# 2022 Residential Building Stock Assessment

## Findings Report

A characterization of the existing residential single-family and multi-family building stock in the Northwest

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neea

# Letter from NEEA

*The Northwest Energy Efficiency Alliance (NEEA) is excited to share the results of the 2022 Residential Building Stock Assessment (2022 RBSA) – the third assessment since the study's inception in 2011. Data for the RBSA is collected every five years and includes information on building characteristics and energy usage data for single-family and multi-family residences in Idaho, Montana, Oregon, and Washington.*

*With close to 2,000 homes surveyed for over 100 building characteristics, the 2022 RBSA is an extremely robust resource for use in energy planning and energy efficiency programs in the region and beyond. We are eager to hear the ways in which analysts and planners utilize the data from the 2022 RBSA to improve and expand upon the region's collective understanding of energy usage and efficiency efforts.*

*We would like to thank all of our funders and stakeholders for their part in the success of this study. The support and expertise they provided throughout the duration of the study's completion cannot be overstated. A special thank you is in order for the RBSA Workgroup members who have given their time and energy assisting in decision making around study design, recruitment, and everything else that goes into ensuring the 2022 RBSA remains a crucial tool for energy planning.*

*At NEEA, our purpose is to transform the market for energy efficiency to the benefit of all consumers in the Northwest, and the RBSA helps create a foundation on which market transformation programs can flourish. We hope the work that you do with the information provided by the 2022 RBSA helps move the needle toward a more efficient, thriving energy future for the Northwest.*

*Sincerely,*

Susan Hermenet

*Susan Hermenet (she/her)*
*Vice President of Analytics, Research and Evaluation, NEEA*

TOGETHER *We Are Transforming the Northwest*



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# Acknowledgements


## The RBSA 2022 Findings Report was Prepared For:

The **Northwest Energy Efficiency Alliance (NEEA)** is a non-profit organization working to effect market transformation through the acceleration and adoption of energy-efficient products, services and practices. NEEA is an alliance of more than 140 Northwest utilities and energy efficiency organizations working on behalf of more than 13 million energy consumers. For more information, visit neea.org.

## The RBSA 2022 Findings Report was Prepared By:

**Evergreen Economics, Inc.**

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With support from:

- Driftless Energy
- Michaels Energy
- Evergreen Consulting Group






# Executive Summary

The main objective of the 2022 Residential Building Stock Assessment (2022 RBSA) is to develop a current, robust, and representative characterization of the existing residential single-family and multi-family building stock in the Northwest. What are some of the key findings uncovered by the 2022 RBSA?

### *Lighting*

- LEDs are now the dominant lamp type in sockets in single-family homes (59%) and multi-family homes (60%).
- Increased reliance on LED lighting has resulted in a reduction in lighting power density (Watts per square foot).
- LED lamps also comprise a large share of multi-family building parking area lighting (38%) and exterior lighting (68%).

### *Water Heating*

- The majority of water heaters in homes in the Northwest are electric resistance or natural gas storage water heaters.
- Heat pump water heaters comprise 3% of single-family water heaters in the Northwest.
- Most water heaters are located in dedicated laundry rooms or garages.
- 60% of multi-family tenant units have water heaters, and most are inefficient electric resistance water heaters.

### *HVAC*

- Primary heating equipment in homes in the Northwest is shifting towards heat pumps, but potential remains:
  - Furnaces (mostly natural gas furnaces) comprise the majority of primary heating in single-family homes (53%).
  - Baseboards and other inefficient room-level heating equipment like wall and unit heaters are the primary heating sources in most multi-family homes (82%).
- There is more cooling in 2022:
  - 66% of single-family homes have cooling (57% in 2017).
  - 49% of multi-family homes have cooling (28% in 2017).
- Heat pumps are becoming increasingly more prevalent and are present in nearly 30% of homes in 2022.
- Single-family average HVAC equipment efficiencies continue to improve.
- Single-family homes rely on a mix of HVAC thermostat types while multi-family homes largely rely on manual controls.

For additional summary findings you can jump ahead to the ***Building Stock Characteristics*** section of this report.

For detailed information regarding the study methods, please refer to the 2022 RBSA Methods Report, or read on for a higher-level summary of the 2022 RBSA, information regarding the sampling and weighting of participant homes, and a summary of participation.

# Overview and Updates

## 2022 RBSA Overview

The 2022 Residential Building Stock Assessment (2022 RBSA) is the third RBSA study after the 2011 RBSA and the 2017 RBSA. The main objective of the 2022 RBSA is to develop a current, robust, and representative characterization of the existing residential single-family and multi-family building stock in the Northwest. The study involved detailed audits of residential single-family and multi-family homes and multi-family buildings across the Northwest.

This report presents background information about the study, such as sampling and weighting approaches, and then provides an overview of single-family home, multi-family home, and multi-family building characteristics, often comparing across states or study years.

## Updates from the 2017 RBSA

Important updates that could have an impact when comparing research findings across studies include the following:

- 2022 RBSA incorporated urban vs. rural distinctions in sampling and recruitment efforts.
- 2022 RBSA includes manufactured homes in the definition of a single-family home.
- 2022 RBSA multi-family survey included both in-person and remote site visits.
- 2022 RBSA produced one analysis report that covers single-family and multi-family housing units, as well as multi-family buildings; the report denotes what population is represented for each finding.

***Additional updates from the 2017 RBSA are provided in the 2022 RBSA Methods Report.***

## Response Rates for the 2022 RBSA

### *Single-Family Response Rate*

For the single-family recruitment effort, the study team mailed 294,103 pieces of mail to addresses across the Northwest. From these mailers, 6,350 households completed screening web surveys (2.2%), and ultimately, 1,910 completed RBSA site visits. This is an overall recruitment rate of 0.6 percent.

### *Multi-Family Response Rates*

For multi-family recruitment, the study pivoted from first recruiting at the building level (i.e., contacting building owners and managers directly via telephone) to mailing recruitment postcards directly to tenants. As a result, the study calculated separate response rates for the two very different recruitment efforts.

In the first effort, the study team called 5,425 multi-family building contacts, which resulted in completed site visits at 92 buildings and 172 tenant units. The study calculates the recruitment rate based on the buildings; thus, the response rate for this effort is 1.7 percent.

In the second effort, the study team mailed 26,961 pieces of mail directly to tenant units across the Northwest, which resulted in completing site visits at 197 tenant units from 127 buildings, including 54 referral tenant participants (tenants who did not receive the mailer but who were recruited with help from a participating tenant). The study calculates the response rate based on the tenants; thus, the response rate for this effort is 0.7 percent.




# Sampling and Weighting

The 2022 RBSA study included detailed audits at representative samples of single-family and multi-family residential homes and multi-family buildings. The sampling for single- and multi-family housing is composed of a "core" sample, which covers the entire Northwest region, and, for single-family, "oversamples," which cover subsets of the region.

***Sampling and weighting approaches and key considerations are included in the 2022 RBSA Methods Report.***

## Eligible Home Types

Single-family homes are defined by the 2022 RBSA as being either detached or attached (i.e., townhomes and individual units in 2-unit, 3-unit, or 4-unit residential buildings). Manufactured homes with foundations that are not considered "mobile homes" are also included in the survey as single-family homes (unlike in the 2017 RBSA), and there are a total of 34 manufactured homes included in the 2022 RBSA's sample of 1,910 single-family homes. Multi-family housing is defined as being five or more attached units in a single building. Multi-family data collection includes both tenant unit and building-level data collection.

## Single-Family Sample

### *Single-Family Core Sample*

The study team developed a single-stage sample design for single-family residences based on housing data from the American Community Survey (ACS) for the four Northwest states. NEEA staff determined that funding in NEEA's 2020 – 2024 business plan would support a sample size of 1,000 single-family detached homes and 130 attached and 2–4-unit homes. The sample design for the single-family core sample is composed of the following seven geographical sub-regions:

1. Idaho
2. Montana (only homes with electricity service through BPA-affiliated utilities or NorthWestern Energy)
3. Eastern Oregon
4. Western Oregon
5. Eastern Washington
6. Western Washington, excluding the Puget Sound region
7. Puget Sound region of Western Washington

The study team stratified single-family homes based on their electricity service provider into two groups: homes served by a Bonneville Power Administration (BPA)-affiliated utility and homes served by a non-BPA utility. The study further segmented single-family homes within each sub-region to ensure that the sample of single-family homes is representative of the universe of Northwest homes based on the following characteristics:

- Two strata based on whether the single-family home is detached or attached.
- Three strata based on the urban or rural status of homes. This was later adjusted to two strata based on an update to the U.S. Census Bureau's definitions of urban and rural for the 2020 Decennial Census.

The 2022 RBSA allotted 1,000 core sample points to single-family detached homes and 130 core sample points to single-family attached homes.

### *Oversamples*

Single-family oversamples involve specific study funders providing additional research funding to add sample points based on specific criteria. Oversampling for the 2022 RBSA included:

- Avista: 240 electric-only single-family homes from Avista's service territory, including homes in Eastern Washington and Northern Idaho.
- BPA: 350 single-family homes with electricity from a BPA-supplied utility (from across the Northwest).
- Energy Trust of Oregon: 190 single-family homes, with the requirements that 107 of those homes are customers of Northwest Natural Gas in Oregon and that the remaining 83 of those homes are not customers of Northwest Natural Gas but come from heating zones 2 and 3.

### *Final Sample of Single-Family Homes*

The final achieved sample of single-family detached and attached homes, including oversamples, are shown next. These overall samples (including oversamples) are the basis of the analysis in this report.

*Single-Family Detached Homes Sample*

| | Rural-Urban Status | Idaho | Montana | Eastern OR | Western OR | Eastern WA | Western WA | Puget Sound, WA | Total |
|---|---|---|---|---|---|---|---|---|---|
| BPA | Rural | 96 | 75 | 93 | 34 | 40 | 27 | 2 | 367 |
| | Urban | 15 | 24 | 35 | 146 | 46 | 67 | 91 | 424 |
| Non-BPA | Rural | 114 | 44 | 35 | 33 | 107 | 0 | 11 | 344 |
| | Urban | 150 | 69 | 52 | 152 | 122 | 1 | 56 | 602 |
| Total Sub-Region | | 375 | 212 | 215 | 365 | 315 | 95 | 160 | 1,737 |

*Single-Family Attached Homes Sample*

| | Rural-Urban Status | Idaho | Montana | Eastern OR | Western OR | Eastern WA | Western WA | Puget Sound, WA | Total |
|---|---|---|---|---|---|---|---|---|---|
| BPA | Rural | 4 | 2 | 4 | 0 | 4 | 0 | 0 | 14 |
| | Urban | 1 | 7 | 3 | 9 | 3 | 8 | 12 | 43 |
| Non-BPA | Rural | 2 | 0 | 1 | 0 | 0 | 0 | 0 | 3 |
| | Urban | 30 | 20 | 3 | 18 | 33 | 0 | 9 | 113 |
| Total Sub-Region | | 37 | 29 | 11 | 27 | 40 | 8 | 21 | 173 |

***A detailed description of the single-family sample design is provided in the 2022 RBSA Methods Report.***

## *Multi-Family Sample*

For multi-family, the initial study design employed a two-stage approach in which the study first recruited multi-family residential buildings into the sample and then within each building recruited multiple housing units. The sample frame for multi-family residences came from building level data downloaded from CoStar™, a proprietary data vendor. The 2022 RBSA segmented the buildings in the sample frame into the following three height classes:

1. Low-rise – One to three stories,
2. Mid-rise – Four to six stories,
3. High-rise – Seven or more stories.

For multi-family, the study segmented the NEEA region by state and did not further segment Oregon or Washington. The study segmented multi-family homes within each state by the urban or rural status of structure based on the U.S. Census Bureau's 2010 definitions, but then updated the urban and rural classifications based on 2020 Census definitions. One impact of this update is that all surveyed multi-family properties are now considered urban. Note that the sample design for the 2022 RBSA is different from the prior RBSAs.

The planned sample size for multi-family properties was 230 buildings and 550 housing units, including at least 15 buildings and 34 housing units in each state. Due to very low recruitment rates because of the COVID-19 pandemic, the study did not meet all the targets.

### *Final Sample of Multi-Family Buildings and Housing Units*

The final achieved sample of 219 multi-family buildings and 369 housing units is provided below and are the basis of the analysis in this report. This includes 97 buildings and 180 tenant units with electric service from a BPA utility.

*Multi-Family Buildings Sample*

| Building Height Class | Idaho | Montana | Oregon | Washington | Total |
|---|---|---|---|---|---|
| High-Rise | 1 | 0 | 9 | 24 | 34 |
| Mid-Rise | 1 | 1 | 21 | 53 | 76 |
| Low-Rise | 8 | 10 | 50 | 41 | 109 |
| Total by State | 10 | 11 | 80 | 118 | 219 |
| Total BPA | 0 | 1 | 3 | 93 | 97 |

*Multi-Family Housing Units Sample*

| Building Height Class | Idaho | Montana | Oregon | Washington | Total |
|---|---|---|---|---|---|
| High-Rise | 1 | 0 | 23 | 49 | 73 |
| Mid-Rise | 1 | 1 | 36 | 103 | 141 |
| Low-Rise | 8 | 12 | 66 | 69 | 155 |
| Total by State | 10 | 13 | 125 | 221 | 369 |
| Total BPA | 0 | 1 | 4 | 175 | 180 |

***A detailed description of the multi-family sample design is provided in the 2022 RBSA Methods Report.***

## Weighting

By design, the samples of single-family homes and multi-family buildings and tenant units do not proportionally match the housing stock universe in the four-state area served by NEEA. Rather, the sample was designed to ensure that there were enough sample points in each of the seven BPA sub-regions (for single-family) and across the region (for multi-family) to conduct statistical analysis.

Our weighting approach used best practices for calculating design weights—adjusting these weights as more recent population data (e.g., 2020 Decennial Census data) became available. The study team developed case weights to be used by researchers to ensure that analysis conducted on the 2022 RBSA single-family and multi-family data (including oversampled sites) can be extrapolated to the housing stock universe in the area served by NEEA or to certain subsets of homes in that area.

The 2022 RBSA used a stratified sample design, and the sample weight for site ***i*** in stratum ***h*** is calculated based on the following equation:

$$w_i = \frac{N_h}{n_h},$$

Where $N_h$ is the (estimated) total number of sites in the population that meet the requirements of stratum ***h***, and $n_h$ is the number of stratum ***h*** sites included in the final sample. The weights represent the estimated number of sites that are similar to the given site based on strata characteristics.

Note that "oversamples" from Avista, BPA, and Energy Trust of Oregon increased the sample sizes for single-family housing across the Northwest. The Avista and Energy Trust of Oregon oversamples do not simply add more "random" homes to a geography in a representative fashion. Rather, these oversamples added more homes of specific types. For this reason, the study had to first approximate the population of homes represented by each respective oversample.

***A detailed description of the weighting is provided in the 2022 RBSA Methods Report.***



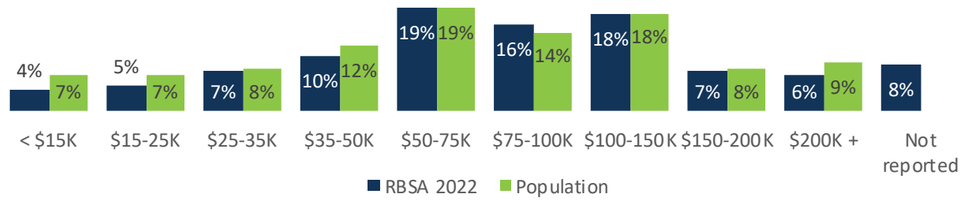


# Summary of Participation

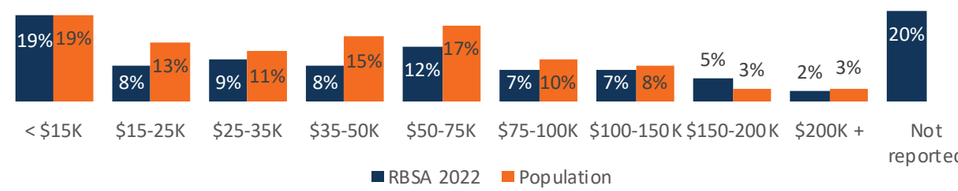
## Distribution of Household Income by State

The distribution of household incomes, as self-reported by the 2022 RBSA participants (unweighted), is provided below for single-family and multi-family homes/households, compared to information from the U.S. Census Bureau Public Use Microdata Sample (PUMS). Note that the population data include all of Montana (not just the areas covered by NEEA and the 2022 RBSA), and that 8 percent of single-family and 20 percent of multi-family RBSA participant households did not report their incomes and are not included in the figures below. Also note that weighted results are consistent with unweighted results.

***Single-Family Participant Household Income Comparison to Census***



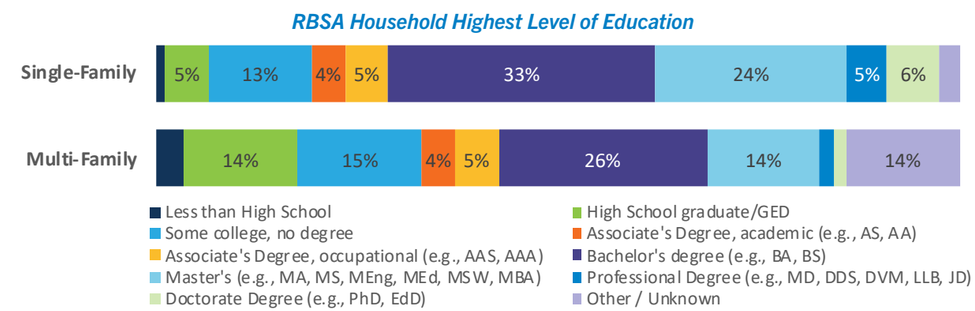

***Multi-Family Participant Household Income Comparison to Census***




## Distribution of Household Education by State

The highest level of education attained by members of participant households is shown below.

***RBSA Household Highest Level of Education***

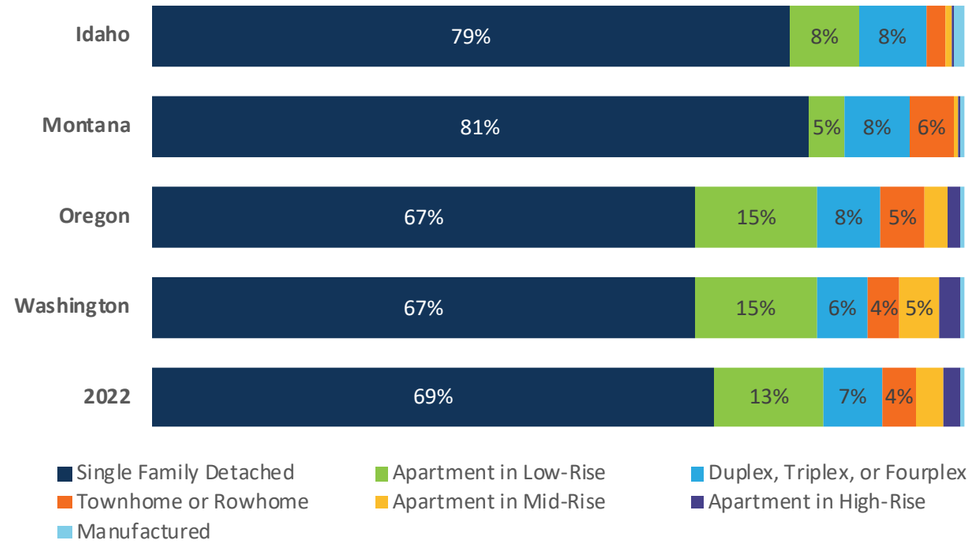


# Building Stock Characteristics

## Home Types, Ages, and Sizes

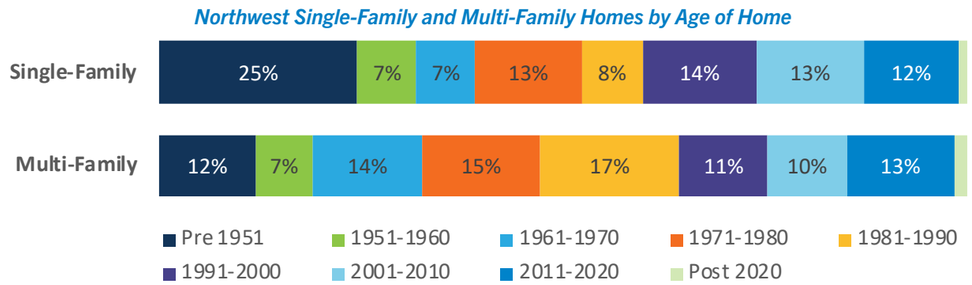
The majority of housing units in the region are single-family detached homes (69%), with higher proportions of single-family detached homes in Idaho and Montana than Oregon and Washington.

*Northwest Housing Units by State by Home Type*




The 2022 RBSA documented the age of buildings in the study for both single-family and multi-family housing units. The weighted distribution shows one quarter of single-family homes were built in the 1950s and earlier, and that nearly half of the multi-family dwellings in the Northwest were built between 1961 and 1990 (46% total).

*Northwest Single-Family and Multi-Family Homes by Age of Home*

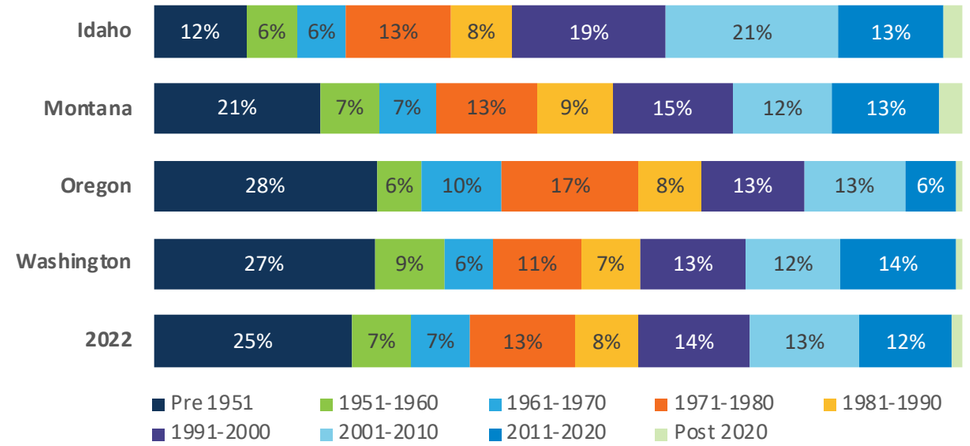






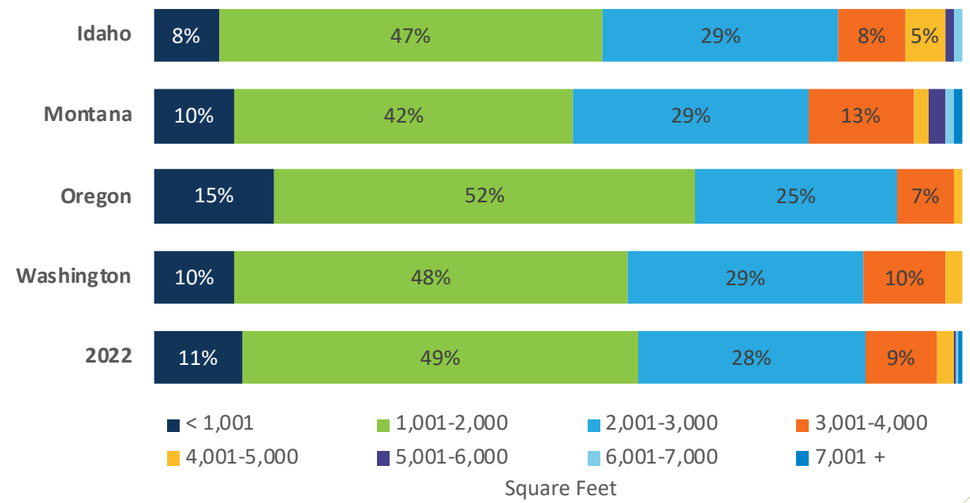

Among single-family homes, over 25 percent of Oregon and Washington homes were built before 1951, with relatively higher proportions of newer homes in Idaho and Montana. Idaho has newest building stock with over a third of single-family homes (37%) built after 2000.

*Northwest Single-Family Homes by State and Age of Home*




The 2022 RBSA also documented the size of homes in the Northwest. The square footage of single-family homes shows that there are some very large homes in Montana and Idaho, but that the majority of single-family homes in the Northwest are between 1,001 and 3,000 square feet in size.

*Northwest Single-Family Homes by State and Size of Home*



## Single-Family Home Energy Use Intensity

The 2022 RBSA calculated weather normalized energy use intensities (EUI) for single-family homes where energy usage data was available for the home. Electric EUIs are calculated as the annual kWh usage per square foot and natural gas EUIs are calculated as the annual therms usage per square foot for each home. The tables below compare the average electric and natural gas EUIs for homes by state and by year. Electric EUIs have decreased slightly overall, while natural gas EUIs have remained relatively constant over time.

*Electric EUI by State, by Year*

| EUI (kWh/sq.ft.) | 2022 | 2017 | 2011 |
|---|---|---|---|
| Idaho | 6.7 | 7.4 | 7.6 |
| Montana | 5.5 | 8.2 | 5.4 |
| Oregon | 6.7 | 7.5 | 7.4 |
| Washington | 7.7 | 7.9 | 7.7 |
| Overall | 7.1 | 7.8 | 7.4 |

*Natural Gas EUI by State, by Year*

| EUI (therms/sq.ft.) | 2022 | 2017 | 2011 |
|---|---|---|---|
| Idaho | 0.4 | 0.4 | 0.4 |
| Montana | 0.4 | 0.4 | 0.5 |
| Oregon | 0.4 | 0.4 | 0.4 |
| Washington | 0.4 | 0.4 | 0.4 |
| Overall | 0.4 | 0.4 | 0.4 |

***A detailed description of the approach for calculating the energy use intensities is provided in the 2022 RBSA Methods Report.***



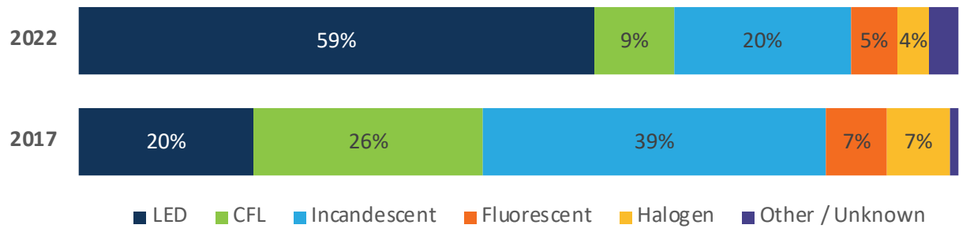


## Lighting in Single-Family and Multi-Family Homes

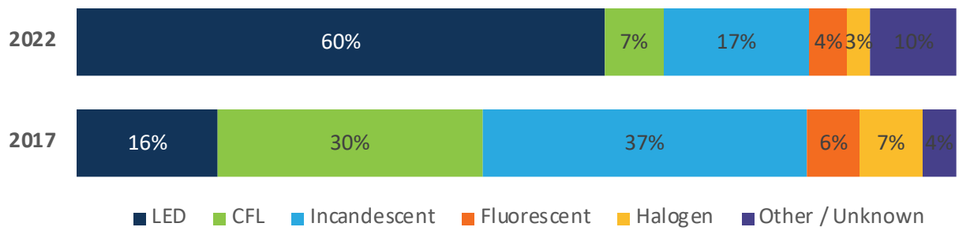
The 2022 RBSA captured detailed lighting information about lamps and fixtures in homes across the Northwest, in both single-family and multi-family housing units. The residential lighting market has changed significantly since 2017. Key findings include:

- CFLs and incandescent lamps are much less prevalent in 2022 than in 2017.
- LEDs are by far the most prevalent lamp type in homes in the Northwest, accounting for nearly 6 in 10 installed lamps.
- Nearly every single-family home (99%) and multi-family tenant unit (96%) have at least one installed LED.
- As a result, lighting power density (LPD) in single-family homes is 0.8 W/sq.ft., down from 1.0 W/sq.ft. in 2017. LPD is even lower for multi-family housing units, at 0.7 W/sq.ft., down from 0.9 W/sq.ft. in 2017.

