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Trends in HERS® Rated Homes

A STATISTICAL ABSTRACT | 2023

RESNET®

Suppliers
Advisory Board

Prepared for RESNET's Suppliers Advisory Board

Ryan Meres | RESNET | May 23, 2023

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Executive Summary

Last year more than one-quarter of all new 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 report is an annual look at the trends across all homes receiving a HERS rating in 2022. 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 looks into 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 2022, HERS Raters rated nearly 338,000 homes. This represents an 8 percent increase over the number of ratings in 2021 and marks a decade of year-over-year increase in HERS ratings. The average HERS Index in 2022 was 58, representing a 42 percent improvement in efficiency over a home built in 2006. Since 2013, the average HERS index score has decreased by five points. Eighty percent of all homes rated last year were one- and two-family dwellings and 20 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 2022. The clear stand-out for the highest percentage of new homes receiving a HERS Rating is Massachusetts. The commonwealth saw 82 percent of all new homes receive a HERS Rating. Indiana comes in second with 68 percent of all new homes HERS Rated last year; while a record-breaking eight 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

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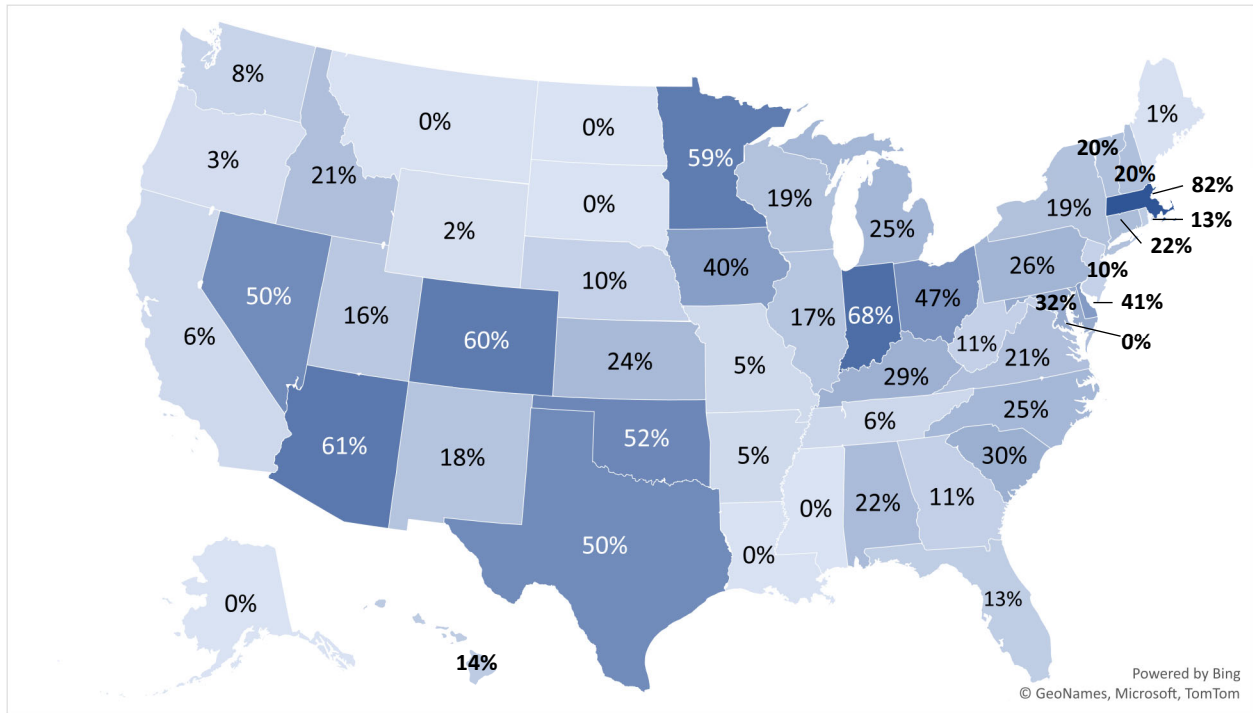


Figure 1. Percent of New Homes HERS Rated by State, 2022

When looking at the total number of ratings, for all home types, by state, Texas comes out on top with more than 81,000 homes HERS rated. Eight 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 2022.

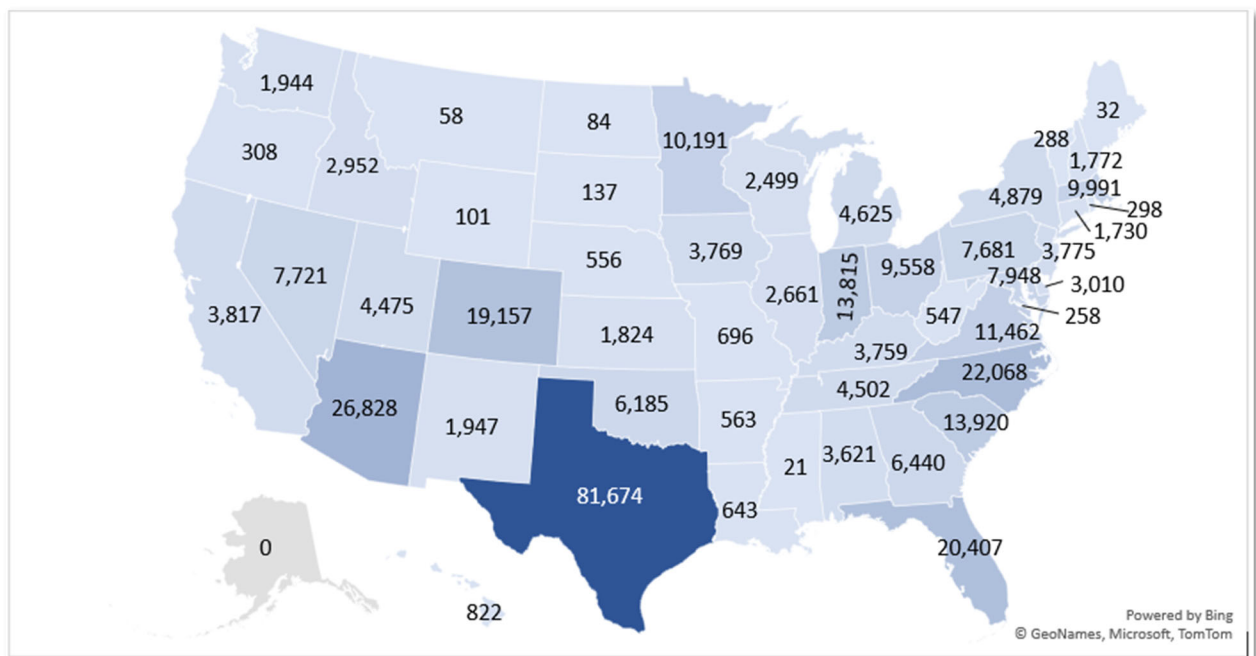


Figure 2. Number of HERS Ratings by State, 2022

HERS Ratings by City

In 2022 there were HERS Ratings completed in more than 5,500 individual municipalities. For the fourth year in a row, San Antonio, Texas tops the list of municipalities with the highest number of HERS Ratings at more than 7,400 homes. The top 25 municipalities are located across seven states and are responsible for 15 percent of HERS Ratings last year. Figure 3 shows the top 25 municipalities for single family and duplex HERS Ratings in 2022.

