan application to assist them in understanding the property type so an appraiser with sufficient knowledge of this property type will be engaged to provide an appraisal to meet secondary mortgage market guidelines.

Completed by:_____ Title:_____ Date:_____

Client:		Client File #:	
Subject Property:		Appraisal File #:	

Solar Panels

The following items are considered within the appraisal analysis of the subject property:

Solar Photovoltaic (Electric) System

	Array #___	Array #__ (if applicable)
Type of Ownership	☐ Leased ☐ Owned ☐* Solar Loan with UCC Filing ☐ Power Purchase Agreement (PPA) If solar loan has UCC Filing, it is considered personal property and should not be included in market value.	☐ Leased ☐ Owned ☐ Solar Loan ☐ UCC Filing ☐ Power Purchase Agreement (PPA)
Panel Specifications	System Size: _____ kW (1kW = 1000 Watts) Year Installed: _____ ll: _____ Energy Production: _____ kWh Source of Energy Source of Energy Production Estimate: _____ Manufacturer: _____ Warranty on Panels: _____ years	System Size: _____ kW (1kW = 1000 Watts) Year Installed: _____ Energy Production: _____ kWh Source of Energy Production Estimate: _____ Manufacturer: _____ Warranty on Panels: _____ years
Array Placement Affects energy production. *Orientation	☐ Fixed Mount ☐ Tracking Mount Tilt / Slope: _____ *Azimuth: _____	Tilt / Slope: _____ Azimuth: _____
Inverter Specifications	Number of Inverters per Array: _____ Year Installed:_____ Wattage: _____watts Manufacturer: _____ Warranty Term: _____years	Number of Inverters per Array: _____ Year Installed: _____ Wattage: _____watts Manufacturer: _____ Warranty Term: _____years
Energy Storing Batteries	Battery Type: □ Lithium-ion □ Lithium-ion Polymer □ Lead Acid □ Lead Calcium □ AGM □ GEL Manufacturer: _____ Storage Capacity: _____kWh Warranty Term: _____ years Year Installed: _____	

Name of Utility Company:		Charge / kWh from Utility	$ _____ / kWh

Solar Thermal Water Heating System

Type of System	Active: ☐Direct ☐ Indirect Passive: ☐ Integral collector ☐ Thermo-syphon	**Storage Tank Size**	Gallons: _____
Collector Type	☐ Flat-Plat ☐ Integral ☐ Evacuated-Tube Solar	**System Age**	Year Installed: _____
Back-Up System	☐ Conventional Water Heater ☐ Tankless On Demand ☐ Tankless Heat Pump	**Warranty Term**	
Solar Energy Factor (SEF)	*Rating ranges 1 to 11. Higher number is more efficient.	**Manufacturer**	

Proposed Solar Installation

Roof Shape: ☐ Pitched ☐ Flat ☐ Rounded ☐ Multiple
Rafters: ☐ Typical ☐ Engineered Wood Trim ☐ Rough Sawn ☐ Structured Insulated Panel Roof ☐ Metal ☐ TJI Rafters
Decking: ☐ No decking ☐ Plywood ☐ Tongue & Groove ☐ OSB ☐ Skip sheathing/Purlin ☐ Structured Insulated Panel
Slope/Roof Pitch: _____ _____ _____ (example: S1_6/12_)
Roof Material: ☐ Comp Shingle ☐ Rolled Asphalt ☐ Concrete Tile ☐ Clay Tile ☐ Slate ☐ Corrugated Metal ☐ Standing Seam Metal ☐ Polycarbonate/fiberglass ☐ Foam ☐ Tar and Gravel ☐ Wood Shake
Number of layers of roof material: _____ (Attach photograph of roof material and attic space)
Electrical Service: ☐ Overhead ☐ Underground
Main Electrical Panel: ☐ Main Breaker Panel ☐ MB & Sub Panel ☐ Fuse Box Amperage: _____

Remaining spaces in main service panel (MSP), subpanel (if in garage), and utility meter (if located separate from MSP): ___ (Attach photograph of inside of electrical panel and door closed and a picture of three feet back to show space around the main service panel (and subpanel))