*Single-Family Distribution of Lamps by Type*




*Multi-Family Distribution of Lamps by Type*

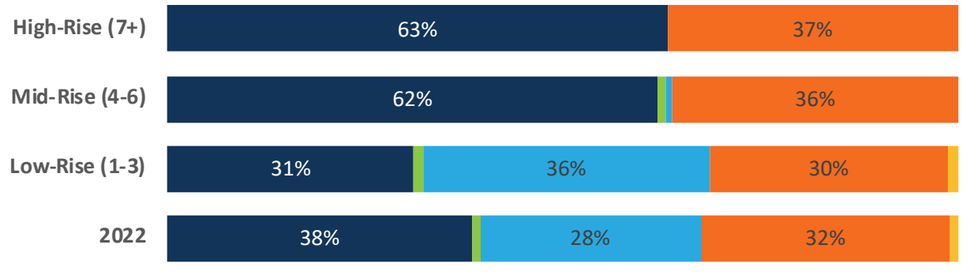


## Lighting in Multi-Family Building Parking and Exterior Areas

The 2022 RBSA documented parking area and exterior area lighting at multi-family buildings in the Northwest. This analysis estimated the total lamp count across buildings in the Northwest to estimate the distribution of total lamps by type.

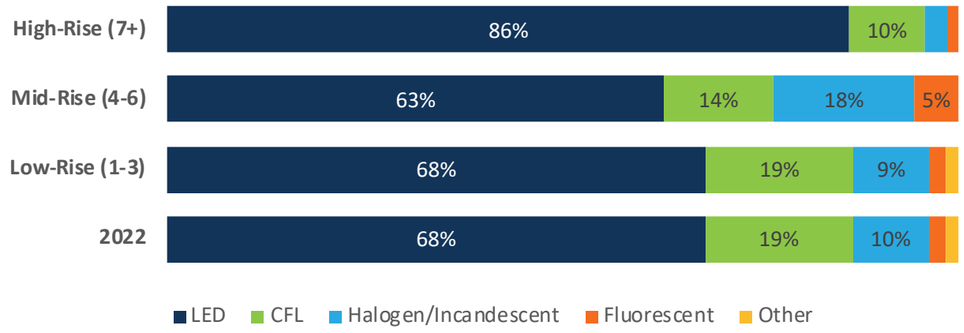
High-rise and mid-rise parking areas are predominantly illuminated by LEDs (63% and 62%, respectively). Parking areas at low-rises are roughly an equal mix of LEDs, halogen or incandescents, and fluorescent lamps (excluding CFLs).

*Multi-Family Building Parking Area Lighting*




Exterior area lighting is dominated by LED lamps across all building height classes, with a particularly high incidence of LED lighting in high-rise exterior lighting (86%). The prevalence of LED lighting in building exterior lighting (often characterized by high operating hours) is encouraging.

*Multi-Family Building Exterior Area Lighting*







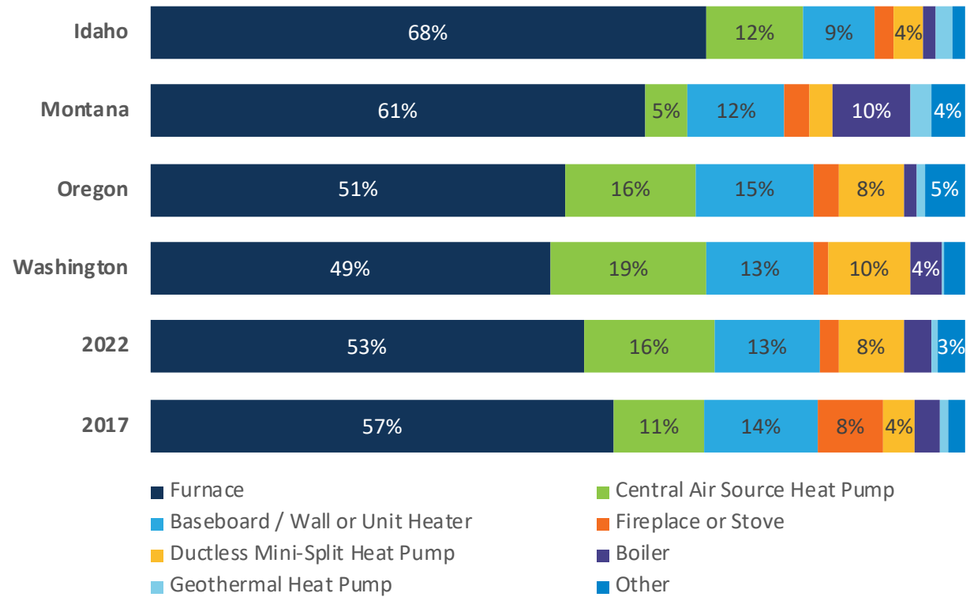

## HVAC Systems in Single-Family Homes

One of the key components of the 2022 RBSA is to document heating, ventilation, and cooling systems (HVAC systems) in homes in the Northwest. The 2022 RBSA documented all HVAC systems present at the homes, including both central ducted systems as well as other systems. For the 2022 RBSA the research team used a prescribed approach for designating a single primary heating system and a primary cooling system at each house (the 2017 RBSA relied on self-reported information for designating primary system types). See the 2022 RBSA Methods Report for additional information.

### *Single-Family Primary Heating Systems*

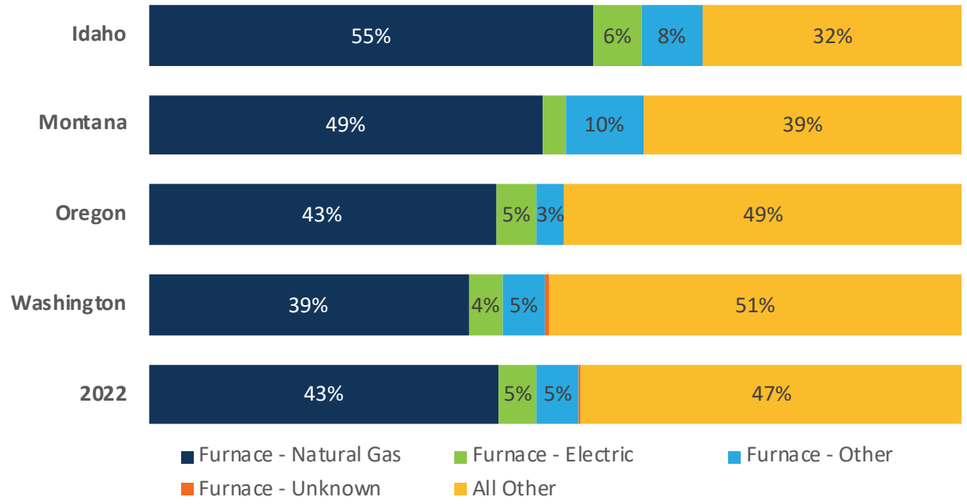
More than half of single-family primary heating systems are centrally ducted furnaces (53%), followed by central air source heat pumps (16%). Since the 2017 RBSA, there has been a slight overall shift from relying on furnaces towards increased reliance on central air source heat pumps, although slight methodological differences in the approach for designating primary system type may have an impact on this result.

*Single-Family Primary Heating Systems by State*



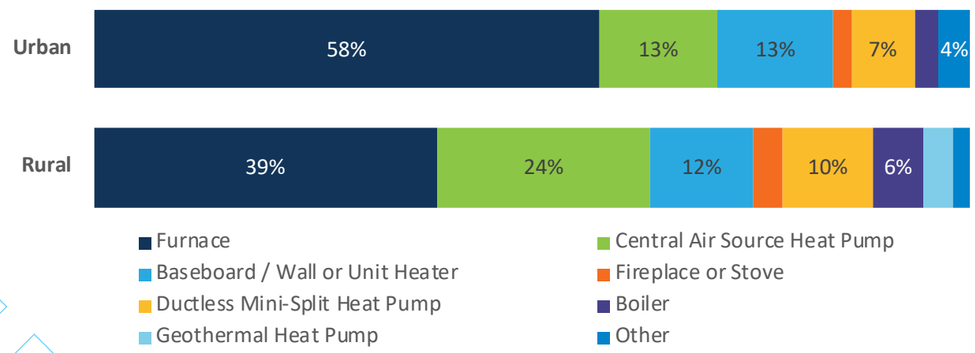
The next figure shows the same information about primary heating systems, but with furnaces broken out by fuel type (and all other system types combined, in yellow). The majority of homes that rely on furnaces as their primary heating system have natural gas furnaces (43% overall), with equal smaller shares relying on electric furnaces and furnaces using other fuels (e.g., propane).

*Single-Family Primary Heating Systems by State, with Furnaces by Fuel Type*




Single-family homes in urban areas are more likely to have a furnace as their primary heating system type compared to homes in rural areas (58% compared to 39%), but there are higher rates of central air source heat pumps as primary heating system types in rural areas (24% compared to 13%).

*Single-Family Primary Heating Systems by Urban and Rural*

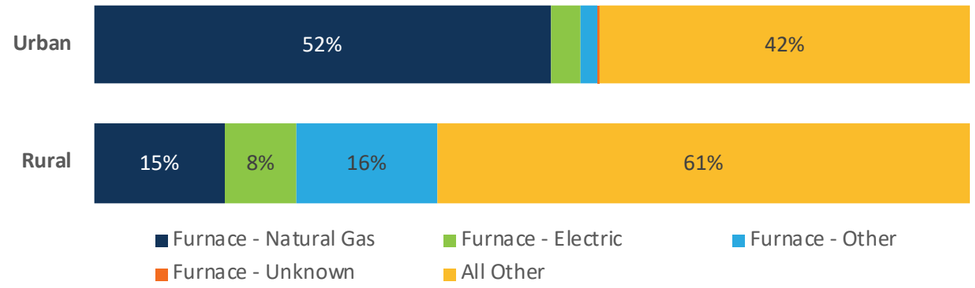






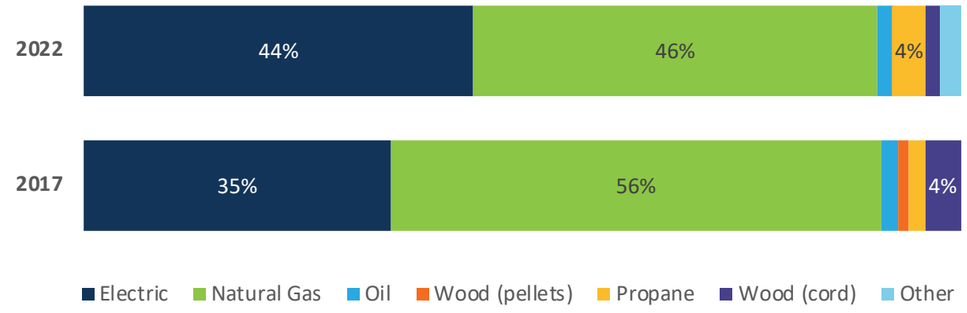

Breaking out furnace fuel types shows that homes in urban areas rely on natural gas furnaces whereas homes in rural areas rely on a mix of furnace fuels for their primary heating system type (in cases where the home has a furnace). The lack of available natural gas service in rural homes may contribute to the higher rates of central air source heat pumps compared to homes in urban areas.

*Single-Family Primary Heating Systems by Urban and Rural, with Furnaces by Fuel Type*




More primary heating systems in 2022 relied on electricity than in 2017, although slight methodological differences in the approach for designating primary system type, as well as in sampling (i.e., greater focus on rural representation in 2022), may have an impact on this result.

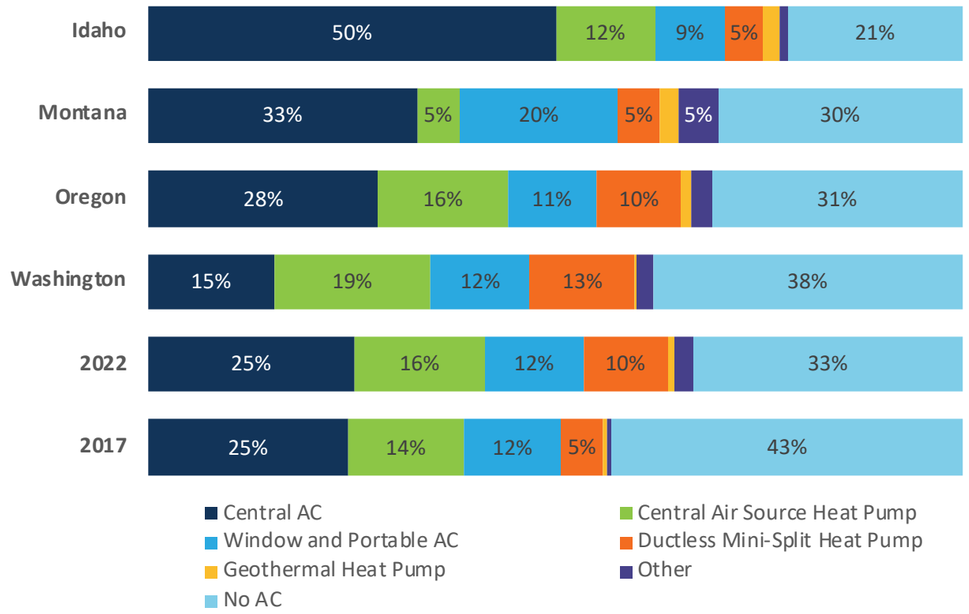
*Single-Family Primary Heating System Fuel Types by Year*



### *Single-Family Primary Cooling Systems*

Two thirds of single-family homes have cooling (66%), with variation across the four Northwest states (Idaho has the most cooling and Washington the least). Approximately one quarter of single-family homes rely on a central AC as the primary source of cooling (25%), and central air source heat pumps are the primary cooling source in 16 percent of homes. Generally, there has been an increase in cooling since 2017, with the largest increase in ductless mini-split heat pumps (from 5% in 2017 to 10% in 2022), although slight methodological differences in the approach for designating primary system type may have an impact on this result.

*Single-Family Primary Cooling Systems by State*

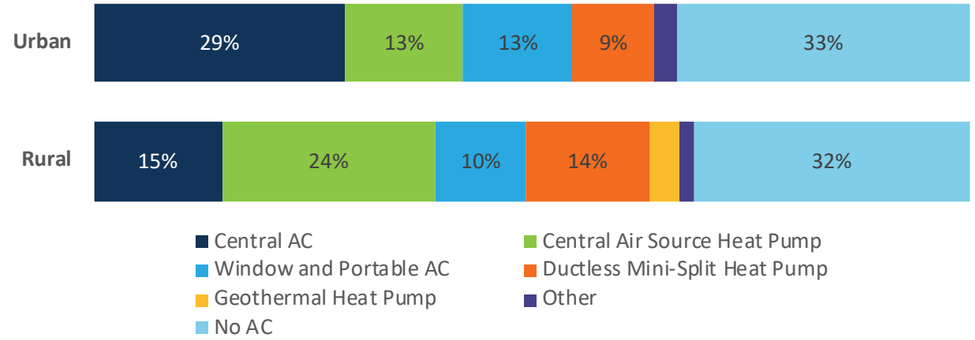







The presence of cooling in single-family homes is consistent across urban and rural homes, but with urban homes relying more heavily on central AC (29%) than rural homes (15%) as the primary source of cooling. Rural homes rely more heavily on central air source heat pumps (24%) and ductless mini-split heat pumps (14%), than homes in urban areas (13% and 9%, respectively).

*Single-Family Primary Cooling Systems by Urban and Rural*




### *Single-Family HVAC Equipment Efficiencies*

The 2022 RBSA captured information on HVAC equipment efficiencies, which continue to show improvements year over year from 2011 to 2022. This is likely the result of changing equipment types (e.g., from furnaces to central air source heat pumps) and also natural replacement of older, less efficient equipment with newer, more efficient equipment of the same type.

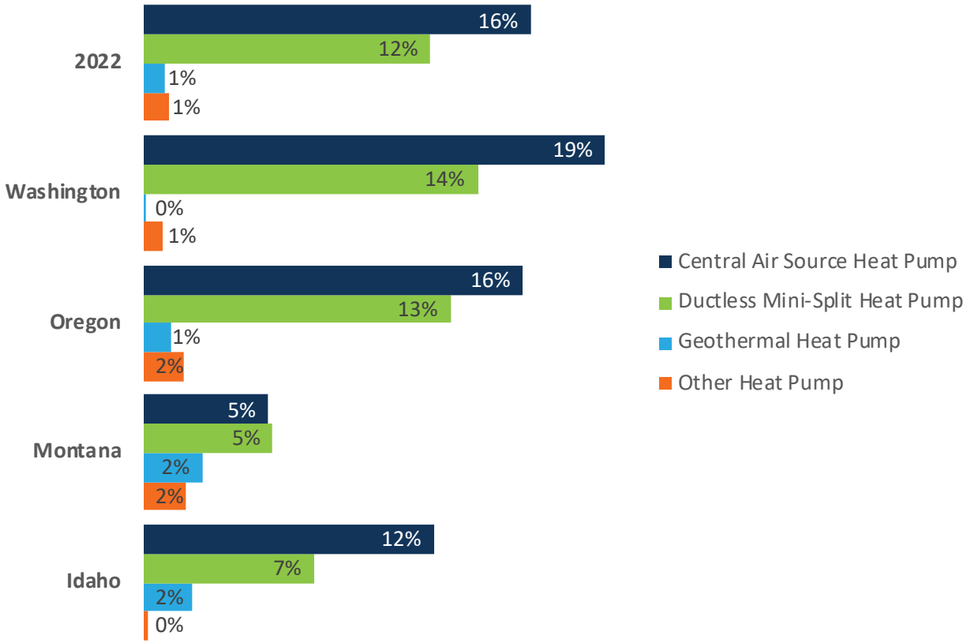
*Average Single-Family HVAC Efficiency Metrics*

| | 2022 | 2017 | 2011 |
|---|---|---|---|
| AFUE | 86% | 86% | 84% |
| Central AC SEER | 13.4 | 12.2 | 11.1 |
| Central HP SEER | 15.2 | 13.4 | 13.0 |
| Central HP HSPF | 8.9 | 8.3 | 8.0 |
| Ductless Mini-Split HP HSPF | 10.8 | | |

### *Presence of Heat Pumps in Single-Family Homes*

In 2022, 16 percent of Northwest single-family homes had a central air source heat pump and 12 percent had one or more ductless mini-split heat pumps. In general, heat pumps are more prevalent in Washington and Oregon than in Idaho or Montana.

*Single-Family Homes with Heat Pumps by State*



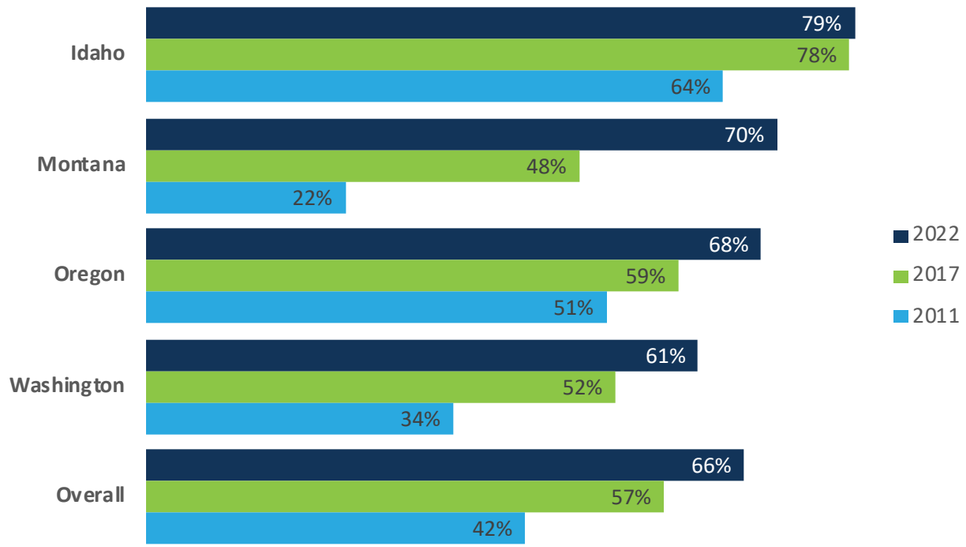





### *Presence of Cooling in Single-Family Homes*

The presence of cooling in homes in 2022 was not evenly distributed across the Northwest, with more cooling in Idaho and Montana than in Oregon and Washington. In 2011, cooling equipment in homes in Montana was relatively uncommon (22% of homes) but in 2022, approximately 70 percent of Montana homes have cooling. Importantly, the presence of cooling in homes has grown year over year in all four states, except it has stalled since 2017 in Idaho.

*Distribution of Single-Family Homes with Cooling by State*

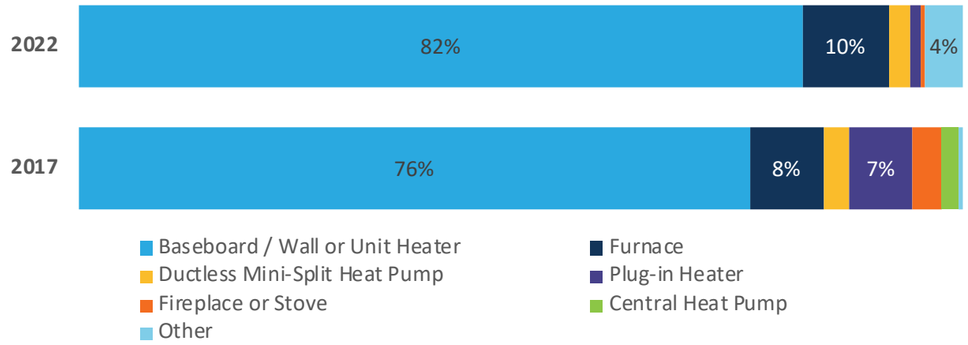


## HVAC Systems in Multi-Family Homes

### Multi-Family In-Unit Primary Heating Systems

For multi-family tenant units, in 2022 the majority of primary heating equipment consists of room-level heating equipment such as baseboards, wall heaters, and unit heaters, consistent with the 2017 RBSA. Relatively few tenant units rely on more central systems like furnaces or central heat pumps.

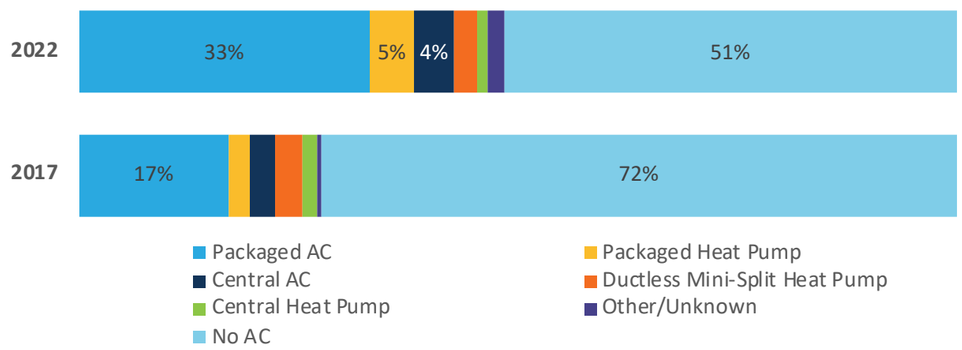
*Multi-Family Housing Unit Primary Heating Systems by Year*




### Multi-Family In-Unit Primary Cooling Systems

Most multi-family tenant units do not have any cooling equipment in the unit, but the prevalence of some form of cooling has increased from approximately 38 percent of tenant units in 2017 to nearly half (49%) in 2022. Packaged AC units such as window and portable air conditioners are becoming increasingly more common in multi-family housing units.

*Multi-Family Housing Unit Primary Cooling Systems and Presence of Cooling by Year*



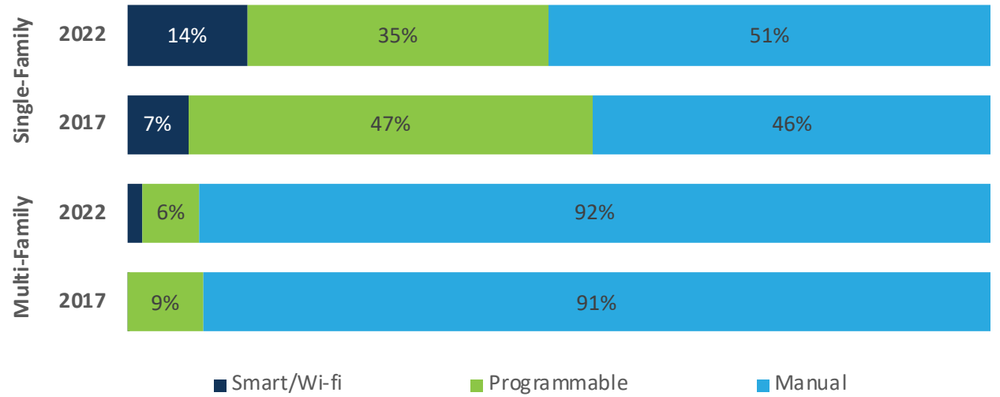





## HVAC Controls in Single-Family and Multi-Family Homes

The 2022 RBSA also documents the thermostats controlling HVAC equipment in homes in the Northwest. Smart / Wi-fi and programmable thermostats are significantly more common in single-family homes than in multi-family housing units, where manual thermostat controls are dominant. Note that multi-family tenant heating equipment is dominated by equipment types that traditionally rely on manual controls, and that tenants are often not given authority to upgrade their thermostats (even if they would prefer more advanced controls).