City	State	HERS Ratings
San Antonio	TX	7,221
Las Vegas	NV	3,497
Katy	TX	3,344
Conroe	TX	2,983
Houston	TX	2,821
Colorado Springs	CO	2,425
Richmond	TX	1,927
Surprise	AZ	1,861
Cypress	TX	1,723
New Braunfels	TX	1,682
Aurora	CO	1,664
Buckeye	AZ	1,649
Maricopa	AZ	1,627
Phoenix	AZ	1,608
Fuquay Varina	NC	1,545
Queen Creek	AZ	1,541
McKinney	TX	1,479
Henderson	NV	1,388
Summerville	SC	1,372
Fulshear	TX	1,335
Jacksonville	FL	1,308
Tucson	AZ	1,300
Peoria	AZ	1,290
Leander	TX	1,223
Georgetown	TX	1,164

Figure 3. Top 25 Municipalities for Single-family and Duplex HERS Ratings, 2022

When considering only multi-family ratings, there were HERS rated dwelling units in more than 1,100 municipalities, with Charlotte, North Carolina beating out San Antonio, Texas to top this year's list at over 1,200 units rated. The top 25 municipalities for multi-family ratings are located across 13 states and the District of Columbia and are

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.

City	State	HERS Ratings
Charlotte	NC	1,204
Boston	MA	970
Phoenix	AZ	902
Richmond	VA	885
Las Vegas	NV	814
Baltimore	MD	744
Raleigh	NC	701
Durham	NC	608
Philadelphia	PA	576
Frederick	MD	571
Greenville	SC	562
Aurora	CO	552
Chandler	AZ	541
Colorado Springs	CO	518
Mesa	AZ	503
Salt Lake City	UT	491
Henderson	NV	481
Albuquerque	NM	477
Alexandria	VA	445
Denver	CO	434
Cary	NC	423
Rochester	NY	403
Lebanon	TN	403
Henrico	VA	397
Charlottesville	VA	394

Figure 4. Top 25 Municipalities for Multi-Family HERS Ratings, 2022

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 2022:

- HERS Index Score: **58**
- Number of bedrooms: **3.7**
- Conditioned floor area: **2,665 ft²**
- Annual energy cost: **\$1,672**
- Annual energy cost savings: **\$800**

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

- HERS Index Score: **58**
- Number of bedrooms: **2.4**
- Conditioned floor area: **1,467 ft²**
- Annual energy cost: **\$1,171**
- Annual energy cost savings: **\$551**

In understanding the data presented in this section, it will be 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 more than 50 percent of all ratings in 2022. 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.

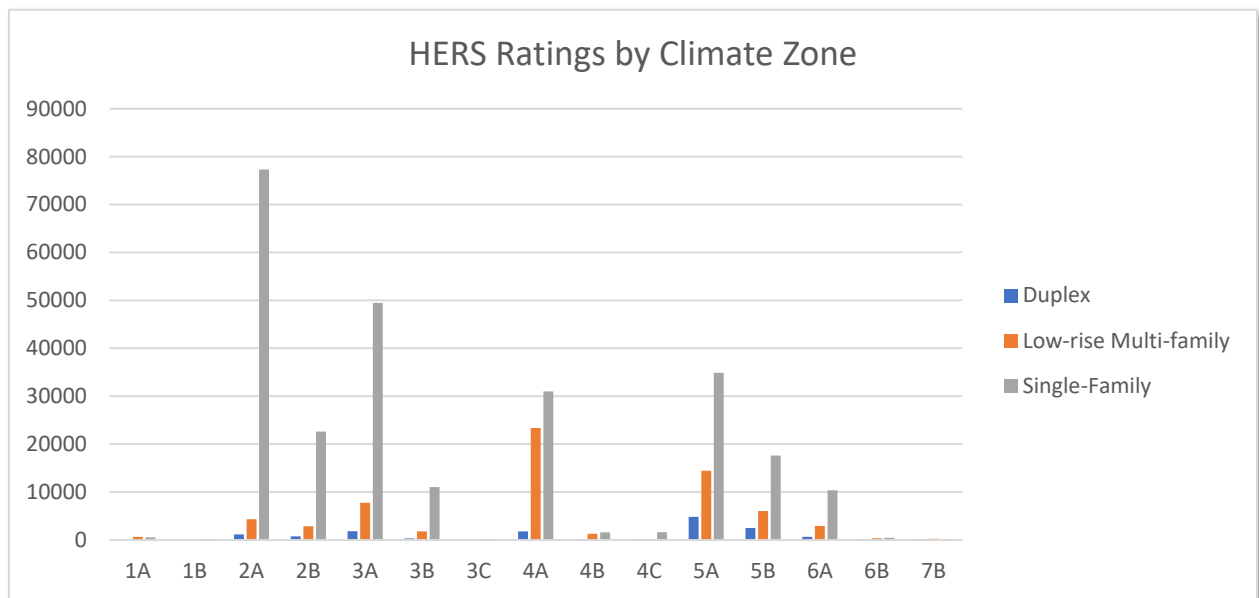


Figure 5. HERS Ratings by Climate Zone, 2022

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.

