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# Trends in HERS<sup>®</sup> Rated Homes

A STATISTICAL ABSTRACT | 2022

**RESNET<sup>®</sup>**

Suppliers  
Advisory Board

Prepared for RESNET's Suppliers Advisory Board

Ryan Meres | RESNET | June 28, 2022

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## Executive Summary

Each year more than one-fifth of all new homes built in the U.S. are 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 2021. 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 percent 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 2021, HERS Raters rated more than 313,000 homes. This represents a 4 percent increase over the number of ratings in 2020 and marks the ninth straight year-over-year increase in HERS ratings. The average HERS Index in 2021 was a 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. Seventy-six percent of all homes rated last year were one- and two-family dwellings and 24 percent were multi-family units.

## HERS Ratings by State

RESNET conducted an analysis of the percentage<sup>1</sup> of new one- and two-family dwellings compared to the number of HERS ratings in each state in 2021. The clear stand-out for the highest percentage of new homes receiving a HERS Rating is Massachusetts. The commonwealth saw 80 percent of all new homes receive a HERS Rating. Indiana comes in second with half of all new homes HERS Rated last year, while 12 states saw between 25 and 49 percent of new homes HERS Rated. Figure 1 shows the percent of homes HERS rated by state.

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<sup>1</sup> 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

## Trends in HERS® Rated Homes, 2022

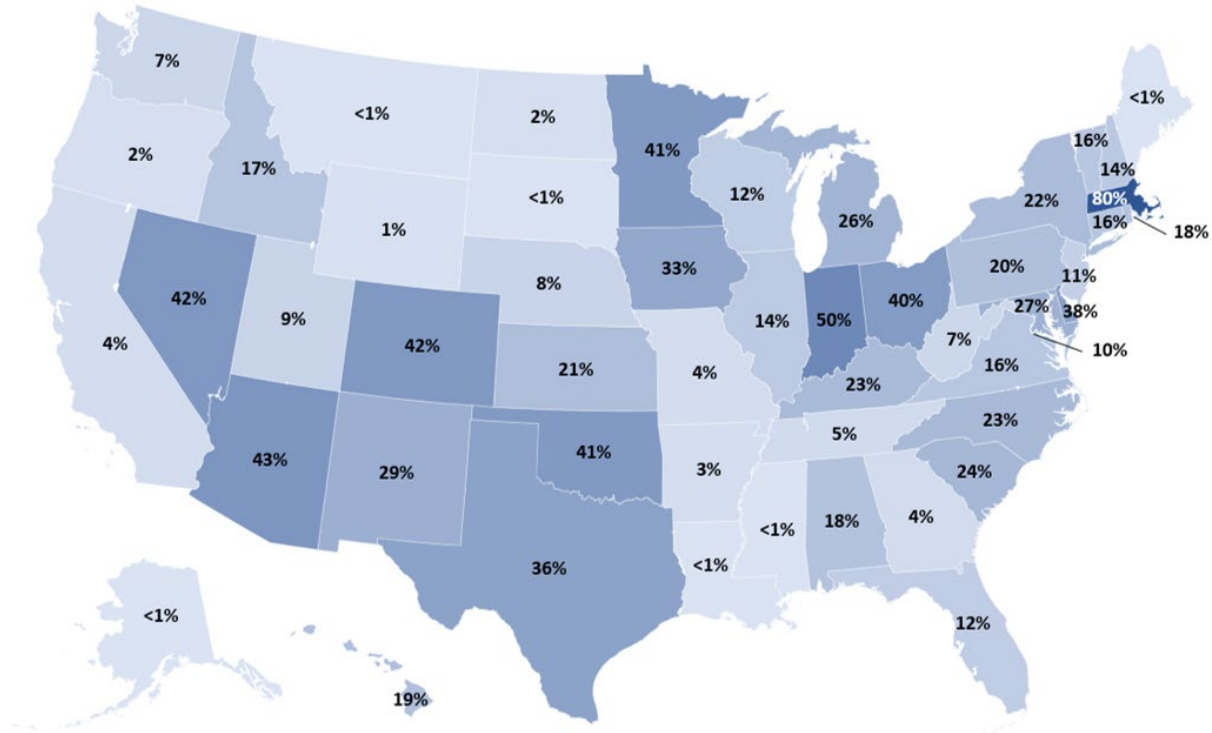


Figure 1. Percent of New Homes HERS Rated by State, 2021

When looking at the total number of ratings, for all home types, by state, Texas comes out on top with more than 70,000 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 2021.

Trends in HERS® Rated Homes, 2022

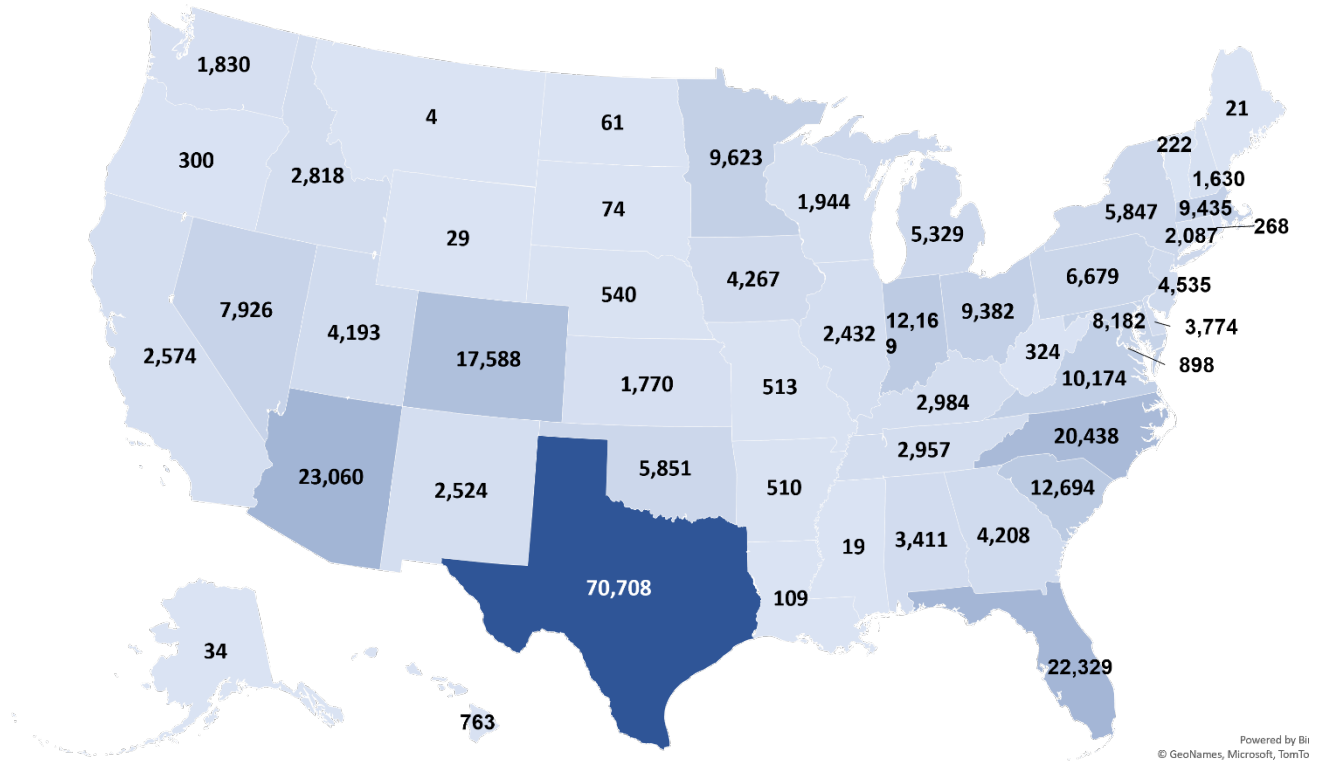


Figure 2. Number of HERS Ratings by State, 2021

### HERS Ratings by City

In 2021 there were HERS Ratings completed in more than 4,000 individual municipalities. For the third year in a row, San Antonio, Texas tops the list of municipalities with the highest number of HERS Ratings at nearly 7,400 homes. The top 25 municipalities are located across seven states and are responsible for nearly one-fifth of HERS Ratings last year. Figure 3 shows the top 25 municipalities for single family HERS Ratings in 2021.