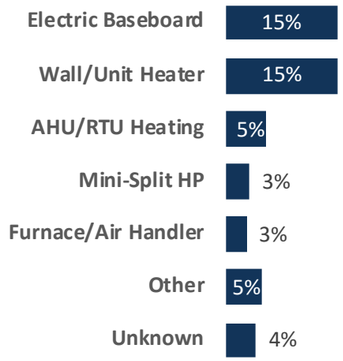
*Thermostats in Single-Family and Multi-Family Homes by Year*



## Multi-Family Building Heating Systems

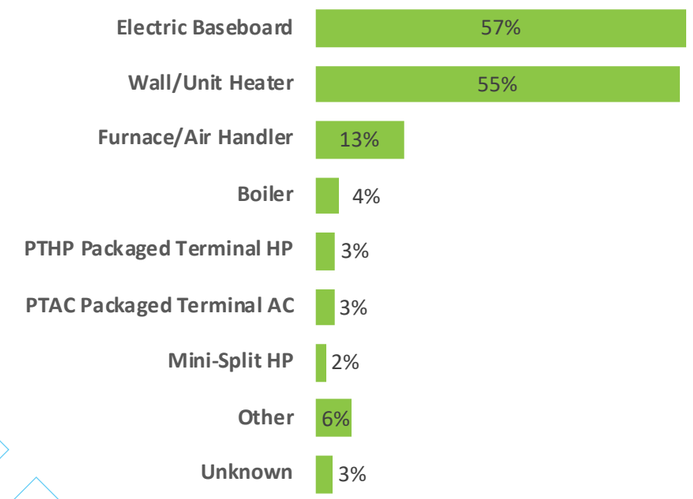
Multi-family buildings may have heating systems that serve the common areas and tenant units. The distribution of heating systems serving common areas in multi-family buildings in the Northwest shows that many buildings rely on electric baseboards and unit or wall heaters for heat. Most high-rises (97%) and mid-rises (89%) have heated common areas, while only 52 percent of low-rise common areas are heated.

*Multi-Family Building Common Area Heating Systems*




Baseboards and unit or wall heaters are also the most prevalent systems in buildings across the Northwest for tenant-level heating. This information is based on both building-level and unit-level systems (i.e., it accounts for central building-level systems and in-unit systems serving tenants in multi-family buildings).

*Multi-Family Building Tenant Area Heating Systems*



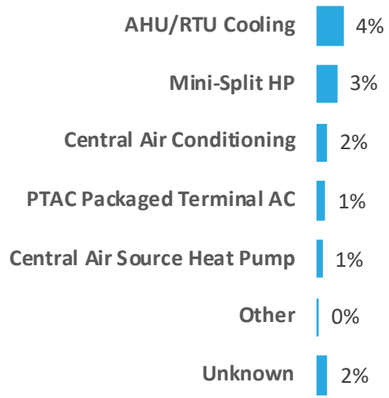





## Multi-Family Building Cooling Systems

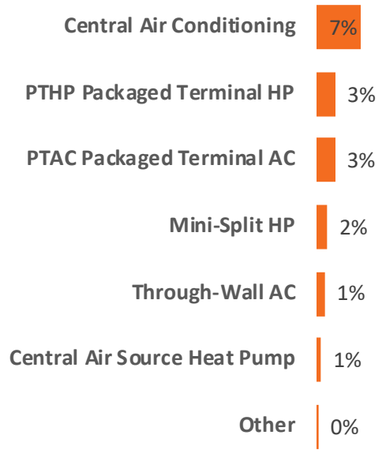
Multi-family buildings also may have common area and tenant unit cooling systems. Most multi-family buildings across the Northwest have no cooling in the common areas (82%), although cooled common areas are present at many high-rises (68%) and about half of mid-rises (48%). However, these building types make up a small portion of multi-family buildings in the Northwest.

*Multi-Family Building Common Area Cooling Systems*




Tenant unit cooling is most often provided by central air conditioning at buildings in the Northwest (7%), with 3 percent of buildings using packaged heat pumps and packaged air conditioners to provide tenant cooling. This information is based on both building-level and unit-level systems.

*Multi-Family Building Tenant Unit Cooling Systems*



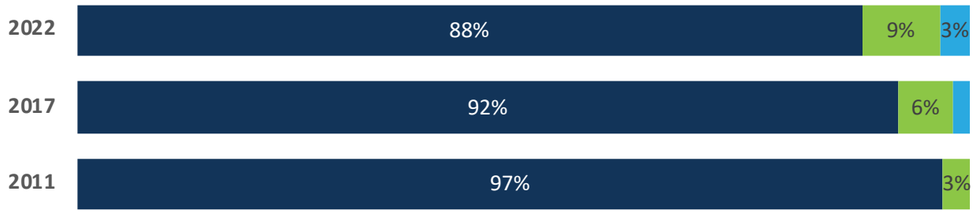
## Water Heaters in Single-Family and Multi-Family Homes

The 2022 RBSA documented the characteristics of water heaters in homes in the Northwest, including any water heating equipment found in multi-family tenant units.

### Single-Family Water Heaters

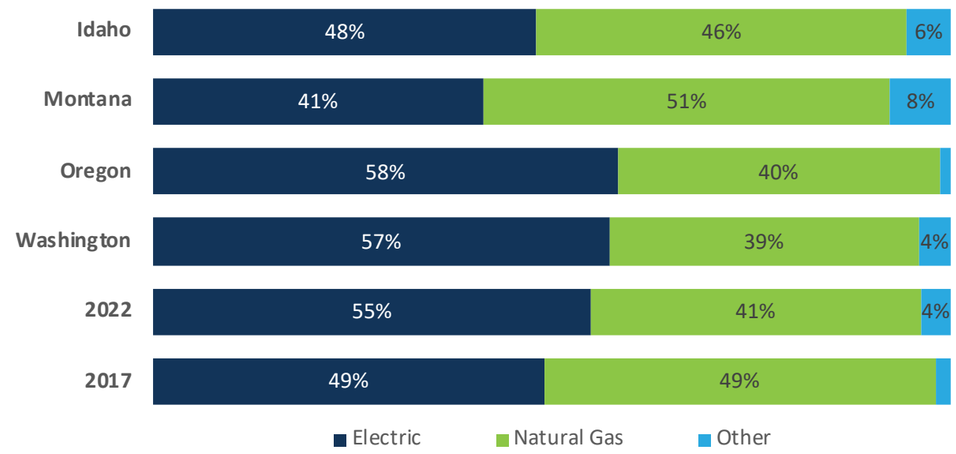
Non-heat pump storage water heaters remain the most prevalent in single-family homes (88%), but the RBSA documented possible slight increases in both tankless and heat pump water heaters since the 2011 RBSA. Generally, there remains a lot of potential for water heater efficiency improvements through increasing the market share of heat pump water heaters, which comprise approximately 3% of single-family water heaters.

*Distribution of Water Heaters in Single-Family Homes by Type and Year*




The 2022 RBSA distribution of water heaters by fuel type is similar to the distribution from 2017. In 2022, electric and natural gas water heaters are common in nearly equal proportions in single-family homes in the Northwest. Natural gas (and other fuel) water heaters are most common in single-family homes in Montana.

*Distribution of Water Heaters in Single-Family Homes by Fuel and by State*

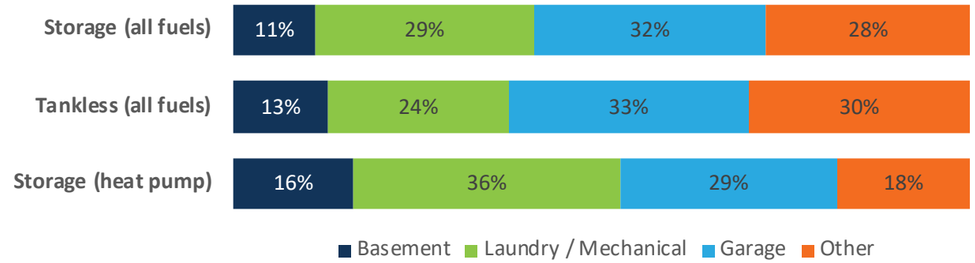






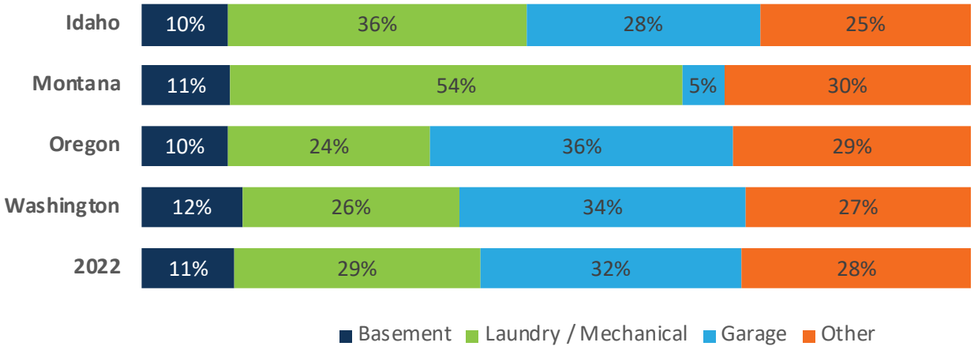

Most water heaters in single-family homes in the Northwest are either located in a dedicated laundry or mechanical room or in the garage, with a smaller but significant portion also located in basements. Water heaters are also located in other room types, but in small proportions (e.g., in kitchens, closets, attics, bathrooms).

*Distribution of Water Heaters in Single-Family Homes by Type and Location in the Home*




The 2022 RBSA found very few storage water heaters in Montana homes located in garages (5%) compared to other states. Most storage water heaters in homes in Montana are located in a dedicated laundry or mechanical room (54%).

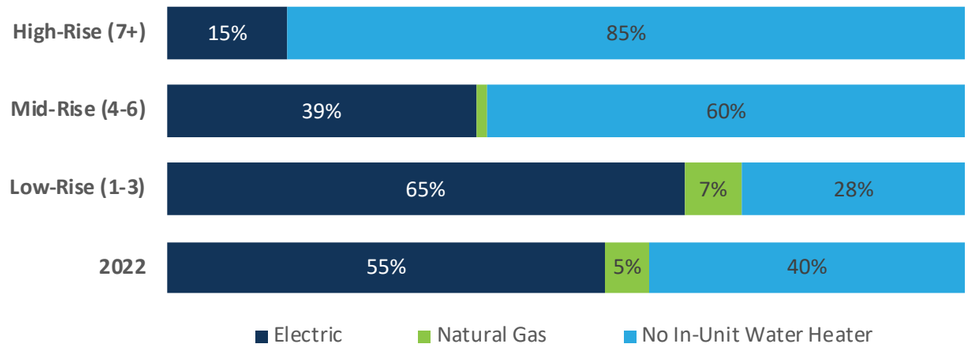
*Distribution of Storage Water Heaters in Single-Family Homes by State and Location in the Home*



### *Multi-Family In-Unit Water Heaters*

The prevalence of in-unit water heating in multi-family tenant units in 2022 varies considerably based on the height of the building, with very few in tenant units in high-rises, but in approximately 72 percent of tenant units in low-rises. Nearly 100 percent of water heaters in multi-family tenant units are non-heat pump storage water heaters, and only 60 percent of tenant units have a water heater in the unit.

*Distribution of Water Heaters in Multi-Family Homes by Fuel and by Building Height Class*

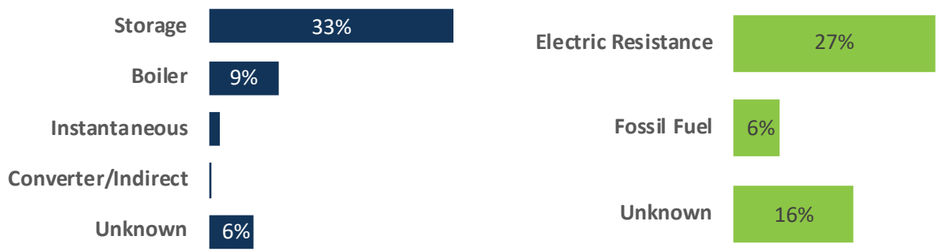



## *Multi-Family Building Water Heating*

Nearly half of multi-family buildings in the Northwest have water heating for the common areas of the building. This includes hot water for common area laundry rooms, bathrooms, and other purposes. Note that not all multi-family buildings have common area water heaters.

Nearly all high-rises (91%) and most mid-rises (85%) have hot water in the common areas. The system types and fuels used for water heating in common areas across multi-family buildings in the Northwest shows that most systems are storage tanks, and the majority of water heating relies on electric resistance water heaters.

*Multi-Family Building Common Area Water Heating Types and Fuels*

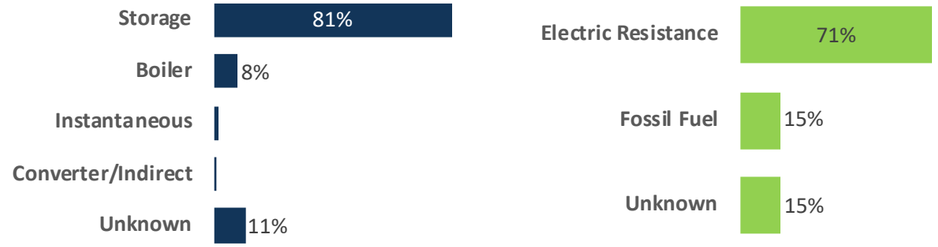







Electric resistance storage tanks are very prevalent in multi-family buildings as the source of hot water for tenant units at buildings across the Northwest. This information is based on both building-level and unit-level systems.

*Multi-Family Building Tenant Unit Water Heating Types and Fuels*




## *Appliances and Consumer Products*

### *Appliance Vintages*

Most appliances in single-family and multi-family homes are from 2010 or newer, and very few appliances in homes in the Northwest are from before the 2000s.

*Appliance Vintages*

| Refrigerators | Pre 1980 | 1980 - 1989 | 1990 - 1999 | 2000-2009 | 2010 - 2019 | Post 2019 |
|---|---|---|---|---|---|---|
| Single-Family | 0% | 2% | 8% | 28% | 51% | 11% |
| Multi-Family | 0% | 0% | 7% | 14% | 65% | 15% |

| Dishwashers | Pre 1980 | 1980 - 1989 | 1990 - 1999 | 2000-2009 | 2010 - 2019 | Post 2019 |
|---|---|---|---|---|---|---|
| Single-Family | 0% | 2% | 8% | 14% | 51% | 25% |
| Multi-Family | 0% | 0% | 5% | 0% | 82% | 14% |

| Clothes Dryers | Pre 1980 | 1980 - 1989 | 1990 - 1999 | 2000-2009 | 2010 - 2019 | Post 2019 |
|---|---|---|---|---|---|---|
| Single-Family | 0% | 3% | 4% | 25% | 54% | 14% |
| Multi-Family | 0% | 0% | 3% | 14% | 62% | 20% |

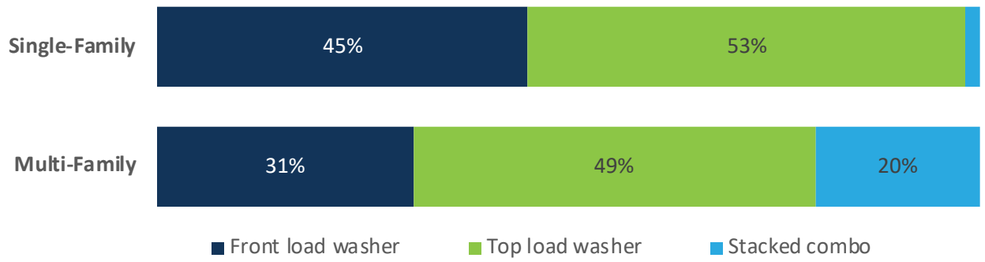
| Clothes Washers | Pre 1980 | 1980 - 1989 | 1990 - 1999 | 2000-2009 | 2010 - 2019 | Post 2019 |
|---|---|---|---|---|---|---|
| Single-Family | 0% | 4% | 5% | 20% | 58% | 13% |
| Multi-Family | 0% | 0% | 3% | 14% | 64% | 19% |

### *Appliance Characteristics*

The appliances in single-family homes were found to be dissimilar to those in multi-family homes, and certain appliances are more prevalent overall in single-family homes, such as laundry equipment (many multi-family tenants have access to laundry in a common area laundry room, but not in their unit).

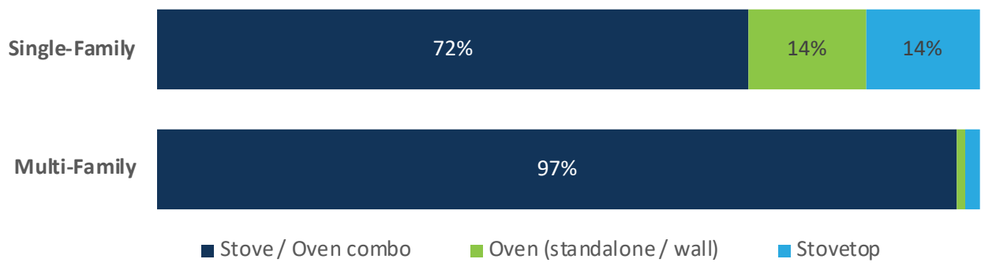
For laundry equipment, stacked combination washers/dryers are more common in multi-family tenant units than in single-family homes (likely due to space constraints). In single-family homes, 92 percent of dryers are electric, and the study found that 100 percent of dryers in tenant units were electric. Less than 1 percent of dryers are heat pump dryers (0.9%).

*Distribution of Clothes Washers by Type*




Separate ovens and cooktops are prevalent in single-family homes but are not common in multi-family homes.

*Distribution of Stoves and Ovens by Type*

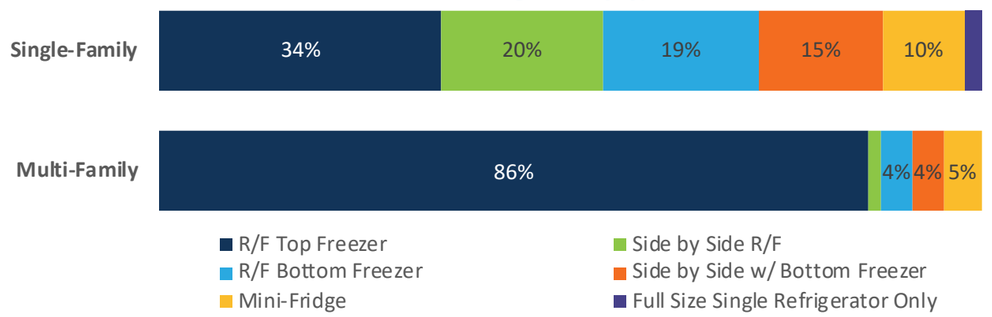






Refrigerators/freezers with the freezer at the top are prevalent in multi-family housing units; approximately 86 percent of tenant units have a refrigerator of this type. Refrigerators in single-family homes are more varied across homes.

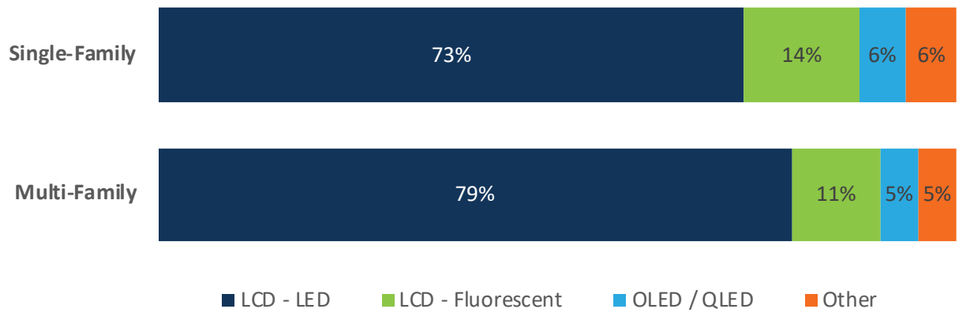
*Distribution of Refrigerators by Type*




### *Televisions in Single-Family and Multi-Family Homes*

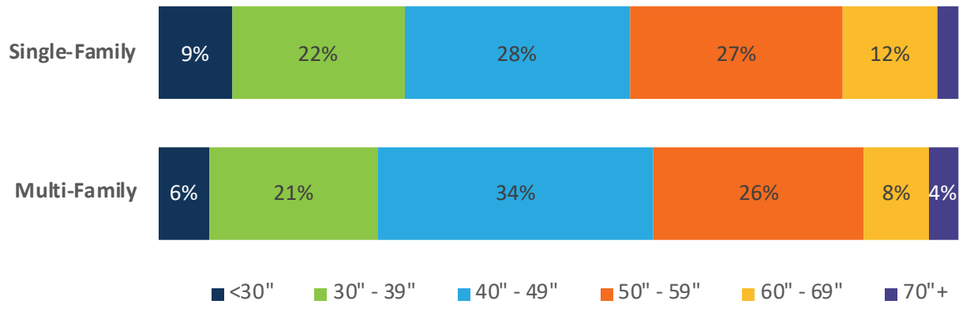
The 2022 RBSA collected detailed information about televisions in single-family and multi-family homes. In 2022, the distribution of televisions by type were similar in single-family and multi-family tenant units. LCD televisions using LEDs as the source of light are by far the most common television type in 2022. Importantly, inefficient CRT televisions are essentially non-existent (1% of televisions), down from approximately 13 percent in 2017. CRT televisions are less efficient than LED based LCD televisions.

*Distribution of Televisions by Type*



Televisions greater than 50 inches in size make up approximately 4 in 10 televisions (41% in single-family homes, and 38% in multi-family units). Larger televisions tend to use more energy than smaller televisions of the same type.

*Distribution of Televisions by Screen Size*




## Distributed Generation and Electric Vehicles

The prevalences of both solar PV and electric vehicles (including plug-in hybrid electric vehicles, or PHEVs) have increased in the Northwest since 2017, and approximately 1 percent of homes have some form of on-site power storage, mainly comprised of batteries.

*Single-Family Homes with Solar PV by Year and by State*

| | Idaho | Montana | Oregon | Washington | Overall |
|---|---|---|---|---|---|
| 2022 | 8% | 5% | 10% | 12% | 10% |
| 2017 | 2% | 1% | 3% | 3% | 3% |

*Single-Family Homes with Electric Vehicles (1+) by Year and by State*

| | Idaho | Montana | Oregon | Washington | Overall |
|---|---|---|---|---|---|
| 2022 | 2% | 3% | 8% | 8% | 7% |
| 2017 | 0% | 2% | 2% | 1% | 1% |



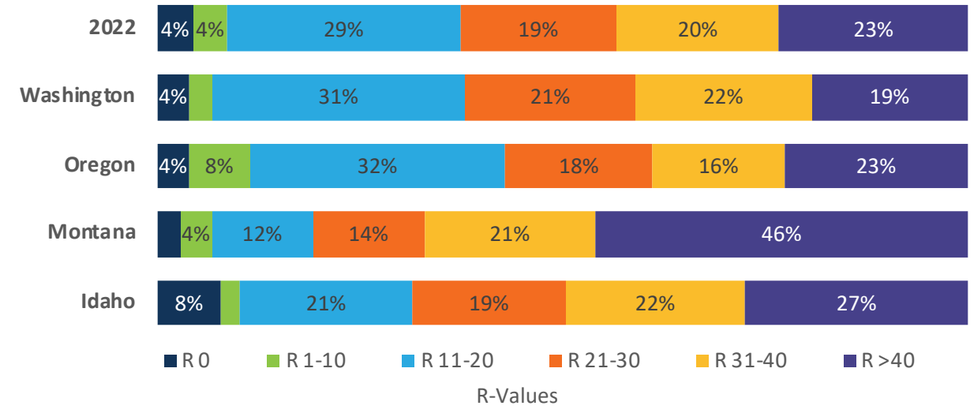


## Single-Family Home Envelope

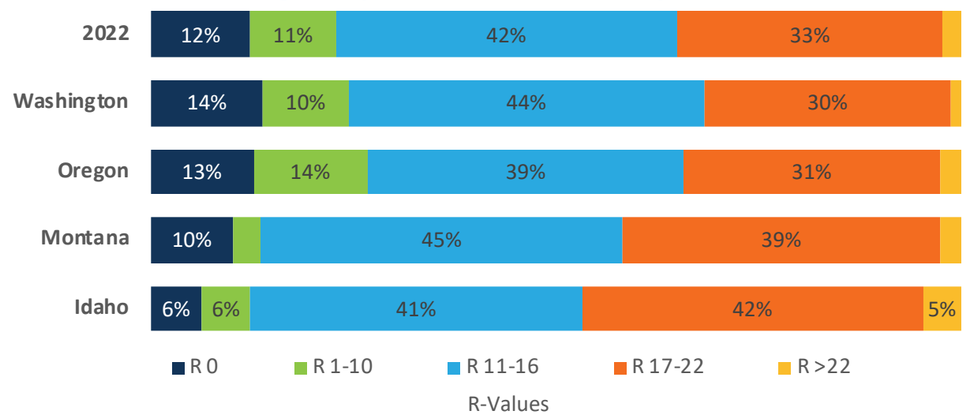
The 2022 RBSA made every effort to collect detailed information about insulation in homes in the Northwest. Insulation is particularly challenging to document accurately, especially insulation in walls and less accessible areas such as small attics and in crawlspaces under homes.

The distributions of single-family home attic and wall insulation by R-value show that higher levels of insulation (by R-value) are found in homes in Montana and Idaho, compared to Oregon and Washington.

*Single-Family Homes Attic Insulation Levels by State*




*Single-Family Homes Wall Insulation Levels by State*



## Single-Family Air Leakage

Air leakage from homes is indicative of poor weatherization and ducting. The 2022 RBSA conducted testing of home tightness and total duct leakage for single-family homes in the Northwest.

Air leakage (measured by "ACH50", or *air changes per hour at 50 pascals pressure differential*) remains higher in Washington and Oregon than in Montana and Idaho, and older homes continue to leak air considerably more than newer homes.

*Single-Family Home Air Leakage (ACH50) by State and Year*

| | Idaho | Montana | Oregon | Washington | Overall |
|---|---|---|---|---|---|
| 2022 | 7.6 | 8.1 | 8.9 | 9.3 | 8.9 |
| 2017 | 6.5 | 7.1 | 10.7 | 8.7 | 8.3 |
| 2011 | 7.4 | 8.3 | 11.7 | 10.4 | 10.3 |

*Single-Family Home Air Leakage (ACH50) by Home Age and Year*

| | Pre 1951 | 1951 - 1960 | 1961 - 1970 | 1971 - 1980 | 1981 - 1985 | 1986 - 1990 | 1991 - 1995 | 1996 - 2000 | 2001 - 2005 | 2006 - 2010 | 2010+ |
|---|---|---|---|---|---|---|---|---|---|---|---|
| 2022 | 13.6 | 11.2 | 10.5 | 8.8 | 7.5 | 8.2 | 7.1 | 8.2 | 5.3 | 5.7 | 4.7 |
| 2017 | 13.0 | 9.8 | 10.7 | 8.3 | 10.2 | 8.8 | 7.2 | 6.9 | 5.6 | 5.8 | 4.9 |
| 2011 | 13.7 | 11.6 | 10.6 | 10.1 | 7.6 | 8.1 | 8.3 | 7.5 | 7.5 | 6.3 | 6.6 |

Duct leakage to the outside (measured by "CFM25 per 100 square feet", or *cubic feet of air flow per minute per 100 square feet of home size*) is also higher in Washington and Oregon than in Montana and Idaho. Very new homes (2010 and newer) experience considerably lower duct leakage to the outside than older homes.