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

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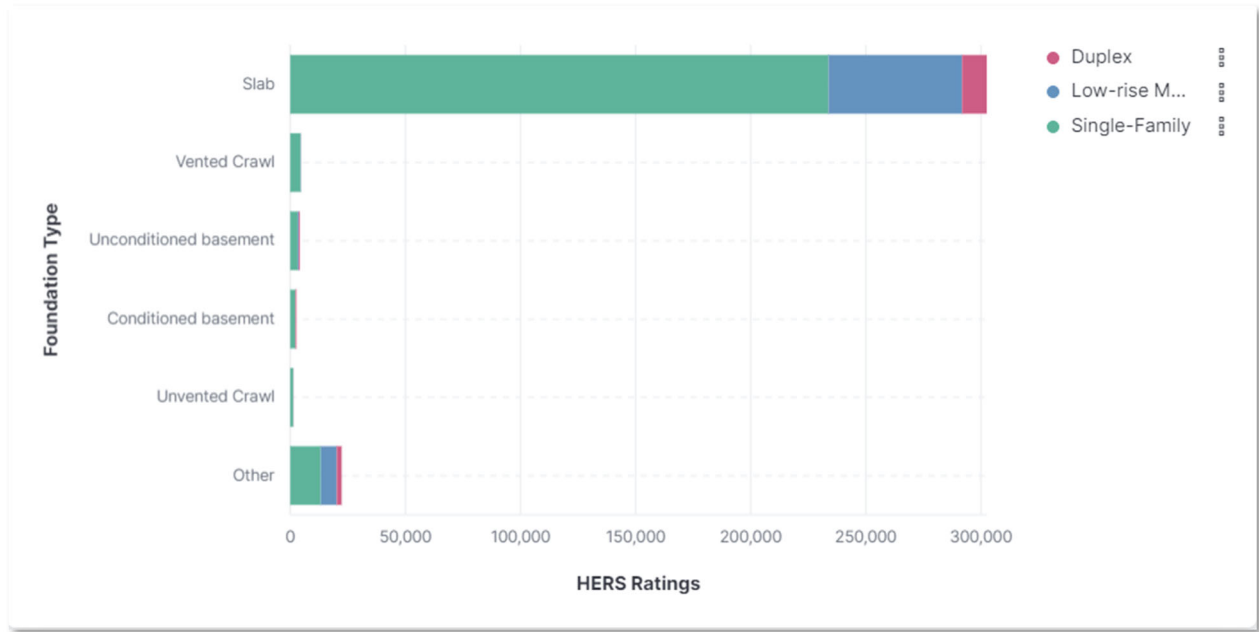


Figure 6. Foundation Types, 2022

Above Grade Wall Insulation

Above grade wall insulation looks at cavity versus continuous insulation across all Ratings. Figure 7 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. The single family and multi-family percentages are nearly identical for cavity and continuous wall insulation.

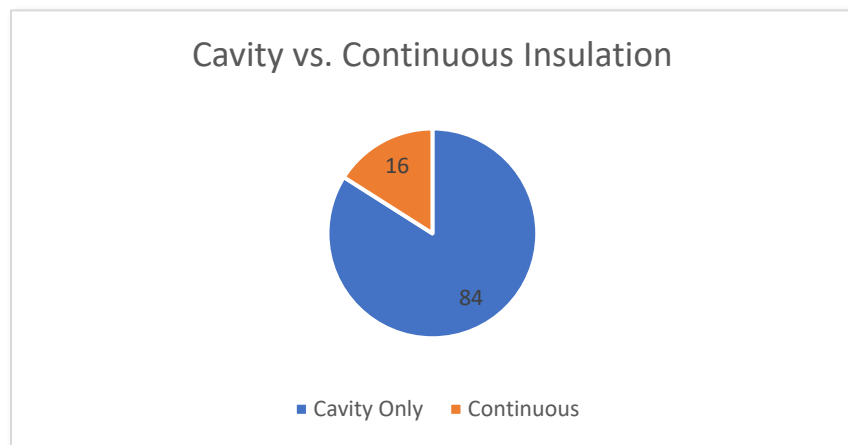


Figure 7. Cavity vs. Continuous Wall Insulation, 2022

The following chart shows the average above-grade wall U_o for all HERS Ratings by year over the past six years. Figure 9 shows the average above grade wall U_o by climate zone for 2022 (climate zones with fewer than 100 ratings have been removed).

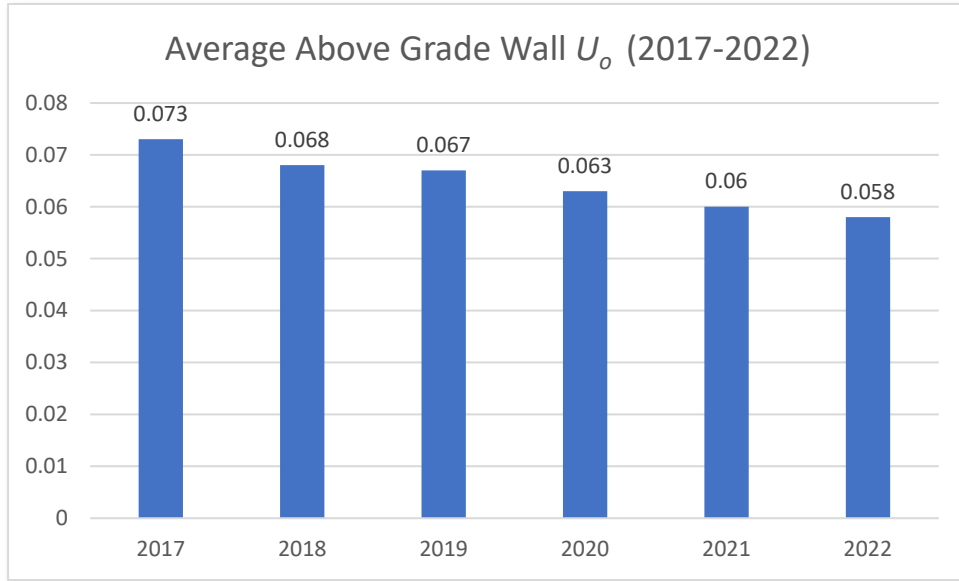


Figure 8. Avg. Above Grade Wall U_o (2017-2022)

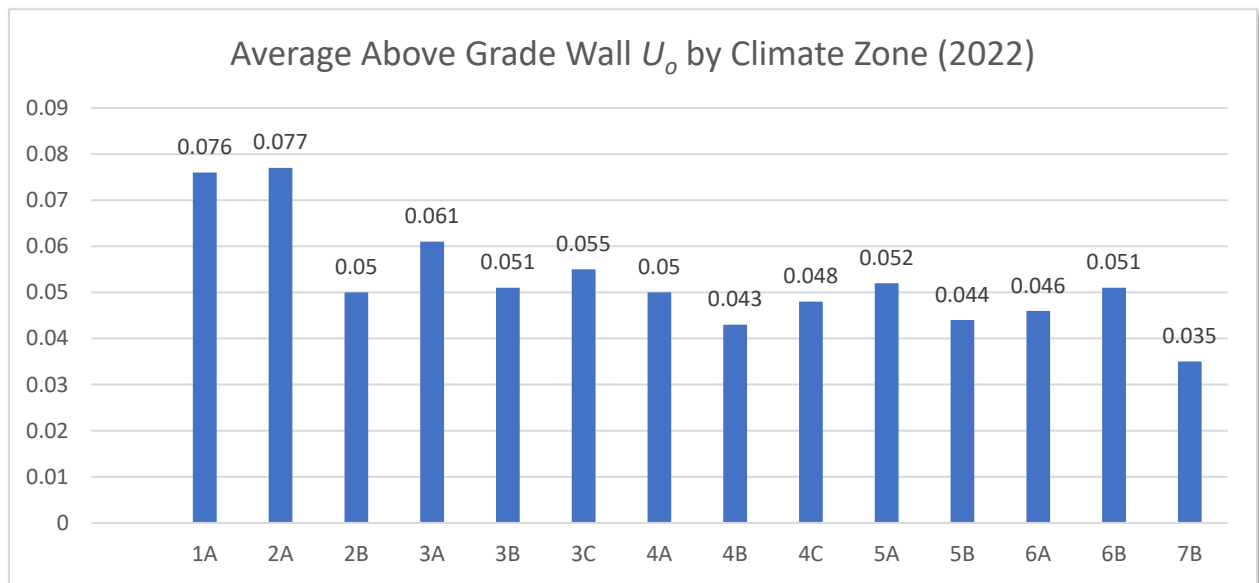


Figure 9. Avg. Above Grade Wall U_o by Climate Zone (2022)