City, State	HERS Ratings
San Antonio, TX	7,352
Richmond, TX	4,179
Las Vegas, NV	3,783
Katy, TX	3,635
Colorado Springs, CO	3,176
Phoenix, AZ	2,646
Houston, TX	2,432
Aurora, CO	2,311
Charlotte, NC	2,050
North Las Vegas, NV	1,952

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Georgetown, TX	1,942
Conroe, TX	1,930
Henderson, NV	1,892
Buckeye, AZ	1,829
Surprise, AZ	1,717
Austin, TX	1,642
Tucson, AZ	1,496
Queen Creek, AZ	1,471
Cypress, TX	1,389
Summerville, SC	1,381
Goodyear, AZ	1,292
Fuquay Varina, NC	1,276
Peoria, AZ	1,206
Fulshear, TX	1,188
Jacksonville, FL	1,185

Figure 3. Top 25 Municipalities for HERS Ratings, 2021

When considering only multi-family ratings, there were HERS rated dwelling units in more than 1,000 municipalities, with San Antonio beating out Charlotte, North Carolina to top this year’s list at over 1,100 units rated. The top 25 municipalities for multi-family ratings are located across 12 states and the District of Columbia and are responsible for nearly one-fifth 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
San Antonio, TX	1,171
Charlotte, NC	930
Richmond, VA	930
Washington, DC	878
Rowlett, TX	858
Grand Prairie, TX	825
Boston, MA	768
Phoenix, AZ	668
Durham, NC	638
Arlington, VA	604
Herndon, VA	602
Baltimore, MD	584
Colorado Springs, CO	562
Frederick, MD	501
Salt Lake City, UT	490
Las Vegas, NV	484
Rochester, NY	477
Hampton, VA	476

Austin, TX	456
Raleigh, NC	449
Georgetown, TX	431
Virginia Beach, VA	402
Henderson, NV	373
Philadelphia, PA	372
Myrtle Beach, SC	355

Figure 4. Top 25 Municipalities for Multi-Family HERS Ratings, 2021

## 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 2021:

- HERS Index Score: **58**
- Number of bedrooms: **3.7**
- Conditioned floor area: **2,703 ft<sup>2</sup>**
- Annual energy cost: **\$1,630**
- Annual energy cost savings: **\$795**

The average multi-family dwelling unit had these basic characteristics in 2021:

- HERS Index Score: **58**
- Number of bedrooms: **2.2**
- Conditioned floor area: **1,385 ft<sup>2</sup>**
- Annual energy cost: **\$1,058**
- Annual energy cost savings: **\$503**

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 zone<sup>2</sup>. 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 make up roughly 50 percent of all ratings in 2021. 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.

<sup>2</sup> Climate zone as defined in the 2021 International Energy Conservation Code