*Single-Family Home Duct Leakage (CFM25 per 100 sq.ft.) by State*

| | Idaho | Montana | Oregon | Washington | Overall |
|---|---|---|---|---|---|
| 2022 | 13.5 | 11.7 | 18.4 | 15.9 | 16.0 |

*Single-Family Home Duct Leakage (CFM25 per 100 sq.ft.) by Home Age*

| | Pre 1951 | 1951 - 1960 | 1961 - 1970 | 1971 - 1980 | 1981 - 1985 | 1986 - 1990 | 1991 - 1995 | 1996 - 2000 | 2001 - 2005 | 2006 - 2010 | 2010+ |
|---|---|---|---|---|---|---|---|---|---|---|---|
| 2022 | 17.7 | 18.5 | 26.2 | 12.1 | 14.8 | 16.3 | 16.2 | 12.3 | 14.5 | 13.4 | 9.2 |

For more information regarding the use of "CFM25 per 100 square feet" and why it was selected for the 2022 RBSA, please see the description of Total Duct Leakage Tests from the U.S. Department of Energy's Building Technologies Office: ***https://basc.pnnl.gov/resource-guides/total-duct-leakage-tests#edit-group-description***



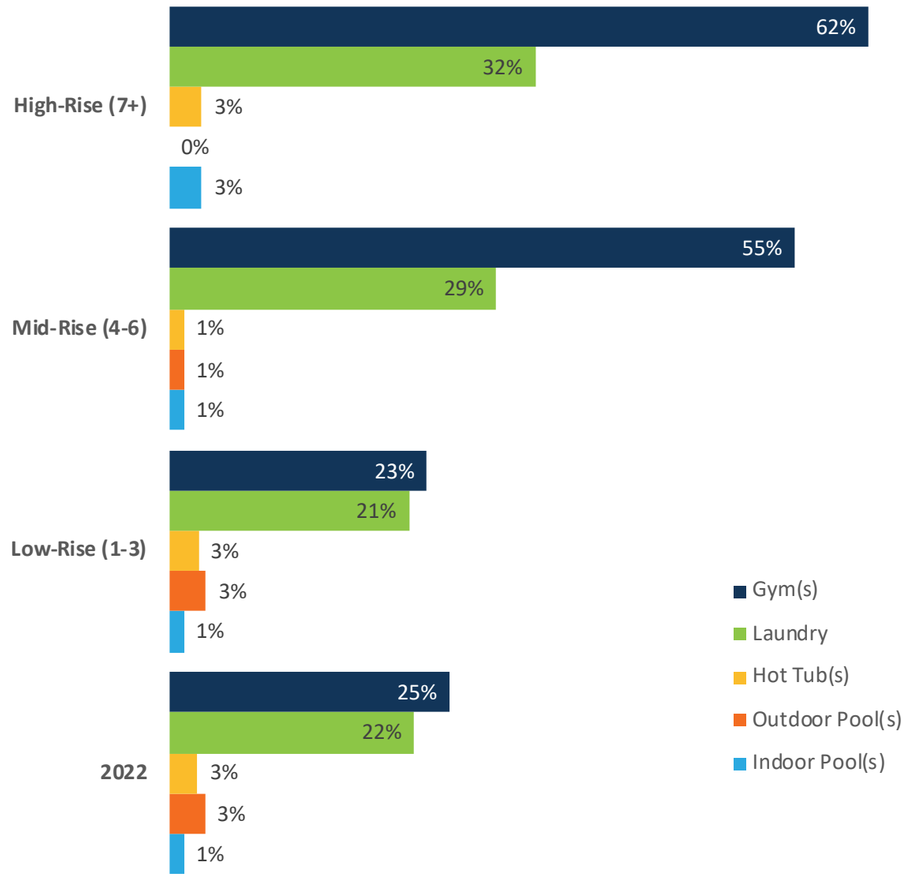


## Multi-Family Building Amenities

The 2022 RBSA captured amenities at multi-family buildings in the Northwest that may be related to energy use. These include the presence of gyms, laundry facilities, hot tubs, and swimming pools. Findings include::

- Gyms are especially common in high-rises (62%) and mid-rises (55%), and are present in one quarter of multi-family buildings overall
- Laundry facilities are also more common in high-rises (32%) and mid-rises (29%) than in low-rises (21%), and are available in 22 percent of multi-family buildings overall.
- Pools and hot tubs are rare amenities in multi-family buildings in the Northwest.

*Multi-Family Building Amenities*



# Appendix (Summary Tables)

The following pages contain weighted summary tables for different populations of the Northwest. The sample sizes and confidence intervals are provided along with the statistics.

For the 2022 RBSA, the study quantified the uncertainty in the empirical data with smoothed bootstrap confidence intervals (95% confidence). This technique is more accurate than traditional percentile-based methods for metrics that are skewed or fail any of the other assumptions of a parametric distribution. Any confidence interval estimated from a small sample has the potential to overstate confidence (i.e., estimating unrealistically tight error bounds) if the sample measurements are similar by random chance (if none of the natural outliers made it into the sample). Due to the significant uncertainty associated with small samples, the study does not provide confidence intervals derived from bootstrap resampling when the sample size is smaller than 10, as such intervals may be overstated. See the 2022 RBSA Data User Guide for more detail.

For the appendix tables, "n" is generally defined as the number of sites with a given item or characteristic. For calculations related to the presence of an item in a home, the average counts of an item in a home and the percent that a sub-type makes up of a larger type category, "n" represents the number of sites with one or more of the item. For example, the "n" for calculations regarding window AC is the number of homes with one or more window ACs. The one exception is building shell calculations where "n" is the number of sites with a non-missing value (e.g., no ceiling heat loss in a lower unit in a four-plex where the ceiling is also the floor of the unit above). This reflects values of zero being meaningful results in building shell calculations. This tailored definition of "n" across different types of calculations ensures the reliability and relevance of confidence intervals (CIs) which are only reported when "n" exceeds 10.

The appendix tables provide different types of information. The ***ENERGY STAR Appliances (Prevalence)*** tables provide the percent of each appliance type found to be ENERGY STAR rated based on field observation. The ***Mean # of _____ per Home*** table shows the average numbers of certain appliances and electronics found at homes in the Northwest. All of the ***Distributions*** tables for installed lighting, water heaters, and primary heating and cooling equipment sum to 100% (by column) and provide the proportions of each equipment sub-type or fuel type that comprise the population of the equipment type (e.g., lamps, primary heating systems). The ***Percent of Appliances by Appliance Sub-Types*** and ***Percent of Electronics by Electronics Sub-Types*** provide these same distributions, but include multiple equipment types in each table, with each type grouping separated by a bold horizontal line. The two ***Cooking Equipment*** sets of tables provide the distributions of ovens and stoves, respectively, by type and fuel type (separated by a horizontal blue line). The ***Single-Family Shell U-Value and UA Statistics*** tables provide weighted average site-level U-values and UA values for building components and overall buildings. Lastly, the ***Single-Family Energy Use Intensity (EUI) Statistics*** tables provide summary EUI statistics by state and overall for different fuels and combined, as well as electric and gas EUIs for homes with and without electric and gas as the primary heating fuels for homes in the Northwest.







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# A1. ENERGY STAR Appliances (Prevalence)

## A1.1. Prevalence of ENERGY STAR Appliances by Home Type

| | Attached | Attached (n) | Attached (CI) | Detached | Detached (n) | Detached (CI) | Multi-Family | Multi-Family (n) | Multi-Family (CI) |
|---|---|---|---|---|---|---|---|---|---|
| ENERGY STAR Dishwashers | 23.5% | 26 | 14.4%-34.0% | 23.8% | 346 | 20.6%-26.8% | 14.4% | 45 | 9.7%-19.4% |
| ENERGY STAR Washing Machines | 30.9% | 40 | 20.4%-41.1% | 38.5% | 628 | 35.0%-41.6% | 28.1% | 43 | 19.4%-37.8% |
| ENERGY STAR Clothes Dryers | 19.3% | 22 | 10.8%-29.5% | 19.0% | 297 | 16.4%-21.9% | 12.5% | 14 | 5.4%-20.6% |
| ENERGY STAR Refrigerators | 8.7% | 9 | NA | 9.2% | 148 | 7.3%-11.0% | 9.9% | 44 | 6.7%-13.5% |
| ENERGY STAR Freezers | 8.9% | 3 | NA | 9.0% | 92 | 6.8%-11.2% | 11.2% | 2 | NA |

## A1.2. Prevalence of ENERGY STAR Appliances by BPA vs Non-BPA

| | BPA | BPA (n) | BPA (CI) | Non-BPA | Non-BPA (n) | Non-BPA (CI) |
|---|---|---|---|---|---|---|
| ENERGY STAR Dishwashers | 21.5% | 165 | 17.4%-25.5% | 22.9% | 252 | 19.7%-26.3% |
| ENERGY STAR Washing Machines | 40.6% | 322 | 36.0%-45.1% | 34.1% | 389 | 30.6%-38.0% |
| ENERGY STAR Clothes Dryers | 19.7% | 137 | 15.7%-23.9% | 17.6% | 196 | 14.7%-20.6% |
| ENERGY STAR Refrigerators | 12.0% | 97 | 9.3%-15.1% | 7.4% | 104 | 5.7%-9.2% |
| ENERGY STAR Freezers | 5.5% | 37 | 3.3%-8.1% | 11.1% | 60 | 8.0%-14.8% |

### *A1.3. Prevalence of ENERGY STAR Appliances by Ownership*

| | Own | Own (n) | Own (CI) | Rent | Rent (n) | Rent (CI) | Unknown | Unknown (n) | Unknown (CI) |
|---|---|---|---|---|---|---|---|---|---|
| ENERGY STAR Dishwashers | 25.8% | 350 | 22.7%-29.0% | 14.7% | 61 | 10.7%-19.4% | 7.2% | 6 | NA |
| ENERGY STAR Washing Machines | 39.7% | 613 | 36.4%-42.8% | 20.8% | 76 | 15.8%-26.8% | 44.1% | 22 | 29.3%-58.0% |
| ENERGY STAR Clothes Dryers | 19.8% | 296 | 17.0%-22.5% | 9.9% | 25 | 5.6%-14.7% | 25.6% | 12 | 14.0%-38.0% |
| ENERGY STAR Refrigerators | 10.4% | 155 | 8.4%-12.5% | 7.5% | 45 | 5.1%-10.5% | 1.2% | 1 | NA |
| ENERGY STAR Freezers | 9.9% | 94 | 7.4%-12.5% | 3.1% | 2 | NA | 5.7% | 1 | NA |

### *A1.4. Prevalence of ENERGY STAR Appliances by State*

| | ID | ID (n) | ID (CI) | MT | MT (n) | MT (CI) | OR | OR (n) | OR (CI) | WA | WA (n) | WA (CI) | Overall | Overall (n) | Overall (CI) |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| ENERGY STAR Dishwashers | 27.7% | 98 | 21.9%-33.6% | 21.9% | 47 | 16.6%-27.9% | 17.6% | 126 | 13.8%-21.7% | 23.7% | 146 | 19.1%-28.1% | 22.3% | 417 | 19.7%-24.7% |
| ENERGY STAR Washing Machines | 36.8% | 160 | 31.4%-42.1% | 33.9% | 93 | 27.7%-40.0% | 31.9% | 207 | 27.7%-36.8% | 39.9% | 251 | 35.4%-44.6% | 36.7% | 711 | 34.0%-39.7% |
| ENERGY STAR Clothes Dryers | 19.2% | 78 | 15.0%-23.8% | 13.5% | 40 | 9.3%-18.2% | 16.9% | 100 | 13.1%-20.8% | 19.9% | 115 | 15.9%-24.0% | 18.5% | 333 | 16.2%-21.0% |
| ENERGY STAR Refrigerators | 5.0% | 29 | 3.1%-7.4% | 3.9% | 16 | 2.0%-5.9% | 7.2% | 62 | 5.1%-9.5% | 12.3% | 94 | 9.6%-15.1% | 9.3% | 201 | 7.8%-10.9% |
| ENERGY STAR Freezers | 8.1% | 25 | 4.6%-12.0% | 7.8% | 13 | 3.1%-13.2% | 12.4% | 33 | 7.5%-17.2% | 7.9% | 26 | 4.3%-12.5% | 9.0% | 97 | 6.6%-11.6% |

### *A1.5. Prevalence of ENERGY STAR Appliances by Urban vs Rural*

| | Rural | Rural (n) | Rural (CI) | Urban | Urban (n) | Urban (CI) |
|---|---|---|---|---|---|---|
| ENERGY STAR Dishwashers | 20.1% | 128 | 15.1%-25.8% | 22.9% | 289 | 19.7%-25.8% |
| ENERGY STAR Washing Machines | 34.3% | 260 | 28.7%-40.0% | 37.5% | 451 | 34.1%-41.0% |
| ENERGY STAR Clothes Dryers | 16.4% | 126 | 12.7%-20.8% | 19.1% | 207 | 16.1%-21.9% |
| ENERGY STAR Refrigerators | 5.5% | 50 | 3.3%-8.1% | 10.3% | 151 | 8.5%-12.2% |
| ENERGY STAR Freezers | 7.3% | 46 | 4.6%-10.5% | 10.0% | 51 | 6.7%-13.5% |

# A2. Distributions of Installed Lighting by Lamp Type

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## A2.1. Distribution of Installed Lamp Types by Home Type

| | Attached | Attached (n) | Attached (CI) | Detached | Detached (n) | Detached (CI) | Multi-Family | Multi-Family (n) | Multi-Family (CI) |
|---|---|---|---|---|---|---|---|---|---|
| LEDs | 59.8% | 171 | 51.9%-67.4% | 58.2% | 1694 | 56.2%-60.2% | 60.0% | 360 | 54.9%-64.8% |
| CFLs | 10.5% | 110 | 6.6%-15.0% | 9.0% | 1265 | 8.2%-9.8% | 6.6% | 135 | 5.0%-8.4% |
| Incandescents | 20.0% | 135 | 15.8%-24.5% | 20.2% | 1444 | 18.7%-21.7% | 16.7% | 208 | 12.4%-21.9% |
| Halogens | 2.9% | 55 | 1.8%-4.2% | 3.6% | 704 | 3.1%-4.3% | 2.7% | 58 | 1.7%-4.0% |
| Linear Fluores-cents | 4.1% | 64 | 2.8%-5.7% | 5.6% | 845 | 4.9%-6.2% | 4.2% | 121 | 3.3%-5.2% |
| Other Lamps | 0.2% | 5 | NA | 0.2% | 82 | 0.1%-0.3% | 0.1% | 6 | NA |
| Unknown Lamps | 2.5% | 47 | 1.3%-3.9% | 3.2% | 653 | 2.8%-3.7% | 9.7% | 158 | 7.6%-12.2% |

### *A2.2. Distribution of Installed Lamp Types by BPA vs Non-BPA*

| | BPA | BPA (n) | BPA (CI) | Non-BPA | Non-BPA (n) | Non-BPA (CI) |
|---|---|---|---|---|---|---|
| LEDs | 58.3% | 996 | 55.7%-61.0% | 58.6% | 1229 | 56.2%-60.9% |
| CFLs | 8.6% | 663 | 7.5%-9.8% | 9.2% | 847 | 8.2%-10.3% |
| Incandescents | 19.0% | 780 | 17.0%-20.9% | 20.6% | 1007 | 18.7%-22.6% |
| Halogens | 4.8% | 396 | 3.9%-5.9% | 2.7% | 421 | 2.3%-3.2% |
| Linear Fluores-cents | 4.8% | 457 | 4.1%-5.6% | 5.7% | 573 | 4.9%-6.5% |
| Other Lamps | 0.2% | 56 | 0.1%-0.3% | 0.2% | 37 | 0.1%-0.3% |
| Unknown Lamps | 4.4% | 421 | 3.7%-5.1% | 3.0% | 437 | 2.5%-3.6% |

### *A2.3. Distribution of Installed Lamp Types by State*

| | ID | ID (n) | ID (CI) | MT | MT (n) | MT (CI) | OR | OR (n) | OR (CI) | WA | WA (n) | WA (CI) | Overall | Overall (n) | Overall (CI) |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| LEDs | 58.5% | 405 | 54.4%-62.2% | 53.6% | 252 | 48.8%-58.9% | 61.3% | 733 | 58.1%-64.0% | 57.8% | 835 | 55.0%-60.7% | 58.5% | 2225 | 56.7%-60.2% |
| CFLs | 9.2% | 299 | 7.8%-10.8% | 8.3% | 183 | 7.0%-9.7% | 8.8% | 482 | 7.7%-9.8% | 9.1% | 546 | 7.7%-10.5% | 8.9% | 1510 | 8.2%-9.7% |
| Incandescents | 21.6% | 345 | 18.9%-24.2% | 22.9% | 224 | 19.7%-26.6% | 18.7% | 591 | 16.3%-21.8% | 19.7% | 627 | 17.7%-21.8% | 20.0% | 1787 | 18.5%-21.5% |
| Halogens | 2.0% | 136 | 1.4%-2.8% | 4.4% | 121 | 3.4%-5.5% | 2.7% | 237 | 2.1%-3.3% | 4.2% | 323 | 3.3%-5.2% | 3.5% | 817 | 3.0%-4.1% |
| Linear Fluores-cents | 6.2% | 191 | 5.1%-7.4% | 8.0% | 144 | 6.4%-9.6% | 5.7% | 360 | 4.9%-6.8% | 4.4% | 335 | 3.6%-5.4% | 5.3% | 1030 | 4.8%-5.9% |
| Other Lamps | 0.2% | 30 | 0.1%-0.3% | 0.0% | 6 | NA | 0.3% | 27 | 0.1%-0.6% | 0.2% | 30 | 0.1%-0.3% | 0.2% | 93 | 0.1%-0.3% |
| Unknown Lamps | 2.3% | 150 | 1.8%-2.9% | 2.8% | 117 | 2.2%-3.5% | 2.6% | 212 | 2.0%-3.1% | 4.6% | 379 | 3.9%-5.4% | 3.6% | 858 | 3.2%-4.1% |

### *A2.4. Distribution of Installed Lamp Types by Urban vs Rural*

| | Rural | Rural (n) | Rural (CI) | Urban | Urban (n) | Urban (CI) |
|---|---|---|---|---|---|---|
| LEDs | 57.2% | 710 | 53.5%-61.0% | 59.0% | 1515 | 56.9%-61.1% |
| CFLs | 8.4% | 523 | 7.1%-10.0% | 9.1% | 987 | 8.3%-10.2% |
| Incandescents | 21.0% | 635 | 18.0%-24.4% | 19.6% | 1152 | 18.1%-21.1% |
| Halogens | 2.8% | 302 | 2.2%-3.6% | 3.8% | 515 | 3.2%-4.5% |
| Linear Fluorescents | 7.3% | 400 | 6.2%-8.5% | 4.6% | 630 | 4.0%-5.2% |
| Other Lamps | 0.3% | 40 | 0.1%-0.6% | 0.1% | 53 | 0.1%-0.2% |
| Unknown Lamps | 2.9% | 301 | 2.3%-3.6% | 3.8% | 557 | 3.3%-4.4% |

# A3. Mean # of _____ per Home

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## A3.1. Mean # of _____ per Home by Home Type

| | Attached | Attached (n) | Attached (CI) | Detached | Detached (n) | Detached (CI) | Multi-Family | Multi-Family (n) | Multi-Family (CI) |
|---|---|---|---|---|---|---|---|---|---|
| Mean # of Computers | 1.3 | 130 | 1.1-1.5 | 1.6 | 1466 | 1.5-1.6 | 0.9 | 243 | 0.8-1 |
| Mean # of Power Strips in Use | 1.4 | 97 | 1-1.9 | 1.6 | 1125 | 1.5-1.8 | 0.9 | 179 | 0.8-1 |
| Mean # of Refrigerators | 1.2 | 173 | 1.1-1.3 | 1.5 | 1736 | 1.4-1.5 | 1 | 369 | 1-1.1 |
| Mean # of Freezers | 0.3 | 44 | 0.2-0.4 | 0.5 | 854 | 0.5-0.6 | 0.1 | 21 | 0-0.1 |
| Mean # of TVs | 1.8 | 162 | 1.6-2 | 2 | 1648 | 1.9-2.1 | 1.2 | 293 | 1.1-1.4 |
| Mean # of LED Lamps | 23.7 | 172 | 19.9-28.4 | 39.5 | 1715 | 37.5-41.5 | 11.7 | 360 | 10.3-13.3 |

## A3.2. Mean # of _____ per Home by BPA vs Non-BPA

| | BPA | BPA (n) | BPA (CI) | Non-BPA | Non-BPA (n) | Non-BPA (CI) |
|---|---|---|---|---|---|---|
| Mean # of Computers | 1.4 | 830 | 1.3-1.5 | 1.4 | 1009 | 1.3-1.5 |
| Mean # of Power Strips in Use | 1.3 | 605 | 1.2-1.5 | 1.6 | 796 | 1.4-1.7 |
| Mean # of Refrigerators | 1.4 | 1021 | 1.3-1.4 | 1.4 | 1257 | 1.3-1.4 |
| Mean # of Freezers | 0.4 | 401 | 0.3-0.4 | 0.4 | 518 | 0.4-0.5 |
| Mean # of TVs | 1.8 | 941 | 1.7-2 | 1.8 | 1162 | 1.8-1.9 |
| Mean # of LED Lamps | 31.4 | 1005 | 29.2-33.7 | 33.2 | 1242 | 31.3-35.2 |

### A3.3. Mean # of _____ per Home by Ownership

| | Own | Own (n) | Own (CI) | Rent | Rent (n) | Rent (CI) | Unknown | Unknown (n) | Unknown (CI) |
|---|---|---|---|---|---|---|---|---|---|
| Mean # of Refrigerators | 1.5 | 1644 | 1.4-1.5 | 1.1 | 572 | 1.1-1.2 | 1.4 | 62 | 1.2-1.6 |
| Mean # of Freezers | 0.5 | 820 | 0.5-0.6 | 0.1 | 80 | 0.1-0.2 | 0.4 | 19 | 0.2-0.6 |

### A3.4. Mean # of _____ per Home by State

| | Overall | Overall (n) | Overall (CI) | ID | ID (n) | ID (CI) | MT | MT (n) | MT (CI) | OR | OR (n) | OR (CI) | WA | WA (n) | WA (CI) |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| Mean # of Computers | 1.4 | 1839 | 1.3-1.5 | 1.4 | 354 | 1.3-1.5 | 1.4 | 199 | 1.2-1.5 | 1.2 | 612 | 1.1-1.3 | 1.5 | 674 | 1.4-1.6 |
| Mean # of Power Strips in Use | 1.5 | 1401 | 1.4-1.6 | 2.1 | 295 | 1.8-2.4 | 1.4 | 146 | 1.2-1.7 | 1.4 | 436 | 1.2-1.6 | 1.4 | 524 | 1.2-1.5 |
| Mean # of Refrigerators | 1.4 | 2278 | 1.3-1.4 | 1.5 | 421 | 1.4-1.6 | 1.5 | 254 | 1.4-1.6 | 1.3 | 744 | 1.3-1.4 | 1.4 | 859 | 1.3-1.4 |
| Mean # of Freezers | 0.4 | 919 | 0.4-0.4 | 0.6 | 223 | 0.5-0.7 | 0.7 | 142 | 0.6-0.8 | 0.3 | 273 | 0.3-0.4 | 0.4 | 281 | 0.3-0.4 |
| Mean # of TVs | 1.8 | 2103 | 1.8-1.9 | 2 | 395 | 1.9-2.2 | 1.9 | 242 | 1.8-2.1 | 1.8 | 685 | 1.7-1.9 | 1.8 | 781 | 1.7-1.9 |
| Mean # of LED Lamps | 32.5 | 2247 | 30.8-34.1 | 36.8 | 414 | 33.2-40.6 | 36.9 | 253 | 31.9-42.4 | 31.2 | 737 | 28.9-33.7 | 31.6 | 843 | 29.2-34.3 |

### *A3.5. Mean # of _____ per Home by Urban vs Rural*

| | Rural | Rural (n) | Rural (CI) | Urban | Urban (n) | Urban (CI) |
|---|---|---|---|---|---|---|
| Mean # of Computers | 1.5 | 591 | 1.4-1.7 | 1.4 | 1248 | 1.3-1.4 |
| Mean # of Power Strips in Use | 1.7 | 471 | 1.4-1.9 | 1.4 | 930 | 1.3-1.5 |
| Mean # of Refrigerators | 1.5 | 728 | 1.5-1.6 | 1.3 | 1550 | 1.3-1.4 |
| Mean # of Freezers | 0.7 | 426 | 0.7-0.8 | 0.3 | 493 | 0.3-0.4 |
| Mean # of TVs | 2 | 689 | 1.9-2.2 | 1.8 | 1414 | 1.7-1.9 |
| Mean # of LED Lamps | 45.1 | 718 | 40.8-49.6 | 29.4 | 1529 | 27.8-31.1 |

# A4. Distributions of Water Heaters in Single-Family Homes by Type

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## A4.1. Distributions of Water Heaters in Single-Family Homes by Home Type

| | Attached | Attached (n) | Attached (CI) | Detached | Detached (n) | Detached (CI) |
|---|---|---|---|---|---|---|
| Storage Electric Heat Pump Packaged | 1.4% | 1 | NA | 3.1% | 51 | 2.0%-4.4% |
| Storage Electric Heat Pump Split System | 0.0% | 0 | NA | 0.6% | 3 | NA |
| Storage Electric Resistance | 56.2% | 104 | 46.1%-65.9% | 46.5% | 916 | 43.3%-49.7% |
| Instantaneous Electric Resistance | 0.0% | 0 | NA | 1.9% | 34 | 1.1%-2.7% |
| Storage Fossil Fuel Condensing | 5.2% | 7 | NA | 4.0% | 62 | 2.8%-5.1% |
| Storage Fossil Fuel Non-Condensing | 29.0% | 40 | 19.7%-39.0% | 35.4% | 525 | 32.0%-38.8% |
| Instantaneous Fossil Fuel Condensing | 1.8% | 2 | NA | 3.9% | 63 | 2.7%-5.3% |
| Instantaneous Fossil Fuel Non-Condensing | 1.4% | 1 | NA | 3.3% | 52 | 2.2%-4.5% |
| Storage Indirect Water Heater | 0.3% | 1 | NA | 0.7% | 16 | 0.3%-1.2% |
| Storage Unknown | 3.3% | 3 | NA | 0.4% | 15 | 0.2%-0.7% |
| Instantaneous Unknown | 1.5% | 1 | NA | 0.2% | 2 | NA |