Ceiling Insulation and Radiant Barriers

In 2022, 32 percent of all Rated homes had a radiant barrier. This is up from 29 percent in 2021. The chart, below, shows the breakdown of homes using a radiant barrier by home type.

Trends in HERS® Rated Homes, 2023

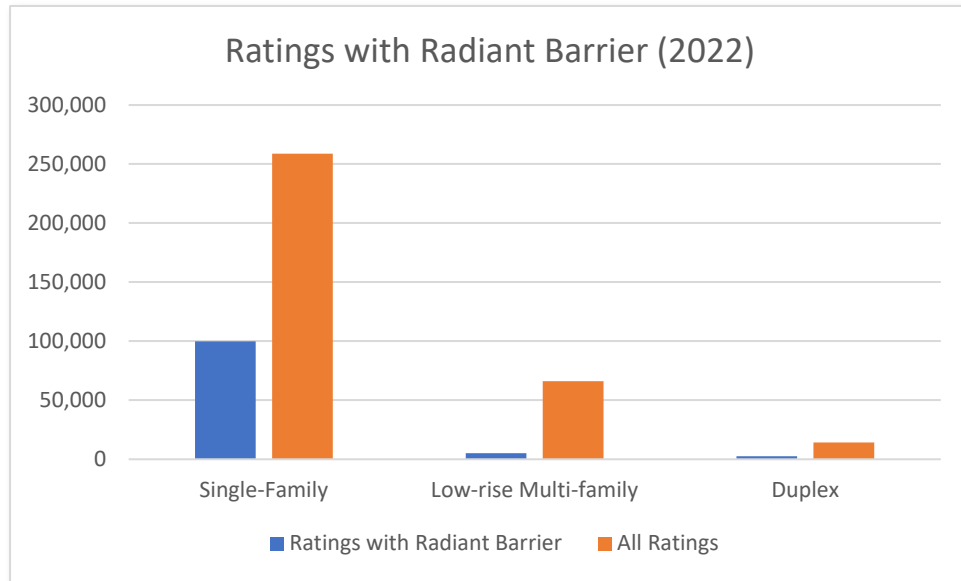


Figure 10. Homes with Radiant Barriers, 2022

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 2022 (climate zones with fewer than 100 ratings have been removed).

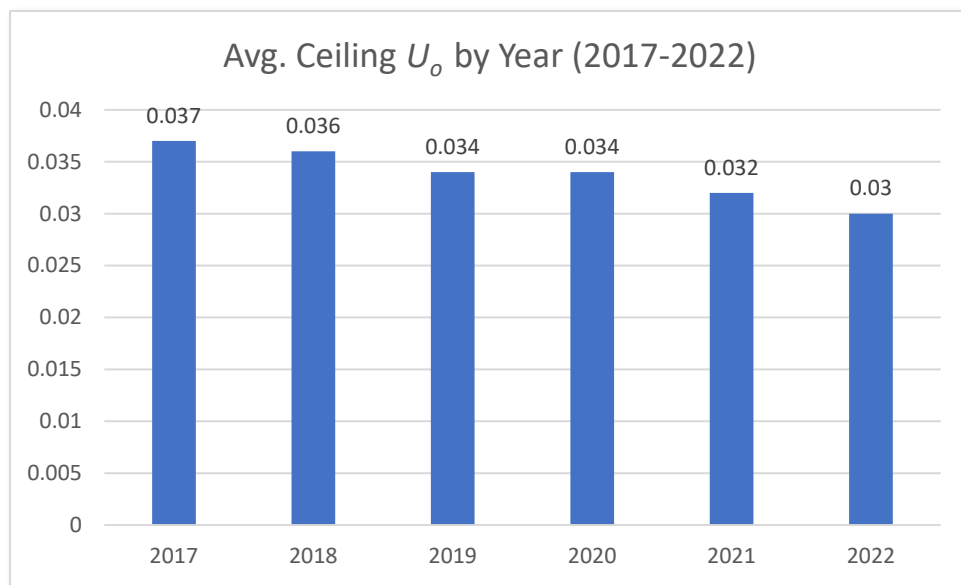


Figure 11. Average Ceiling U_o (2017-2022)

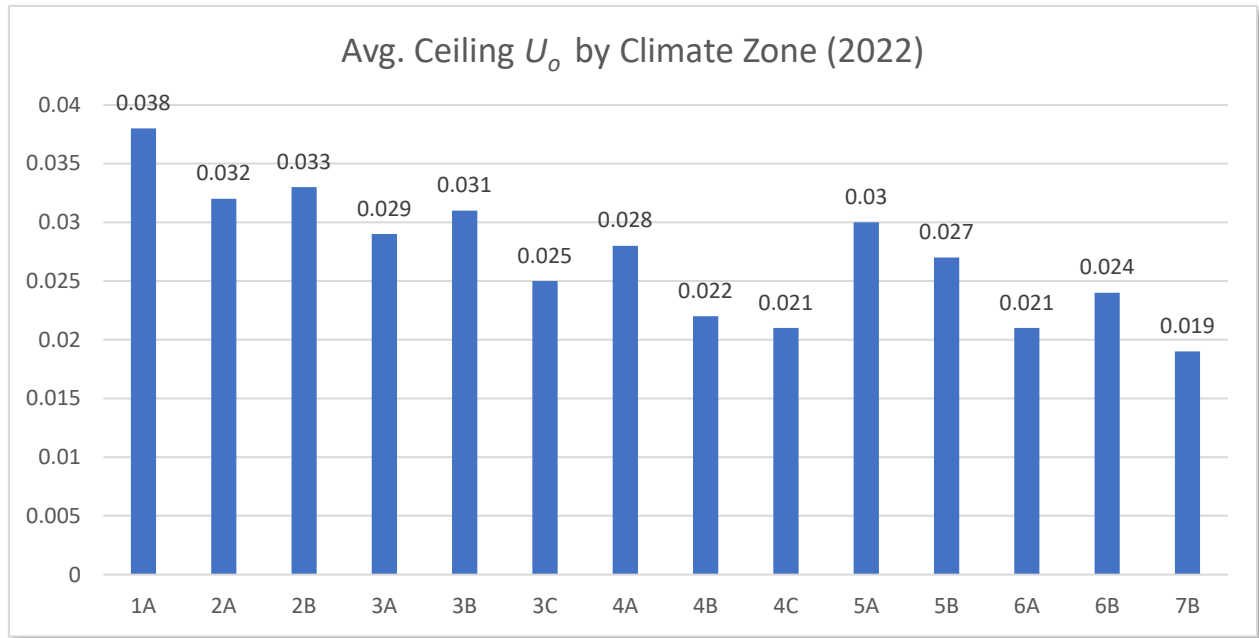


Figure 12. Avg. Ceiling U_o by Climate Zone (2022)