## Trends in HERS® Rated Homes, 2022

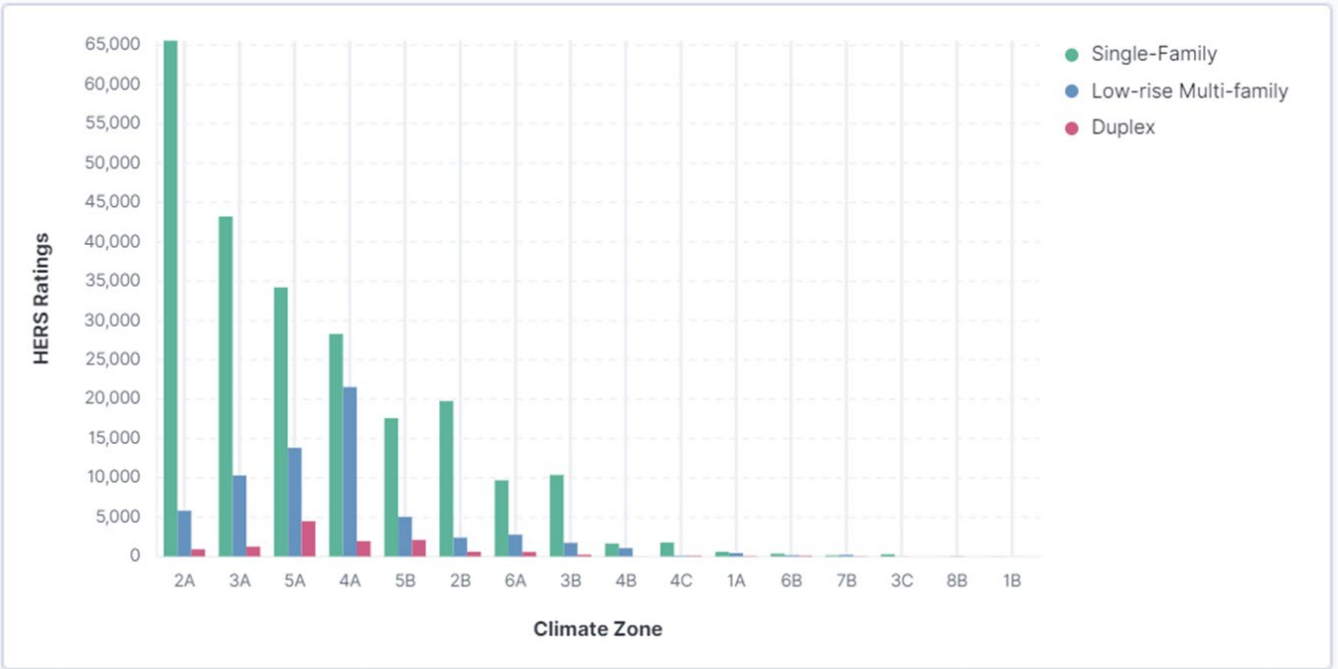


Figure 5. HERS Ratings by Climate Zone, 2021

## 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.

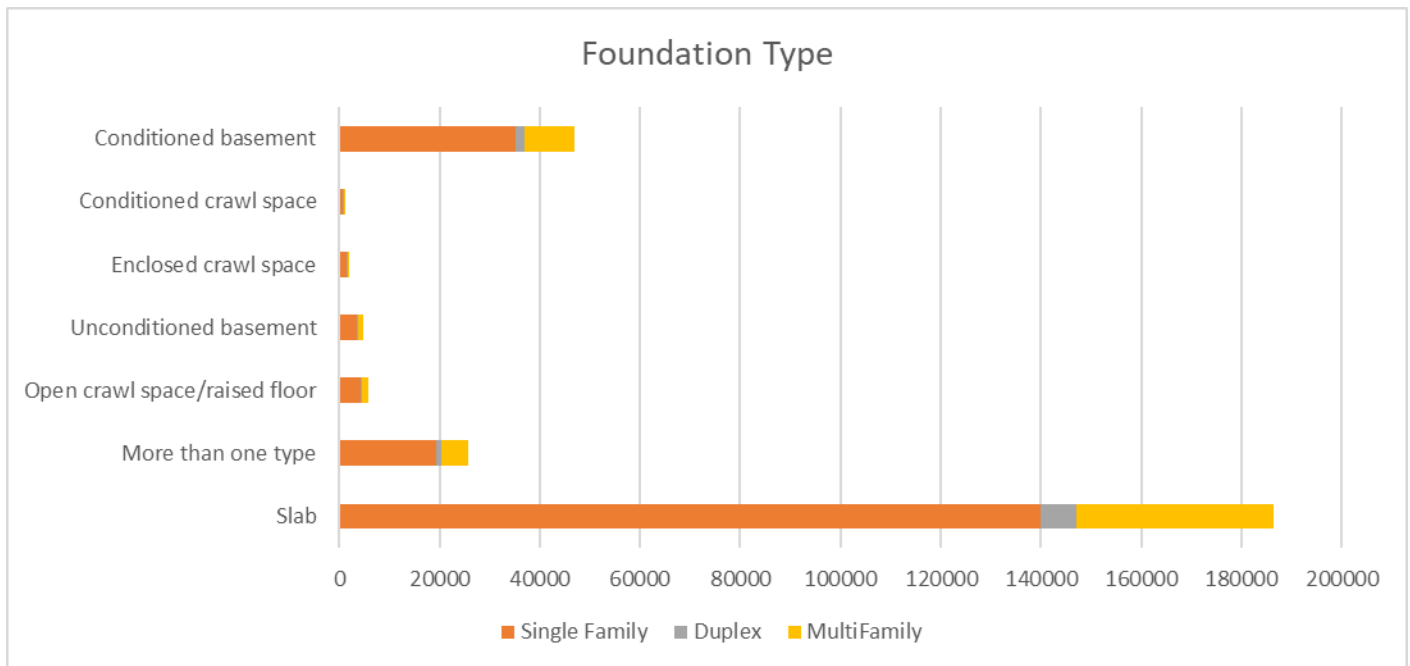


Figure 6. Foundation Types, 2021



### Above Grade Wall Insulation

Above grade wall insulation looks at cavity versus continuous insulation for single and multi-family homes. 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-1 insulation. The single family and multi-family percentages are nearly identical for cavity and continuous wall insulation.

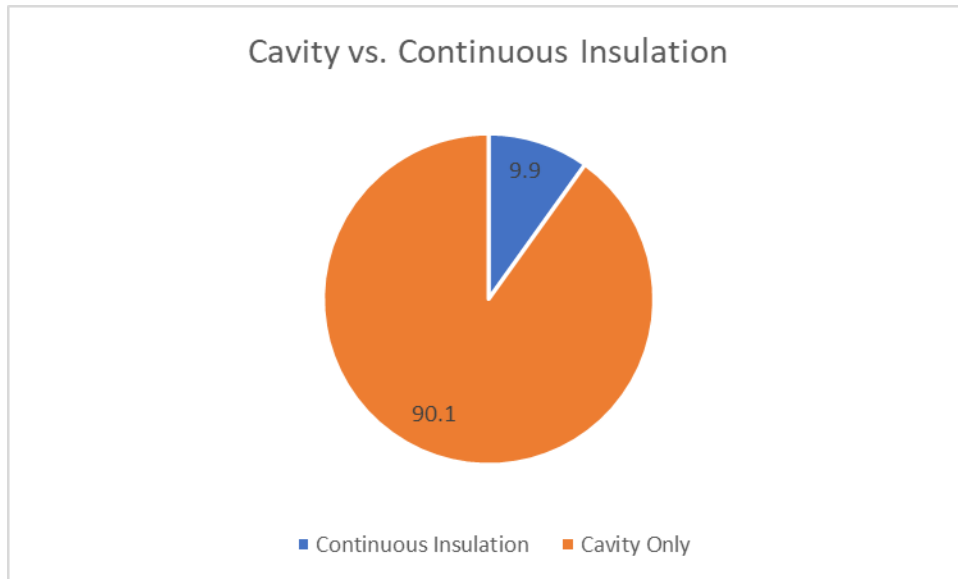
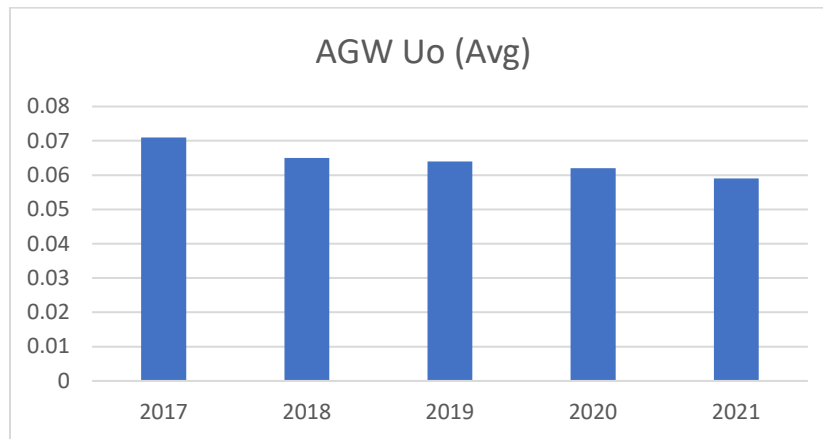


Figure 7. Cavity vs. Continuous Wall Insulation, 2021

The following chart shows the average above-grade wall  $U_o$  for all HERS Ratings by year over the past five years.



### Ceiling Insulation and Radiant Barriers

In 2021, 90 percent of single family and multi-family HERS Rated homes used blown-in insulation in ceilings (up from 87 and 83 percent in 2020 respectively) while the

remaining used batt insulation. When it came to the use of radiant barriers in 2021 just 29 percent of all HERS Rated homes had one, about a 2 percent drop from 2020.

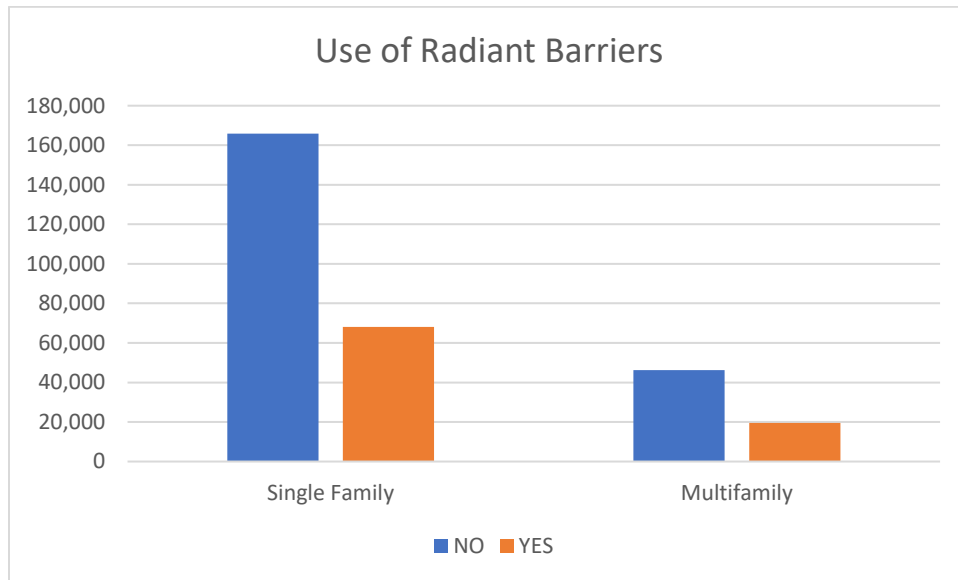
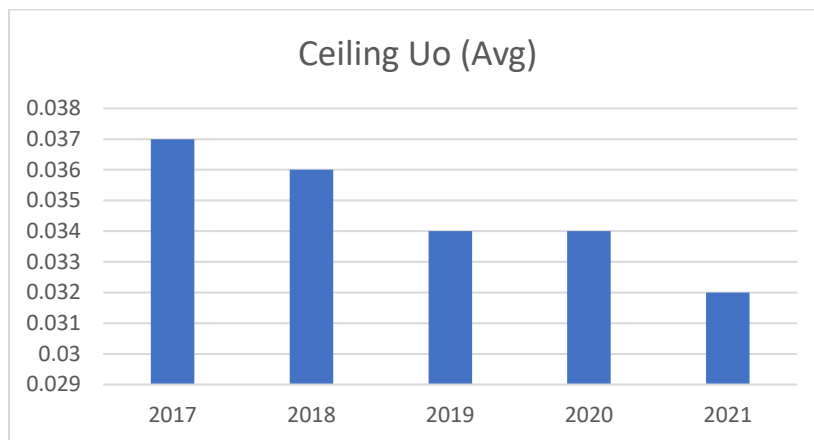


Figure 8. Homes with Radiant Barriers, 2021

The following chart shows the average  $U_o$  for ceilings for all HERS Ratings each year for the past five years.



