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Trends in HERS[®] Rated Homes

A STATISTICAL ABSTRACT | 2024

RESNET[®]

Suppliers
Advisory Board

Prepared for RESNET's Suppliers Advisory Board

Ryan Meres | RESNET | June 6, 2024

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Executive Summary

Last year, thirty percent of all new single-family homes built in the U.S. were rated for their energy efficiency using the Residential Energy Services Network's (RESNET®) Home Energy Rating System (HERS®) Index. The HERS Index is comparable to a miles-per-gallon rating for homes, where a lower score means less energy use. A score of 100 on the index represents a home built using standard construction practices from 2006, while a score of zero represents a home that produces as much energy as it uses on an annual basis. This annual report looks at the trends across all homes receiving a HERS rating in 2023. The report was completed on behalf of RESNET's Suppliers Advisory Board.

The report first looks at broad national-level trends in the number of HERS ratings and average index scores. Next, the report covers state-level trends, including the total number of HERS ratings in each state and the percentage of new homes that received a HERS Rating. After the state-level data, the report surveys trends of HERS ratings in cities, including the top 25 cities for single-family and multi-family ratings. The remainder of the report focuses on individual trends across HERS ratings, including a breakdown of the basic characteristics of rated homes and individual building components. A variety of building envelope components are covered as well as air leakage rates, equipment efficiencies, and the use of solar on HERS rated homes.

Another Record Year

In 2023, HERS Raters rated over 362,000 homes. This represents a seven percent increase over the number of ratings in 2022 and marks a decade of year-over-year increase in HERS ratings. The average HERS Index in 2023 was 57, representing a 43 percent improvement in efficiency over a home built in 2006. Since 2013, the average HERS index score has decreased by six points. Seventy-seven percent of all homes rated last year were one- and two-family dwellings and 23 percent were multi-family units.

HERS Ratings by State

RESNET conducted an analysis of the percentage¹ of new one- and two-family dwellings compared to the number of HERS ratings in each state in 2023. The clear stand-out for the highest percentage of new homes receiving a HERS Rating is Massachusetts. The commonwealth saw 98 percent of all new homes receive a HERS Rating. Arizona eclipsed Indiana this year to come in second place with 73 percent of all new homes HERS Rated last year; while six total states saw 50 percent or more of their new homes HERS Rated. Figure 1 shows the percentage of homes HERS rated by state.

¹ Based on the number of HERS Ratings on one- and two-family dwellings in RESNET's National Buildings Registry and permit data from the U.S. Census Bureau

Percentage of Homes HERS Rated by State in 2023

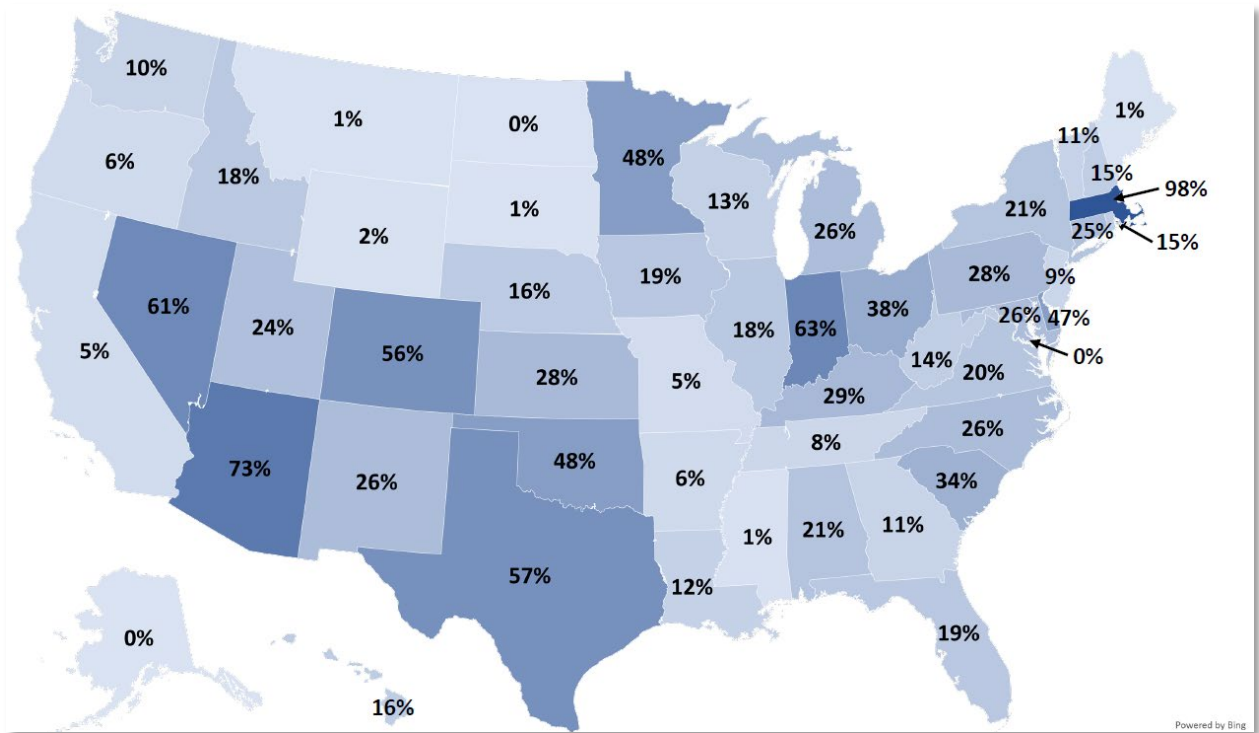


Figure 1. Percent of New Homes HERS Rated by State, 2023

When looking at the total number of ratings, for all home types, by state, Texas comes out on top with more than 89,000 homes HERS rated. Nine states recorded more than 10,000 ratings last year. Figure 2 shows the total number of HERS Ratings for all home types by state in 2023.

Total Number of HERS Ratings for all Home Types by State in 2023

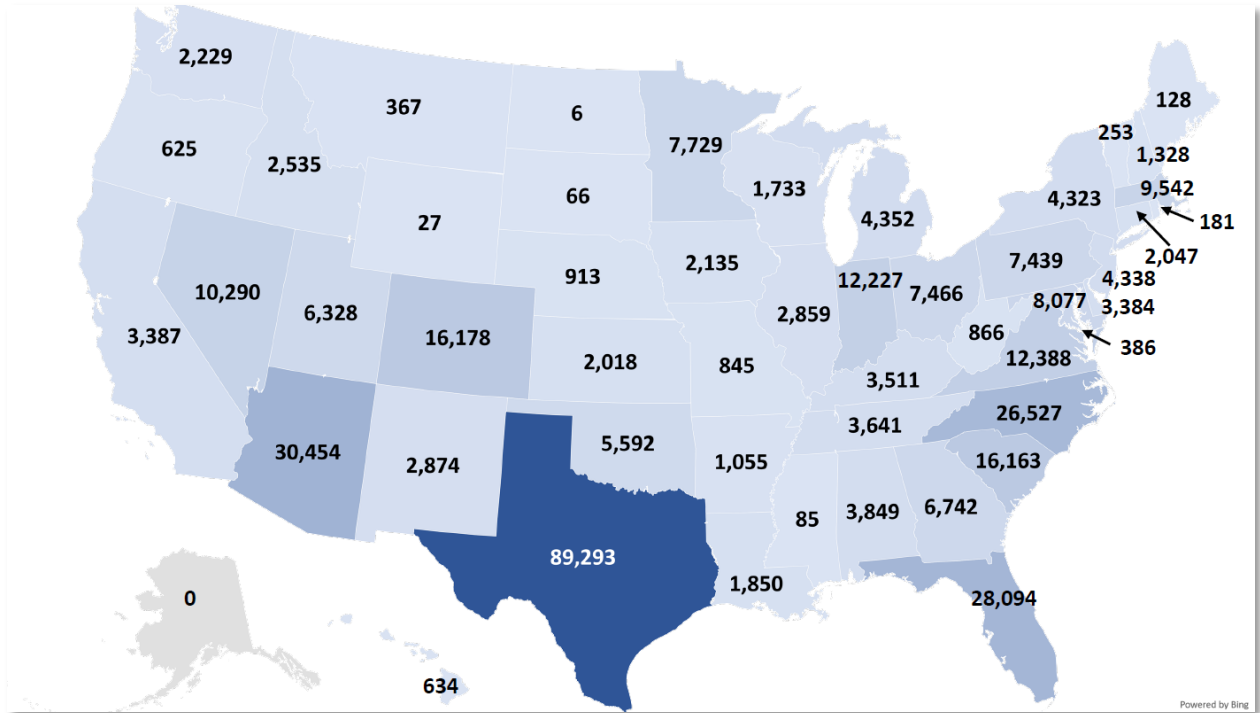


Figure 2. Number of HERS Ratings by State, 2023

HERS Ratings by Municipality

In 2023, there were HERS Ratings completed in more than 5,300 individual municipalities. For the fifth year in a row, San Antonio, Texas tops the list of municipalities with the highest number of HERS Ratings at more than 8,500 homes. The top 25 municipalities are located across eight states and are responsible for one-fifth of single-family and duplex HERS Ratings last year. Figure 3 shows the top 25 municipalities for single-family and duplex HERS Ratings in 2023.