### *A4.2. Distributions of Water Heaters in Single-Family Homes by BPA vs Non-BPA*

| | BPA | BPA (n) | BPA (CI) | Non-BPA | Non-BPA (n) | Non-BPA (CI) |
|---|---|---|---|---|---|---|
| Storage Electric Heat Pump Packaged | 4.3% | 31 | 2.5%-6.5% | 1.9% | 21 | 0.9%-3.3% |
| Storage Electric Heat Pump Split System | 0.4% | 1 | NA | 0.6% | 2 | NA |
| Storage Electric Resistance | 55.1% | 494 | 50.2%-59.9% | 42.7% | 526 | 38.8%-46.5% |
| Instantaneous Electric Resistance | 1.7% | 17 | 0.7%-3.0% | 1.6% | 17 | 0.8%-2.6% |
| Storage Fossil Fuel Condensing | 3.3% | 24 | 1.5%-5.5% | 4.6% | 45 | 3.2%-6.3% |
| Storage Fossil Fuel Non-Condensing | 26.6% | 198 | 21.7%-31.1% | 40.0% | 367 | 36.2%-44.2% |
| Instantaneous Fossil Fuel Condensing | 3.9% | 36 | 2.3%-6.0% | 3.4% | 29 | 2.1%-5.0% |
| Instantaneous Fossil Fuel Non-Condensing | 2.2% | 23 | 1.1%-3.5% | 3.6% | 30 | 2.1%-5.3% |
| Storage Indirect Water Heater | 0.7% | 9 | NA | 0.6% | 8 | NA |
| Storage Unknown | 0.9% | 8 | NA | 0.7% | 10 | 0.1%-1.7% |
| Instantaneous Unknown | 0.9% | 2 | NA | 0.1% | 1 | NA |

### *A4.3. Distributions of Water Heaters in Single-Family Homes by Heating Zone*

| | HZ 1 | HZ 1 (n) | HZ 1 (CI) | HZ 2/3 | HZ 2/3 (n) | HZ 2/3 (CI) |
|---|---|---|---|---|---|---|
| Storage Electric Heat Pump Packaged | 2.9% | 27 | 1.6%-4.5% | 2.8% | 25 | 1.4%-4.6% |
| Storage Electric Heat Pump Split System | 0.2% | 1 | NA | 1.3% | 2 | NA |
| Storage Electric Resistance | 47.0% | 423 | 42.6%-50.8% | 49.8% | 597 | 45.6%-53.8% |
| Instantaneous Electric Resistance | 1.7% | 17 | 0.9%-2.8% | 1.4% | 17 | 0.6%-2.3% |
| Storage Fossil Fuel Condensing | 4.2% | 38 | 2.7%-6.0% | 3.7% | 31 | 2.3%-5.5% |
| Storage Fossil Fuel Non-Condensing | 35.6% | 343 | 31.9%-39.4% | 31.9% | 222 | 28.1%-35.9% |
| Instantaneous Fossil Fuel Condensing | 3.8% | 35 | 2.4%-5.4% | 3.1% | 30 | 1.8%-4.5% |
| Instantaneous Fossil Fuel Non-Condensing | 3.0% | 29 | 1.8%-4.5% | 3.0% | 24 | 1.8%-4.4% |
| Storage Indirect Water Heater | 0.2% | 2 | NA | 1.9% | 15 | 0.9%-3.2% |
| Storage Unknown | 0.8% | 7 | NA | 0.8% | 11 | 0.2%-1.5% |
| Instantaneous Unknown | 0.5% | 2 | NA | 0.2% | 1 | NA |

### *A4.4. Distributions of Water Heaters in Single-Family Homes by State*

| | ID | ID (n) | ID (CI) | MT | MT (n) | MT (CI) | OR | OR (n) | OR (CI) | WA | WA (n) | WA (CI) | Overall | Overall (n) | Overall (CI) |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| Storage Electric Heat Pump Packaged | 0.9% | 4 | NA | 0.6% | 1 | NA | 3.7% | 25 | 1.9%-6.0% | 3.4% | 22 | 1.8%-5.3% | 2.9% | 52 | 1.8%-4.1% |
| Storage Electric Heat Pump Split System | 0.0% | 0 | NA | 0.0% | 0 | NA | 0.0% | 0 | NA | 1.0% | 3 | NA | 0.5% | 3 | NA |
| Storage Electric Resistance | 46.1% | 231 | 40.4%-51.8% | 36.5% | 96 | 29.8%-43.0% | 50.3% | 301 | 44.7%-55.6% | 48.6% | 392 | 43.0%-54.2% | 47.7% | 1020 | 44.6%-50.9% |
| Instantaneous Electric Resistance | 0.8% | 3 | NA | 3.2% | 8 | NA | 1.7% | 12 | 0.7%-2.9% | 1.6% | 11 | 0.5%-2.9% | 1.7% | 34 | 1.0%-2.5% |
| Storage Fossil Fuel Condensing | 6.3% | 24 | 3.7%-9.1% | 5.0% | 11 | 2.2%-7.8% | 2.3% | 14 | 1.0%-4.0% | 4.4% | 20 | 2.5%-6.7% | 4.1% | 69 | 3.0%-5.3% |
| Storage Fossil Fuel Non-Condensing | 40.6% | 125 | 35.1%-46.5% | 41.7% | 94 | 35.4%-48.0% | 34.2% | 212 | 29.2%-39.5% | 31.9% | 134 | 26.8%-36.9% | 34.6% | 565 | 31.6%-37.8% |
| Instantaneous Fossil Fuel Condensing | 2.7% | 10 | 0.8%-5.1% | 5.3% | 15 | 2.6%-8.2% | 2.1% | 19 | 0.9%-3.6% | 4.5% | 21 | 2.5%-6.7% | 3.6% | 65 | 2.6%-4.8% |
| Instantaneous Fossil Fuel Non-Condensing | 1.7% | 9 | NA | 4.3% | 8 | NA | 4.4% | 24 | 2.4%-6.8% | 2.4% | 12 | 0.9%-4.2% | 3.0% | 53 | 2.0%-4.1% |
| Storage Indirect Water Heater | 0.6% | 4 | NA | 2.8% | 6 | NA | 0.3% | 4 | NA | 0.6% | 3 | NA | 0.7% | 17 | 0.3%-1.1% |
| Storage Unknown | 0.3% | 4 | NA | 0.6% | 1 | NA | 0.7% | 6 | NA | 1.0% | 7 | NA | 0.8% | 18 | 0.2%-1.5% |
| Instantaneous Unknown | 0.0% | 0 | NA | 0.0% | 0 | NA | 0.2% | 1 | NA | 0.7% | 2 | NA | 0.4% | 3 | NA |

### *A4.5. Distributions of Water Heaters in Single-Family Homes by Urban vs Rural*

| | Rural | Rural (n) | Rural (CI) | Urban | Urban (n) | Urban (CI) |
|---|---|---|---|---|---|---|
| Storage Electric Heat Pump Packaged | 4.7% | 26 | 2.2%-8.1% | 2.3% | 26 | 1.3%-3.5% |
| Storage Electric Heat Pump Split System | 0.0% | 0 | NA | 0.7% | 3 | NA |
| Storage Electric Resistance | 62.2% | 505 | 56.2%-67.5% | 42.9% | 515 | 39.1%-46.9% |
| Instantaneous Electric Resistance | 1.8% | 16 | 0.7%-3.0% | 1.6% | 18 | 0.8%-2.6% |
| Storage Fossil Fuel Condensing | 1.7% | 16 | 0.8%-2.8% | 4.9% | 53 | 3.4%-6.6% |
| Storage Fossil Fuel Non-Condensing | 19.5% | 91 | 14.4%-25.0% | 39.7% | 474 | 36.1%-43.1% |
| Instantaneous Fossil Fuel Condensing | 2.8% | 22 | 1.5%-4.5% | 3.9% | 43 | 2.5%-5.3% |
| Instantaneous Fossil Fuel Non-Condensing | 4.5% | 28 | 2.8%-6.6% | 2.5% | 25 | 1.3%-3.7% |
| Storage Indirect Water Heater | 1.9% | 14 | 0.7%-3.3% | 0.3% | 3 | NA |
| Storage Unknown | 0.9% | 10 | 0.3%-1.8% | 0.7% | 8 | NA |
| Instantaneous Unknown | 0.0% | 0 | NA | 0.5% | 3 | NA |

### *A4.6. Distributions of Water Heaters in Single-Family Homes by Home Vintage*

| | Pre 1951 | Pre 1951 (n) | Pre 1951 (CI) | 1951-1970 | 1951-1970 (n) | 1951-1970 (CI) | 1971-1990 | 1971-1990 (n) | 1971-1990 (CI) | 1991-2010 | 1991-2010 (n) | 1991-2010 (CI) | Post 2010 | Post 2010 (n) | Post 2010 (CI) |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| Storage Electric Heat Pump Packaged | 3.8% | 9 | NA | 2.7% | 5 | NA | 2.2% | 6 | NA | 1.4% | 12 | 0.5%-2.5% | 6.7% | 19 | 3.0%-11.1% |
| Storage Electric Heat Pump Split System | 0.0% | 0 | NA | 1.1% | 1 | NA | 0.3% | 1 | NA | 0.0% | 0 | NA | 2.4% | 1 | NA |
| Storage Electric Resistance | 54.9% | 234 | 48.8%-61.8% | 51.0% | 142 | 42.5%-59.1% | 64.9% | 286 | 57.7%-72.0% | 30.0% | 223 | 25.1%-35.3% | 42.6% | 110 | 33.3%-50.7% |
| Instantaneous Electric Resistance | 2.5% | 7 | NA | 1.6% | 4 | NA | 0.1% | 1 | NA | 1.4% | 13 | 0.5%-2.3% | 2.4% | 7 | NA |
| Storage Fossil Fuel Condensing | 3.1% | 10 | 1.2%-5.6% | 4.3% | 9 | NA | 1.0% | 6 | NA | 8.7% | 35 | 5.4%-12.0% | 3.0% | 8 | NA |
| Storage Fossil Fuel Non-Condensing | 28.1% | 95 | 22.3%-34.4% | 33.2% | 74 | 25.3%-41.7% | 24.9% | 90 | 19.2%-31.4% | 51.4% | 222 | 45.2%-57.5% | 21.4% | 60 | 15.3%-28.8% |
| Instantaneous Fossil Fuel Condensing | 2.7% | 9 | NA | 2.1% | 7 | NA | 1.5% | 5 | NA | 2.9% | 15 | 1.1%-5.2% | 12.7% | 28 | 6.8%-18.6% |
| Instantaneous Fossil Fuel Non-Condensing | 2.5% | 11 | 0.9%-4.5% | 1.8% | 5 | NA | 3.2% | 9 | NA | 2.8% | 18 | 1.4%-4.6% | 6.6% | 9 | NA |
| Storage Indirect Water Heater | 0.9% | 3 | NA | 0.0% | 0 | NA | 0.8% | 4 | NA | 1.0% | 7 | NA | 0.5% | 3 | NA |
| Storage Unknown | 1.2% | 4 | NA | 2.3% | 5 | NA | 0.4% | 5 | NA | 0.5% | 3 | NA | 0.1% | 1 | NA |
| Instantaneous Unknown | 0.3% | 1 | NA | 0.0% | 0 | NA | 0.8% | 1 | NA | 0.0% | 0 | NA | 1.6% | 1 | NA |

# A5. Distributions of Water Heaters in Multi-Family Homes by Type

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## A5.1. Distributions of Water Heaters in Multi-Family Homes by BPA vs Non-BPA

| | BPA | BPA (n) | BPA (CI) | Non-BPA | Non-BPA (n) | Non-BPA (CI) |
|---|---|---|---|---|---|---|
| Storage Electric Heat Pump Packaged | 0.0% | 0 | NA | 0.0% | 0 | NA |
| Storage Electric Heat Pump Split System | 0.0% | 0 | NA | 0.0% | 0 | NA |
| Storage Electric Resistance | 94.5% | 71 | 88.0%-98.7% | 85.1% | 87 | 77.2%-92.7% |
| Instantaneous Electric Resistance | 0.6% | 1 | NA | 0.0% | 0 | NA |
| Storage Fossil Fuel Condensing | 0.0% | 0 | NA | 1.9% | 2 | NA |
| Storage Fossil Fuel Non-Condensing | 1.1% | 2 | NA | 11.7% | 10 | 3.9%-19.2% |
| Instantaneous Fossil Fuel Condensing | 0.0% | 0 | NA | 0.0% | 0 | NA |
| Instantaneous Fossil Fuel Non-Condensing | 0.0% | 0 | NA | 0.0% | 0 | NA |
| Storage Indirect Water Heater | 0.0% | 0 | NA | 0.0% | 0 | NA |
| Storage Unknown | 3.7% | 3 | NA | 1.3% | 2 | NA |
| Instantaneous Unknown | 0.0% | 0 | NA | 0.0% | 0 | NA |

### *A5.2. Distributions of Water Heaters in Multi-Family Homes by Heating Zone*

| | HZ 1 | HZ 1 (n) | HZ 1 (CI) | HZ 2/3 | HZ 2/3 (n) | HZ 2/3 (CI) |
|---|---|---|---|---|---|---|
| Storage Electric Heat Pump Packaged | 0.0% | 0 | NA | 0.0% | 0 | NA |
| Storage Electric Heat Pump Split System | 0.0% | 0 | NA | 0.0% | 0 | NA |
| Storage Electric Resistance | 90.5% | 145 | 84.8%-95.3% | 72.7% | 13 | 46.3%-93.4% |
| Instantaneous Electric Resistance | 0.3% | 1 | NA | 0.0% | 0 | NA |
| Storage Fossil Fuel Condensing | 1.3% | 2 | NA | 0.0% | 0 | NA |
| Storage Fossil Fuel Non-Condensing | 5.6% | 7 | NA | 25.3% | 5 | NA |
| Instantaneous Fossil Fuel Condensing | 0.0% | 0 | NA | 0.0% | 0 | NA |
| Instantaneous Fossil Fuel Non-Condensing | 0.0% | 0 | NA | 0.0% | 0 | NA |
| Storage Indirect Water Heater | 0.0% | 0 | NA | 0.0% | 0 | NA |
| Storage Unknown | 2.3% | 4 | NA | 2.0% | 1 | NA |
| Instantaneous Unknown | 0.0% | 0 | NA | 0.0% | 0 | NA |

### *A5.3. Distributions of Water Heaters in Multi-Family Homes by State*

| | ID | ID (n) | ID (CI) | MT | MT (n) | MT (CI) | OR | OR (n) | OR (CI) | WA | WA (n) | WA (CI) | Overall | Overall (n) | Overall (CI) |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| Storage Electric Heat Pump Packaged | 0.0% | 0 | NA | 0.0% | 0 | NA | 0.0% | 0 | NA | 0.0% | 0 | NA | 0.0% | 0 | NA |
| Storage Electric Heat Pump Split System | 0.0% | 0 | NA | 0.0% | 0 | NA | 0.0% | 0 | NA | 0.0% | 0 | NA | 0.0% | 0 | NA |
| Storage Electric Resistance | 62.0% | 6 | NA | 70.0% | 7 | NA | 89.6% | 49 | 80.4%-97.7% | 93.2% | 96 | 86.8%-98.2% | 88.7% | 158 | 82.8%-93.6% |
| Instantaneous Electric Resistance | 0.0% | 0 | NA | 0.0% | 0 | NA | 0.0% | 0 | NA | 0.4% | 1 | NA | 0.2% | 1 | NA |
| Storage Fossil Fuel Condensing | 0.0% | 0 | NA | 0.0% | 0 | NA | 4.2% | 2 | NA | 0.0% | 0 | NA | 1.2% | 2 | NA |
| Storage Fossil Fuel Non-Condensing | 35.8% | 3 | NA | 30.0% | 3 | NA | 4.2% | 2 | NA | 4.0% | 4 | NA | 7.7% | 12 | 3.3%-12.9% |
| Instantaneous Fossil Fuel Condensing | 0.0% | 0 | NA | 0.0% | 0 | NA | 0.0% | 0 | NA | 0.0% | 0 | NA | 0.0% | 0 | NA |
| Instantaneous Fossil Fuel Non-Condensing | 0.0% | 0 | NA | 0.0% | 0 | NA | 0.0% | 0 | NA | 0.0% | 0 | NA | 0.0% | 0 | NA |
| Storage Indirect Water Heater | 0.0% | 0 | NA | 0.0% | 0 | NA | 0.0% | 0 | NA | 0.0% | 0 | NA | 0.0% | 0 | NA |
| Storage Unknown | 2.3% | 1 | NA | 0.0% | 0 | NA | 2.1% | 1 | NA | 2.4% | 3 | NA | 2.2% | 5 | NA |
| Instantaneous Unknown | 0.0% | 0 | NA | 0.0% | 0 | NA | 0.0% | 0 | NA | 0.0% | 0 | NA | 0.0% | 0 | NA |

### *A5.4. Distributions of Water Heaters in Multi-Family Homes by Home Vintage*

| | Pre 1951 | Pre 1951 (n) | Pre 1951 (CI) | 1951-1970 | 1951-1970 (n) | 1951-1970 (CI) | 1971-1990 | 1971-1990 (n) | 1971-1990 (CI) | 1991-2010 | 1991-2010 (n) | 1991-2010 (CI) | Post 2010 | Post 2010 (n) | Post 2010 (CI) |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| Storage Electric Heat Pump Packaged | 0.0% | 0 | NA | 0.0% | 0 | NA | 0.0% | 0 | NA | 0.0% | 0 | NA | 0.0% | 0 | NA |
| Storage Electric Heat Pump Split System | 0.0% | 0 | NA | 0.0% | 0 | NA | 0.0% | 0 | NA | 0.0% | 0 | NA | 0.0% | 0 | NA |
| Storage Electric Resistance | 93.7% | 9 | NA | 96.0% | 35 | 89.0%-100.0% | 89.2% | 53 | 80.5%-97.3% | 71.6% | 36 | 54.1%-89.0% | 98.1% | 20 | 93.8%-100.0% |
| Instantaneous Electric Resistance | 0.0% | 0 | NA | 0.0% | 0 | NA | 0.0% | 0 | NA | 1.2% | 1 | NA | 0.0% | 0 | NA |
| Storage Fossil Fuel Condensing | 0.0% | 0 | NA | 0.0% | 0 | NA | 2.8% | 2 | NA | 0.0% | 0 | NA | 0.0% | 0 | NA |
| Storage Fossil Fuel Non-Condensing | 6.3% | 1 | NA | 0.0% | 0 | NA | 5.6% | 3 | NA | 26.1% | 8 | NA | 0.0% | 0 | NA |
| Instantaneous Fossil Fuel Condensing | 0.0% | 0 | NA | 0.0% | 0 | NA | 0.0% | 0 | NA | 0.0% | 0 | NA | 0.0% | 0 | NA |
| Instantaneous Fossil Fuel Non-Condensing | 0.0% | 0 | NA | 0.0% | 0 | NA | 0.0% | 0 | NA | 0.0% | 0 | NA | 0.0% | 0 | NA |
| Storage Indirect Water Heater | 0.0% | 0 | NA | 0.0% | 0 | NA | 0.0% | 0 | NA | 0.0% | 0 | NA | 0.0% | 0 | NA |
| Storage Unknown | 0.0% | 0 | NA | 4.0% | 2 | NA | 2.4% | 1 | NA | 1.1% | 1 | NA | 1.9% | 1 | NA |
| Instantaneous Unknown | 0.0% | 0 | NA | 0.0% | 0 | NA | 0.0% | 0 | NA | 0.0% | 0 | NA | 0.0% | 0 | NA |

# A6. Distributions of Primary Cooling Equipment in Single-Family Homes by Type

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## A6.1. Distributions of Primary Cooling Equipment in Single-Family Homes by Home Type

| | Attached | Attached (n) | Attached (CI) | Detached | Detached (n) | Detached (CI) |
|---|---|---|---|---|---|---|
| None | 37.6% | 54 | 27.9%-47.0% | 32.3% | 465 | 29.2%-35.6% |
| Central AC | 16.9% | 35 | 10.8%-24.2% | 26.6% | 486 | 24.2%-29.2% |
| Portable AC | 12.1% | 18 | 5.6%-19.0% | 4.6% | 59 | 3.2%-6.2% |
| Window AC | 11.1% | 32 | 6.1%-16.6% | 5.5% | 174 | 4.4%-6.9% |
| Ductless Mini-Split Heat Pump | 8.3% | 10 | 3.4%-15.0% | 10.8% | 152 | 8.3%-13.1% |
| Central Air Source Heat Pump | 7.4% | 12 | 2.7%-13.3% | 17.6% | 339 | 15.3%-20.0% |
| Unknown | 3.0% | 4 | NA | 0.5% | 3 | NA |
| PTHP Packaged Terminal Heat Pump | 1.6% | 2 | NA | 0.0% | 0 | NA |
| Ductless Mini-Split AC | 0.9% | 1 | NA | 0.1% | 4 | NA |
| PTAC Packaged Terminal Air Conditioner | 0.7% | 1 | NA | 0.0% | 1 | NA |
| Through-Wall AC | 0.4% | 4 | NA | 0.3% | 9 | NA |
| Geothermal Heat Pump | 0.0% | 0 | NA | 1.0% | 27 | 0.6%-1.5% |
| Water Source Heat Pump | 0.0% | 0 | NA | 0.3% | 5 | NA |
| Evaporative Cooler | 0.0% | 0 | NA | 0.2% | 9 | NA |
| Portable Heat Pump | 0.0% | 0 | NA | 0.1% | 2 | NA |
| Window Heat Pump | 0.0% | 0 | NA | 0.0% | 2 | NA |

### *A6.2. Distributions of Primary Cooling Equipment in Single-Family Homes by BPA vs Non-BPA*

| | BPA | BPA (n) | BPA (CI) | Non-BPA | Non-BPA (n) | Non-BPA (CI) |
|---|---|---|---|---|---|---|
| None | 37.1% | 257 | 32.3%-41.7% | 30.2% | 262 | 26.6%-34.5% |
| Central Air Source Heat Pump | 20.6% | 183 | 17.1%-24.5% | 13.1% | 168 | 10.2%-16.0% |
| Central AC | 15.5% | 184 | 12.7%-18.6% | 31.9% | 337 | 28.4%-35.3% |
| Ductless Mini-Split Heat Pump | 11.8% | 88 | 9.0%-15.0% | 9.5% | 74 | 6.8%-12.4% |
| Portable AC | 6.2% | 35 | 3.8%-8.9% | 5.3% | 42 | 3.3%-7.8% |
| Window AC | 5.2% | 58 | 3.2%-7.4% | 7.1% | 148 | 5.4%-8.8% |
| Unknown | 1.2% | 3 | NA | 0.6% | 4 | NA |
| Geothermal Heat Pump | 1.0% | 15 | 0.5%-1.6% | 0.8% | 12 | 0.3%-1.4% |
| Water Source Heat Pump | 0.4% | 3 | NA | 0.2% | 2 | NA |
| Ductless Mini-Split AC | 0.4% | 3 | NA | 0.1% | 2 | NA |
| Through-wall AC | 0.3% | 6 | NA | 0.2% | 7 | NA |
| Evaporative Cooler | 0.1% | 3 | NA | 0.3% | 6 | NA |
| Portable Heat Pump | 0.1% | 1 | NA | 0.1% | 1 | NA |
| PTAC Packaged Terminal Air Conditioner | 0.0% | 1 | NA | 0.2% | 1 | NA |
| Window Heat Pump | 0.0% | 1 | NA | 0.0% | 1 | NA |
| PTHP Packaged Terminal Heat Pump | 0.0% | 0 | NA | 0.4% | 2 | NA |

### *A6.3. Distributions of Primary Cooling Equipment in Single-Family Homes by Heating Zone*

| | HZ 1 | HZ 1 (n) | HZ 1 (CI) | HZ 2/3 | HZ 2/3 (n) | HZ 2/3 (CI) |
|---|---|---|---|---|---|---|
| None | 33.8% | 226 | 29.7%-37.8% | 31.0% | 293 | 26.8%-34.5% |
| Central AC | 24.2% | 315 | 21.2%-27.5% | 28.0% | 206 | 24.7%-31.7% |
| Central Air Source Heat Pump | 17.4% | 178 | 14.6%-20.2% | 12.8% | 173 | 10.2%-15.3% |
| Ductless Mini-Split Heat Pump | 11.4% | 83 | 8.9%-14.3% | 7.6% | 79 | 5.6%-10.0% |
| Portable AC | 6.3% | 41 | 4.4%-8.5% | 4.0% | 36 | 2.2%-6.3% |
| Window AC | 4.3% | 51 | 2.8%-6.0% | 11.8% | 155 | 9.4%-14.5% |
| Unknown | 1.0% | 5 | NA | 0.4% | 2 | NA |
| Geothermal Heat Pump | 0.6% | 8 | NA | 1.7% | 19 | 0.9%-2.8% |
| Through-wall AC | 0.2% | 6 | NA | 0.4% | 7 | NA |
| Water Source Heat Pump | 0.2% | 1 | NA | 0.5% | 4 | NA |
| Ductless Mini-split AC | 0.2% | 1 | NA | 0.4% | 4 | NA |
| PTHP Packaged Terminal Heat Pump | 0.2% | 1 | NA | 0.4% | 1 | NA |
| PTAC Packaged Terminal Air Conditioner | 0.1% | 1 | NA | 0.0% | 1 | NA |
| Portable Heat Pump | 0.1% | 1 | NA | 0.1% | 1 | NA |
| Evaporative Cooler | 0.0% | 0 | NA | 0.8% | 9 | NA |
| Window Heat Pump | 0.0% | 0 | NA | 0.1% | 2 | NA |

### *A6.4. Distributions of Primary Cooling Equipment in Single-Family Homes by Ownership*

| | Own | Own (n) | Own (CI) | Rent | Rent (n) | Rent (CI) | Unknown | Unknown (n) | Unknown (CI) |
|---|---|---|---|---|---|---|---|---|---|
| None | 30.3% | 412 | 26.8%-33.6% | 45.5% | 85 | 36.2%-54.9% | 43.9% | 22 | 27.5%-58.9% |
| Central AC | 27.1% | 477 | 24.4%-30.0% | 10.9% | 27 | 6.6%-15.8% | 29.8% | 17 | 17.4%-42.9% |
| Central Air Source Heat Pump | 18.8% | 334 | 16.3%-21.5% | 5.9% | 14 | 2.5%-9.6% | 2.3% | 3 | NA |
| Ductless Mini-Split Heat Pump | 11.3% | 149 | 8.8%-13.7% | 2.8% | 5 | NA | 13.7% | 8 | NA |
| Portable AC | 5.3% | 56 | 3.6%-7.1% | 10.2% | 20 | 4.6%-16.4% | 2.0% | 1 | NA |
| Window AC | 4.6% | 140 | 3.5%-5.9% | 16.5% | 62 | 10.8%-23.1% | 8.3% | 4 | NA |
| Geothermal Heat Pump | 1.1% | 27 | 0.6%-1.7% | NA | NA | NA | 0.0% | 0 | NA |
| Unknown | 0.5% | 3 | NA | 3.4% | 4 | NA | 0.0% | 0 | NA |
| Water Source Heat Pump | 0.4% | 5 | NA | 0.0% | 0 | NA | 0.0% | 0 | NA |
| Evaporative Cooler | 0.2% | 8 | NA | 0.2% | 1 | NA | 0.0% | 0 | NA |
| Through-wall AC | 0.2% | 8 | NA | 1.0% | 5 | NA | 0.0% | 0 | NA |
| Ductless Mini-Split AC | 0.1% | 4 | NA | 1.0% | 1 | NA | 0.0% | 0 | NA |
| Portable Heat Pump | 0.1% | 2 | NA | 0.0% | 0 | NA | 0.0% | 0 | NA |
| Window Heat Pump | 0.0% | 2 | NA | 0.0% | 0 | NA | 0.0% | 0 | NA |
| PTAC Packaged Terminal Air Conditioner | 0.0% | 1 | NA | 0.8% | 1 | NA | 0.0% | 0 | NA |
| PTHP Packaged Terminal Heat Pump | 0.0% | 0 | NA | 1.8% | 2 | NA | 0.0% | 0 | NA |