### Window U-Value and SHGC

Data on window U-Values shows that 58 percent of windows have a U-Value between 0.31-0.35. Window solar heat gain coefficient (SHGC) shows a similar trend with about 53 percent of windows having an SHGC of 0.2-0.25. Figure 9 shows the breakdown of window U-Values and solar heat gain coefficients for single family ratings last year. Figure 10 shows multi-family window U-Values and SHGC for ratings last year.

When looking back over the past five years, average window SHGC and U-values are remarkably stable. The average SHGC for the past five years has been right around 0.25 and U-values at 0.31.

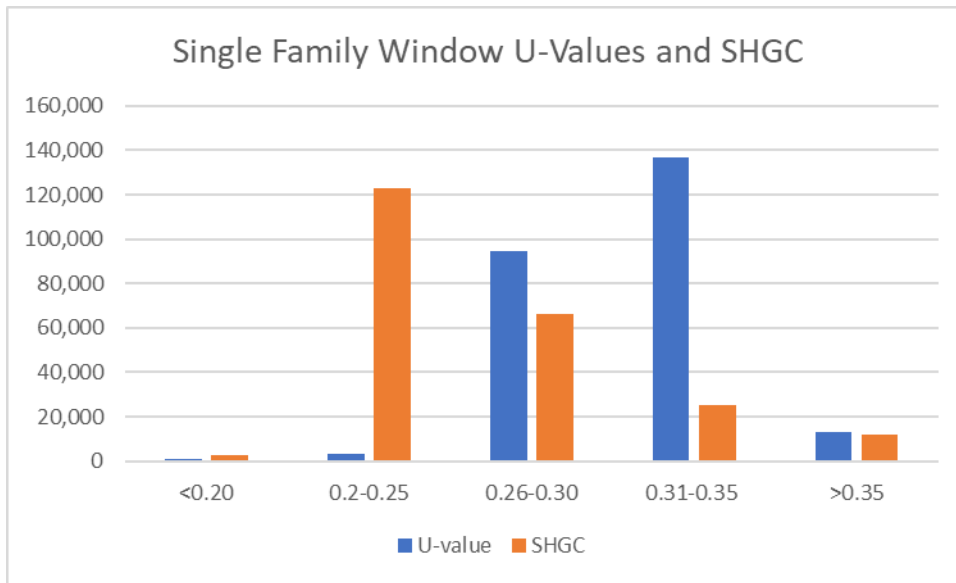


Figure 9. Single Family Window U-Value and SHGC, 2021

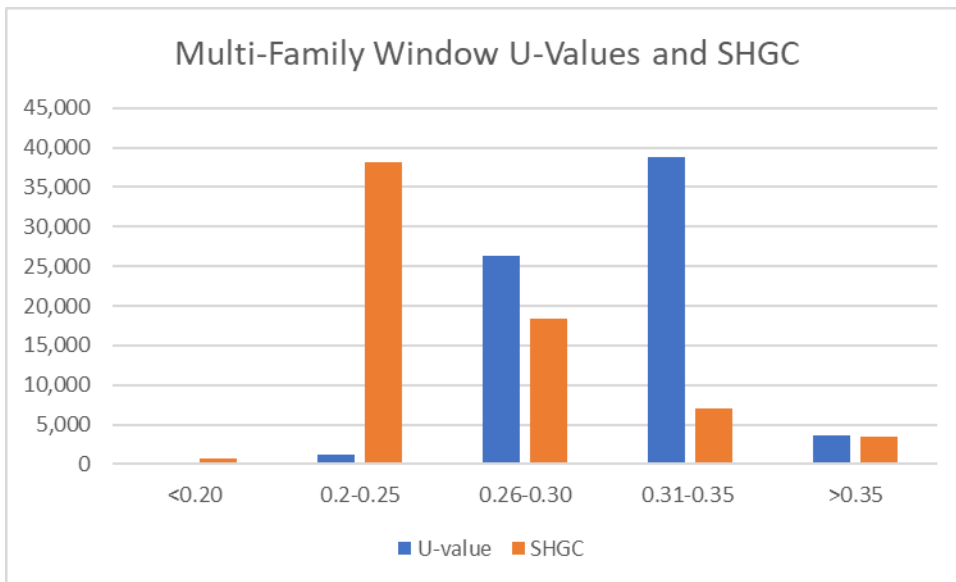


Figure 10. Multi-Family Window U-Value and SHGC, 2021

### Envelope Air Leakage Rates

In 2021, nearly 75 percent of all single family and 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 33,000 single family and multi-family homes had an air leakage rate of less than 2 ACH50. Figure 11 shows the breakdown of air leakage rates for rated homes last year.

## Trends in HERS® Rated Homes, 2022

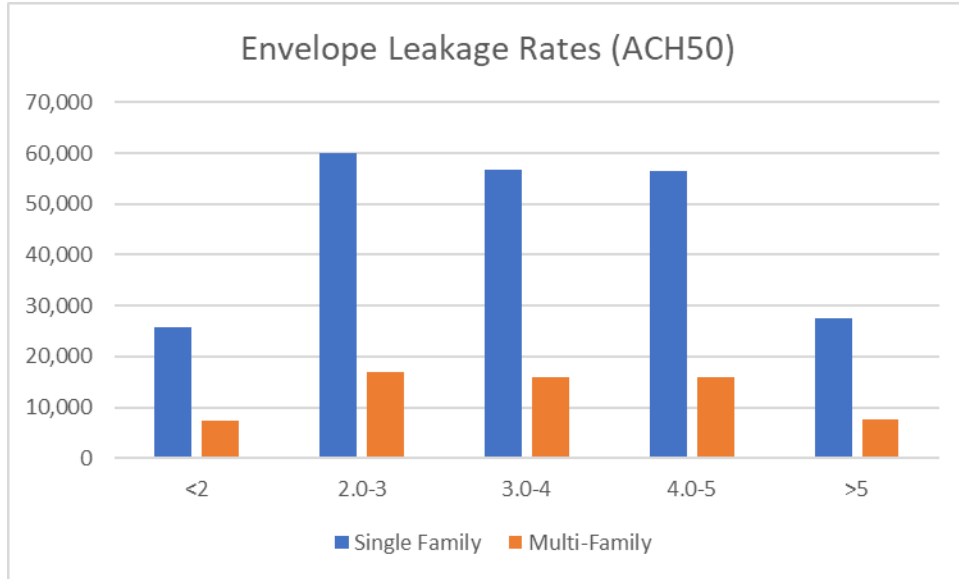


Figure 11. Air Leakage Rates of HERS Rated Homes, 2021

## 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 a tie between the use of the air handler for ventilation air and supply only. Figure 12 shows the breakdown of ventilation types for HERS Rated homes last year.