Top 25 Municipalities for Single Family and Duplex HERS Ratings in 2023

Municipality	State	HERS Ratings
San Antonio	TX	8,552
Las Vegas	NV	4,764
Katy	TX	3,401
Phoenix	AZ	2,541
Surprise	AZ	2,452
Houston	TX	2,425
Conroe	TX	2,361
Cypress	TX	2,263
Buckeye	AZ	2,006

Trends in HERS® Rated Homes, 2024

Henderson	NV	1,953
Queen Creek	AZ	1,838
Fort Worth	TX	1,636
Georgetown	TX	1,493
Fulshear	TX	1,487
Tucson	AZ	1,480
McKinney	TX	1,464
New Braunfels	TX	1,406
Aubrey	TX	1,375
Myrtle Beach	SC	1,360
Westfield	IN	1,342
Colorado Springs	CO	1,281
Summerville	SC	1,259
Richmond	TX	1,216
Celina	TX	1,210
Fuquay Varina	NC	1,201

Figure 3. Top 25 Municipalities for Single-family and Duplex HERS Ratings, 2023

When considering only multi-family ratings, there were HERS rated dwelling units in more than 1,200 municipalities, with Charlotte, North Carolina topping the list for the second year at over 1,900 units rated. The top 25 municipalities for multi-family ratings are located across 12 states and the District of Columbia and were responsible for nearly a quarter of all multi-family HERS Ratings last year. Figure 4 shows the top 25 municipalities for multi-family HERS Ratings last year.

Top 25 Municipalities for Multi-family HERS Ratings in 2023

Municipality	State	HERS Ratings
Charlotte	NC	1,935
Raleigh	NC	1,280
Salt Lake City	UT	1,121
Las Vegas	NV	1,096
Baltimore	MD	999
Phoenix	AZ	971
Herndon	VA	736
Henderson	NV	731
Boston	MA	673
Reston	VA	671
Houston	TX	653
Denver	CO	639
Kissimmee	FL	635
Philadelphia	PA	617
Greenville	SC	594
Mesa	AZ	564

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Glendale	AZ	555
Durham	NC	537
Myrtle Beach	SC	533
Frederick	MD	529
Colorado Springs	CO	492
Plymouth	MA	446
Norfolk	VA	431
Chesapeake	VA	431
Richmond	VA	240

Figure 4. Top 25 Municipalities for Multi-Family HERS Ratings, 2023

Components of HERS Rated Homes

This section will address various national construction trends across HERS Rated homes last year. Both single-family and multi-family home types will be addressed. As a national aggregate, the average single-family HERS Rated home had the following basic characteristics in 2023:

- HERS Index Score: **57**
- Number of bedrooms: **3.7**
- Conditioned floor area: **2,550 ft²** (4% decrease over 2022)
- Annual energy cost: **\$1,733**
- Annual energy cost savings: **\$894**

The average multi-family dwelling unit had these basic characteristics in 2022:

- HERS Index Score: **57**
- Number of bedrooms: **2.4**
- Conditioned floor area: **1,450 ft²**
- Annual energy cost: **\$1,228**
- Annual energy cost savings: **\$610**

In understanding the data presented in this section, it is helpful to provide some context for the number of homes rated in each climate zone². This context is useful when considering the insulation R-values and other construction practices characterized below. Climate zones 2 (a and b) and 3 (a and b) cover most of the southern states from Texas and Oklahoma, east to the southern half of North Carolina and south to Florida and the Gulf Coast. They also cover the southern portions of Arizona and New Mexico. These states are primarily in warmer climates and made up nearly 60 percent of all ratings in 2023. Most of the rest of the ratings were in climate zones 4a and 5 (a and b). These climate zones run roughly from the mid-Atlantic and lower northeast states, west to Nevada and north to Oregon and Washington.

² Climate zone as defined in the 2021 International Energy Conservation Code

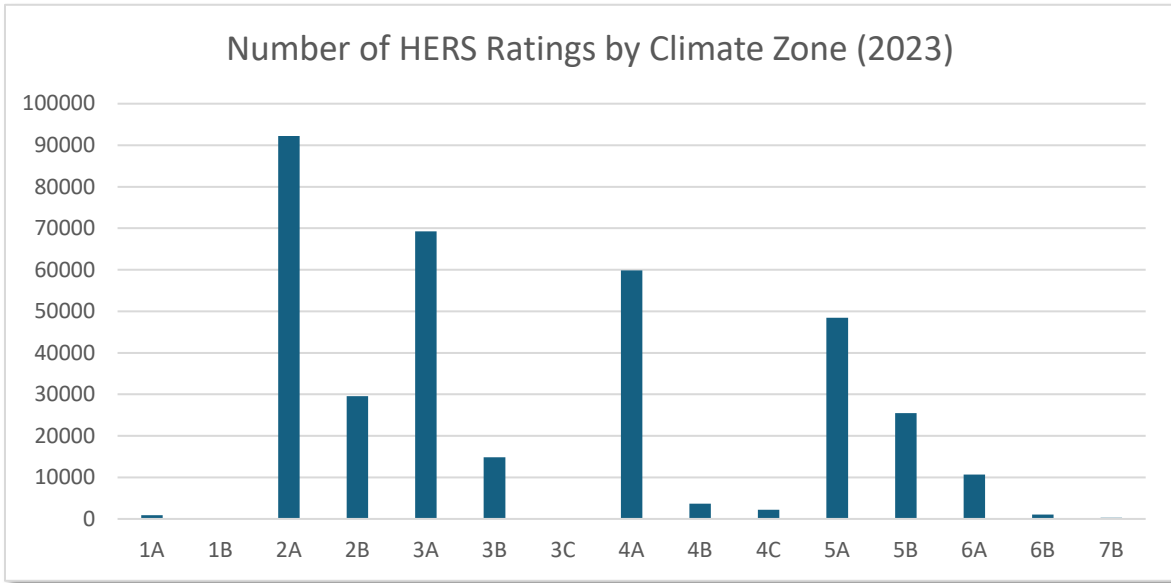


Figure 5. HERS Ratings by Climate Zone, 2023

Foundation Types

Figure 6 displays the foundation types for HERS Rated homes last year. The most common foundation type for all home types was slab-on-grade. The “other” category includes homes where more than one foundation type may be entered.

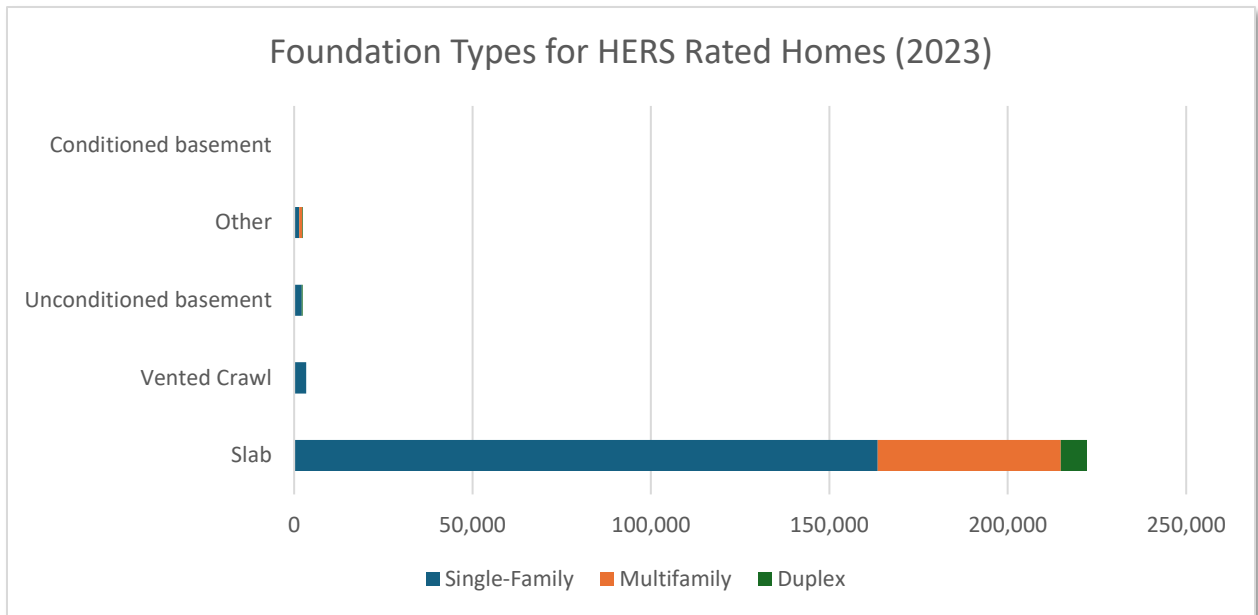
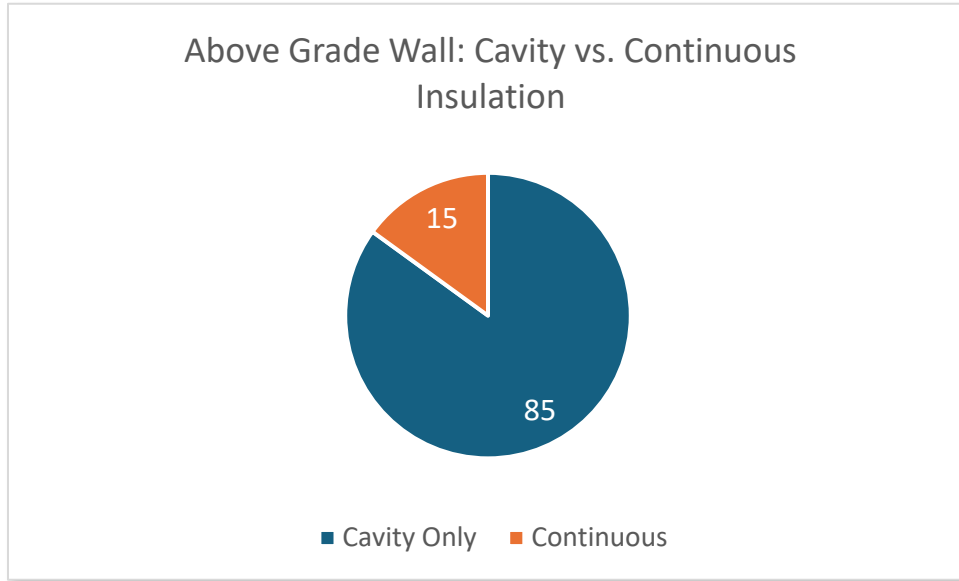


Figure 6. Foundation Types, 2023

Above-Grade Wall Insulation

Above grade wall insulation looks at cavity versus continuous insulation across all Ratings. The chart below shows how many homes had cavity only compared to cavity

and continuous insulation. Continuous insulation is included in these figures if it is greater than R-3 insulation.