Window U-Value and SHGC

Data on window U-Values shows that 51 percent of windows have a U-Value between 0.31-0.35 for single family homes. Window solar heat gain coefficient (SHGC) shows a similar trend with about 57 percent of windows having an SHGC of 0.2-0.25. Figure 13 shows the breakdown of window U-Values and solar heat gain coefficients for single family ratings last year. Figure 14 shows multi-family window U-Values and SHGC for ratings last year and Figure 15 shows the average window U-Values and SHGC by climate zone (climate zones with fewer than 100 ratings have been removed).

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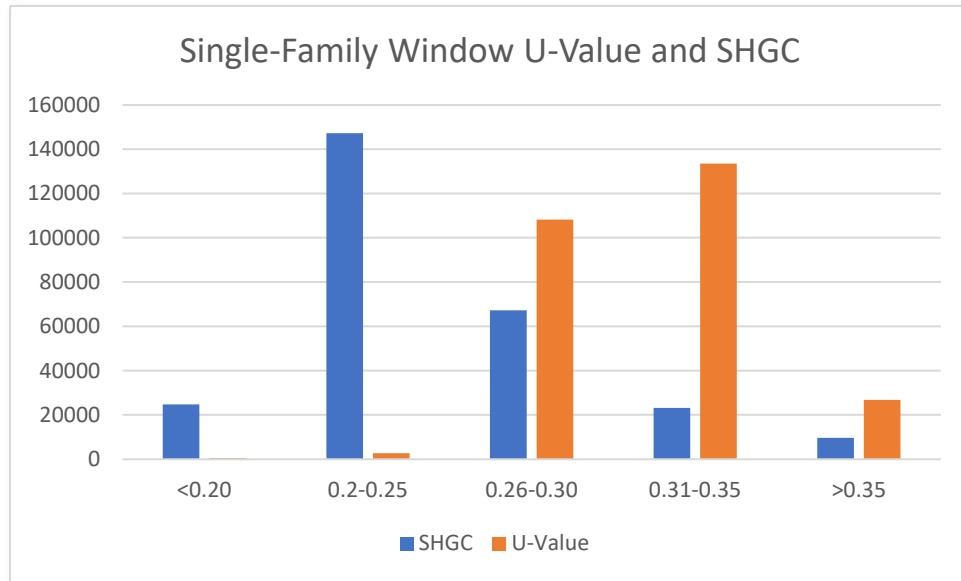