### *A6.5. Distributions of Primary Cooling Equipment in Single-Family Homes by State*

| | ID | ID (n) | ID (CI) | MT | MT (n) | MT (CI) | OR | OR (n) | OR (CI) | WA | WA (n) | WA (CI) | Overall | Overall (n) | Overall (CI) |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| Central AC | 50.1% | 152 | 44.2%-55.4% | 33.0% | 70 | 26.8%-39.4% | 28.3% | 202 | 23.9%-32.7% | 15.4% | 97 | 12.4%-19.0% | 25.3% | 521 | 22.9%-27.7% |
| None | 21.5% | 114 | 17.2%-25.9% | 30.0% | 73 | 23.8%-36.4% | 30.7% | 159 | 25.6%-36.1% | 38.0% | 173 | 32.7%-43.4% | 33.0% | 519 | 29.9%-35.9% |
| Central Air Source Heat Pump | 12.1% | 59 | 8.5%-16.1% | 5.2% | 16 | 2.6%-8.1% | 15.8% | 112 | 12.2%-19.7% | 19.2% | 164 | 15.3%-23.4% | 16.1% | 351 | 13.8%-18.4% |
| Window AC | 7.9% | 42 | 4.9%-11.0% | 12.4% | 29 | 8.2%-17.4% | 6.3% | 50 | 4.1%-8.5% | 4.9% | 85 | 2.9%-7.3% | 6.3% | 206 | 5.1%-7.8% |
| Ductless Mini-Split Heat Pump | 4.5% | 26 | 2.4%-7.0% | 5.0% | 15 | 2.7%-8.1% | 10.4% | 58 | 7.4%-13.9% | 12.9% | 63 | 9.3%-16.7% | 10.4% | 162 | 8.4%-12.6% |
| Geothermal Heat Pump | 2.0% | 7 | NA | 2.5% | 9 | NA | 1.1% | 7 | NA | 0.1% | 4 | NA | 0.9% | 27 | 0.5%-1.3% |
| Portable AC | 0.9% | 5 | NA | 7.1% | 17 | 4.0%-10.9% | 4.7% | 19 | 2.2%-7.7% | 7.3% | 36 | 4.7%-10.0% | 5.7% | 77 | 4.0%-7.4% |
| Evaporative Cooler | 0.4% | 2 | NA | 1.1% | 3 | NA | 0.1% | 2 | NA | 0.0% | 2 | NA | 0.2% | 9 | NA |
| Unknown | 0.4% | 1 | NA | 0.5% | 1 | NA | 1.0% | 2 | NA | 0.9% | 3 | NA | 0.8% | 7 | NA |
| PTAC Packaged Terminal Air Conditioner | 0.1% | 1 | NA | 0.0% | 0 | NA | 0.0% | 0 | NA | 0.2% | 1 | NA | 0.1% | 2 | NA |
| Window Heat Pump | 0.1% | 1 | NA | 0.0% | 0 | NA | 0.0% | 0 | NA | 0.0% | 1 | NA | 0.0% | 2 | NA |
| Ductless Mini-Split AC | 0.0% | 1 | NA | 0.4% | 2 | NA | 0.4% | 1 | NA | 0.1% | 1 | NA | 0.2% | 5 | NA |
| Through-wall AC | 0.0% | 1 | NA | 1.1% | 3 | NA | 0.4% | 4 | NA | 0.2% | 5 | NA | 0.3% | 13 | 0.1%-0.5% |
| Water Source Heat Pump | 0.0% | 0 | NA | 1.6% | 3 | NA | 0.0% | 1 | NA | 0.3% | 1 | NA | 0.3% | 5 | NA |
| PTHP Packaged Terminal Heat Pump | 0.0% | 0 | NA | 0.0% | 0 | NA | 0.4% | 1 | NA | 0.2% | 1 | NA | 0.2% | 2 | NA |
| Portable Heat Pump | 0.0% | 0 | NA | 0.0% | 0 | NA | 0.2% | 1 | NA | 0.1% | 1 | NA | 0.1% | 2 | NA |

### *A6.6. Distributions of Primary Cooling Equipment in Single-Family Homes by Urban vs Rural*

| | Rural | Rural (n) | Rural (CI) | Urban | Urban (n) | Urban (CI) |
|---|---|---|---|---|---|---|
| None | 31.6% | 215 | 26.3%-37.4% | 33.5% | 304 | 29.8%-37.0% |
| Central Air Source Heat Pump | 24.4% | 184 | 19.6%-29.6% | 13.5% | 167 | 11.2%-16.3% |
| Central AC | 14.6% | 103 | 11.3%-17.9% | 28.7% | 418 | 25.7%-31.5% |
| Ductless Mini-Split Heat Pump | 14.1% | 79 | 9.7%-19.4% | 9.3% | 83 | 7.1%-11.8% |
| Window AC | 7.6% | 82 | 4.9%-10.7% | 5.9% | 124 | 4.6%-7.5% |
| Geothermal Heat Pump | 3.4% | 25 | 1.9%-5.0% | 0.1% | 2 | NA |
| Portable AC | 2.7% | 22 | 1.4%-4.3% | 6.6% | 55 | 4.6%-8.6% |
| Water Source Heat Pump | 0.6% | 4 | NA | 0.2% | 1 | NA |
| Through-wall AC | 0.5% | 5 | NA | 0.2% | 8 | NA |
| Evaporative Cooler | 0.2% | 3 | NA | 0.2% | 6 | NA |
| Ductless Mini-Split AC | 0.2% | 3 | NA | 0.3% | 2 | NA |
| Portable Heat Pump | 0.1% | 1 | NA | 0.1% | 1 | NA |
| PTAC Packaged Terminal Air Conditioner | 0.0% | 1 | NA | 0.1% | 1 | NA |
| Window Heat Pump | 0.0% | 1 | NA | 0.0% | 1 | NA |
| Unknown | 0.0% | 0 | NA | 1.1% | 7 | NA |
| PTHP Packaged Terminal Heat Pump | 0.0% | 0 | NA | 0.3% | 2 | NA |

### *A6.7. Distributions of Primary Cooling Equipment in Single-Family Homes by Home Vintage*

| | Pre 1951 | Pre 1951 (n) | Pre 1951 (CI) | 1951-1970 | 1951-1970 (n) | 1951-1970 (CI) | 1971-1990 | 1971-1990 (n) | 1971-1990 (CI) | 1991-2010 | 1991-2010 (n) | 1991-2010 (CI) | Post 2010 | Post 2010 (n) | Post 2010 (CI) |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| None | 46.6% | 146 | 39.7%-53.9% | 36.9% | 68 | 28.0%-44.9% | 32.3% | 120 | 26.3%-38.9% | 24.5% | 122 | 19.2%-29.6% | 15.3% | 41 | 8.1%-23.1% |
| Central AC | 13.8% | 58 | 9.9%-18.0% | 23.8% | 70 | 17.7%-29.9% | 18.3% | 83 | 14.2%-22.8% | 35.8% | 201 | 30.7%-41.2% | 36.1% | 91 | 28.6%-44.7% |
| Ductless Mini-Split Heat Pump | 12.4% | 40 | 7.7%-17.3% | 9.3% | 21 | 4.9%-14.3% | 11.7% | 46 | 7.4%-17.2% | 5.0% | 26 | 2.2%-8.3% | 16.0% | 21 | 8.1%-24.1% |
| Window AC | 10.3% | 77 | 7.4%-14.0% | 6.4% | 32 | 4.0%-9.9% | 3.9% | 39 | 2.4%-6.0% | 6.3% | 45 | 3.4%-9.9% | 1.6% | 9 | NA |
| Portable AC | 7.3% | 28 | 4.0%-11.0% | 7.0% | 10 | 2.5%-12.3% | 5.2% | 13 | 2.2%-8.8% | 6.0% | 18 | 2.7%-9.8% | 3.3% | 7 | NA |
| Central Air Source Heat Pump | 6.6% | 33 | 3.7%-9.9% | 13.9% | 37 | 8.7%-19.5% | 23.8% | 97 | 18.0%-30.0% | 19.7% | 119 | 15.4%-24.5% | 23.5% | 62 | 15.8%-31.4% |
| Unknown | 0.9% | 2 | NA | 0.5% | 1 | NA | 0.9% | 2 | NA | 0.6% | 1 | NA | 1.8% | 1 | NA |
| Water Source Heat Pump | 0.7% | 1 | NA | 0.4% | 1 | NA | 0.1% | 1 | NA | 0.1% | 1 | NA | 0.5% | 1 | NA |
| Through-wall AC | 0.6% | 3 | NA | 0.2% | 2 | NA | 0.5% | 6 | NA | 0.1% | 1 | NA | 0.0% | 1 | NA |
| Ductless Mini-Split AC | 0.5% | 1 | NA | 0.0% | 0 | NA | 0.5% | 3 | NA | 0.0% | 1 | NA | 0.0% | 0 | NA |
| Geothermal Heat Pump | 0.2% | 1 | NA | 0.0% | 0 | NA | 1.5% | 8 | NA | 1.2% | 11 | 0.4%-2.1% | 1.9% | 7 | NA |
| Evaporative Cooler | 0.0% | 1 | NA | 0.7% | 3 | NA | 0.5% | 4 | NA | 0.0% | 1 | NA | 0.0% | 0 | NA |
| PTHP Packaged Terminal Heat Pump | 0.0% | 0 | NA | 0.9% | 1 | NA | 0.0% | 0 | NA | 0.4% | 1 | NA | 0.0% | 0 | NA |
| Window Heat Pump | 0.0% | 0 | NA | 0.0% | 1 | NA | 0.1% | 1 | NA | 0.0% | 0 | NA | 0.0% | 0 | NA |
| Portable Heat Pump | 0.0% | 0 | NA | 0.0% | 0 | NA | 0.5% | 2 | NA | 0.0% | 0 | NA | 0.0% | 0 | NA |
| PTAC Packaged Terminal Air Conditioner | 0.0% | 0 | NA | 0.0% | 0 | NA | 0.1% | 1 | NA | 0.4% | 1 | NA | 0.0% | 0 | NA |

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# A7. Distributions of Primary Cooling Equipment in Multi-Family Homes by Type

## A7.1. Distributions of Primary Cooling Equipment in Multi-Family Homes by BPA vs Non-BPA

| | BPA | BPA (n) | BPA (CI) | Non-BPA | Non-BPA (n) | Non-BPA (CI) |
|---|---|---|---|---|---|---|
| None | 65.0% | 108 | 55.1%-74.2% | 42.1% | 69 | 34.1%-50.1% |
| Portable AC | 18.6% | 29 | 10.9%-26.7% | 15.4% | 31 | 10.3%-21.2% |
| Ductless Mini-Split Heat Pump | 5.5% | 10 | 1.9%-10.4% | 0.5% | 2 | NA |
| Window AC | 3.5% | 9 | NA | 22.4% | 38 | 15.5%-30.1% |
| Unknown | 3.3% | 3 | NA | 0.9% | 2 | NA |
| PTAC Packaged Terminal Air Conditioner | 1.8% | 2 | NA | 1.7% | 4 | NA |
| Water Source Heat Pump | 1.4% | 4 | NA | 1.2% | 5 | NA |
| Portable Heat Pump | 0.7% | 2 | NA | 1.7% | 4 | NA |
| Through-wall Heat Pump | 0.3% | 1 | NA | 1.2% | 5 | NA |
| Central AC | 0.0% | 0 | NA | 7.7% | 9 | NA |
| PTHP Packaged Terminal Heat Pump | 0.0% | 0 | NA | 5.2% | 16 | 2.6%-8.9% |

### *A7.2. Distributions of Primary Cooling Equipment in Multi-Family Homes by Heating Zone*

| | HZ 1 | HZ 1 (n) | HZ 1 (CI) | HZ 2/3 | HZ 2/3 (n) | HZ 2/3 (CI) |
|---|---|---|---|---|---|---|
| None | 54.5% | 174 | 47.9%-60.7% | 17.8% | 3 | NA |
| Portable AC | 17.3% | 58 | 12.7%-22.1% | 10.0% | 2 | NA |
| Window AC | 11.6% | 35 | 7.9%-15.8% | 48.7% | 12 | 23.6%-72.6% |
| PTHP Packaged Terminal Heat Pump | 3.3% | 16 | 1.5%-5.5% | 0.0% | 0 | NA |
| Central AC | 3.2% | 5 | NA | 19.9% | 4 | NA |
| Ductless Mini-Split Heat Pump | 2.8% | 12 | 1.0%-5.2% | 0.0% | 0 | NA |
| Unknown | 2.0% | 5 | NA | 0.0% | 0 | NA |
| PTAC Packaged Terminal Air Conditioner | 1.8% | 5 | NA | 1.7% | 1 | NA |
| Water Source Heat Pump | 1.4% | 9 | NA | 0.0% | 0 | NA |
| Portable Heat Pump | 1.2% | 5 | NA | 1.9% | 1 | NA |
| Through-wall Heat Pump | 0.9% | 6 | NA | 0.0% | 0 | NA |

### *A7.3. Distributions of Primary Cooling Equipment in Multi-Family Homes by Ownership*

| | Own | Own (n) | Own (CI) | Rent | Rent (n) | Rent (CI) | Unknown | Unknown (n) | Unknown (CI) |
|---|---|---|---|---|---|---|---|---|---|
| Central AC | 36.6% | 4 | NA | 3.2% | 5 | NA | 0.0% | 0 | NA |
| None | 33.8% | 5 | NA | 52.2% | 168 | 45.8%-58.5% | 59.2% | 4 | NA |
| Window AC | 15.8% | 3 | NA | 14.9% | 44 | 10.3%-19.9% | 0.0% | 0 | NA |
| Water Source Heat Pump | 13.8% | 4 | NA | 0.6% | 4 | NA | 4.2% | 1 | NA |
| Portable AC | 0.0% | 0 | NA | 18.1% | 60 | 13.4%-22.8% | 0.0% | 0 | NA |
| PTHP Packaged Terminal Heat Pump | 0.0% | 0 | NA | 3.3% | 16 | 1.5%-5.4% | 0.0% | 0 | NA |
| Unknown | 0.0% | 0 | NA | 2.0% | 5 | NA | 0.0% | 0 | NA |
| PTAC Packaged Terminal Air Conditioner | 0.0% | 0 | NA | 1.9% | 6 | NA | 0.0% | 0 | NA |
| Ductless Mini-Split Heat Pump | 0.0% | 0 | NA | 1.5% | 10 | 0.7%-2.6% | 36.6% | 2 | NA |
| Portable Heat Pump | 0.0% | 0 | NA | 1.4% | 6 | NA | 0.0% | 0 | NA |
| Through-wall Heat Pump | 0.0% | 0 | NA | 0.9% | 6 | NA | 0.0% | 0 | NA |

### *A7.4. Distributions of Primary Cooling Equipment in Multi-Family Homes by State*

| | ID | ID (n) | ID (CI) | MT | MT (n) | MT (CI) | OR | OR (n) | OR (CI) | WA | WA (n) | WA (CI) | Overall | Overall (n) | Overall (CI) |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| Central AC | 47.7% | 4 | NA | 15.5% | 2 | NA | 0.4% | 1 | NA | 2.0% | 2 | NA | 4.5% | 9 | NA |
| Window AC | 23.8% | 2 | NA | 62.0% | 8 | NA | 22.3% | 23 | 14.3%-30.9% | 7.9% | 14 | 3.5%-12.9% | 14.5% | 47 | 10.0%-19.4% |
| PTHP Packaged Terminal Heat Pump | 14.3% | 2 | NA | 0.0% | 0 | NA | 5.1% | 10 | 2.2%-8.6% | 0.9% | 4 | NA | 3.0% | 16 | 1.4%-5.1% |
| None | 14.2% | 2 | NA | 0.0% | 0 | NA | 37.8% | 42 | 28.2%-47.7% | 64.3% | 133 | 56.5%-72.3% | 51.7% | 177 | 45.7%-58.8% |
| Portable AC | 0.0% | 0 | NA | 7.7% | 1 | NA | 20.5% | 24 | 12.7%-28.5% | 16.6% | 35 | 10.9%-22.7% | 16.7% | 60 | 12.1%-21.3% |
| Portable Heat Pump | 0.0% | 0 | NA | 7.7% | 1 | NA | 3.2% | 4 | NA | 0.2% | 1 | NA | 1.3% | 6 | NA |
| PTAC Packaged Terminal Air Conditioner | 0.0% | 0 | NA | 7.0% | 1 | NA | 5.1% | 5 | NA | 0.0% | 0 | NA | 1.8% | 6 | NA |
| Through-wall Heat Pump | 0.0% | 0 | NA | 0.0% | 0 | NA | 1.7% | 4 | NA | 0.4% | 2 | NA | 0.8% | 6 | NA |
| Unknown | 0.0% | 0 | NA | 0.0% | 0 | NA | 1.6% | 2 | NA | 2.3% | 3 | NA | 1.9% | 5 | NA |
| Water Source Heat Pump | 0.0% | 0 | NA | 0.0% | 0 | NA | 1.3% | 3 | NA | 1.4% | 6 | NA | 1.3% | 9 | NA |
| Ductless Mini-Split Heat Pump | 0.0% | 0 | NA | 0.0% | 0 | NA | 0.9% | 2 | NA | 3.8% | 10 | 1.3%-7.2% | 2.6% | 12 | 1.0%-4.7% |

# A8. Distributions of Primary Heating Equipment in Single-Family Homes by Type

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## A8.1. Distributions of Primary Heating Equipment in Single-Family Homes by Home Type

| | Attached | Attached (n) | Attached (CI) | Detached | Detached (n) | Detached (CI) |
|---|---|---|---|---|---|---|
| Furnace - Natural gas | 26.7% | 47 | 18.9%-34.9% | 45.8% | 666 | 42.7%-49.2% |
| Baseboard | 17.2% | 36 | 10.2%-25.5% | 1.6% | 67 | 1.0%-2.3% |
| Unit Heater | 10.2% | 20 | 5.2%-16.3% | 5.5% | 115 | 4.2%-6.9% |
| Wall Heater | 9.8% | 14 | 4.3%-15.8% | 1.7% | 24 | 0.8%-2.7% |
| Ductless Mini-split Heat Pump | 8.0% | 9 | NA | 7.9% | 118 | 6.0%-9.8% |
| Central Air Source Heat Pump | 7.4% | 12 | 2.7%-12.9% | 17.6% | 339 | 15.3%-20.1% |
| Fireplace or Stove | 6.4% | 6 | NA | 1.7% | 33 | 1.0%-2.5% |
| Unknown | 4.2% | 6 | NA | 0.9% | 8 | NA |
| Boiler - Natural gas | 3.5% | 4 | NA | 1.7% | 23 | 1.0%-2.7% |
| Furnace - Electric | 1.9% | 8 | NA | 5.0% | 152 | 3.8%-6.2% |
| PTHP Packaged Terminal Heat Pump | 1.6% | 2 | NA | 0.0% | 0 | NA |
| Furnace - Other | 1.4% | 1 | NA | 2.2% | 28 | 1.1%-3.4% |
| PTAC Packaged Terminal Air Conditioner | 1.1% | 5 | NA | 0.2% | 7 | NA |
| Furnace - Propane | 0.6% | 2 | NA | 3.6% | 62 | 2.3%-5.1% |
| Furnace - Unknown | 0.0% | 1 | NA | 0.3% | 3 | NA |
| Geothermal Heat Pump | 0.0% | 0 | NA | 1.0% | 27 | 0.6%-1.5% |
| Radiant Heating | 0.0% | 0 | NA | 0.9% | 18 | 0.3%-1.6% |
| Boiler - Electric | 0.0% | 0 | NA | 0.8% | 15 | 0.2%-1.6% |
| Boiler - Propane | 0.0% | 0 | NA | 0.5% | 13 | 0.1%-0.9% |
| Boiler - Other | 0.0% | 0 | NA | 0.5% | 9 | NA |
| Water Source Heat Pump | 0.0% | 0 | NA | 0.3% | 5 | NA |
| Portable Heater | 0.0% | 0 | NA | 0.3% | 4 | NA |
| Window Heat Pump | 0.0% | 0 | NA | 0.0% | 1 | NA |

### *A8.2. Distributions of Primary Heating Equipment in Single-Family Homes by BPA vs Non-BPA*

| | BPA | BPA (n) | BPA (CI) | Non-BPA | Non-BPA (n) | Non-BPA (CI) |
|---|---|---|---|---|---|---|
| Furnace - Natural gas | 33.9% | 261 | 29.1%-38.8% | 49.4% | 452 | 45.3%-53.7% |
| Central Air Source Heat Pump | 20.5% | 184 | 17.0%-24.2% | 13.1% | 167 | 10.3%-15.9% |
| Ductless Mini-split Heat Pump | 9.9% | 69 | 7.3%-12.9% | 6.6% | 58 | 4.2%-8.9% |
| Unit Heater | 8.5% | 75 | 6.3%-11.2% | 4.6% | 60 | 3.0%-6.6% |
| Furnace - Electric | 5.2% | 71 | 3.6%-7.2% | 4.1% | 89 | 2.7%-5.7% |
| Baseboard | 3.3% | 31 | 1.8%-5.0% | 4.2% | 72 | 2.5%-6.3% |
| Fireplace or Stove | 3.3% | 19 | 1.4%-5.5% | 1.8% | 20 | 0.9%-2.8% |
| Wall Heater | 3.2% | 17 | 1.3%-5.2% | 2.6% | 21 | 1.2%-4.2% |
| Boiler - Natural gas | 2.5% | 10 | 0.7%-4.5% | 1.6% | 17 | 0.8%-2.5% |
| Unknown | 2.0% | 9 | NA | 0.9% | 5 | NA |
| Furnace - Other | 1.9% | 13 | 0.5%-3.4% | 2.2% | 16 | 0.9%-3.9% |
| Furnace - Propane | 1.8% | 30 | 0.8%-3.6% | 4.2% | 34 | 2.5%-6.5% |
| Geothermal Heat Pump | 1.0% | 16 | 0.5%-1.7% | 0.8% | 11 | 0.3%-1.3% |
| Radiant Heating | 0.7% | 7 | NA | 0.8% | 11 | 0.1%-1.8% |
| Boiler - Electric | 0.5% | 10 | 0.2%-0.9% | 0.8% | 5 | NA |
| Water Source Heat Pump | 0.4% | 3 | NA | 0.2% | 2 | NA |
| Boiler - Propane | 0.4% | 10 | 0.1%-0.8% | 0.4% | 3 | NA |
| Furnace - Unknown | 0.4% | 1 | NA | 0.1% | 3 | NA |
| PTAC Packaged Terminal Air Conditioner | 0.3% | 6 | NA | 0.3% | 6 | NA |
| Boiler - Other | 0.3% | 6 | NA | 0.5% | 3 | NA |
| Portable Heater | 0.0% | 0 | NA | 0.5% | 4 | NA |
| PTHP Packaged Terminal Heat Pump | 0.0% | 0 | NA | 0.4% | 2 | NA |
| Window Heat Pump | 0.0% | 0 | NA | 0.0% | 1 | NA |

### *A8.3. Distributions of Primary Heating Equipment in Single-Family Homes by Heating Zone*

| | HZ 1 | HZ 1 (n) | HZ 1 (CI) | HZ 2/3 | HZ 2/3 (n) | HZ 2/3 (CI) |
|---|---|---|---|---|---|---|
| Furnace - Natural gas | 44.5% | 450 | 40.6%-48.5% | 39.3% | 263 | 35.6%-43.4% |
| Central Air Source Heat Pump | 17.4% | 178 | 14.5%-20.5% | 12.8% | 173 | 10.3%-15.2% |
| Ductless Mini-split Heat Pump | 8.8% | 66 | 6.5%-11.4% | 5.6% | 61 | 3.8%-7.7% |
| Unit Heater | 5.7% | 48 | 4.0%-7.5% | 7.5% | 87 | 5.4%-9.5% |
| Furnace - Electric | 3.7% | 47 | 2.5%-5.1% | 6.8% | 113 | 5.1%-8.6% |
| Wall Heater | 3.4% | 24 | 1.9%-5.1% | 1.2% | 14 | 0.4%-2.2% |
| Baseboard | 3.1% | 18 | 1.7%-4.8% | 5.7% | 85 | 3.7%-8.2% |
| Furnace - Other | 2.3% | 12 | 1.0%-3.7% | 1.6% | 17 | 0.7%-2.5% |
| Fireplace or Stove | 2.3% | 16 | 1.0%-3.8% | 2.7% | 23 | 1.5%-4.0% |
| Furnace - Propane | 2.2% | 11 | 0.7%-4.1% | 5.9% | 53 | 4.1%-7.8% |
| Unknown | 1.5% | 10 | 0.5%-2.7% | 0.8% | 4 | NA |
| Boiler - Natural gas | 1.4% | 8 | NA | 3.5% | 19 | 1.9%-5.3% |
| Radiant Heating | 0.7% | 6 | NA | 0.8% | 12 | 0.2%-1.6% |
| Boiler - Electric | 0.6% | 3 | NA | 0.9% | 12 | 0.3%-1.6% |
| Geothermal Heat Pump | 0.6% | 8 | NA | 1.7% | 19 | 0.9%-2.7% |
| PTAC Packaged Terminal Air Conditioner | 0.3% | 5 | NA | 0.2% | 7 | NA |
| Portable Heater | 0.3% | 2 | NA | 0.1% | 2 | NA |
| Boiler - Other | 0.3% | 2 | NA | 0.7% | 7 | NA |
| Boiler - Propane | 0.2% | 1 | NA | 0.9% | 12 | 0.3%-1.7% |
| Furnace - Unknown | 0.2% | 1 | NA | 0.3% | 3 | NA |
| Water Source Heat Pump | 0.2% | 1 | NA | 0.5% | 4 | NA |
| PTHP Packaged Terminal Heat Pump | 0.2% | 1 | NA | 0.4% | 1 | NA |
| Window Heat Pump | 0.0% | 0 | NA | 0.0% | 1 | NA |