This section also looks at above grade wall U_o values. The following chart shows the average above-grade wall U_o for all HERS Ratings by year over the past six years. Figure 8 shows the average above-grade wall U_o by climate zone for 2023 (climate zones with fewer than 100 ratings have been removed).

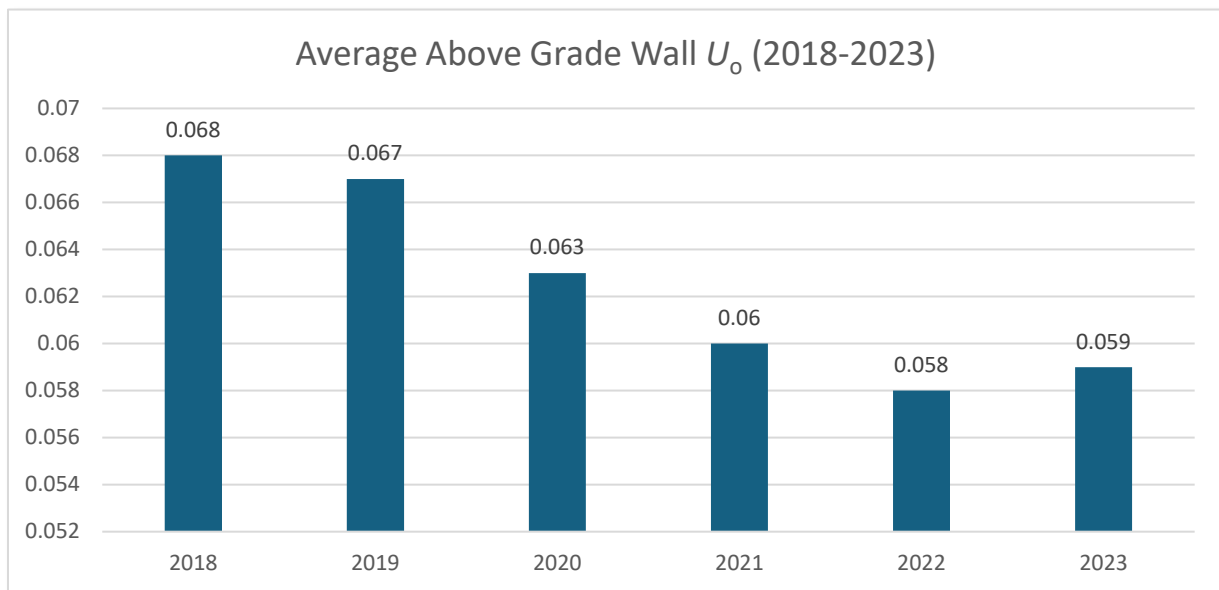


Figure 7. Avg. Above Grade Wall U_o (2018-2023)

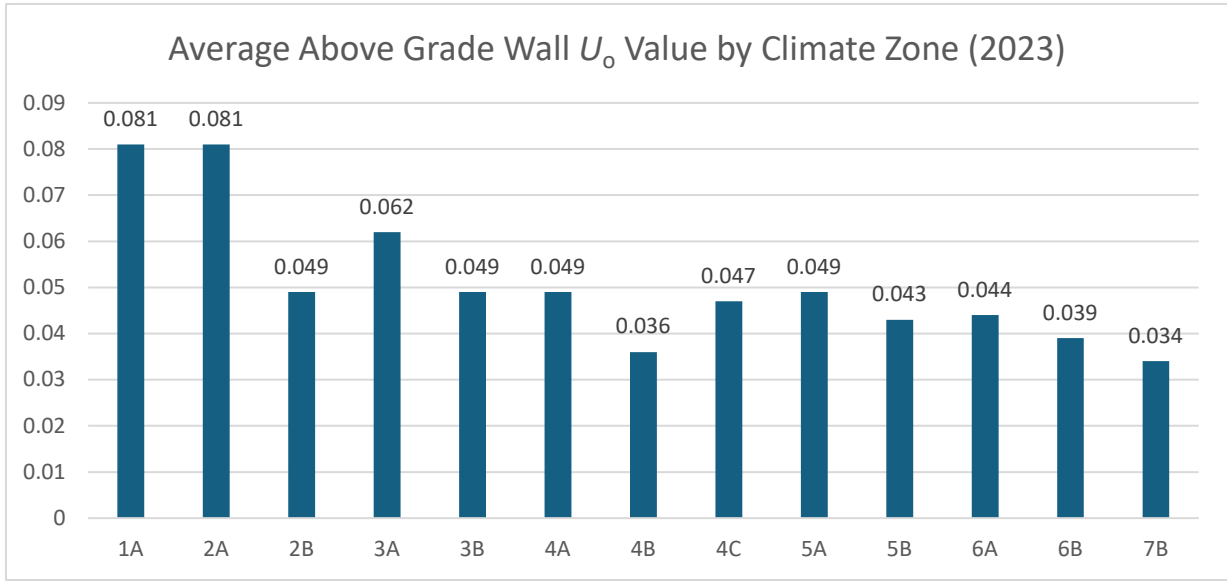
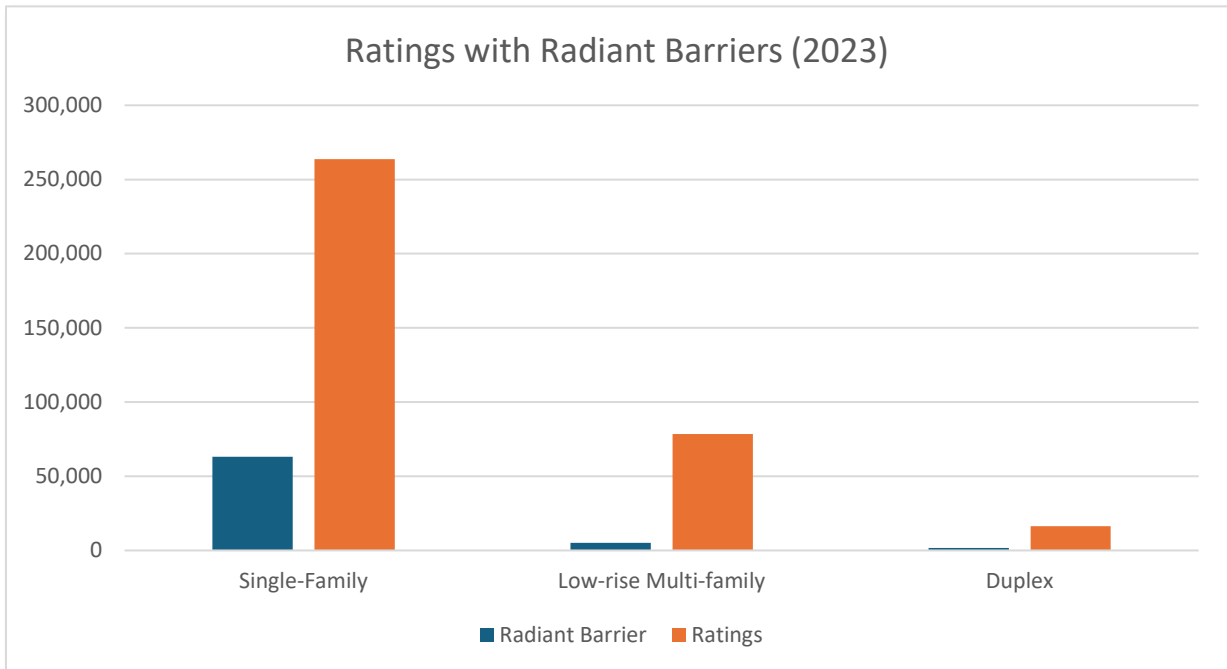


Figure 8. Avg. Above Grade Wall U_o by Climate Zone (2023)

Ceiling Insulation and Radiant Barriers

In 2023, 19 percent of all HERS Rated homes had a radiant barrier. This is down from 32 percent in 2022. The chart, below, shows the breakdown of homes using a radiant barrier by home type.



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Figure 9. Homes with Radiant Barriers, 2023

The following chart shows the average U_o for ceilings for all HERS Ratings each year for the past six years. Figure 12 shows the average ceiling U_o by climate zone for 2023 (climate zones with fewer than 100 ratings have been removed).