Figure 13. Single Family Window U-Value and SHGC, 2022

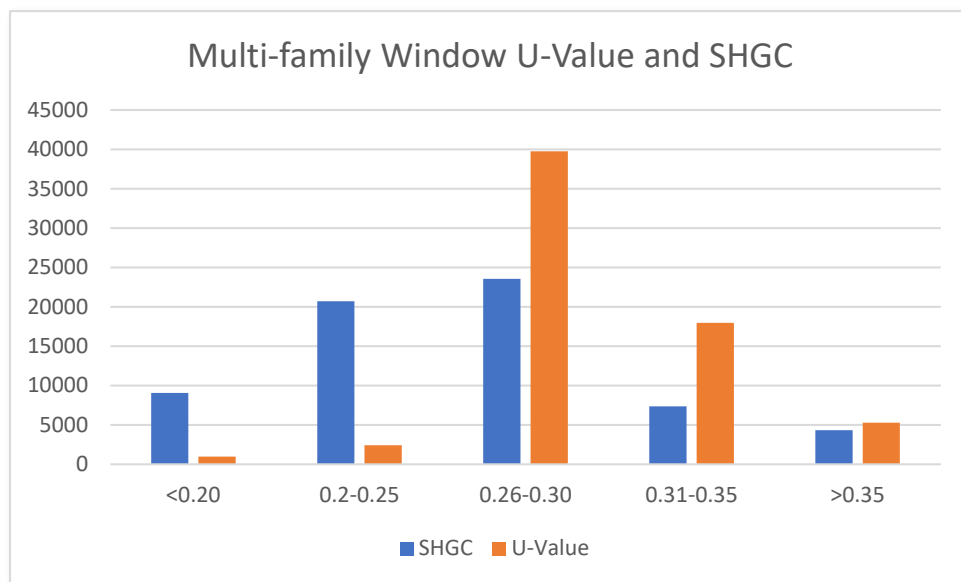


Figure 14. Multi-Family Window U-Value and SHGC, 2022

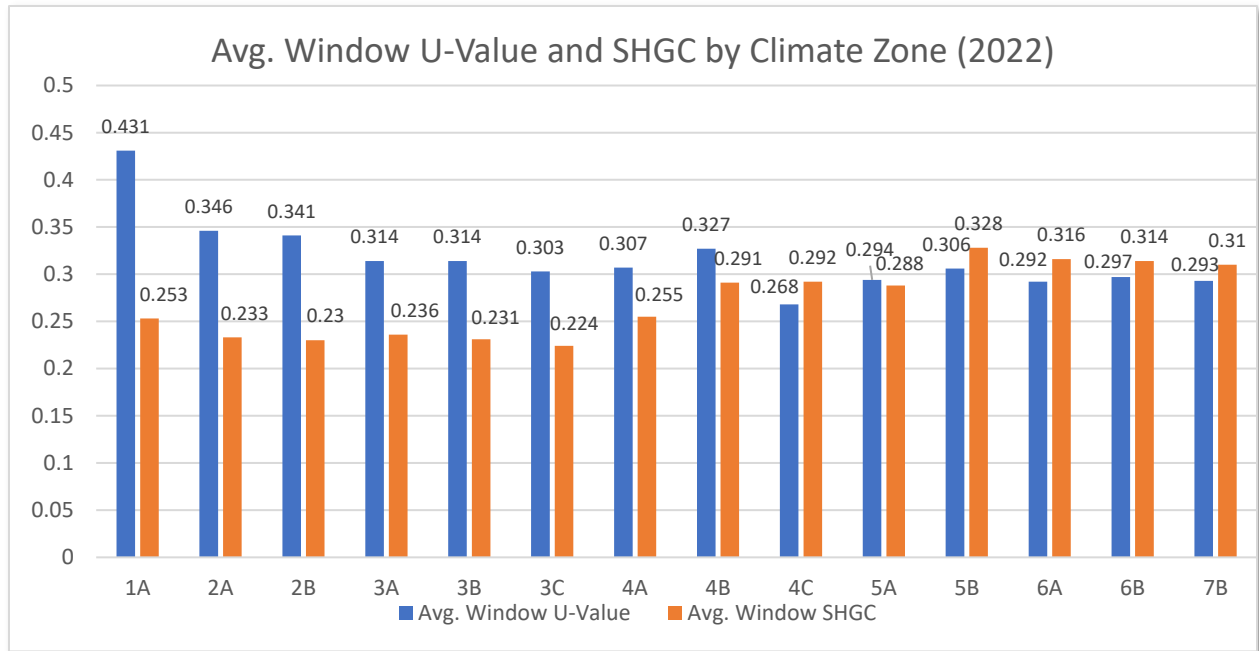


Figure 15. Avg. Window U-Value and SHGC by Climate Zone (2022)

Envelope Air Leakage Rates

In 2022, 80 percent of all single family and 50 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 more than 27,000 single family and multi-family homes had an air leakage rate of less than 2 ACH50. Figure 16 shows the breakdown of air leakage rates for HERS rated homes last year. Figure 17 provides a breakdown of average envelope leakage rates by climate zone (climate zones with fewer than 100 ratings have been removed).

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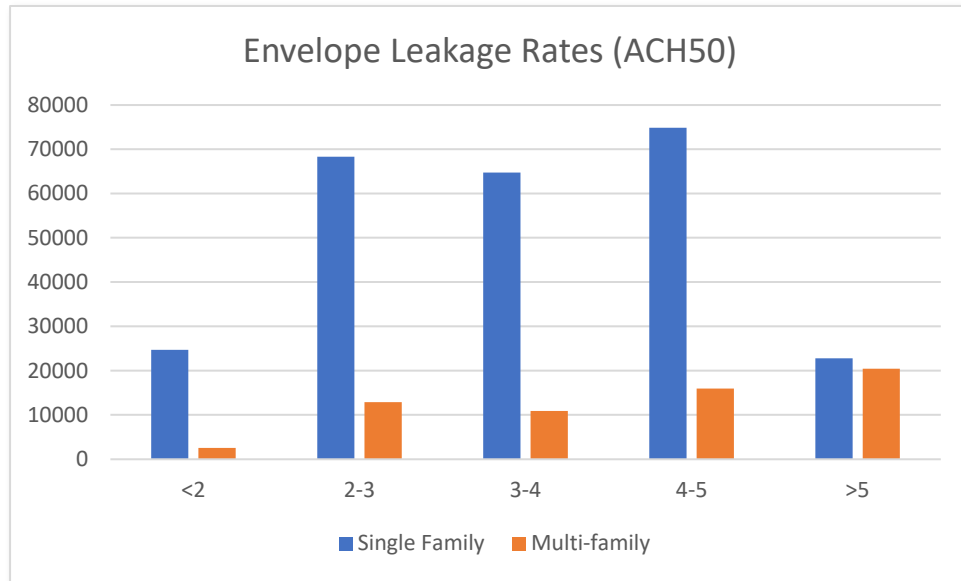


Figure 16. Air Leakage Rates of HERS Rated Homes, 2022

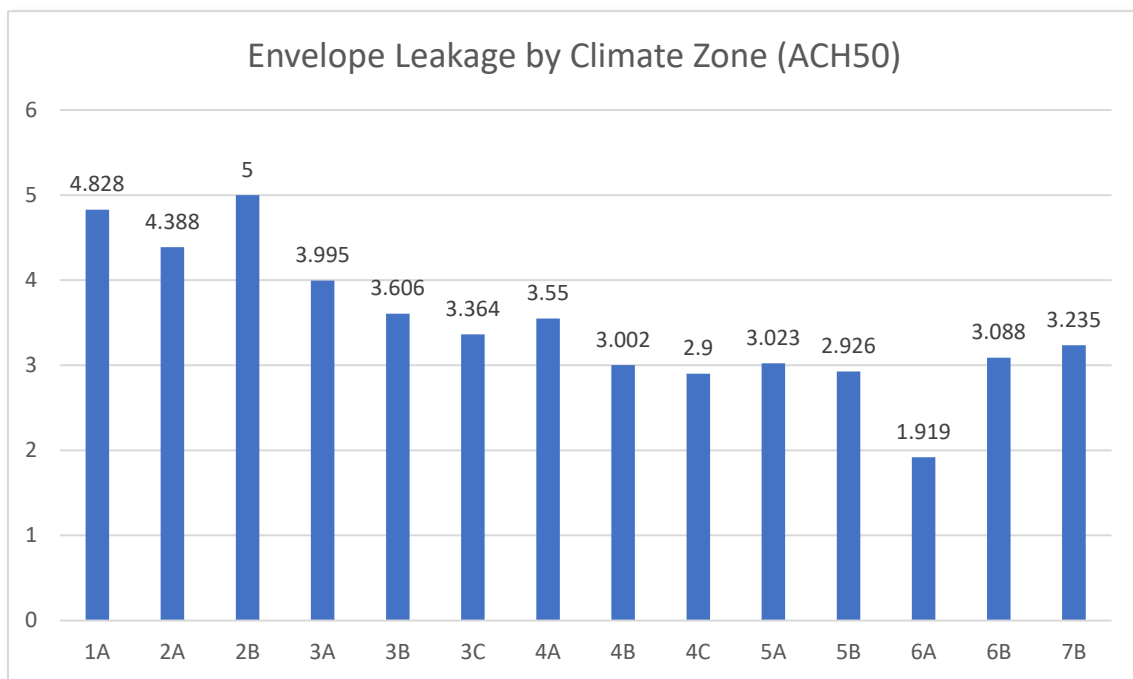


Figure 17. Avg. Envelope Leakage by Climate Zone (2022)

Ventilation Types

Data on mechanical ventilation types shows that exhaust only ventilation strategies are still the most common for HERS Rated homes. For homes with mechanical ventilation, the second most common strategy is supply only, followed closely by the use of the air handler (CFIS) for ventilation. Figure 12 shows the breakdown of ventilation types for HERS Rated homes last year.