### *A8.4. Distributions of Primary Heating Equipment in Single-Family Homes by Ownership*

| | Own | Own (n) | Own (CI) | Rent | Rent (n) | Rent (CI) | Unknown | Unknown (n) | Unknown (CI) |
|---|---|---|---|---|---|---|---|---|---|
| Furnace - Natural gas | 44.6% | 626 | 41.3%-48.0% | 25.8% | 58 | 19.1%-33.5% | 59.6% | 29 | 44.7%-73.4% |
| Central Air Source Heat Pump | 18.8% | 334 | 16.2%-21.7% | 5.8% | 14 | 2.5%-9.6% | 2.4% | 3 | NA |
| Ductless Mini-split Heat Pump | 8.8% | 118 | 6.8%-11.0% | 2.4% | 4 | NA | 7.9% | 5 | NA |
| Unit Heater | 4.9% | 98 | 3.6%-6.4% | 11.1% | 29 | 6.6%-16.4% | 13.2% | 8 | NA |
| Furnace - Electric | 4.6% | 133 | 3.5%-5.8% | 5.8% | 24 | 2.7%-9.7% | 1.8% | 3 | NA |
| Furnace - Propane | 3.4% | 60 | 2.1%-4.9% | 1.2% | 3 | NA | 4.9% | 1 | NA |
| Furnace - Other | 2.3% | 26 | 1.2%-3.8% | 0.2% | 2 | NA | 2.5% | 1 | NA |
| Boiler - Natural gas | 2.2% | 24 | 1.2%-3.4% | 0.6% | 2 | NA | 1.0% | 1 | NA |
| Fireplace or Stove | 2.1% | 31 | 1.2%-3.3% | 5.4% | 8 | NA | 0.0% | 0 | NA |
| Baseboard | 1.9% | 57 | 1.1%-3.0% | 16.1% | 44 | 8.4%-23.6% | 3.3% | 2 | NA |
| Wall Heater | 1.6% | 21 | 0.7%-2.7% | 12.1% | 17 | 5.7%-19.0% | 0.0% | 0 | NA |
| Geothermal Heat Pump | 1.1% | 27 | 0.6%-1.6% | 0.0% | 0 | NA | 0.0% | 0 | NA |
| Unknown | 0.8% | 7 | NA | 5.1% | 7 | NA | 0.0% | 0 | NA |
| Boiler - Electric | 0.8% | 13 | 0.2%-1.8% | 0.5% | 2 | NA | 0.0% | 0 | NA |
| Radiant Heating | 0.6% | 16 | 0.2%-1.2% | 1.8% | 2 | NA | 0.0% | 0 | NA |
| Boiler - Propane | 0.4% | 12 | 0.1%-0.9% | 0.0% | 0 | NA | 0.9% | 1 | NA |
| Water Source Heat Pump | 0.4% | 5 | NA | 0.0% | 0 | NA | 0.0% | 0 | NA |
| Boiler - Other | 0.3% | 8 | NA | 0.0% | 0 | NA | 2.5% | 1 | NA |
| PTAC Packaged Terminal Air Conditioner | 0.1% | 6 | NA | 1.8% | 6 | NA | 0.0% | 0 | NA |
| Furnace - Unknown | 0.1% | 2 | NA | 1.3% | 2 | NA | 0.0% | 0 | NA |
| Portable Heater | 0.1% | 2 | NA | 1.6% | 2 | NA | 0.0% | 0 | NA |
| Window Heat Pump | 0.0% | 1 | NA | 0.0% | 0 | NA | 0.0% | 0 | NA |
| PTHP Packaged Terminal Heat Pump | 0.0% | 0 | NA | 1.7% | 2 | NA | 0.0% | 0 | NA |

### *A8.5. Distributions of Primary Heating Equipment in Single-Family Homes by State*

| | ID | ID (n) | ID (CI) | MT | MT (n) | MT (CI) | OR | OR (n) | OR (CI) | WA | WA (n) | WA (CI) | Overall | Overall (n) | Overall (CI) |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| Furnace - Natural gas | 54.8% | 156 | 49.3%-60.4% | 48.5% | 106 | 42.1%-55.6% | 42.7% | 282 | 37.5%-47.7% | 39.3% | 169 | 34.3%-44.5% | 43.1% | 713 | 40.0%-46.2% |
| Central Air Source Heat Pump | 12.1% | 59 | 8.8%-15.9% | 5.2% | 16 | 2.8%-8.2% | 15.8% | 112 | 12.3%-19.7% | 19.2% | 164 | 15.6%-23.2% | 16.1% | 351 | 14.0%-18.4% |
| Furnace - Propane | 6.8% | 31 | 4.3%-10.0% | 9.3% | 19 | 5.1%-13.7% | 1.0% | 8 | NA | 2.5% | 6 | NA | 3.2% | 64 | 2.0%-4.6% |
| Furnace - Electric | 5.7% | 48 | 3.6%-8.1% | 2.7% | 9 | NA | 5.0% | 46 | 3.0%-7.5% | 4.3% | 57 | 2.7%-6.1% | 4.6% | 160 | 3.6%-5.7% |
| Unit Heater | 4.2% | 23 | 2.2%-6.6% | 8.2% | 25 | 4.6%-11.7% | 6.3% | 34 | 3.9%-9.2% | 6.4% | 53 | 4.2%-8.8% | 6.2% | 135 | 4.8%-7.7% |
| Ductless Mini-split Heat Pump | 3.8% | 23 | 1.8%-5.9% | 2.8% | 9 | NA | 7.9% | 42 | 5.0%-11.3% | 9.9% | 53 | 6.9%-13.5% | 7.9% | 127 | 6.2%-9.8% |
| Baseboard | 3.1% | 23 | 1.5%-5.0% | 3.7% | 10 | 1.5%-6.4% | 2.5% | 7 | NA | 4.8% | 63 | 2.7%-7.3% | 3.8% | 103 | 2.6%-5.2% |
| Fireplace or Stove | 2.3% | 8 | NA | 3.0% | 6 | NA | 3.0% | 17 | 1.4%-5.1% | 1.9% | 8 | NA | 2.4% | 39 | 1.4%-3.5% |
| Geothermal Heat Pump | 2.0% | 7 | NA | 2.5% | 9 | NA | 1.1% | 7 | NA | 0.1% | 4 | NA | 0.9% | 27 | 0.5%-1.3% |
| Wall Heater | 1.4% | 7 | NA | 0.0% | 0 | NA | 5.9% | 20 | 3.1%-9.2% | 1.9% | 11 | 0.6%-3.8% | 2.8% | 38 | 1.7%-4.2% |
| Unknown | 0.8% | 2 | NA | 0.5% | 1 | NA | 2.3% | 7 | NA | 1.0% | 4 | NA | 1.3% | 14 | 0.6%-2.2% |
| Furnace - Other | 0.8% | 3 | NA | 0.2% | 1 | NA | 2.4% | 14 | 0.8%-4.4% | 2.5% | 11 | 0.9%-4.7% | 2.1% | 29 | 1.1%-3.2% |
| Boiler - Electric | 0.8% | 7 | NA | 0.5% | 2 | NA | 0.5% | 3 | NA | 0.8% | 3 | NA | 0.7% | 15 | 0.2%-1.4% |
| Radiant Heating | 0.5% | 4 | NA | 1.6% | 4 | NA | 0.8% | 3 | NA | 0.6% | 7 | NA | 0.7% | 18 | 0.3%-1.3% |
| Boiler - Propane | 0.5% | 6 | NA | 1.1% | 3 | NA | 0.3% | 3 | NA | 0.3% | 1 | NA | 0.4% | 13 | 0.1%-0.8% |
| Boiler - Natural gas | 0.2% | 2 | NA | 7.7% | 14 | 4.0%-11.5% | 0.5% | 3 | NA | 2.4% | 8 | NA | 2.0% | 27 | 1.1%-2.9% |
| Furnace - Unknown | 0.1% | 1 | NA | 0.0% | 0 | NA | 0.0% | 0 | NA | 0.5% | 3 | NA | 0.2% | 4 | NA |
| Boiler - Other | 0.1% | 1 | NA | 0.4% | 2 | NA | 0.3% | 3 | NA | 0.6% | 3 | NA | 0.4% | 9 | NA |
| PTAC Packaged Terminal Air Conditioner | 0.1% | 1 | NA | 0.4% | 2 | NA | 0.3% | 3 | NA | 0.4% | 6 | NA | 0.3% | 12 | 0.1%-0.6% |
| Water Source Heat Pump | 0.0% | 0 | NA | 1.6% | 3 | NA | 0.0% | 1 | NA | 0.3% | 1 | NA | 0.3% | 5 | NA |
| Portable Heater | 0.0% | 0 | NA | 0.0% | 0 | NA | 0.9% | 3 | NA | 0.0% | 1 | NA | 0.3% | 4 | NA |
| PTHP Packaged Terminal Heat Pump | 0.0% | 0 | NA | 0.0% | 0 | NA | 0.4% | 1 | NA | 0.2% | 1 | NA | 0.2% | 2 | NA |
| Window Heat Pump | 0.0% | 0 | NA | 0.0% | 0 | NA | 0.0% | 0 | NA | 0.0% | 1 | NA | 0.0% | 1 | NA |

### *A8.6. Distributions of Primary Heating Equipment in Single-Family Homes by Urban vs Rural*

| | Rural | Rural (n) | Rural (CI) | Urban | Urban (n) | Urban (CI) |
|---|---|---|---|---|---|---|
| Central Air Source Heat Pump | 24.4% | 184 | 19.6%-29.9% | 13.5% | 167 | 11.2%-16.2% |
| Furnace - Natural gas | 14.9% | 81 | 10.9%-19.7% | 52.1% | 632 | 48.3%-55.5% |
| Furnace - Propane | 12.7% | 61 | 8.2%-18.0% | 0.2% | 3 | NA |
| Ductless Mini-split Heat Pump | 10.2% | 62 | 6.5%-14.5% | 7.2% | 65 | 5.2%-9.3% |
| Furnace - Electric | 8.2% | 105 | 5.9%-10.6% | 3.4% | 55 | 2.3%-4.7% |
| Unit Heater | 7.9% | 70 | 5.5%-10.5% | 5.7% | 65 | 4.0%-7.5% |
| Fireplace or Stove | 3.5% | 24 | 2.0%-5.3% | 2.0% | 15 | 0.8%-3.3% |
| Geothermal Heat Pump | 3.4% | 25 | 2.0%-5.0% | 0.1% | 2 | NA |
| Furnace - Other | 3.3% | 16 | 1.2%-6.5% | 1.7% | 13 | 0.7%-2.9% |
| Baseboard | 2.8% | 33 | 1.6%-4.3% | 4.1% | 70 | 2.5%-6.0% |
| Boiler - Electric | 2.3% | 12 | 0.5%-5.2% | 0.2% | 3 | NA |
| Boiler - Natural gas | 1.7% | 10 | 0.6%-3.0% | 2.0% | 17 | 0.9%-3.3% |
| Boiler - Propane | 1.0% | 12 | 0.4%-1.8% | 0.2% | 1 | NA |
| Wall Heater | 0.9% | 7 | NA | 3.4% | 31 | 1.9%-5.1% |
| Boiler - Other | 0.7% | 7 | NA | 0.3% | 2 | NA |
| Water Source Heat Pump | 0.6% | 4 | NA | 0.2% | 1 | NA |
| Radiant Heating | 0.6% | 9 | NA | 0.8% | 9 | NA |
| Unknown | 0.5% | 2 | NA | 1.6% | 12 | 0.6%-2.7% |
| PTAC Packaged Terminal Air Conditioner | 0.3% | 4 | NA | 0.3% | 8 | NA |
| Portable Heater | 0.0% | 0 | NA | 0.4% | 4 | NA |
| Furnace - Unknown | 0.0% | 0 | NA | 0.3% | 4 | NA |
| PTHP Packaged Terminal Heat Pump | 0.0% | 0 | NA | 0.3% | 2 | NA |
| Window Heat Pump | 0.0% | 0 | NA | 0.0% | 1 | NA |

## *A8.7. Distributions of Primary Heating Equipment in Single-Family Homes by Home Vintage*

| | Pre 1951 | Pre 1951 (n) | Pre 1951 (CI) | 1951-1970 | 1951-1970 (n) | 1951-1970 (CI) | 1971-1990 | 1971-1990 (n) | 1971-1990 (CI) | 1991-2010 | 1991-2010 (n) | 1991-2010 (CI) | Post 2010 | Post 2010 (n) | Post 2010 (CI) |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| Furnace - Natural gas | 49.5% | 170 | 42.5%-56.6% | 48.6% | 108 | 40.7%-56.8% | 27.8% | 99 | 21.7%-34.1% | 43.6% | 210 | 37.9%-49.6% | 41.0% | 96 | 32.9%-48.7% |
| Ductless Mini-split Heat Pump | 8.8% | 29 | 5.0%-12.9% | 7.5% | 16 | 3.7%-12.3% | 9.8% | 40 | 5.7%-15.3% | 2.6% | 18 | 1.1%-4.6% | 15.5% | 19 | 7.8%-23.9% |
| Central Air Source Heat Pump | 6.6% | 33 | 3.9%-9.9% | 13.9% | 37 | 8.5%-19.4% | 23.6% | 97 | 17.6%-29.5% | 19.7% | 119 | 15.3%-24.4% | 23.5% | 62 | 15.9%-31.3% |
| Wall Heater | 6.2% | 18 | 2.8%-10.1% | 3.7% | 6 | NA | 3.2% | 10 | 0.9%-6.4% | 1.1% | 4 | NA | 0.0% | 0 | NA |
| Unit Heater | 6.0% | 36 | 3.7%-8.7% | 5.4% | 14 | 1.8%-10.4% | 8.7% | 34 | 5.2%-12.8% | 5.7% | 37 | 3.5%-8.1% | 0.9% | 6 | NA |
| Baseboard | 3.8% | 35 | 1.7%-6.4% | 4.4% | 14 | 1.1%-8.7% | 5.0% | 29 | 2.4%-8.8% | 3.3% | 17 | 0.8%-6.4% | 0.5% | 5 | NA |
| Furnace - Other | 3.8% | 12 | 1.1%-7.3% | 4.5% | 9 | NA | 0.8% | 3 | NA | 1.1% | 4 | NA | 0.0% | 0 | NA |
| Fireplace or Stove | 3.3% | 10 | 1.0%-6.1% | 0.9% | 3 | NA | 2.0% | 11 | 0.8%-3.6% | 2.9% | 11 | 1.1%-5.2% | 3.3% | 4 | NA |
| Boiler - Natural gas | 2.8% | 7 | NA | 0.7% | 3 | NA | 1.8% | 7 | NA | 3.2% | 9 | NA | 0.0% | 0 | NA |
| Furnace - Electric | 2.2% | 15 | 0.7%-4.3% | 4.4% | 20 | 1.7%-7.8% | 8.9% | 54 | 5.8%-12.4% | 4.9% | 55 | 3.0%-7.2% | 3.7% | 14 | 1.2%-7.4% |
| Unknown | 1.8% | 4 | NA | 1.8% | 3 | NA | 0.9% | 2 | NA | 1.1% | 3 | NA | 1.9% | 2 | NA |
| Furnace - Propane | 1.2% | 8 | NA | 1.3% | 4 | NA | 2.2% | 12 | 0.9%-3.9% | 7.2% | 31 | 3.3%-11.6% | 1.5% | 8 | NA |
| Furnace - Unknown | 1.0% | 3 | NA | 0.0% | 0 | NA | 0.0% | 0 | NA | 0.0% | 0 | NA | 0.1% | 1 | NA |
| Radiant Heating | 0.8% | 1 | NA | 0.6% | 2 | NA | 0.7% | 7 | NA | 0.3% | 3 | NA | 2.2% | 5 | NA |
| Water Source Heat Pump | 0.7% | 1 | NA | 0.4% | 1 | NA | 0.1% | 1 | NA | 0.1% | 1 | NA | 0.5% | 1 | NA |
| PTAC Packaged Terminal Air Conditioner | 0.6% | 3 | NA | 0.2% | 2 | NA | 0.2% | 4 | NA | 0.4% | 2 | NA | 0.0% | 1 | NA |
| Portable Heater | 0.3% | 2 | NA | 0.0% | 0 | NA | 0.9% | 1 | NA | 0.0% | 0 | NA | 0.2% | 1 | NA |
| Geothermal Heat Pump | 0.2% | 1 | NA | 0.0% | 0 | NA | 1.5% | 8 | NA | 1.2% | 11 | 0.4%-2.1% | 1.9% | 7 | NA |
| Boiler - Electric | 0.2% | 1 | NA | 0.3% | 1 | NA | 0.8% | 3 | NA | 0.2% | 2 | NA | 3.2% | 8 | NA |
| Boiler - Propane | 0.1% | 1 | NA | 0.0% | 0 | NA | 0.3% | 2 | NA | 1.0% | 8 | NA | 0.1% | 1 | NA |
| Boiler - Other | 0.0% | 1 | NA | 0.5% | 2 | NA | 0.7% | 3 | NA | 0.1% | 2 | NA | 0.0% | 0 | NA |
| PTHP Packaged Terminal Heat Pump | 0.0% | 0 | NA | 0.9% | 1 | NA | 0.0% | 0 | NA | 0.4% | 1 | NA | 0.0% | 0 | NA |
| Window Heat Pump | 0.0% | 0 | NA | 0.0% | 1 | NA | 0.0% | 0 | NA | 0.0% | 0 | NA | 0.0% | 0 | NA |

# A9. Distributions of Primary Heating Equipment Fuel Types in Single-Family Homes

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### A9.1. Distributions of Primary Heating Equipment Fuel Types in Single-Family Homes by Home Type

| | Attached | Attached (n) | Attached (CI) | Detached | Detached (n) | Detached (CI) |
|---|---|---|---|---|---|---|
| Electric | 58.4% | 106 | 48.4%-67.2% | 42.1% | 872 | 38.8%-45.4% |
| Natural gas | 33.4% | 55 | 25.0%-42.2% | 48.2% | 701 | 44.9%-51.3% |
| Unknown | 4.2% | 6 | NA | 1.1% | 11 | 0.4%-2.1% |
| Wood (cord) | 1.5% | 1 | NA | 1.6% | 34 | 1.0%-2.2% |
| Other | 1.4% | 1 | NA | 0.5% | 5 | NA |
| Propane | 0.9% | 3 | NA | 4.4% | 86 | 3.1%-6.1% |
| Oil | 0.3% | 1 | NA | 1.8% | 24 | 1.0%-3.0% |
| Wood (pellets) | 0.0% | 0 | NA | 0.1% | 2 | NA |
| Gasoline | 0.0% | 0 | NA | 0.1% | 1 | NA |
| Kerosene | 0.0% | 0 | NA | 0.1% | 1 | NA |

### *A9.2. Distributions of Primary Heating Equipment Fuel Types in Single-Family Homes by BPA vs Non-BPA*

| | BPA | BPA (n) | BPA (CI) | Non-BPA | Non-BPA (n) | Non-BPA (CI) |
|---|---|---|---|---|---|---|
| Electric | 53.4% | 473 | 48.7%-58.3% | 38.3% | 505 | 34.6%-42.4% |
| Natural gas | 37.6% | 274 | 32.8%-42.4% | 52.0% | 482 | 47.5%-56.2% |
| Propane | 2.7% | 49 | 1.5%-4.6% | 4.7% | 40 | 2.9%-6.9% |
| Unknown | 2.4% | 11 | 0.9%-4.2% | 1.0% | 6 | NA |
| Oil | 2.1% | 16 | 0.7%-3.8% | 1.3% | 9 | NA |
| Wood (cord) | 1.5% | 15 | 0.4%-2.8% | 1.6% | 20 | 0.9%-2.4% |
| Wood (pellets) | 0.2% | 2 | NA | 0.0% | 0 | NA |
| Gasoline | 0.1% | 1 | NA | 0.0% | 0 | NA |
| Other | 0.0% | 0 | NA | 1.1% | 6 | NA |
| Kerosene | 0.0% | 0 | NA | 0.1% | 1 | NA |

### *A9.3. Distributions of Primary Heating Equipment Fuel Types in Single-Family Homes by Heating Zone*

| | HZ 1 | HZ 1 (n) | HZ 1 (CI) | HZ 2/3 | HZ 2/3 (n) | HZ 2/3 (CI) |
|---|---|---|---|---|---|---|
| Natural gas | 46.9% | 465 | 42.9%-50.8% | 43.9% | 291 | 39.8%-48.0% |
| Electric | 45.2% | 405 | 41.1%-49.5% | 42.2% | 573 | 38.2%-46.1% |
| Propane | 2.5% | 13 | 0.9%-4.3% | 7.8% | 76 | 5.9%-10.0% |
| Oil | 1.8% | 10 | 0.8%-3.0% | 1.1% | 15 | 0.5%-1.9% |
| Unknown | 1.7% | 11 | 0.7%-2.9% | 1.1% | 6 | NA |
| Wood (cord) | 1.0% | 9 | NA | 3.2% | 26 | 1.8%-4.6% |
| Other | 0.7% | 3 | NA | 0.5% | 3 | NA |
| Gasoline | 0.1% | 1 | NA | 0.0% | 0 | NA |
| Wood (pellets) | 0.1% | 1 | NA | 0.0% | 1 | NA |
| Kerosene | 0.0% | 0 | NA | 0.2% | 1 | NA |

### *A9.4. Distributions of Primary Heating Equipment Fuel Types in Single-Family Homes by Ownership*

| | Own | Own (n) | Own (CI) | Rent | Rent (n) | Rent (CI) | Unknown | Unknown (n) | Unknown (CI) |
|---|---|---|---|---|---|---|---|---|---|
| Natural gas | 47.9% | 662 | 44.4%-51.1% | 27.8% | 64 | 21.0%-35.9% | 59.6% | 30 | 45.6%-73.4% |
| Electric | 43.0% | 815 | 39.8%-46.3% | 60.5% | 141 | 51.4%-69.1% | 30.7% | 22 | 18.9%-45.4% |
| Propane | 4.2% | 83 | 2.9%-5.8% | 1.8% | 5 | NA | 4.8% | 1 | NA |
| Oil | 1.5% | 19 | 0.7%-2.5% | 0.6% | 4 | NA | 4.9% | 2 | NA |
| Wood (cord) | 1.5% | 30 | 0.9%-2.2% | 2.9% | 5 | NA | 0.0% | 0 | NA |
| Unknown | 0.9% | 9 | NA | 6.4% | 8 | NA | 0.0% | 0 | NA |
| Other | 0.8% | 6 | NA | 0.0% | 0 | NA | 0.0% | 0 | NA |
| Wood (pellets) | 0.1% | 2 | NA | 0.0% | 0 | NA | 0.0% | 0 | NA |
| Gasoline | 0.1% | 1 | NA | 0.0% | 0 | NA | 0.0% | 0 | NA |
| Kerosene | 0.1% | 1 | NA | 0.0% | 0 | NA | 0.0% | 0 | NA |

### *A9.5. Distributions of Primary Heating Equipment Fuel Types in Single-Family Homes by State*

| | ID | ID (n) | ID (CI) | MT | MT (n) | MT (CI) | OR | OR (n) | OR (CI) | WA | WA (n) | WA (CI) | Overall | Overall (n) | Overall (CI) |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| Natural gas | 56.2% | 163 | 50.9%-61.2% | 58.0% | 123 | 51.1%-64.6% | 44.9% | 290 | 39.3%-50.2% | 42.1% | 180 | 37.2%-46.6% | 46.1% | 756 | 42.9%-49.2% |
| Electric | 32.8% | 199 | 28.1%-38.3% | 25.2% | 79 | 19.8%-31.1% | 46.8% | 274 | 41.6%-52.6% | 49.4% | 426 | 44.2%-54.1% | 44.4% | 978 | 41.3%-47.8% |
| Propane | 7.3% | 37 | 4.8%-10.1% | 12.3% | 28 | 8.1%-17.6% | 1.8% | 17 | 0.8%-3.1% | 2.8% | 7 | NA | 3.9% | 89 | 2.8%-5.4% |
| Wood (cord) | 2.4% | 9 | NA | 2.7% | 6 | NA | 1.2% | 12 | 0.5%-2.2% | 1.3% | 8 | NA | 1.6% | 35 | 0.9%-2.3% |
| Unknown | 0.8% | 2 | NA | 0.7% | 2 | NA | 2.3% | 7 | NA | 1.5% | 6 | NA | 1.6% | 17 | 0.8%-2.6% |
| Kerosene | 0.4% | 1 | NA | 0.0% | 0 | NA | 0.0% | 0 | NA | 0.0% | 0 | NA | 0.0% | 1 | NA |
| Wood (pellets) | 0.1% | 1 | NA | 0.0% | 0 | NA | 0.2% | 1 | NA | 0.0% | 0 | NA | 0.1% | 2 | NA |
| Other | 0.0% | 0 | NA | 0.7% | 1 | NA | 1.0% | 4 | NA | 0.6% | 1 | NA | 0.6% | 6 | NA |
| Oil | 0.0% | 0 | NA | 0.4% | 2 | NA | 1.6% | 13 | 0.5%-3.2% | 2.2% | 10 | 0.8%-4.1% | 1.6% | 25 | 0.8%-2.5% |
| Gasoline | 0.0% | 0 | NA | 0.0% | 0 | NA | 0.2% | 1 | NA | 0.0% | 0 | NA | 0.1% | 1 | NA |

### *A9.6. Distributions of Primary Heating Equipment Fuel Types in Single-Family Homes by Urban vs Rural*

| | Rural | Rural (n) | Rural (CI) | Urban | Urban (n) | Urban (CI) |
|---|---|---|---|---|---|---|
| Electric | 59.7% | 500 | 53.6%-65.7% | 39.6% | 478 | 36.2%-43.2% |
| Natural gas | 17.2% | 94 | 12.9%-22.1% | 55.3% | 662 | 51.6%-58.7% |
| Propane | 14.7% | 82 | 9.9%-19.8% | 0.5% | 7 | NA |
| Wood (cord) | 3.6% | 26 | 2.0%-5.4% | 0.9% | 9 | NA |
| Other | 1.8% | 4 | NA | 0.3% | 2 | NA |
| Oil | 1.8% | 15 | 0.7%-3.0% | 1.5% | 10 | 0.6%-2.7% |
| Unknown | 0.6% | 3 | NA | 1.9% | 14 | 0.8%-3.1% |
| Wood (pellets) | 0.3% | 2 | NA | 0.0% | 0 | NA |
| Gasoline | 0.2% | 1 | NA | 0.0% | 0 | NA |
| Kerosene | 0.2% | 1 | NA | 0.0% | 0 | NA |