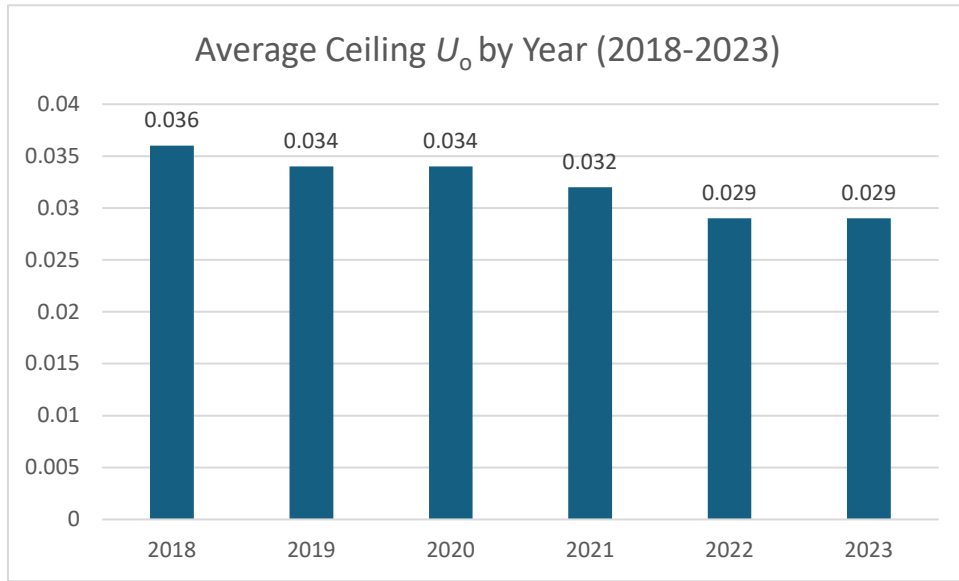


Figure 10. Average Ceiling U_o (2018-2023)

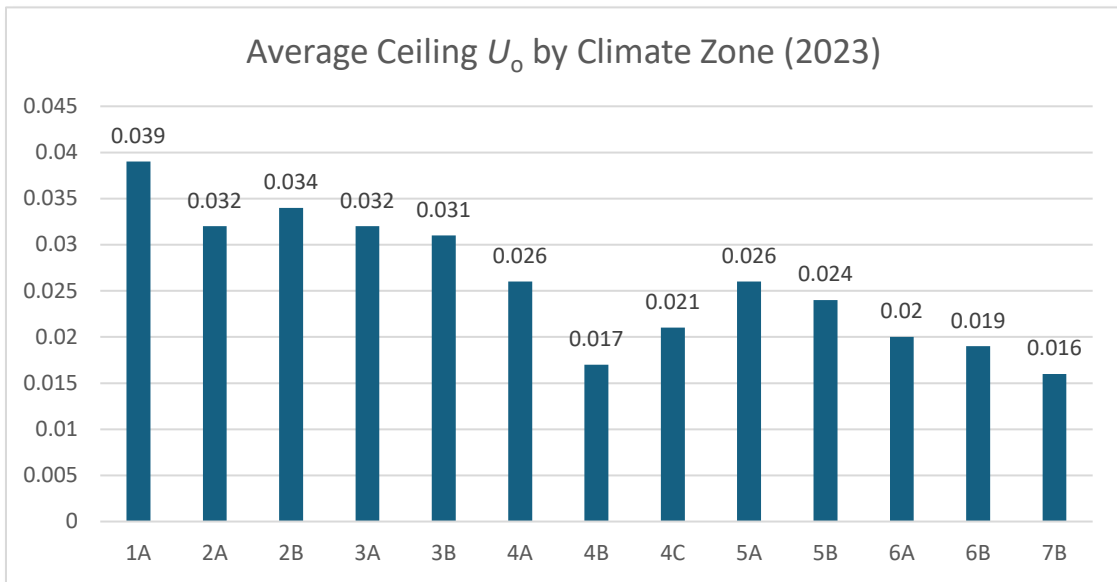


Figure 11. Avg. Ceiling U_o by Climate Zone (2023)

Window U-Value and SHGC

Data on window U -Values shows that 49 percent of windows have a U -Value between 0.31-0.36 for single-family homes. Window solar heat gain coefficient (SHGC) shows a

similar trend with about 61 percent of windows having an SHGC of 0.21-0.26. Figure 12 shows the breakdown of window *U*-Values and solar heat gain coefficients for single-family ratings last year. Figure 13 shows multi-family window *U*-Values and SHGC for ratings last year and Figure 14 shows the average window *U*-Values and SHGC by climate zone (climate zones with fewer than 100 ratings have been removed).