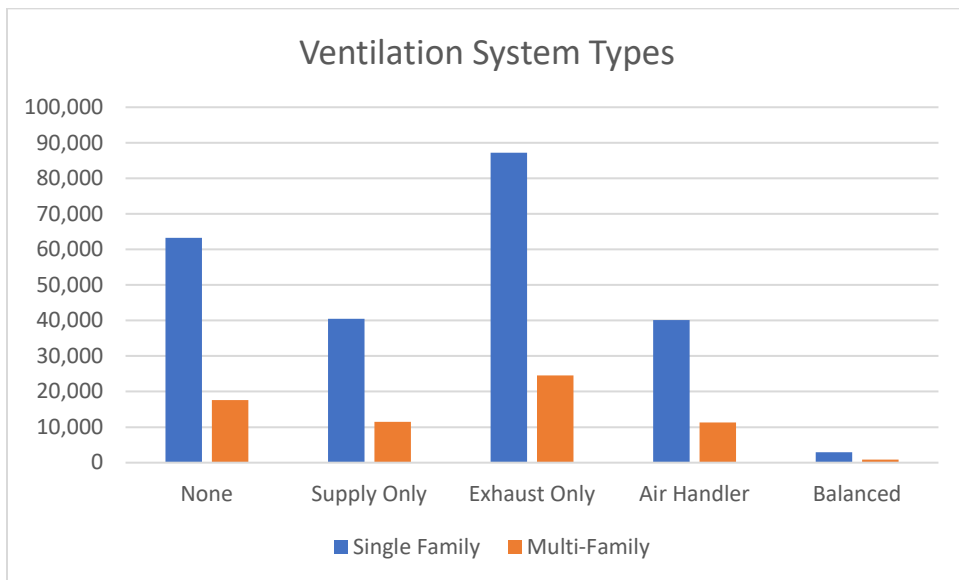


Figure 12. Ventilation Types in HERS Rated Homes, 2021

## 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 39 percent of all single family homes with a fuel-fired furnace used a standard efficiency furnace (less than 90 AFUE), while 61 percent used a high-efficient furnace as shown in Figure 13. Multi-family units had the same split with 39 percent of units using a standard efficiency furnace.

Figure 14 shows that standard efficiency furnaces are most commonly used in the southern states.

For air conditioner efficiency, 63 percent of single family and multi-family homes used either a 14 or 16 SEER unit, while 15 SEER and units greater than 16 were the least common, as shown in Figure 15.

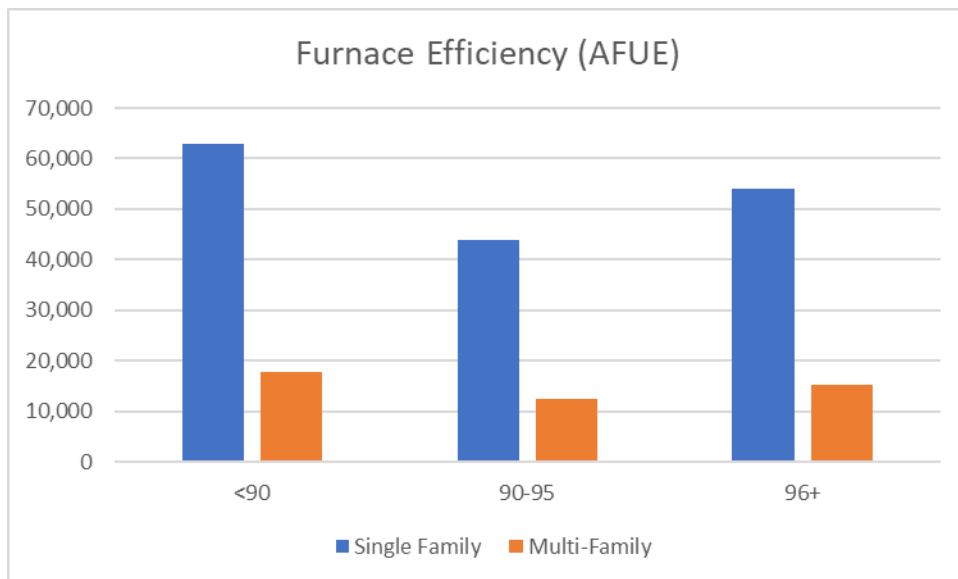


Figure 13. Furnace Efficiency in HERS Rated Homes, 2021

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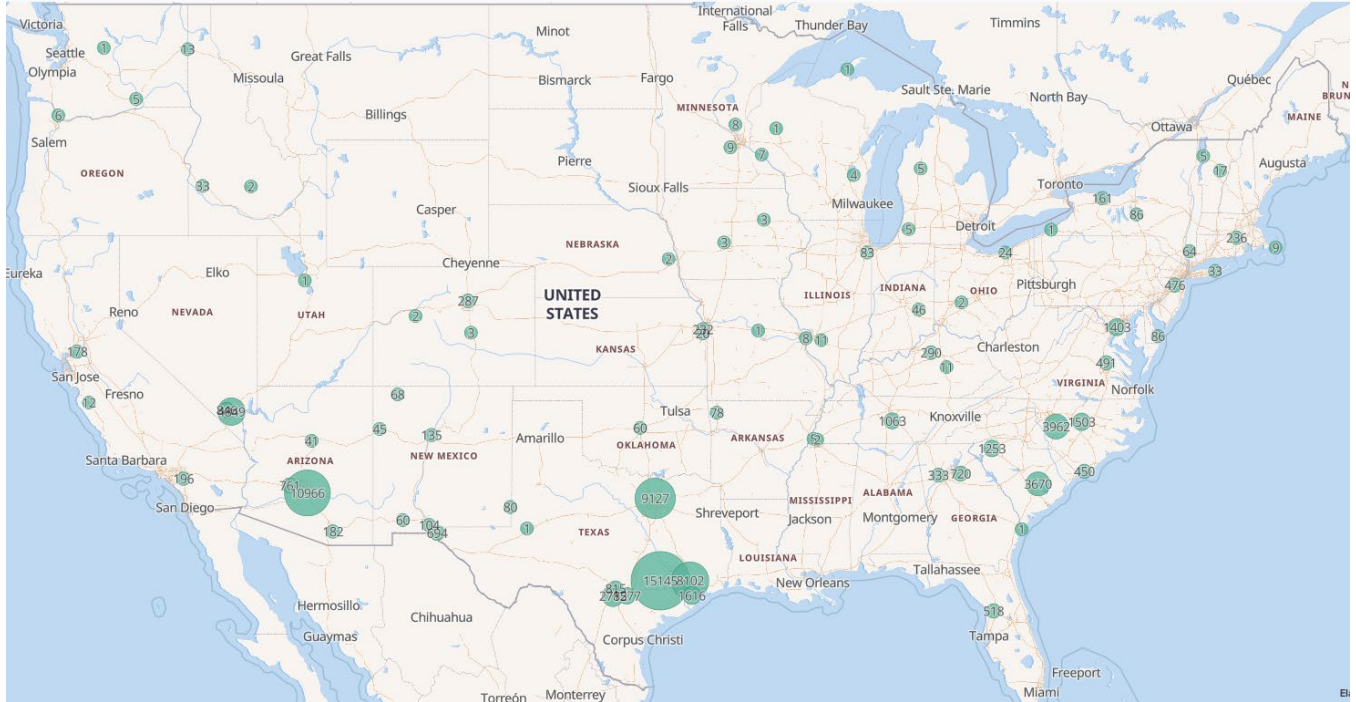