Red flag – ☐ Gas line within 3' of electrical panel ☐ More than 3 layers of roof covering ☐ Wood Shake Shingles ☐ Composition Shingle over Wood Shake ☐ Tile Roof Without Decking ☐ Composition Shingle less than 2:12 pitch ☐ Roof section over 12:12 pitch ☐ Unpermitted structure/addition ☐ Metal Trusses ☐ No permanent foundation ☐ Carport may not be structurally sound ☐ SIP Roofing may not be structurally sound ☐ Open/No walls (Patio)

Completed by:_____Title:_____ Date:_____

Client:		Client File #:	
Subject Property:		Appraisal File #:	

Location - Site			
The following items are considered within the appraisal analysis of the subject property:			
Walk Score	Score:	Source: ☐ http://www.walkscore.com ☐ Other: _____	
Public Transportation	☐ Bus Distance: _____ Blocks	☐ Train: Distance: _____ Blocks	☐ Subway Distance: _____ Blocks
Site	Orientation (front faces): ☐ East / West ☐ North / South	Landscaping: ☐ Water Efficient ☐ Natural ☐ Pond/Lake on site ☐ Rain Garden	
Comments			

Incentives – Amount of Incentive and Terms	
The following items are considered within the appraised value of the subject property and **based on effective date of value**.	
Federal	
State	
Local	
Comments	Incentives offset cost and should be reported and described in the cost approach section of the report. Clearly identify the incentives that offset the gross cost of construction to meet appraisal standards. Incentives are typically not a sales concession in sales comparison approach since they do not transfer with the property and are not paid by the seller. Incentives are typically for a specified period and only those available as of the date of value should be addressed in the appraisal process. Incentives may be available to offset repairs or deferred maintenance items as well. Incentives, rebates, and tax credits for most U.S. properties can be found at www.dsireusa.org

The objective of this Addendum is to standardize the communication of the high performing features of residential properties. Identifying the features not found on the appraisal form provides a basis for comparable selection and analysis of the features.

- Builders, contractors, homeowners, and third party verifiers are encouraged to complete this Addendum and present to appraisers, agents, lenders, and homeowners. Appraisers typically do not have sufficient information to complete this addendum without builder, contractor, or third party verifier documentation.
- Attach this completed document to the MLS listing to provide sufficient detail on sales and listings to assist buyers, appraisers, and real estate agents in understanding the high performance features of the property.
- Complete the pages that apply to the property appraised and provide to appraiser prior to the completion of an appraisal.
- Provide the Addendum to the lender at the time of loan application to assist them in understanding the property type so an appraiser with sufficient knowledge of this property type will be engaged to provide an appraisal to meet secondary mortgage market guidelines.

Completed by:_____Title:_____ Date:_____

Client:		Client File #:	
Subject Property:		Appraisal File #:	

Residential Green and Energy Efficient Addendum
Additional Resources

Residential Green Valuation Tools. A textbook resource for completing the AI Residential Green and Energy Efficient Addendum is available. It can be purchased at the following website:

https://www.appraisalinstitute.org/insights-and-resources/resources/books/residential-green-valuation-tools

Glossary

ASHRAE 700 / ICC National Green Building Standard (NGBS): An ANSI-approved residential green building standard developed by the National Association of Home Builders (NAHB) and the International Code Council (ICC). It is applicable to single and multifamily projects, renovations and additions and residential land development. To comply, all buildings must incorporate sustainable lot development techniques and address energy, water & material resource efficiency and indoor environmental quality. Also, all owners must be educated about building operation and maintenance. Fill out a form to receive a free e-copy. www.nahb.org/forms/open/icc-ashrae-700-2015-national-green-building-standard-sign-up-form

Building Envelope: The building envelope is everything that separates the building's interior from the exterior. This includes the foundation, exterior walls, roof, doors and windows. The envelope rating should be compared to the local building code requirements for this rating to identify a structure that exceeds the building code.

Energy Recovery Ventilation System (ERV) or Heat Recovery Ventilators (HRV): These systems provide fresh air without wasting all the energy already used to heat the indoor air. By recovering sensible (heat) or latent (moisture) energy from the stale indoor air, they offer fresh air ventilation with reduced energy loss.