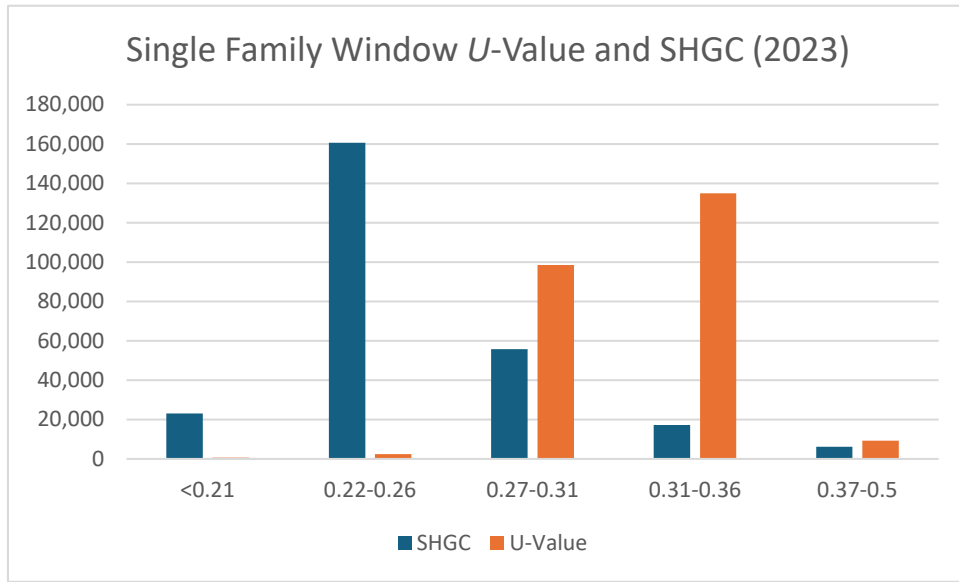


Figure 12. Single Family Window U-Value and SHGC, 2023

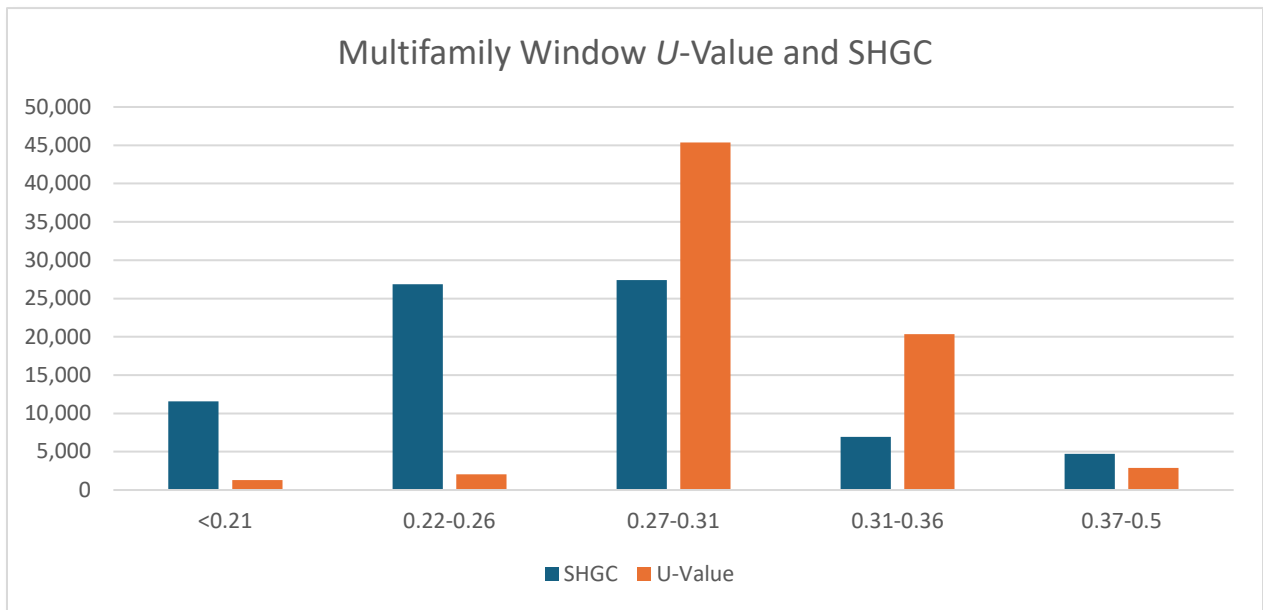


Figure 13. Multi-Family Window U-Value and SHGC, 2023

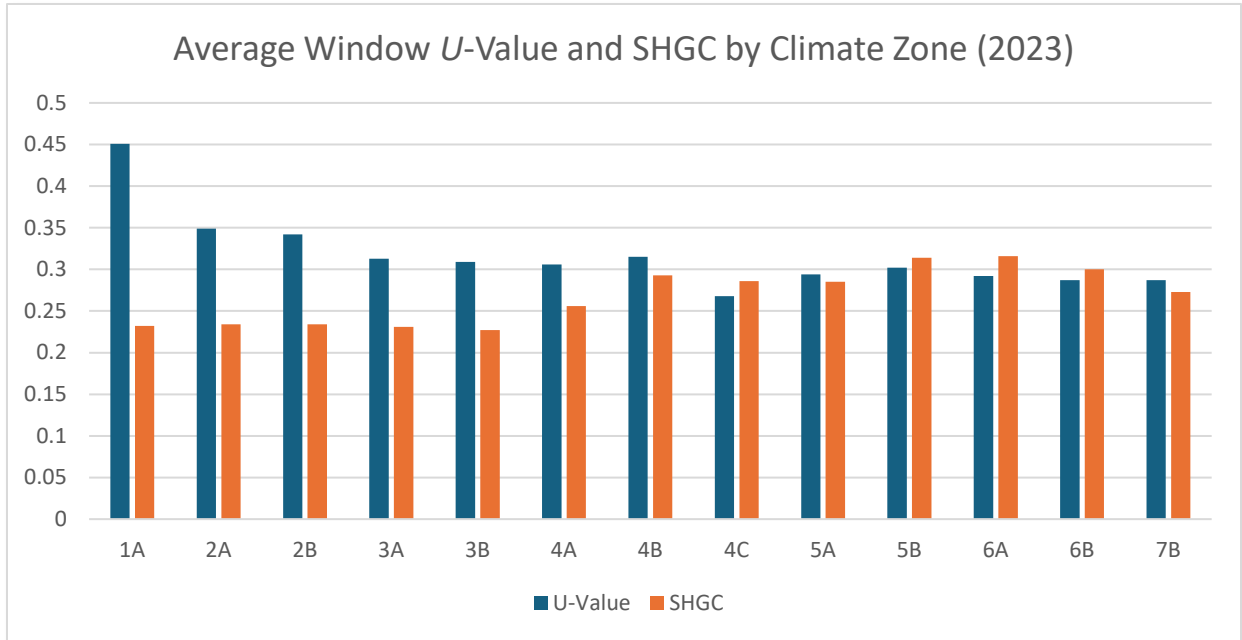


Figure 14. Avg. Window U-Value and SHGC by Climate Zone (2023)

Envelope Air Leakage Rates

In 2023, 80 percent of all single-family and 62 percent of all multi-family HERS Rated homes had an envelope leakage rate of between 2 and 5 air changes per hour at 50 Pascals. Impressively, a combined total of nearly 32,000 single-family and multi-family homes had an air leakage rate of less than 2 ACH50. Figure 15 shows the breakdown of air leakage rates for HERS rated homes last year. Figure 16 provides a breakdown of average envelope leakage rates by climate zone (climate zones with fewer than 100 ratings have been removed).

Trends in HERS® Rated Homes, 2024

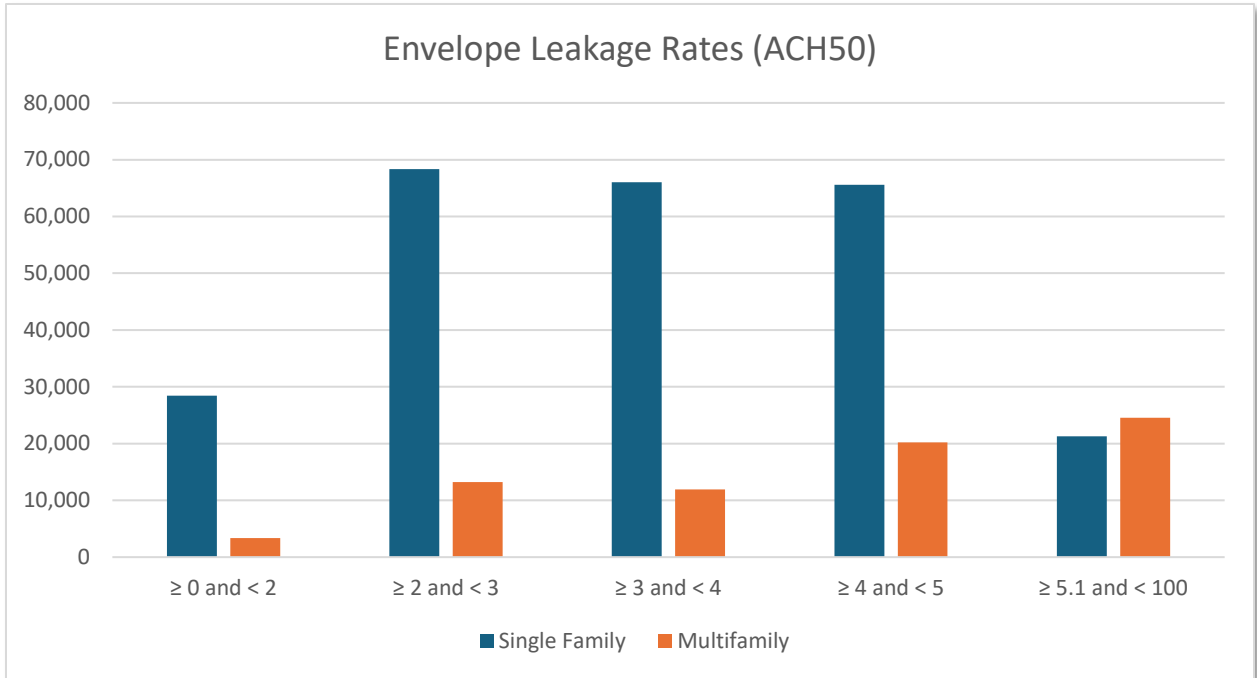


Figure 15. Air Leakage Rates of HERS Rated Homes, 2023

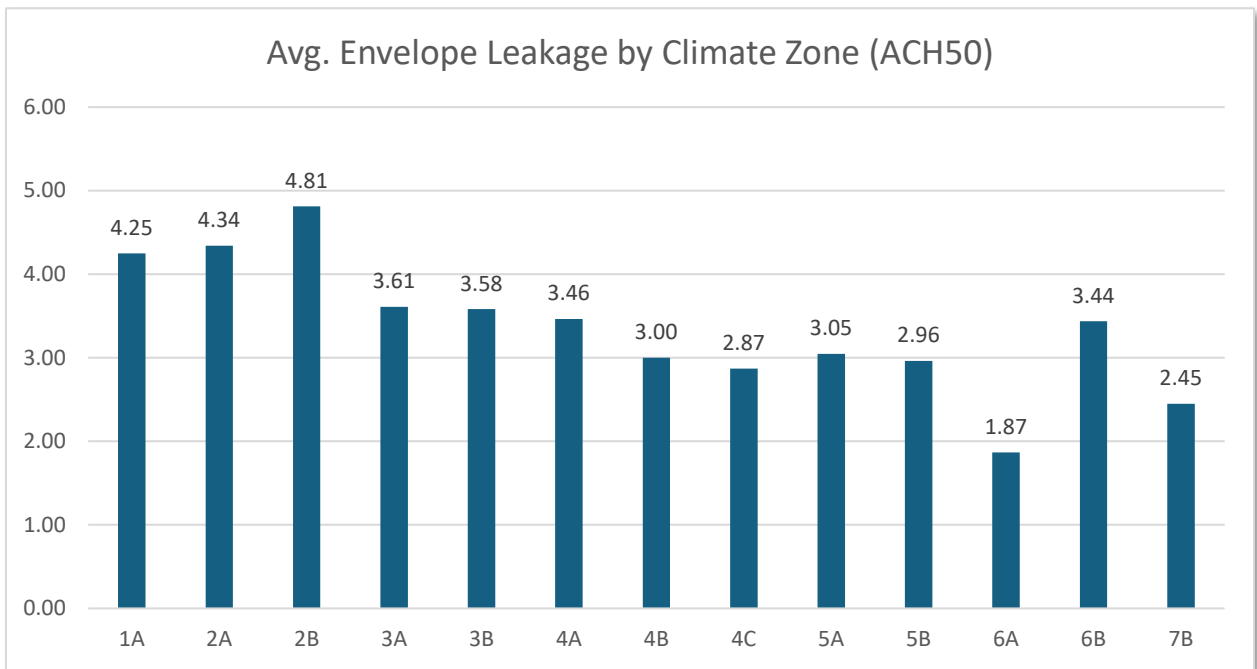


Figure 16. Avg. Envelope Leakage by Climate Zone (2023)

Ventilation Types

Data on mechanical ventilation types shows that exhaust- and supply-only ventilation strategies are still the most common for single-family HERS Rated homes. For homes with mechanical ventilation, the third most common strategy is the use of the air handler

(CFIS) for ventilation. Figure 17 shows the breakdown of ventilation types for single-family HERS Rated homes last year. In multifamily units, exhaust-only ventilation is the most common ventilation type, followed by supply-only, then ERV and CFIS. Figure 18 shows the breakdown of ventilation types for multifamily units.