Figure 14. Homes with Furnace AFUE of less than 90

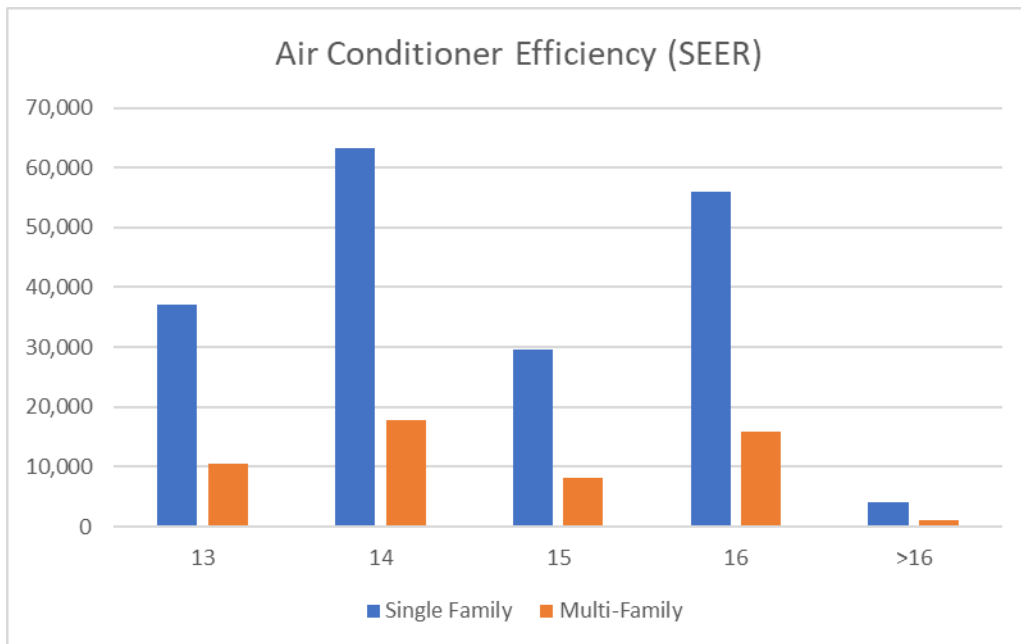


Figure 15. Air Conditioner Efficiency in HERS Rated Homes, 2021

When looking at the fuel type for furnaces, natural gas has the largest share of single family HERS Rated homes with 73 percent, but only made up about 50 percent of the multi-family Ratings last year. These numbers represent a drop of about 17 percent for single family and 35 percent for multi-family over the 2020 numbers. This is a potential indication that the all-electric movement is picking up steam. Electric was the second most common heating fuel type, representing almost 50 percent of multi-family Ratings and 25 percent of single family Ratings in 2021. Figure 16 shows the number of heating system fuel types for HERS Ratings last year. Figure 17 shows the heating system types for 2021.

Figure 18 shows the location of homes with air-source heat pumps that were Rated in 2021. This map makes it clear that few air-source heat pumps are being installed in HERS Rated homes in the northern climates.

Figure 19 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.

Finally, data on water heater types shows that conventional, storage-type water heaters are the most used, with 63 percent of the single family market using that type and nearly three-quarters of the multi-family sector using the same. Instant water heaters are the second most common in both housing types, while heat pump water heaters are increasing in use, but still have a small market share as shown in Figure 20.

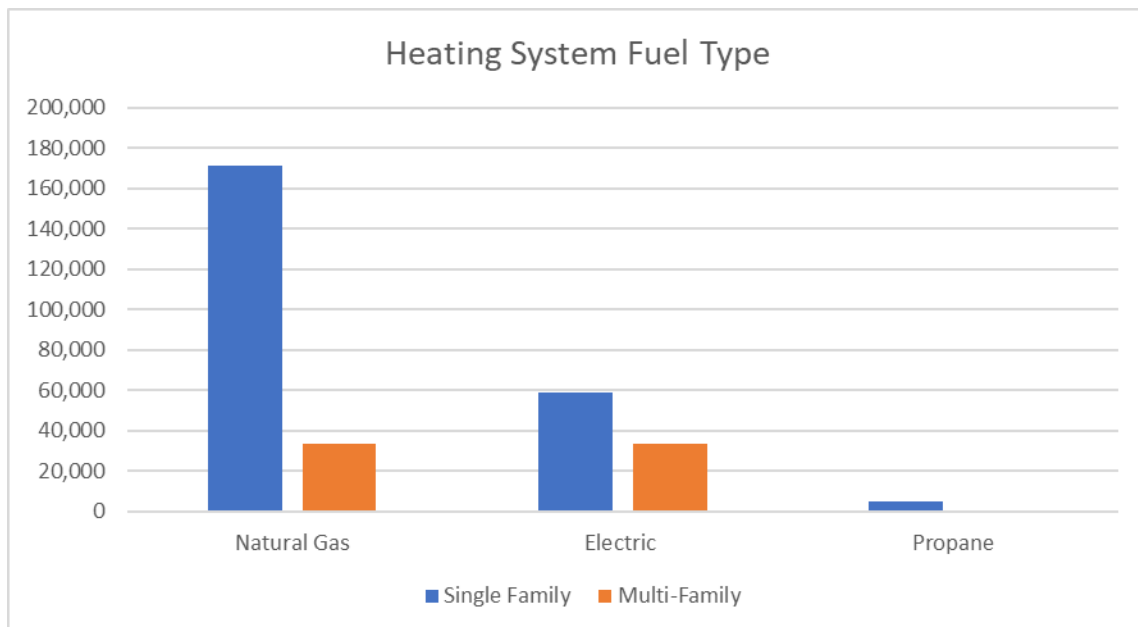


Figure 16. Heating System Fuel Type, 2021

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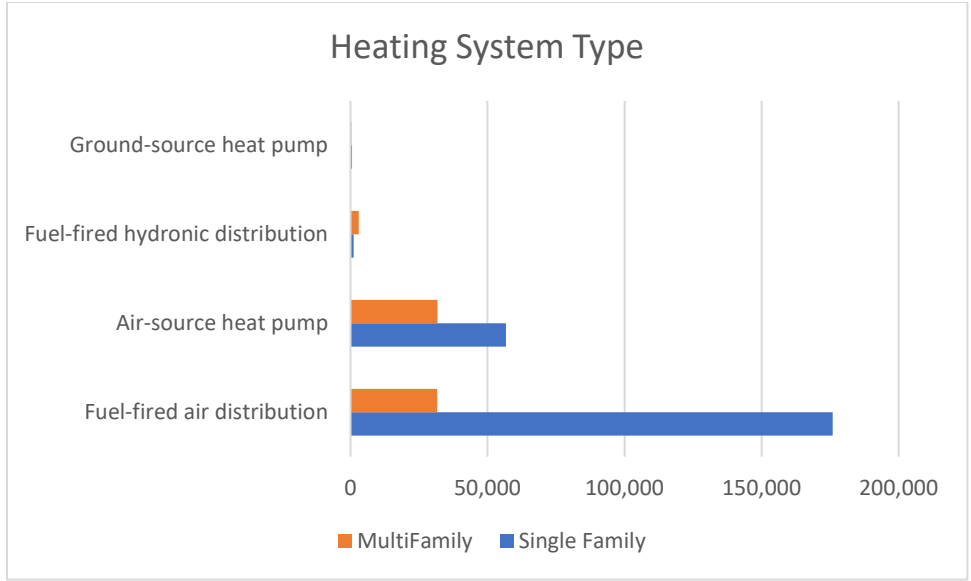