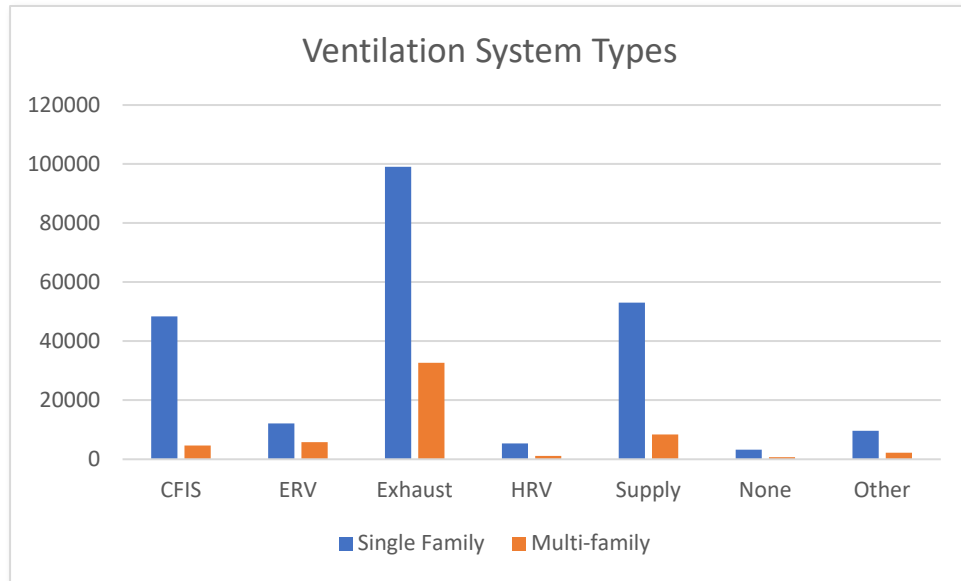


Figure 18. Ventilation Types in HERS Rated Homes, 2022

Heating, Cooling and Water Heating Equipment

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 45 percent of all single family homes with a fuel-fired furnace used a standard efficiency furnace (less than 90 AFUE), while 55 percent used a high-efficient furnace as shown in Figure 19. For multi-family units about 20 percent of units had a standard efficiency furnace.

For air conditioner efficiency, 68 percent of single family and multi-family homes used either a 14 or 16 SEER unit, while 13 and 15 SEER and units greater than 16 were the least common, as shown in Figure 20.

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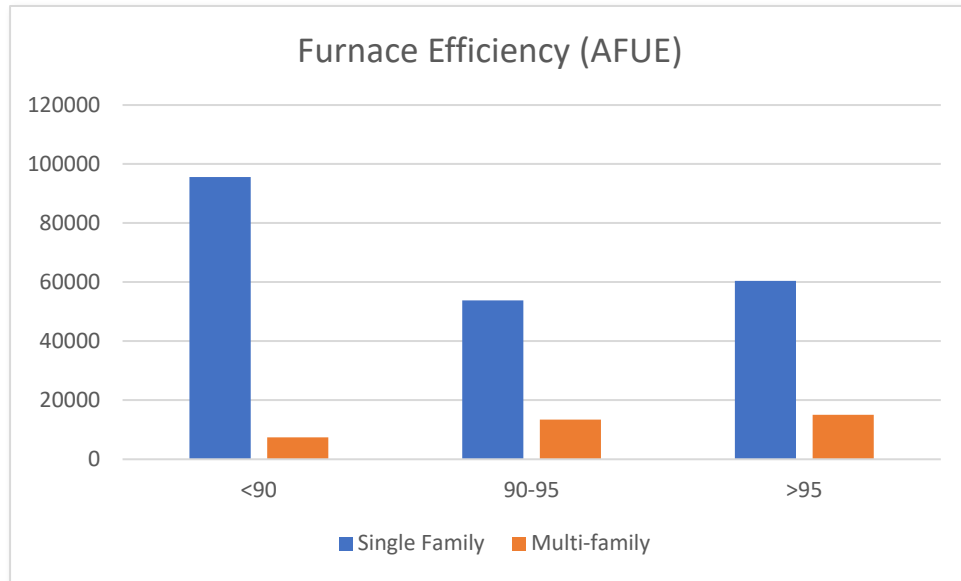


Figure 19. Furnace Efficiency in HERS Rated Homes, 2022

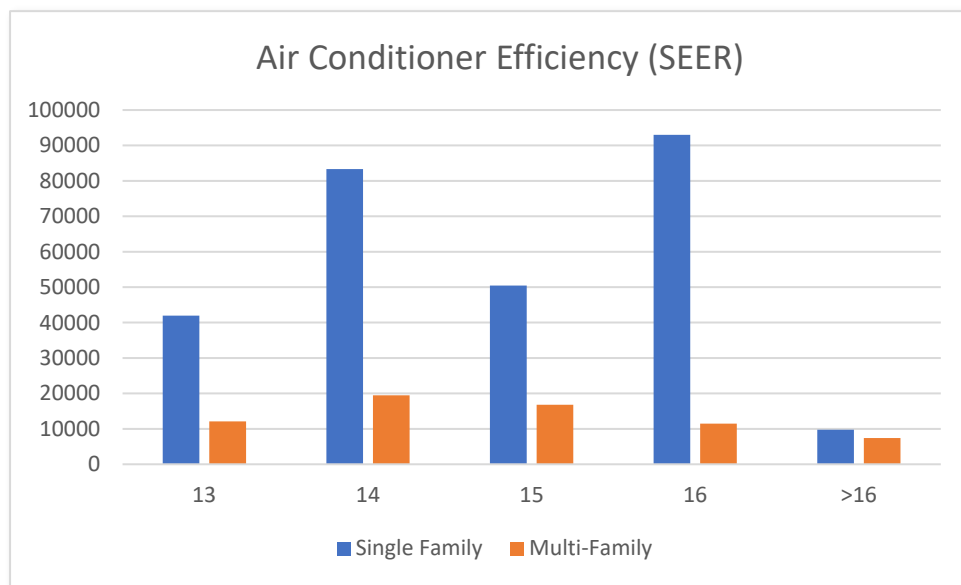


Figure 20. Air Conditioner Efficiency in HERS Rated Homes, 2022

When looking at the fuel type for furnaces, natural gas has the largest share of single family HERS Rated homes with 69 percent, but only made up about 50 percent of the multi-family Ratings last year. These numbers represent a drop of about 4 percent for single family and no change for multi-family over the 2021 numbers. Electric was the second most common heating fuel type, representing almost 49 percent of multi-family Ratings and 29 percent of single family Ratings in 2021. Figure 21 shows the number of 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 split on electric versus gas.