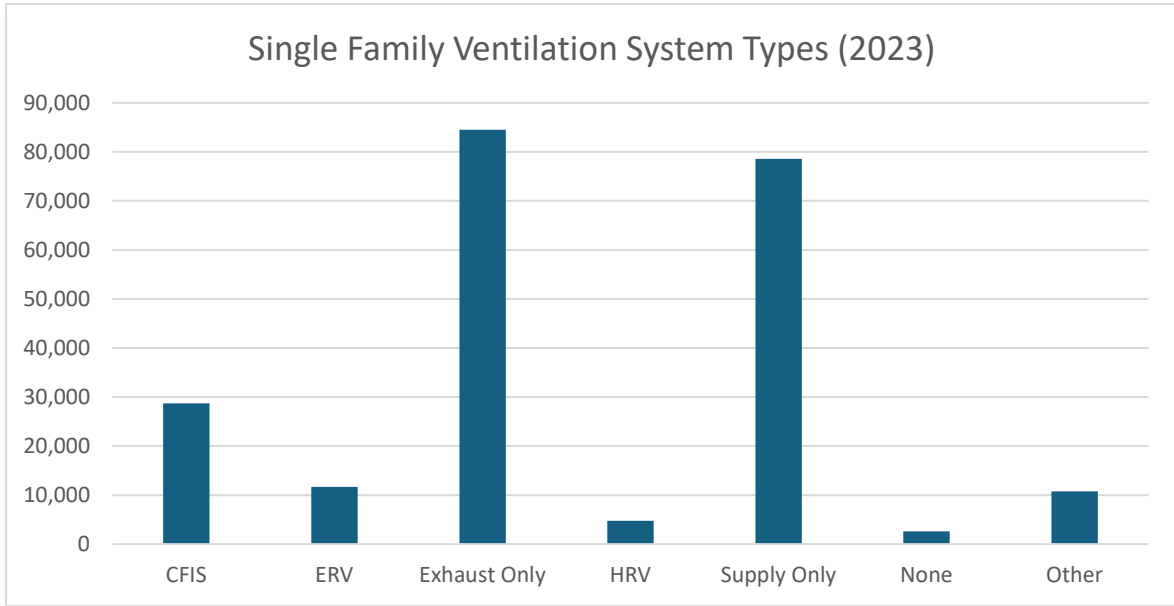


Figure 17. Ventilation Types in Single Family HERS Rated Homes, 2023

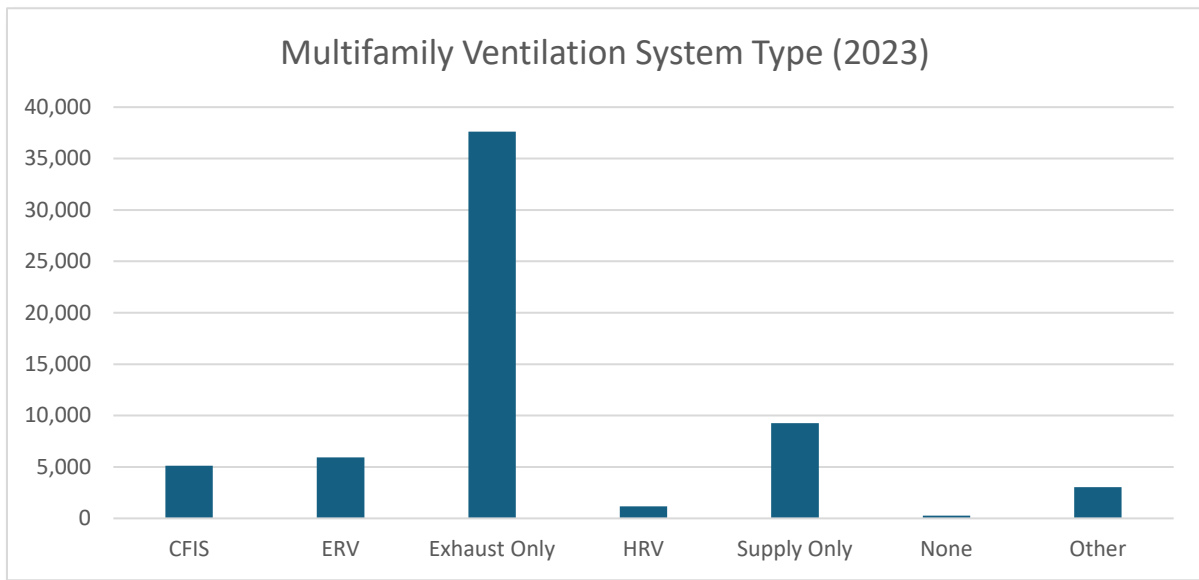


Figure 18. Ventilation Types in Multifamily HERS Rated Homes, (2023)

Heating, Cooling, Water Heating Equipment and Ducts

RESNET looked at data trends for furnace and air conditioner efficiencies as well as types of water heaters and the fuel sources for water heaters and furnaces. Looking at

furnace efficiencies, about 51 percent of all single-family homes with a fuel-fired furnace used a standard efficiency furnace (less than 90 AFUE), while 49 percent used a high-efficiency furnace as shown in Figure 19. For multi-family units, about 25 percent of units had a standard efficiency furnace.

For air conditioner efficiency, 35 percent of single-family homes used a 16 SEER unit, while multifamily homes had a fairly even distribution of 14-16 SEER units, as shown in Figure 20.

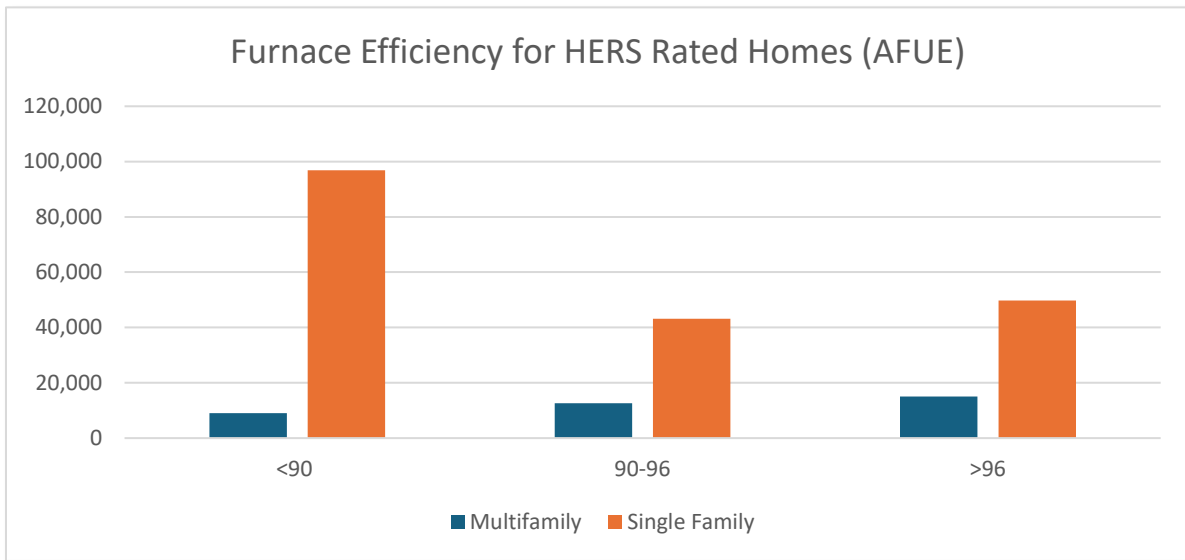


Figure 19. Furnace Efficiency in HERS Rated Homes, 2023

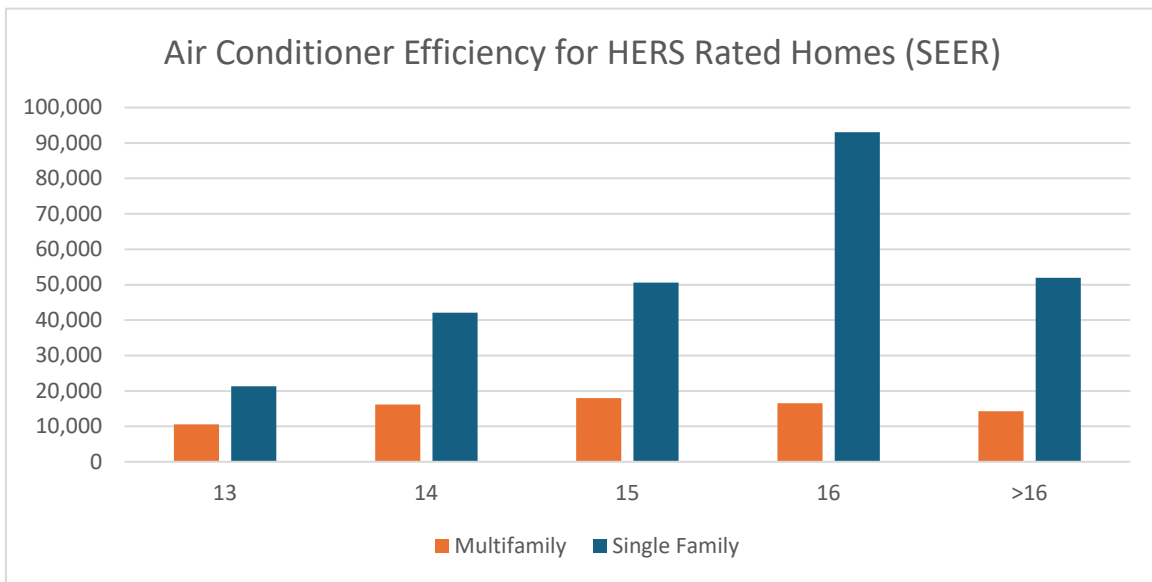


Figure 20. Air Conditioner Efficiency in HERS Rated Homes, 2023

When looking at the fuel type for furnaces, natural gas has the largest share of single-family HERS Rated homes with 66 percent, but only made up about 44 percent of the multi-family Ratings last year. These numbers represent a drop of 3 percent for single-family and 6 percent for multi-family over the 2022 numbers. Electric was the second

most common heating fuel type, representing almost 56 percent of multi-family Ratings and 32 percent of single-family Ratings in 2022. Figure 21 shows the heating system fuel types for HERS Ratings last year.

Figure 22 shows water heater fuel types. Like heating system fuel type, natural gas is still the most popular for single-family homes, while multi-family is roughly 65 percent electric and 35 percent gas.