Figure 17. Heating System Types, 2021

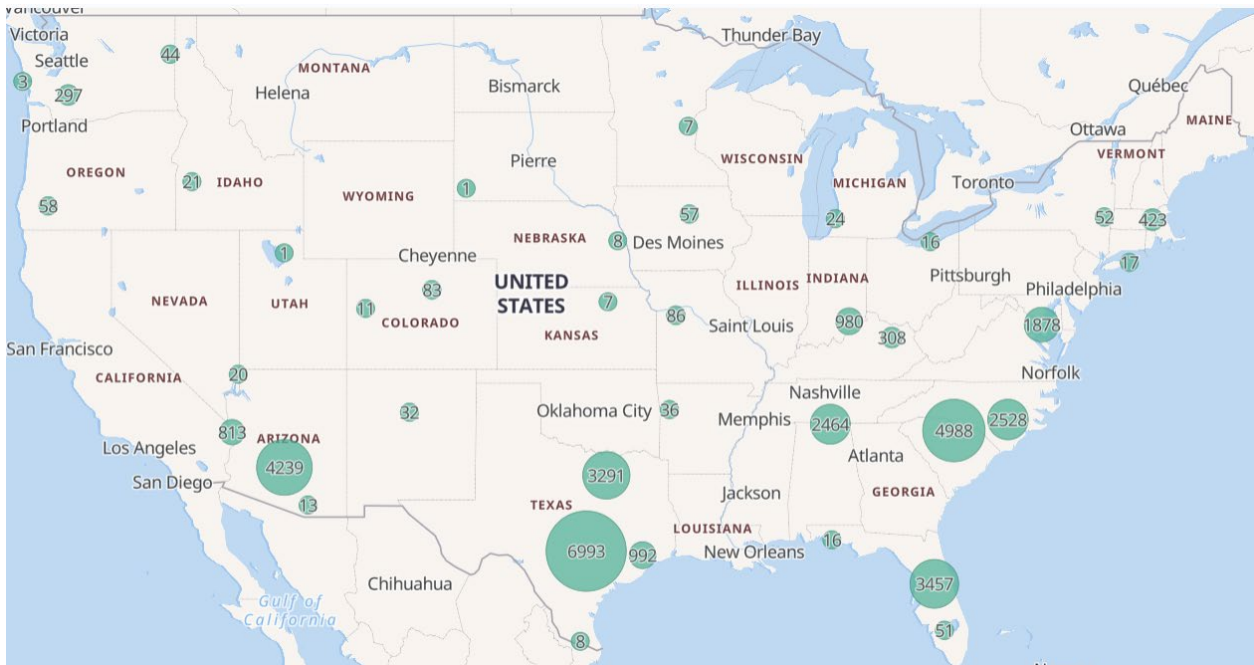


Figure 18. Location of Ratings with Air-Source Heat Pumps, 2021



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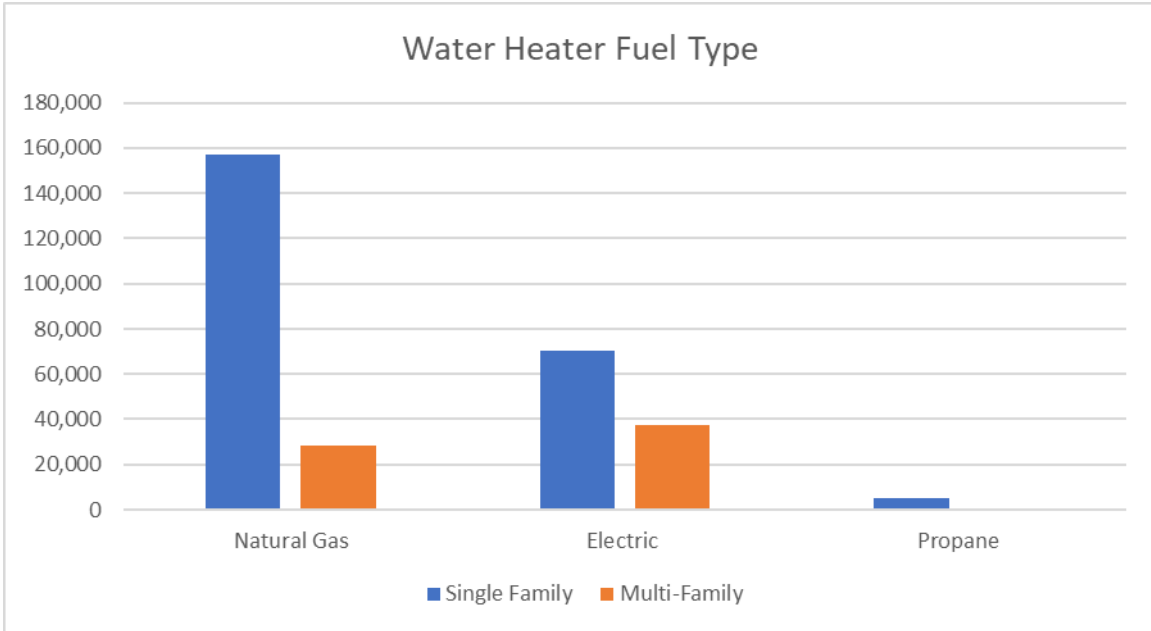