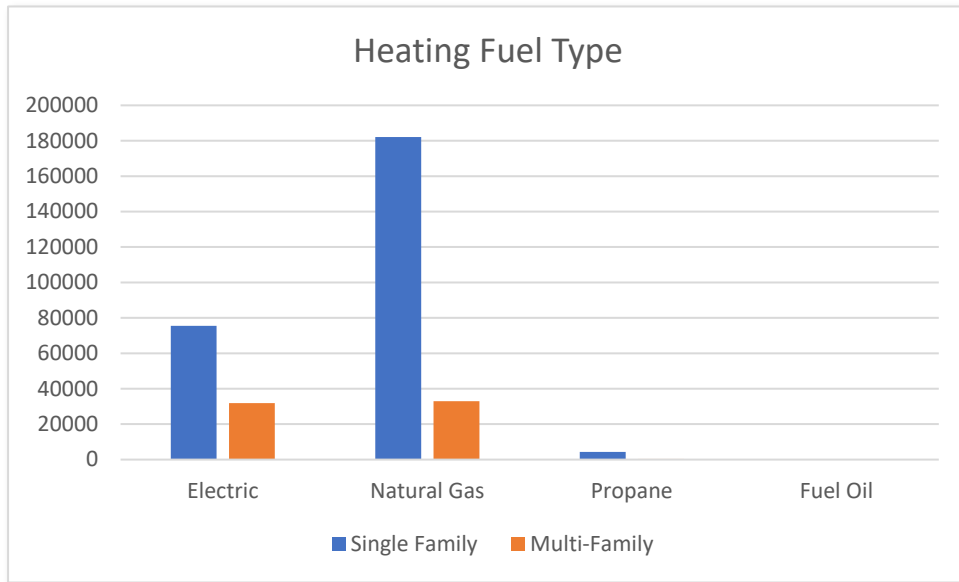


Figure 21. Heating System Fuel Type, 2022

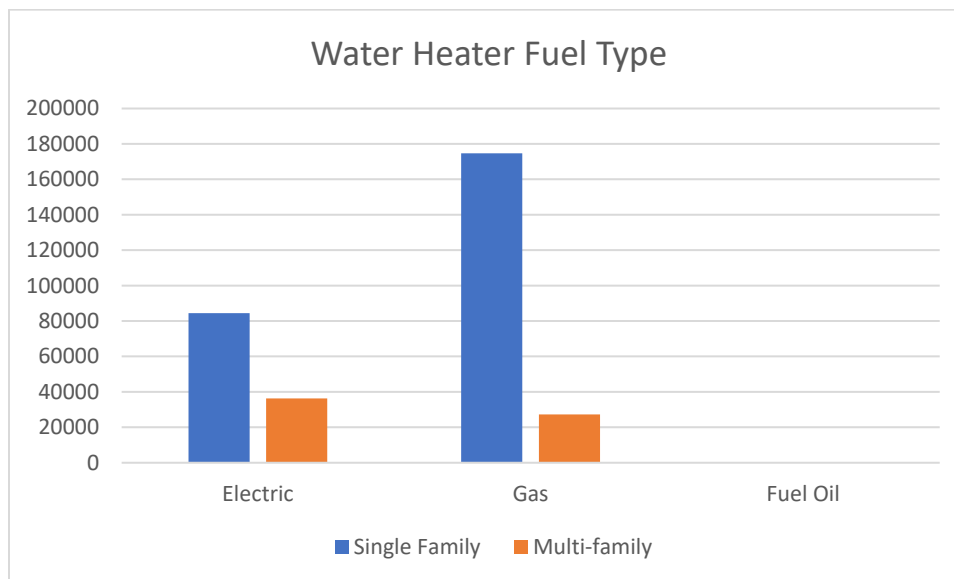


Figure 22. Water Heater Fuel Type, 2022

The Use of Solar PV on HERS Rated Homes

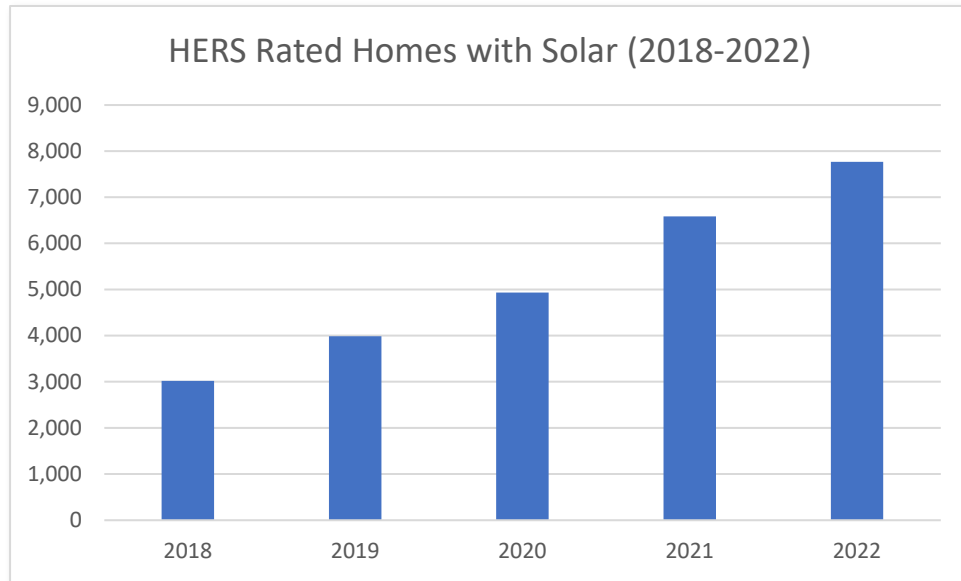
In 2022 there were over 7,700 HERS Rated homes that had solar PV. A total of 6,599 were installed on single family and duplex homes and the remainder were on multi-family. The following are some statistics for HERS Rated homes using solar:

- The average HERS Score for homes with solar was a 22.
- The average HERS Index before accounting for solar was a 48.

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

State	Ratings
CA	3,771
FL	962
CO	867
MA	579
TX	524
NY	256
AZ	154
CT	88
NH	77
NM	69
NC	56
PA	54
DC	47
VA	35
VT	35
OH	27
DE	25
IL	24
WA	23
NV	15

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



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 second 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 2022. In fact, the number of HERS_{H2O} Ratings doubled compared to 2021 and nearly 100 more Raters have been certified as HERS_{H2O} Raters and WaterSense Home Verifiers.

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

- Number of homes rated with HERS_{H2O} and receiving the WaterSense Label for Homes: 2,293
- Average Index score of HERS_{H2O} Ratings: 61
- Number of RESNET-accredited HERS_{H2O} Providers: 26
- Number of certified RESNET HERS_{H2O} Raters: 293

To learn more about HERS_{H2O} and the WaterSense Label for Homes, visit:

<https://www.resnet.us/about/hersh2o/>.

Closing Remarks

This is the fourth installment of RESNET's *Trends in HERS Rated Homes* report. RESNET intends to make this an annual tradition and 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 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 Suppliers Advisory Board is to provide an opportunity for suppliers to better understand RESNET; network with other suppliers, customers and HERS raters; and to 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.