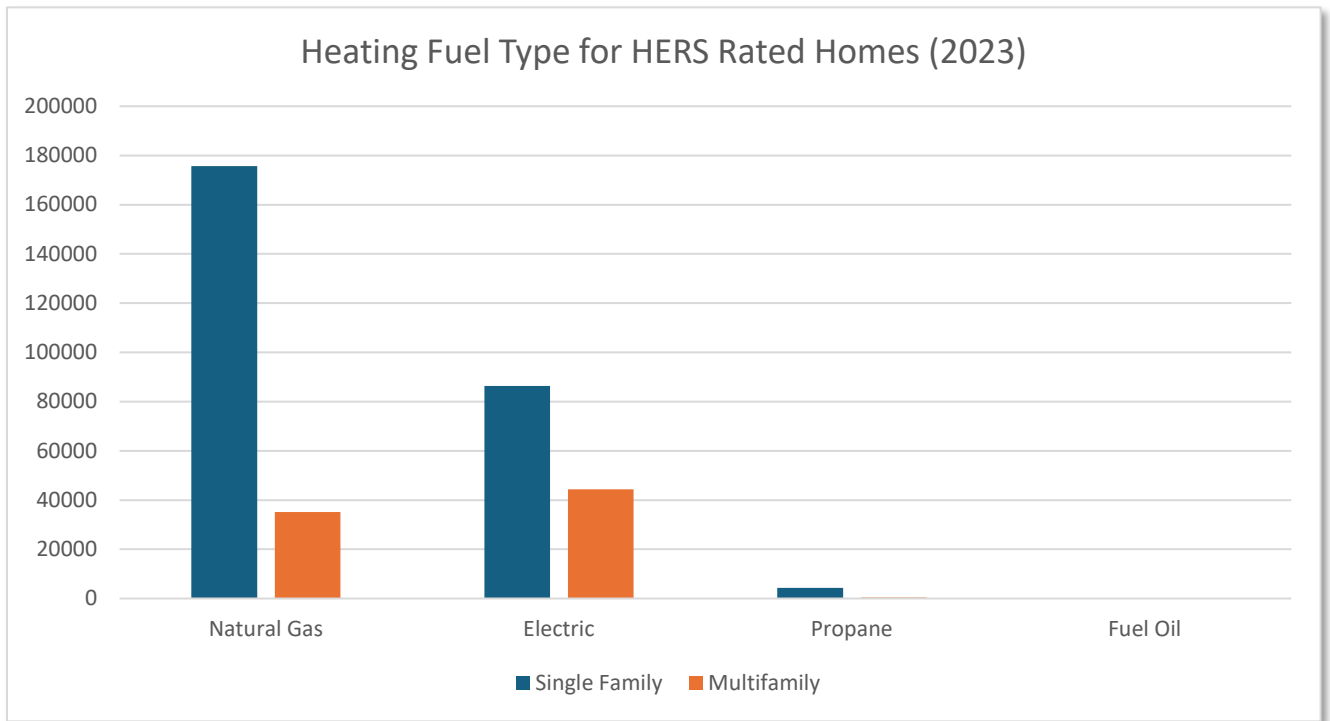


Figure 21. Heating System Fuel Type, 2023

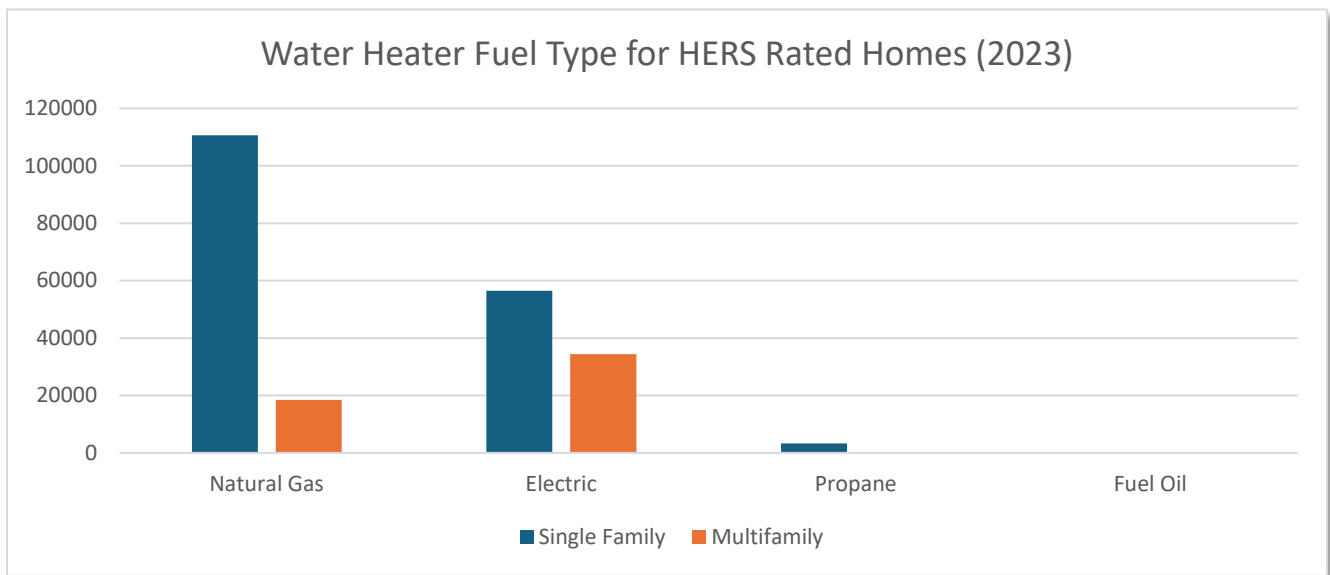


Figure 22. Water Heater Fuel Type, 2022

The next chart looks at the number of HERS Rated homes with all supply and return ducts in conditioned space. In total, there are almost 68,000 (26%) single-family homes and over 44,000 (56%) multifamily units with ducts completely in conditioned space. Figure 23 shows the top 10 states for single-family homes with ducts in conditioned space and Figure 24 shows multifamily units.

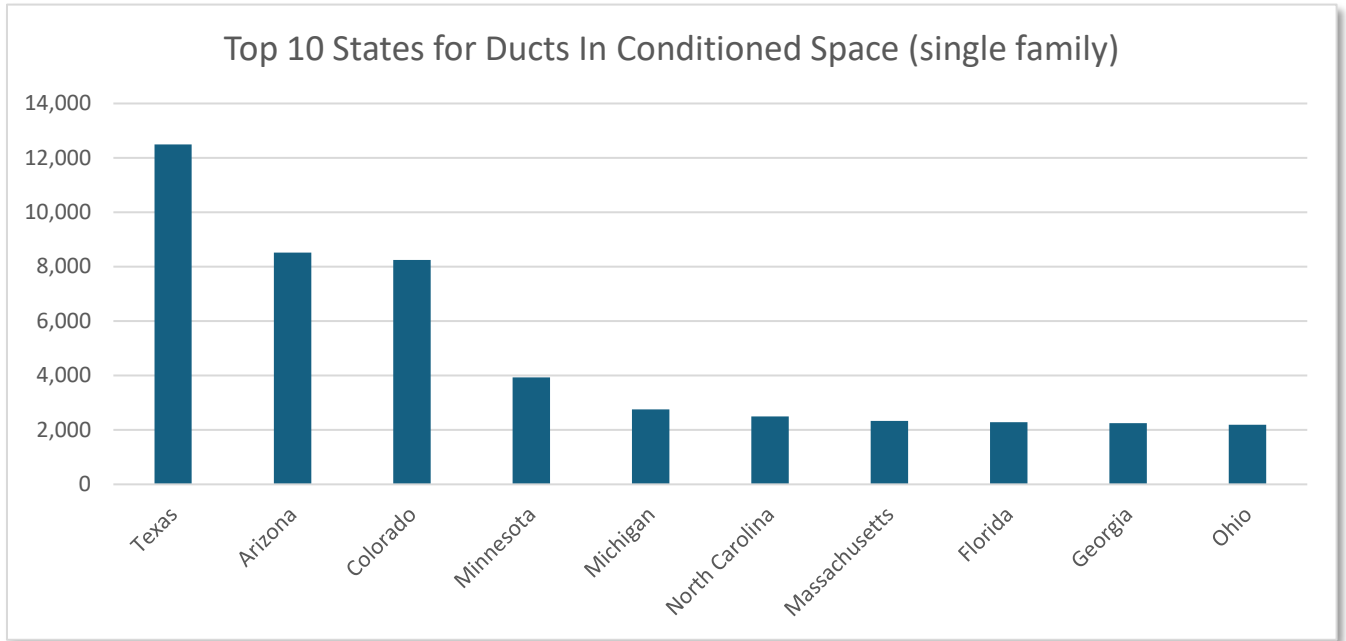


Figure 23. Top 10 States for Single Family Homes with Ducts in Conditioned Space, 2023