ENERGY STAR Certified New Homes: EPA's ENERGY STAR certified homes are independently verified to be at least 15 percent more efficient that code-built homes, and include additional energy efficiency measures that can deliver savings of up to 30 percent compared to standard new homes. More than just a collection of ENERGY STAR products, an ENERGY STAR certified home includes a comprehensive package of energy efficiency systems and features that work together to deliver better performance, including a High-Efficiency Heating & Cooling System, a Complete Thermal Enclosure System; a Water Protection System; and Efficient Lighting & Appliances. www.energystar.gov/newhomes

ENERGY STAR Products: Behind each blue label is a product, building, or home that is independently certified to use less energy and cause fewer of the emissions that contribute to climate change. Today, ENERGY STAR is the most widely recognized symbol for energy efficiency in the world. In order to earn the label, ENERGY STAR products must be third-party certified based on testing in EPA-recognized laboratories. In addition to up-front testing, a percentage of all ENERGY STAR products are subject to "off–the–shelf" verification testing each year. The goal of this testing is to ensure that changes or variations in the manufacturing process do not undermine a product's qualification with ENERGY STAR requirements. https://www.energystar.gov/about/origins_mission

Geothermal: A geothermal heat pump uses the constant below ground temperature of soil or water to heat and cool your home. http://energy.gov/energysaver/articles/geothermal-heat-pumps

HERS Index: The Home Energy Rating System (HERS) Index is an industry standard by which a home's energy efficiency is measured. It's also the nationally recognized system for inspecting and calculating a home's energy performance. A qualified third party certifier assesses the house based on its physical characteristics. The energy estimates from this assessment may vary depending on the lifestyle of the occupants, increasing utility expenses, and changes in the maintenance or characteristics of the energy features. There are three rating types: sampling rating, projected rating, and confirmed rating. A **Sampling Rating** is an application of the Home Energy Rating process whereby fewer than 100% of a builder's new homes are randomly inspected and tested to evaluate compliance with a set of threshold specifications. A **Projected Rating:** A Rating Type that encompasses one individual dwelling or dwelling unit and is conducted in accordance with Section 5.1.4.3.1 through 5.1.4.3.5 of the ANSI/RESNET/ICC Standard 301. A **Confirmed Rating** is a rating type that encompasses one individual dwelling or dwelling unit and is conducted in accordance with Sections 5.1.4.1.1 through 5.1.4.1.3. More information: http://www.resnet.us/hers-index.

Home Energy Score (HES): The Home Energy Score, developed and managed by the U.S. Department of Energy (DOE), is a national system that allows homes to receive an energy rating, like the MPG rating available for cars. The Home Energy Score uses a 10-point scale to reflect how much energy a home is expected to use under standard operating conditions. The Home Energy Score uses a standard calculation method and considers the home's structure and envelope (walls, windows, foundation) and its heating, cooling, and hot water systems. Only Assessors who pass DOE's Simulation Training can provide the Home Energy Score. https://betterbuildingssolutioncenter.energy.gov/home-energy-score

Indoor airPLUS: EPA's Indoor airPLUS is a voluntary EPA label for new homes that integrate a set of construction practices and technologies to reduce indoor air pollutants and improve the indoor air quality in a new home beyond minimum code requirements. It is only available to homes that first meet ENERGY STAR® Certified Home requirements. Http://www.epa.gov/indoorairplus

LEED: Leadership in Energy and Environmental Design is a green certification program created by the U.S. Green Building Council (USGBC). As an internationally recognized mark of excellence, LEED provides building owners and operators with a framework for identifying and implementing practical and measurable green building design, construction, operations and maintenance solutions. http://www.usgbc.org/DisplayPage.aspx?CMSPageID=1988

Living Building Challenge: Created by the Living Future Institute, the Living Building Challenge is the world's most rigorous proven performance standard for buildings. People can use the regenerative design framework to create spaces that, like a flower, give more than they take. Living Building Challenge certification requires actual rather than modeled performance. Therefore, projects must be operational for at least twelve consecutive months prior to evaluation. https://living-future.org/lbc/basics/

Low E: "Low emissivity" indicates a coating is added to the glass surface. The coating allows visible light to pass through the glass while stopping radiant heat energy from entering the building by passing through the glass. Approximately 40% of the sun's harmful ultra violet rays are blocked and insulation enhanced. https://energy.gov/energysaver/energy-efficient-windows