Figure 19. Water Heater Fuel Type, 2021

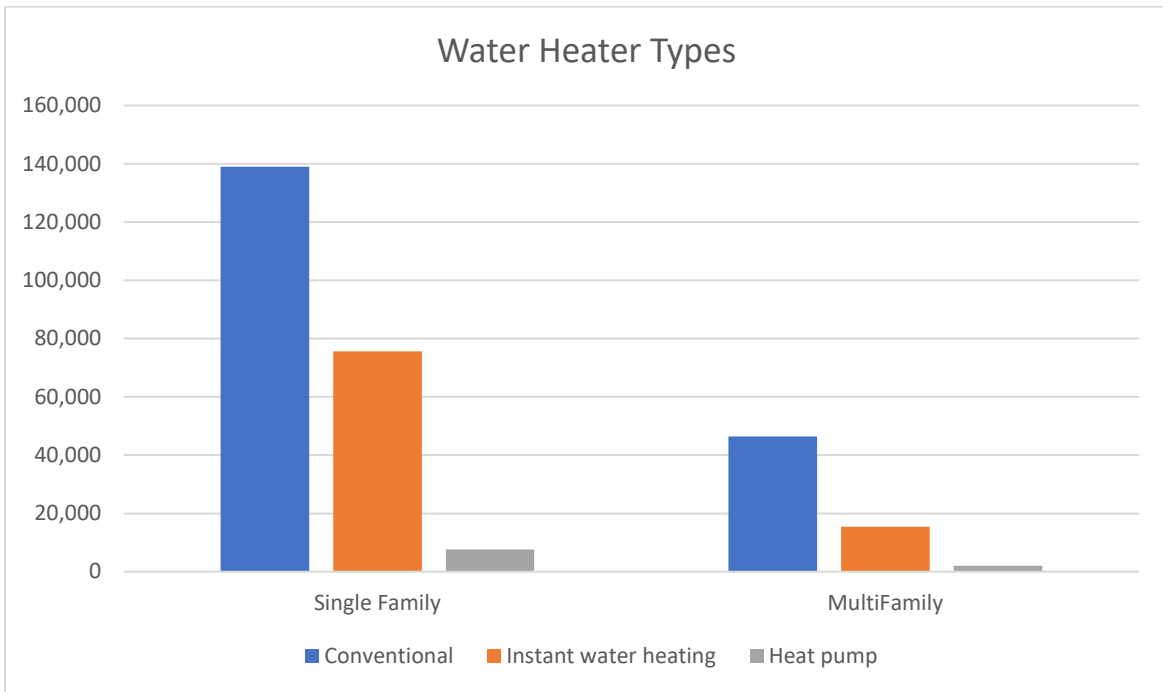


Figure 20. Water Heater Types for HERS Rated Homes, 2021

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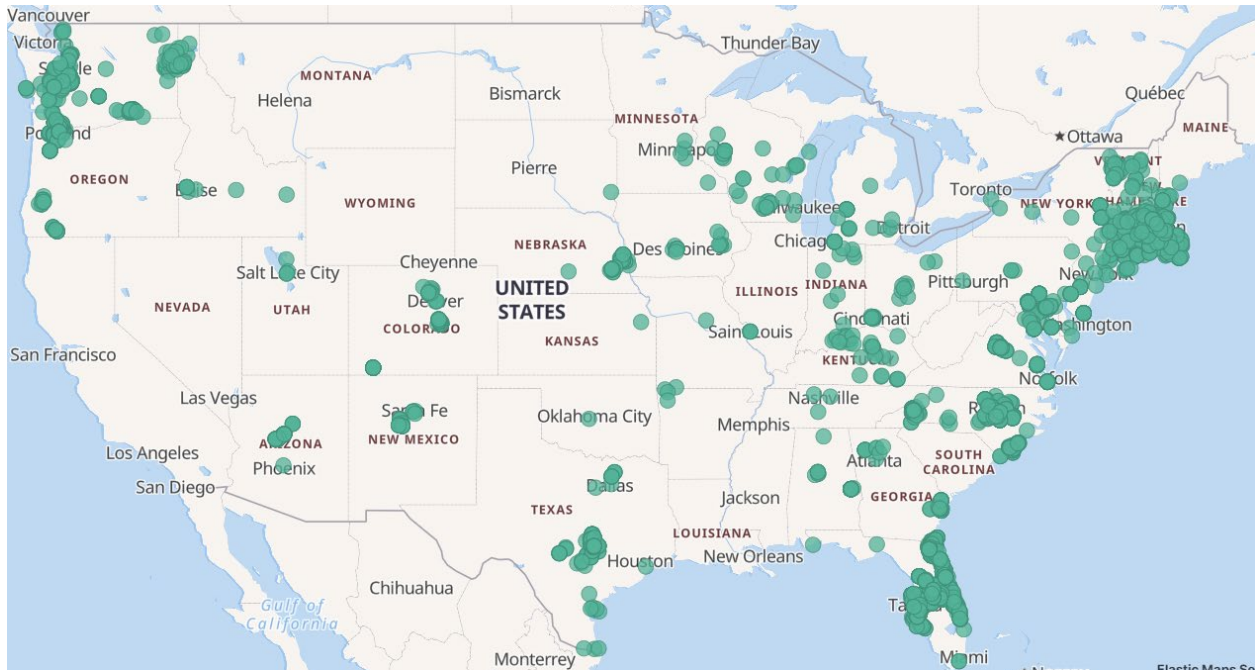


Figure 21. Locations of Ratings with Heat Pump Water Heaters

### The Use of Solar PV on HERS Rated Homes

In 2021 there were over 6,600 HERS Rated homes that had solar PV. A total of 5,386 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 31.
- Average HERS Index before accounting for solar was a 53.
- Average impact on the HERS Index for homes with solar was 22 points.

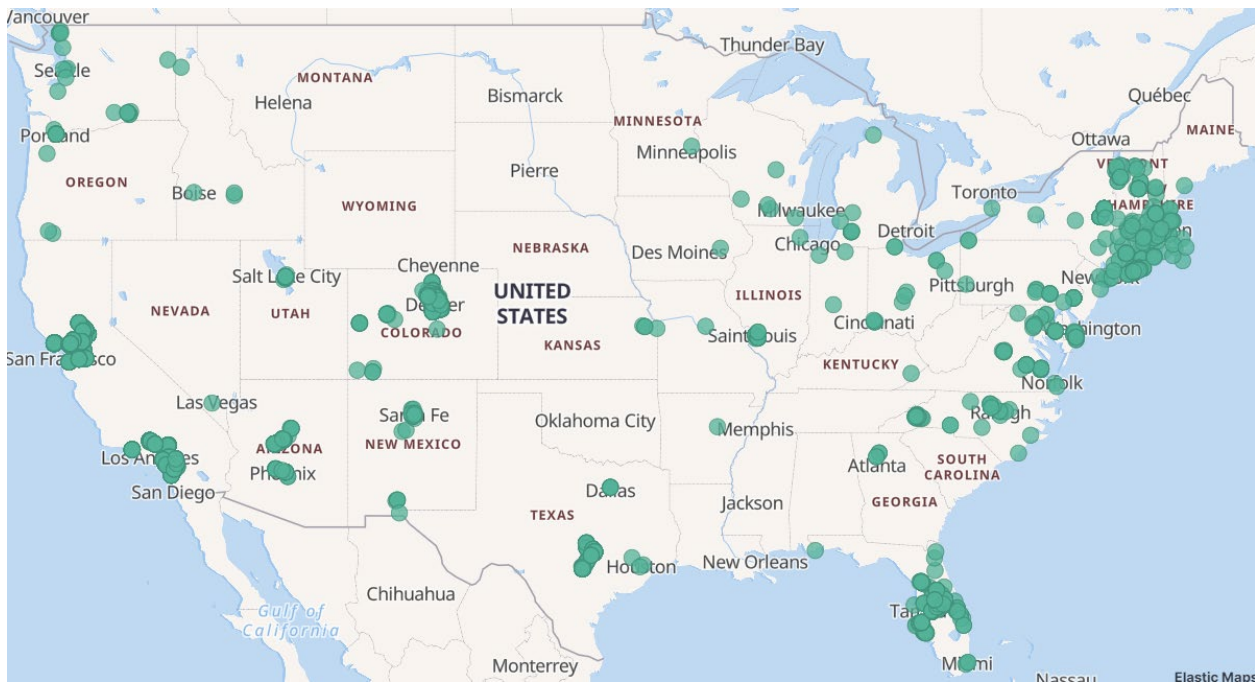
The following are the top 20 states for the use of solar on HERS Rated homes, last year.

State	Ratings
CA	2,314
CO	1,236
FL	1,003
TX	381
CT	251
NY	238
NM	200
MA	185
AZ	169
NH	138
VA	138
NC	50

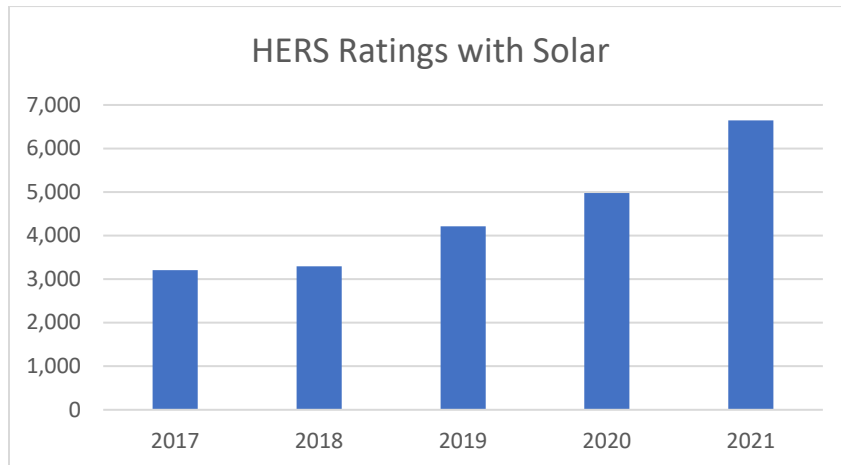
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PA	39
VT	39
UT	32
AR	29
OR	28
IL	25
WA	22
DE	16
Other	109

This map shows the locations of HERS Rated homes with solar.



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



## New for 2021: HERS<sub>H2O</sub> Rating Data

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

Last year was the first year of HERS<sub>H2O</sub> Ratings being submitted to the RESNET Registry. After launching a pilot program with HERS<sub>H2O</sub> and WaterSense in the fall of 2020, the program saw steady growth in 2021. The following are the HERS<sub>H2O</sub> numbers for last year:

- Number of homes rated with HERS<sub>H2O</sub> and receiving the WaterSense Label for Homes: 1,049
- Average Index score of HERS<sub>H2O</sub> Ratings: 61
- Number of RESNET-accredited HERS<sub>H2O</sub> Providers: 22
- Number of certified RESNET HERS<sub>H2O</sub> Raters: 197

## Closing Remarks

This is the third 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](mailto: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. 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.