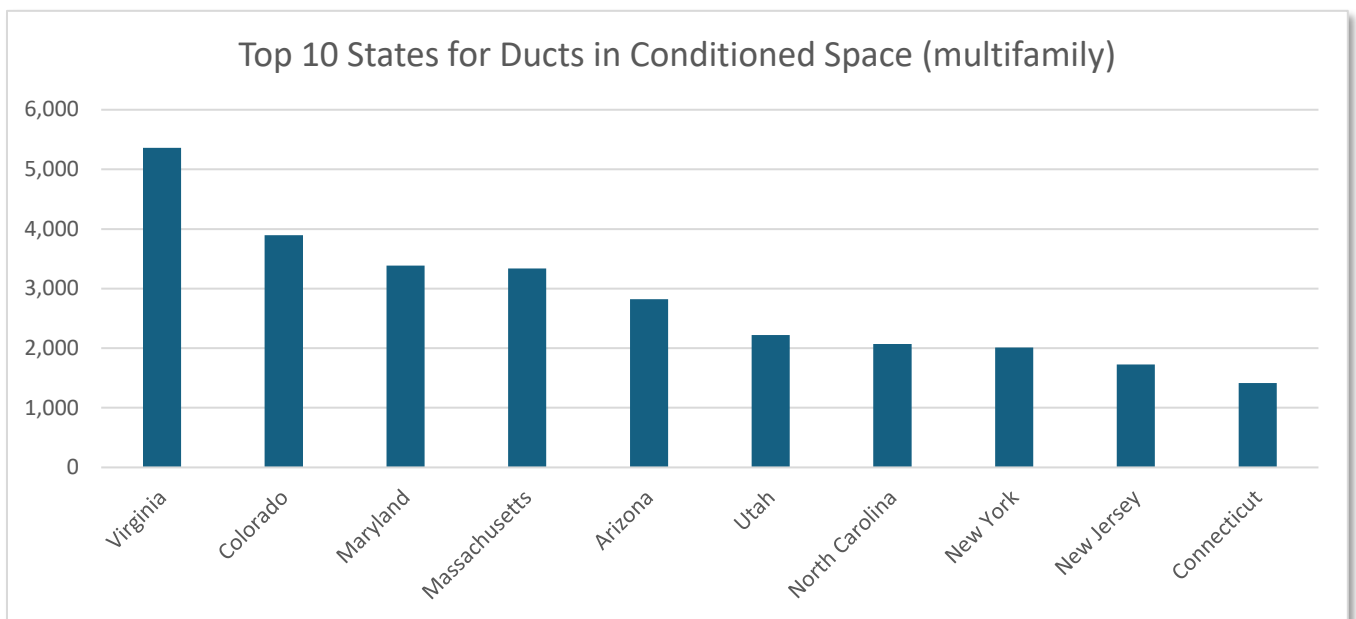


Figure 24. Top 10 States for Multifamily Units with Ducts in Conditioned Space, 2023

The Use of Solar Photovoltaics (PV) on HERS Rated Homes

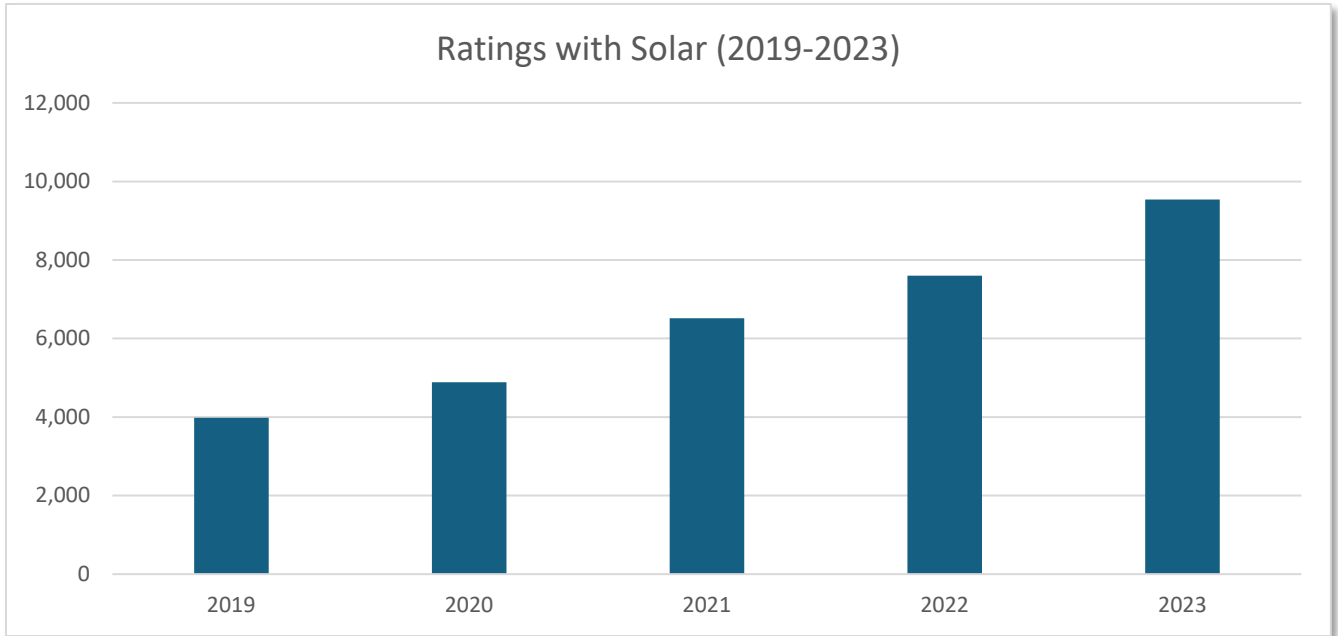
In 2023, there were over 9,500 HERS Rated homes that had solar PV. A total of 7,509 were installed on single-family and duplex homes and the remainder were on multi-family. The following are some statistics for HERS Rated homes using solar:

- The average HERS Score for homes with solar: 16.
- The average HERS Index before accounting for solar: 54.

The following are the top 20 states for the use of solar on HERS Rated homes, last year.

State	Ratings with Solar
CA	3,149
FL	1,475
CO	1,462
NY	586
TX	577
MA	408
AL	406
AZ	314
NV	209
NH	139
CT	124
NM	115
WA	90
DE	89
HI	78
NC	75
SC	48
VT	32
IL	18
MN	18

The following chart shows the trend in HERS Rated homes with solar over the past five years.



A new analysis added for 2024 is a look at insulation levels for homes with and without solar. This analysis looked at the 32 states where solar was included in at least five HERS Ratings. Both ceiling and wall R-values were considered. Here is a summary of the results:

- The average ceiling R-value for all homes without solar: 41
- The average ceiling R-value for all homes with solar: 51
- The average above-grade wall R-value for all homes without solar: 22
- The average above-grade wall R-value for all homes with solar: 28

There were 12 of 32 states where the average ceiling R-value was lower for homes with solar than homes without. Six of 32 states had lower above-grade wall R-values for homes with solar than those without. Only four states had homes with both lower average wall R-value and ceiling R-value for homes with solar than those without. In these four states, the average difference for ceilings was lower by R-10 and lower by R-5 for walls.

Top 15th Percentile of HERS Ratings by State

In early 2024, a new green bond was announced by American Homes 4 Rent that includes HERS Rated homes that score in the top 15 percent of ratings for a given state. The following is a breakdown of the number of homes and maximum HERS score for the top 15th percentile of ratings for each state in 2023.

State	Number of Ratings	Maximum HERS Index for the Top 15 th Percentile of Ratings
Alabama	576	57

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Arkansas	187	65
Arizona	5,088	48
California	100	13
Colorado	388	51
Connecticut	338	46
DC	59	52
Delaware	540	51
Florida	5,239	52
Georgia	1,221	55
Hawaii	102	36
Iowa	331	54
Idaho	510	57
Illinois	443	55
Kansas	378	61
Kentucky	531	54
Indiana	2,355	61
Louisiana	294	51
Massachusetts	1,621	45
Maryland	1,325	50
Maine	21	37
Michigan	802	55
Minnesota	1,753	47
Missouri	167	55
Mississippi	16	60
Montana	101	56
North Carolina	4,375	58
North Dakota	2	47
Nebraska	173	55
New Hampshire	214	44
New Jersey	855	49
New Mexico	482	47
Nevada	2,051	48
New York	714	42
Ohio	1,279	57
Oklahoma	1,035	49
Oregon	110	51
Puerto Rico	8	68
Rhode Island	29	48
South Carolina	2,995	56
South Dakota	10	42
Tennessee	621	55

Texas	14,811	52
Utah	1,024	52
Virginia	2,412	56
Vermont	40	34
Washington	403	47
Wisconsin	300	50
West Virginia	165	58
Wyoming	8	53

HERS_{H2O}® Rating Data

HERS_{H2O}® is RESNET's new whole-house water efficiency rating that can be used to achieve the WaterSense Label for Homes. The HERS_{H2O} Index works the same as the HERS Index where a lower score means less water usage.

Last year was the third full year of receiving HERS_{H2O} Ratings in the RESNET Registry. After launching HERS_{H2O} and the WaterSense Label for Homes, version 2, in early 2021, the program has seen steady growth through 2023. In fact, the number of HERS_{H2O} Ratings increased by 75 percent from 2022 to 2023.

The following are the HERS_{H2O} numbers for last year:

- Number of homes rated with HERS_{H2O} and receiving the WaterSense Label for Homes: 4,003
- Average Index score of HERS_{H2O} Ratings: 60
- Number of RESNET-accredited HERS_{H2O} Providers: 26
- Number of certified RESNET HERS_{H2O} Raters: 359
- The average HERS_{H2O} Rated home is estimated to save 79,500 gallons of water per year compared to the Reference Home.

To learn more about HERS_{H2O} and the WaterSense Label for Homes, visit: <https://www.resnet.us/about/hersh2o/>.

Closing Remarks

This is the fifth installment of RESNET's *Trends in HERS Rated Homes* report. RESNET welcomes feedback on data trends you would like to see analyzed for next year's report. Feedback can be sent to RESNET's Program Director, Ryan Meres at ryan@resnet.us.

This report is made possible with support from RESNET's Suppliers Advisory Board (SAB) members. If you are a supplier of goods or services to the homebuilding market, you can join RESNET's Suppliers Advisory Board and receive additional access to RESNET's HERS Rating data, RESNET Conference Sponsorship benefits, and opportunities to get in front of RESNET's vast network of home energy professionals. See below for more information about the SAB.

About RESNET's Suppliers Advisory Board



The purpose of the RESNET SAB is to provide an opportunity for suppliers to better understand RESNET; network with other suppliers, customers, and HERS raters; and provide supplier input to the RESNET Board of Directors. Membership is open to all suppliers of goods and services to the homebuilding market. Visit <https://www.resnet.us/about/sab/> for more information and the benefits of becoming a member of the SAB.