NGBS Small Project Remodel: Run by the Home Innovation Research Labs, this program certifies whole house and small project remodels as energy efficient. Unlike the Whole–House Remodel, the Small Project certification is prescriptive. Chapter 12 of the National Green Building Standard includes a list of mandatory practices, related to materials use, sustainable products, energy efficiency, and indoor environmental quality. A Home Innovation Accredited NGBS Green Verifier gives a final inspection to verify Small Project certification. During inspection, the Verifier will ensure the applicable practices have been met. https://www.iccsafe.org/wp-content/uploads/HERS-H2O-ANSI-Standard-Release-V4.pdf

NGBS Whole Home Remodel: Run by the Home Innovation Research Labs, this program certifies whole house and small project remodels as energy efficient. Certification of a whole-building remodel requires demonstrating that there has been a minimum of a 15% reduction in energy consumption and at least a 20% reduction in water consumption over the pre-remodel condition. There are some mandatory practices that must be met. A minimum number of points must be obtained from practices related to Lot Design, Resource Efficiency, Indoor Environmental Quality, and Homeowner Education. www.homeinnovation.com/services/certification/green_homes/existing_building_certification/remodel_home_certification_process

Passivhaus Standard: German standard for low energy homes that began in the 1980s. Passivhaus is a rigorous, voluntary standard for energy efficiency in a building, reducing its ecological footprint. It results in ultra-low energy buildings that require little energy for space heating or cooling. The Passive House Institute (PHI) is an independent research institute that has played an especially crucial role in the development of the Passive House concept - the only internationally recognized, performance-based energy standard in construction. http://passiv.de/en/

Passive House Institute US (PHIUS): Buildings designed and built to the PHIUS+ 2015 Passive Building Standard consume 86% less energy for heating and 46% less energy for cooling (depending on climate zone and building type) when compared to a code-compliant building. PHIUS+ 2015 is the first and only passive building standard based upon climate-specific comfort and performance criteria aimed at presenting a cost-optimized solution to achieving the most durable, resilient, and energy-efficient building possible for a specific location. http://www.phius.org/home-page

Passive Solar: Passive solar is technology for using sunlight to light and heat buildings with no circulating fluid or energy conversion system. https://www.nrel.gov/grid/solar-resource/solar-glossary.html . A complete passive solar building design has the following five elements: (1) aperture (collector) (2) absorber (3) thermal mass (4) distribution (5) control. https://www.nrel.gov/research/re-passive-solar.html

Rain Garden: A rain garden is a depressed area in the landscape that collects rain water from a roof, driveway or street and allows it to soak into the ground. Planted with grasses and flowering perennials, rain gardens can be a cost effective and beautiful way to reduce runoff from your property. Rain gardens can also help filter out pollutants in runoff and provide food and shelter for butterflies, songbirds and other wildlife. More complex rain gardens with drainage systems and amended soils are referred to as bio-retention. https://www.epa.gov/soakuptherain/rain-gardens

SEER: Seasonal energy efficiency ratio - The higher the SEER rating, the more energy efficient the equipment is. A higher SEER can result in lower energy costs. https://www.energystar.gov/about/federal_tax_credits_consumer_energy_efficiency_definitions

Smart House: A smart house is a home that has highly advanced, automated systems to control and monitor any function of a house – lighting, temperature control, multi-media, security, window and door operations, air quality, or any other task of necessity or comfort performed by a home's resident.

Water Heaters: Types are described here: http://energy.gov/energysaver/articles/solar-water-heaters.

WaterSense: EPA released its Final Version 1.1 WaterSense New Home Specification. This specification will be effective January 1, 2013 and establishes the criteria for new homes labeled under the WaterSense program and is applicable to newly constructed single-family and multi-family homes. https://19january2017snapshot.epa.gov/www3/watersense/commercial/index.html

Whole Building Ventilation System: A whole building ventilation system assists in a controlled movement of air in tight envelope construction. Whole building ventilation equipment is often a part of the forced air heating or cooling systems. There are various methods of providing whole home ventilation including a heat recovery ventilator (HRV) or an energy recovery ventilator (ERV). Four primary types of systems here: https://energy.gov/energysaver/whole-house-ventilation

Zero Energy Ready Home (ZERH): To qualify as a DOE Zero Energy Ready Home, a home shall meet certain minimum requirements, be verified and field-tested in accordance with HERS Standards by an approved verifier, and meet all applicable codes. Builders may meet the requirements of either the Performance Path or the Prescriptive path to qualify a home. http://energy.gov/eere/buildings/zero-energy-ready-home