### *A9.7. Distributions of Primary Heating Equipment Fuel Types in Single-Family Homes by Home Vintage*

| | Pre 1951 | Pre 1951 (n) | Pre 1951 (CI) | 1951-1970 | 1951-1970 (n) | 1951-1970 (CI) | 1971-1990 | 1971-1990 (n) | 1971-1990 (CI) | 1991-2010 | 1991-2010 (n) | 1991-2010 (CI) | Post 2010 | Post 2010 (n) | Post 2010 (CI) |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| Natural gas | 53.0% | 183 | 46.8%-60.0% | 50.2% | 113 | 41.9%-58.6% | 29.8% | 106 | 23.7%-35.9% | 48.7% | 224 | 43.1%-54.2% | 42.9% | 99 | 34.0%-52.8% |
| Electric | 36.6% | 170 | 30.3%-42.8% | 40.6% | 112 | 32.6%-48.3% | 62.5% | 282 | 56.2%-68.6% | 39.2% | 266 | 33.7%-45.0% | 51.5% | 126 | 41.9%-60.5% |
| Unknown | 2.7% | 6 | NA | 1.8% | 3 | NA | 0.9% | 2 | NA | 1.2% | 4 | NA | 1.9% | 2 | NA |
| Oil | 2.6% | 12 | 0.7%-4.9% | 4.1% | 8 | NA | 0.8% | 3 | NA | 0.0% | 0 | NA | 0.0% | 0 | NA |
| Wood (cord) | 1.9% | 7 | NA | 1.3% | 4 | NA | 2.6% | 13 | 1.2%-4.4% | 1.1% | 9 | NA | 1.5% | 2 | NA |
| Propane | 1.7% | 11 | 0.6%-2.9% | 1.4% | 5 | NA | 3.0% | 19 | 1.6%-4.8% | 8.8% | 43 | 4.9%-13.5% | 1.8% | 10 | 0.6%-3.3% |
| Other | 1.3% | 1 | NA | 0.2% | 1 | NA | 0.0% | 0 | NA | 1.0% | 3 | NA | 0.5% | 1 | NA |
| Wood (pellets) | 0.2% | 1 | NA | 0.0% | 0 | NA | 0.0% | 0 | NA | 0.0% | 0 | NA | 0.1% | 1 | NA |
| Gasoline | 0.0% | 0 | NA | 0.4% | 1 | NA | 0.0% | 0 | NA | 0.0% | 0 | NA | 0.0% | 0 | NA |
| Kerosene | 0.0% | 0 | NA | 0.0% | 0 | NA | 0.3% | 1 | NA | 0.0% | 0 | NA | 0.0% | 0 | NA |

# A10. Distributions of Primary Heating Equipment in Multi-Family Homes by Type

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## A10.1. Primary Heating Equipment in Multi-Family Homes by Type by BPA vs Non-BPA

| | BPA | BPA (n) | BPA (CI) | Non-BPA | Non-BPA (n) | Non-BPA (CI) |
|---|---|---|---|---|---|---|
| Unit Heater | 41.5% | 77 | 32.8%-51.0% | 39.3% | 81 | 30.8%-47.3% |
| Baseboard | 32.9% | 59 | 24.6%-42.3% | 23.3% | 32 | 15.6%-30.6% |
| Unknown | 9.8% | 15 | 4.5%-15.8% | 2.7% | 8 | NA |
| Wall Heater | 5.6% | 8 | NA | 6.1% | 7 | NA |
| Ductless Mini-split Heat Pump | 5.2% | 10 | 1.8%-9.3% | 0.5% | 2 | NA |
| PTAC Packaged Terminal Air Conditioner | 1.6% | 2 | NA | 1.7% | 4 | NA |
| Water Source Heat Pump | 1.3% | 4 | NA | 1.2% | 5 | NA |
| Fireplace or Stove | 0.8% | 1 | NA | 0.2% | 1 | NA |
| Portable Heater | 0.6% | 2 | NA | 1.5% | 3 | NA |
| Furnace - Electric | 0.3% | 1 | NA | 0.2% | 1 | NA |
| Through-wall Heat Pump | 0.3% | 1 | NA | 1.2% | 5 | NA |
| Furnace - Natural gas | 0.0% | 0 | NA | 14.8% | 19 | 8.5%-21.5% |
| PTHP Packaged Terminal Heat Pump | 0.0% | 0 | NA | 5.1% | 16 | 2.3%-8.4% |
| Furnace - Unknown | 0.0% | 0 | NA | 1.4% | 2 | NA |
| Boiler - Unknown | 0.0% | 0 | NA | 0.5% | 2 | NA |
| Boiler - Natural gas | 0.0% | 0 | NA | 0.3% | 1 | NA |

### *A10.2. Primary Heating Equipment in Multi-Family Homes by Type by Heating Zone*

| | HZ 1 | HZ 1 (n) | HZ 1 (CI) | HZ 2/3 | HZ 2/3 (n) | HZ 2/3 (CI) |
|---|---|---|---|---|---|---|
| Unit Heater | 40.7% | 150 | 34.3%-46.2% | 34.9% | 8 | NA |
| Baseboard | 27.2% | 84 | 21.7%-33.5% | 31.8% | 7 | NA |
| Furnace - Natural gas | 6.8% | 14 | 3.6%-10.5% | 27.9% | 5 | NA |
| Wall Heater | 6.4% | 15 | 3.2%-9.8% | 0.0% | 0 | NA |
| Unknown | 6.2% | 23 | 3.5%-9.5% | 0.0% | 0 | NA |
| PTHP Packaged Terminal Heat Pump | 3.1% | 16 | 1.5%-5.3% | 0.0% | 0 | NA |
| Ductless Mini-split Heat Pump | 2.7% | 12 | 1.0%-4.8% | 0.0% | 0 | NA |
| PTAC Packaged Terminal Air Conditioner | 1.7% | 5 | NA | 1.7% | 1 | NA |
| Water Source Heat Pump | 1.3% | 9 | NA | 0.0% | 0 | NA |
| Portable Heater | 1.2% | 5 | NA | 0.0% | 0 | NA |
| Through-wall Heat Pump | 0.9% | 6 | NA | 0.0% | 0 | NA |
| Furnace - Unknown | 0.7% | 1 | NA | 1.7% | 1 | NA |
| Fireplace or Stove | 0.5% | 2 | NA | 0.0% | 0 | NA |
| Boiler - Unknown | 0.3% | 2 | NA | 0.0% | 0 | NA |
| Furnace - Electric | 0.3% | 2 | NA | 0.0% | 0 | NA |
| Boiler - Natural gas | 0.0% | 0 | NA | 1.9% | 1 | NA |

### *A10.3. Primary Heating Equipment in Multi-Family Homes by Type by Ownership*

| | Own | Own (n) | Own (CI) | Rent | Rent (n) | Rent (CI) | Unknown | Unknown (n) | Unknown (CI) |
|---|---|---|---|---|---|---|---|---|---|
| Furnace - Natural gas | 42.4% | 4 | NA | 7.5% | 15 | 4.0%-11.6% | 0.0% | 0 | NA |
| Unit Heater | 21.7% | 3 | NA | 44.1% | 155 | 37.9%-51.1% | 0.0% | 0 | NA |
| Baseboard | 15.4% | 3 | NA | 28.8% | 86 | 22.6%-35.3% | 17.7% | 2 | NA |
| Water Source Heat Pump | 13.8% | 4 | NA | 0.6% | 4 | NA | 2.0% | 1 | NA |
| Fireplace or Stove | 3.5% | 1 | NA | 0.4% | 1 | NA | 0.0% | 0 | NA |
| Furnace - Electric | 3.2% | 1 | NA | 0.2% | 1 | NA | 0.0% | 0 | NA |
| Wall Heater | 0.0% | 0 | NA | 5.9% | 14 | 2.6%-9.6% | 8.8% | 1 | NA |
| PTHP Packaged Terminal Heat Pump | 0.0% | 0 | NA | 3.3% | 16 | 1.6%-5.2% | 0.0% | 0 | NA |
| Unknown | 0.0% | 0 | NA | 2.6% | 7 | NA | 51.7% | 16 | 28.9%-80.2% |
| PTAC Packaged Terminal Air Conditioner | 0.0% | 0 | NA | 1.9% | 6 | NA | 0.0% | 0 | NA |
| Ductless Mini-split Heat Pump | 0.0% | 0 | NA | 1.5% | 10 | 0.6%-2.4% | 17.7% | 2 | NA |
| Portable Heater | 0.0% | 0 | NA | 1.2% | 5 | NA | 0.0% | 0 | NA |
| Furnace - Unknown | 0.0% | 0 | NA | 0.9% | 2 | NA | 0.0% | 0 | NA |
| Through-wall Heat Pump | 0.0% | 0 | NA | 0.9% | 6 | NA | 0.0% | 0 | NA |
| Boiler - Natural gas | 0.0% | 0 | NA | 0.2% | 1 | NA | 0.0% | 0 | NA |
| Boiler - Unknown | 0.0% | 0 | NA | 0.2% | 1 | NA | 2.0% | 1 | NA |

### *A10.4. Primary Heating Equipment in Multi-Family Homes by Type by State*

| | ID | ID (n) | ID (CI) | MT | MT (n) | MT (CI) | OR | OR (n) | OR (CI) | WA | WA (n) | WA (CI) | Overall | Overall (n) | Overall (CI) |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| Furnace - Natural gas | 47.7% | 4 | NA | 15.5% | 2 | NA | 11.4% | 10 | 5.5%-18.8% | 2.9% | 3 | NA | 8.4% | 19 | 4.8%-12.7% |
| Unit Heater | 23.8% | 2 | NA | 38.7% | 5 | NA | 48.8% | 58 | 39.9%-57.7% | 37.5% | 93 | 29.5%-45.4% | 40.3% | 158 | 34.3%-46.4% |
| PTHP Packaged Terminal Heat Pump | 14.3% | 2 | NA | 0.0% | 0 | NA | 5.0% | 10 | 2.1%-8.8% | 0.9% | 4 | NA | 2.9% | 16 | 1.3%-4.9% |
| Furnace - Unknown | 14.2% | 2 | NA | 0.0% | 0 | NA | 0.0% | 0 | NA | 0.0% | 0 | NA | 0.8% | 2 | NA |
| Baseboard | 0.0% | 0 | NA | 31.0% | 4 | NA | 12.3% | 14 | 6.3%-18.8% | 37.8% | 73 | 29.1%-46.3% | 27.5% | 91 | 21.9%-33.5% |
| Boiler - Natural gas | 0.0% | 0 | NA | 7.7% | 1 | NA | 0.0% | 0 | NA | 0.0% | 0 | NA | 0.1% | 1 | NA |
| PTAC Packaged Terminal Air Conditioner | 0.0% | 0 | NA | 7.0% | 1 | NA | 5.0% | 5 | NA | 0.0% | 0 | NA | 1.7% | 6 | NA |
| Unknown | 0.0% | 0 | NA | 0.0% | 0 | NA | 5.2% | 9 | NA | 6.8% | 14 | 2.9%-11.5% | 5.8% | 23 | 3.1%-8.8% |
| Wall Heater | 0.0% | 0 | NA | 0.0% | 0 | NA | 3.4% | 3 | NA | 7.9% | 12 | 3.3%-13.4% | 5.9% | 15 | 2.8%-9.5% |
| Portable Heater | 0.0% | 0 | NA | 0.0% | 0 | NA | 2.7% | 3 | NA | 0.4% | 2 | NA | 1.1% | 5 | NA |
| Through-wall Heat Pump | 0.0% | 0 | NA | 0.0% | 0 | NA | 1.7% | 4 | NA | 0.4% | 2 | NA | 0.8% | 6 | NA |
| Water Source Heat Pump | 0.0% | 0 | NA | 0.0% | 0 | NA | 1.3% | 3 | NA | 1.4% | 6 | NA | 1.2% | 9 | NA |
| Fireplace or Stove | 0.0% | 0 | NA | 0.0% | 0 | NA | 1.1% | 1 | NA | 0.2% | 1 | NA | 0.5% | 2 | NA |
| Boiler - Unknown | 0.0% | 0 | NA | 0.0% | 0 | NA | 0.9% | 2 | NA | 0.0% | 0 | NA | 0.3% | 2 | NA |
| Ductless Mini-split Heat Pump | 0.0% | 0 | NA | 0.0% | 0 | NA | 0.8% | 2 | NA | 3.7% | 10 | 1.2%-7.0% | 2.5% | 12 | 0.9%-4.7% |
| Furnace - Electric | 0.0% | 0 | NA | 0.0% | 0 | NA | 0.4% | 1 | NA | 0.2% | 1 | NA | 0.3% | 2 | NA |

### *A10.5. Primary Heating Equipment in Multi-Family Homes by Type by Home Vintage*

| | Pre 1951 | Pre 1951 (n) | Pre 1951 (CI) | 1951-1970 | 1951-1970 (n) | 1951-1970 (CI) | 1971-1990 | 1971-1990 (n) | 1971-1990 (CI) | 1991-2010 | 1991-2010 (n) | 1991-2010 (CI) | Post 2010 | Post 2010 (n) | Post 2010 (CI) |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| Unknown | 39.5% | 16 | 21.5%-56.5% | 1.3% | 2 | NA | 0.0% | 0 | NA | 0.7% | 1 | NA | 5.2% | 4 | NA |
| Furnace - Natural gas | 20.4% | 6 | NA | 0.0% | 0 | NA | 8.0% | 6 | NA | 14.1% | 6 | NA | 4.7% | 1 | NA |
| Unit Heater | 15.7% | 12 | 7.4%-27.1% | 34.2% | 21 | 21.4%-47.3% | 49.0% | 45 | 37.6%-60.4% | 50.7% | 46 | 38.0%-63.3% | 37.6% | 31 | 24.4%-52.5% |
| Baseboard | 12.4% | 4 | NA | 52.4% | 34 | 38.3%-66.0% | 33.9% | 31 | 22.7%-45.4% | 11.7% | 11 | 4.6%-21.2% | 9.7% | 9 | NA |
| Portable Heater | 3.4% | 3 | NA | 1.8% | 1 | NA | 1.2% | 1 | NA | 0.0% | 0 | NA | 0.0% | 0 | NA |
| PTHP Packaged Terminal Heat Pump | 3.3% | 3 | NA | 0.0% | 0 | NA | 4.0% | 5 | NA | 2.6% | 4 | NA | 5.2% | 4 | NA |
| Wall Heater | 3.1% | 1 | NA | 7.1% | 4 | NA | 1.9% | 1 | NA | 7.2% | 4 | NA | 14.0% | 5 | NA |
| Boiler - Unknown | 2.4% | 2 | NA | 0.0% | 0 | NA | 0.0% | 0 | NA | 0.0% | 0 | NA | 0.0% | 0 | NA |
| Ductless Mini-split Heat Pump | 0.0% | 0 | NA | 2.6% | 4 | NA | 0.0% | 0 | NA | 0.7% | 1 | NA | 8.6% | 6 | NA |
| PTAC Packaged Terminal Air Conditioner | 0.0% | 0 | NA | 0.6% | 1 | NA | 0.4% | 1 | NA | 3.5% | 2 | NA | 4.9% | 2 | NA |
| Fireplace or Stove | 0.0% | 0 | NA | 0.0% | 0 | NA | 1.2% | 1 | NA | 0.7% | 1 | NA | 0.0% | 0 | NA |
| Through-wall Heat Pump | 0.0% | 0 | NA | 0.0% | 0 | NA | 0.4% | 1 | NA | 0.7% | 1 | NA | 3.5% | 4 | NA |
| Water Source Heat Pump | 0.0% | 0 | NA | 0.0% | 0 | NA | 0.0% | 0 | NA | 5.5% | 8 | NA | 0.9% | 1 | NA |
| Furnace - Electric | 0.0% | 0 | NA | 0.0% | 0 | NA | 0.0% | 0 | NA | 1.3% | 2 | NA | 0.0% | 0 | NA |
| Boiler - Natural gas | 0.0% | 0 | NA | 0.0% | 0 | NA | 0.0% | 0 | NA | 0.7% | 1 | NA | 0.0% | 0 | NA |
| Furnace - Unknown | 0.0% | 0 | NA | 0.0% | 0 | NA | 0.0% | 0 | NA | 0.0% | 0 | NA | 5.6% | 2 | NA |

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# A11. Distributions of Primary Heating Equipment Fuel Types in Multi-Family Homes

## A11.1. Primary Heating Fuel in Multi-Family Homes by Type by BPA vs Non-BPA

| | BPA | BPA (n) | BPA (CI) | Non-BPA | Non-BPA (n) | Non-BPA (CI) |
|---|---|---|---|---|---|---|
| Electric | 96.7% | 165 | 92.1%-100.0% | 80.0% | 154 | 73.4%-86.8% |
| Unknown | 3.3% | 3 | NA | 3.7% | 8 | NA |
| Natural gas | NA | NA | NA | 16.3% | 23 | 10.0%-23.0% |

## A11.2. Primary Heating Fuel in Multi-Family Homes by Heating Zone

| | HZ 1 | HZ 1 (n) | HZ 1 (CI) | HZ 2/3 | HZ 2/3 (n) | HZ 2/3 (CI) |
|---|---|---|---|---|---|---|
| Electric | 88.7% | 304 | 84.1%-92.8% | 66.5% | 15 | 41.7%-87.9% |
| Natural gas | 7.6% | 16 | 4.2%-11.6% | 31.8% | 7 | NA |
| Unknown | 3.6% | 10 | 1.3%-6.9% | 1.7% | 1 | NA |

## A11.3. Primary Heating Fuel in Multi-Family Homes by Ownership

| | Own | Own (n) | Own (CI) | Rent | Rent (n) | Rent (CI) |
|---|---|---|---|---|---|---|
| Electric | 54.2% | 11 | 26.3%-87.5% | 88.2% | 302 | 83.3%-92.6% |
| Natural gas | 45.8% | 5 | NA | 8.2% | 18 | 4.3%-12.3% |
| Unknown | 0.0% | 0 | NA | 3.6% | 10 | 1.4%-6.5% |

### *A11.4. Primary Heating Fuel in Multi-Family Homes by State*

| | ID | ID (n) | ID (CI) | MT | MT (n) | MT (CI) | OR | OR (n) | OR (CI) | WA | WA (n) | WA (CI) | Overall | Overall (n) | Overall (CI) |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| Natural gas | 47.7% | 4 | NA | 31.0% | 4 | NA | 12.8% | 11 | 6.1%-19.8% | 3.3% | 4 | NA | 9.5% | 23 | 5.5%-13.9% |
| Electric | 38.2% | 4 | NA | 69.0% | 9 | NA | 83.1% | 103 | 76.1%-90.3% | 94.4% | 203 | 89.4%-98.3% | 87.0% | 319 | 82.2%-91.7% |
| Unknown | 14.2% | 2 | NA | 0.0% | 0 | NA | 4.1% | 6 | NA | 2.3% | 3 | NA | 3.5% | 11 | 1.4%-6.1% |

### *A11.5. Primary Heating Fuel in Multi-Family Homes by Home Vintage*

| | Pre 1951 | Pre 1951 (n) | Pre 1951 (CI) | 1951-1970 | 1951-1970 (n) | 1951-1970 (CI) | 1971-1990 | 1971-1990 (n) | 1971-1990 (CI) | 1991-2010 | 1991-2010 (n) | 1991-2010 (CI) | Post 2010 | Post 2010 (n) | Post 2010 (CI) |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| Electric | 43.5% | 21 | 26.7%-62.8% | 100.0% | 65 | 100.0%-100.0% | 92.0% | 86 | 85.4%-97.6% | 84.4% | 79 | 71.9%-95.3% | 86.9% | 62 | 73.2%-99.0% |
| Natural gas | 32.0% | 8 | NA | 0.0% | 0 | NA | 8.0% | 6 | NA | 15.6% | 8 | NA | 4.8% | 1 | NA |
| Unknown | 24.5% | 8 | NA | 0.0% | 0 | NA | 0.0% | 0 | NA | 0.0% | 0 | NA | 8.3% | 3 | NA |

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# A12. Cooking Equipment - Oven Distributions by Type and Fuel Type

## A12.1. Oven Types and Fuel Types by Home Type

| | Attached | Attached (n) | Attached (CI) | Detached | Detached (n) | Detached (CI) | Multi-Family | Multi-Family (n) | Multi-Family (CI) |
|---|---|---|---|---|---|---|---|---|---|
| Stove Oven Combo | 96.2% | 168 | 91.9%-99.6% | 81.3% | 1438 | 78.8%-83.9% | 98.9% | 356 | 97.9%-99.7% |
| Standalone Oven - Full Size | 3.8% | 5 | NA | 18.2% | 311 | 15.7%-20.8% | 1.1% | 6 | NA |
| Standalone Oven - Mini | 0.0% | 0 | NA | 0.5% | 7 | NA | 0.0% | 0 | NA |
| Oven Fuel - Electric | 72.6% | 139 | 63.7%-81.7% | 69.9% | 1256 | 66.8%-72.8% | 79.4% | 302 | 73.8%-84.6% |
| Oven Fuel - Natural Gas | 24.9% | 30 | 15.6%-33.6% | 20.6% | 318 | 18.1%-23.3% | 7.0% | 27 | 3.9%-10.5% |
| Oven Fuel - Other | 2.5% | 4 | NA | 9.6% | 162 | 7.5%-11.8% | 13.6% | 33 | 9.0%-18.4% |

## A12.2. Oven Types and Fuel Types by BPA vs Non-BPA

| | BPA | BPA (n) | BPA (CI) | Non-BPA | Non-BPA (n) | Non-BPA (CI) |
|---|---|---|---|---|---|---|
| Stove Oven Combo | 85.1% | 872 | 82.3%-88.0% | 86.9% | 1090 | 84.4%-89.5% |
| Standalone Oven - Full Size | 14.6% | 159 | 11.7%-17.7% | 12.7% | 163 | 10.1%-15.1% |
| Standalone Oven - Mini | 0.2% | 3 | NA | 0.4% | 4 | NA |
| Oven Fuel - Electric | 73.8% | 760 | 70.0%-77.8% | 70.5% | 937 | 67.1%-74.1% |
| Oven Fuel - Natural Gas | 16.7% | 156 | 13.0%-20.2% | 20.0% | 219 | 17.2%-22.9% |
| Oven Fuel - Other | 9.5% | 106 | 7.1%-12.2% | 9.5% | 93 | 7.0%-12.2% |

### A12.3. Oven Types and Fuel Types by Ownership

| | Own | Own (n) | Own (CI) | Rent | Rent (n) | Rent (CI) | Unknown | Unknown (n) | Unknown (CI) |
|---|---|---|---|---|---|---|---|---|---|
| Stove Oven Combo | 82.5% | 1365 | 80.0%-85.1% | 98.2% | 549 | 97.0%-99.2% | 73.6% | 48 | 60.0%-85.5% |
| Standalone Oven - Full Size | 16.9% | 294 | 14.6%-19.4% | 1.8% | 13 | 0.8%-3.0% | 26.4% | 15 | 14.4%-40.1% |
| Standalone Oven - Mini | 0.5% | 7 | NA | 0.0% | 0 | NA | 0.0% | 0 | NA |
| Oven Fuel - Electric | 67.5% | 1171 | 64.4%-70.6% | 85.8% | 486 | 81.8%-89.3% | 60.7% | 40 | 46.9%-73.6% |
| Oven Fuel - Natural Gas | 23.7% | 323 | 20.7%-26.6% | 5.9% | 40 | 3.7%-8.4% | 17.4% | 12 | 8.2%-28.4% |
| Oven Fuel - Other | 8.9% | 152 | 6.8%-10.9% | 8.4% | 36 | 5.5%-11.7% | 22.0% | 11 | 9.9%-33.5% |

### A12.4. Oven Types and Fuel Types by State

| | ID | ID (n) | ID (CI) | MT | MT (n) | MT (CI) | OR | OR (n) | OR (CI) | WA | WA (n) | WA (CI) | Overall | Overall (n) | Overall (CI) |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| Stove Oven Combo | 90.3% | 370 | 87.2%-93.0% | 86.9% | 226 | 82.5%-91.2% | 87.8% | 631 | 84.9%-90.7% | 84.2% | 735 | 81.0%-87.3% | 86.2% | 1962 | 84.1%-88.1% |
| Standalone Oven - Full Size | 9.7% | 57 | 6.7%-13.1% | 13.1% | 37 | 9.2%-17.3% | 11.8% | 104 | 9.2%-14.5% | 15.4% | 124 | 12.4%-18.4% | 13.5% | 322 | 11.6%-15.4% |
| Standalone Oven - Mini | 0.0% | 0 | NA | 0.0% | 0 | NA | 0.5% | 4 | NA | 0.4% | 3 | NA | 0.3% | 7 | NA |
| Oven Fuel - Electric | 72.6% | 311 | 67.0%-77.6% | 69.1% | 183 | 63.1%-75.9% | 75.3% | 524 | 71.2%-79.3% | 70.2% | 679 | 66.0%-74.1% | 71.9% | 1697 | 69.2%-74.4% |
| Oven Fuel - Natural Gas | 19.2% | 62 | 14.7%-23.9% | 21.8% | 52 | 16.6%-27.1% | 19.6% | 161 | 16.0%-23.4% | 17.4% | 100 | 14.1%-21.1% | 18.6% | 375 | 16.4%-21.1% |
| Oven Fuel - Other | 8.1% | 49 | 5.5%-10.9% | 9.1% | 23 | 5.0%-13.6% | 5.0% | 51 | 3.5%-6.9% | 12.4% | 76 | 9.4%-15.6% | 9.5% | 199 | 7.8%-11.4% |

### *A12.5. Oven Types and Fuel Types by Urban vs Rural*

| | Rural | Rural (n) | Rural (CI) | Urban | Urban (n) | Urban (CI) |
|---|---|---|---|---|---|---|
| Stove Oven Combo | 76.7% | 586 | 71.4%-81.4% | 88.6% | 1376 | 86.6%-90.6% |
| Standalone Oven - Full Size | 22.7% | 162 | 17.9%-28.2% | 11.1% | 160 | 9.2%-12.9% |
| Standalone Oven - Mini | 0.6% | 4 | NA | 0.3% | 3 | NA |
| Oven Fuel - Electric | 70.7% | 553 | 65.1%-76.5% | 72.2% | 1144 | 69.3%-75.0% |
| Oven Fuel - Natural Gas | 10.8% | 62 | 7.4%-14.7% | 20.6% | 313 | 18.1%-23.2% |
| Oven Fuel - Other | 18.5% | 118 | 13.6%-23.3% | 7.2% | 81 | 5.4%-8.9% |

# A13. Cooking Equipment - Stove Distributions by Type and Fuel Type

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## A13.1. Stove Types and Fuel Types by Home Type

| | Attached | Attached (n) | Attached (CI) | Detached | Detached (n) | Detached (CI) | Multi-Family | Multi-Family (n) | Multi-Family (CI) |
|---|---|---|---|---|---|---|---|---|---|
| Stove Oven Combo | 96.6% | 168 | 92.4%-100.0% | 81.9% | 1438 | 79.4%-84.2% | 98.3% | 356 | 96.8%-99.5% |
| Standalone Stovetop | 3.4% | 4 | NA | 18.1% | 306 | 15.4%-20.8% | 1.7% | 9 | NA |
| Stove Fuel - Electric | 71.6% | 136 | 60.8%-81.0% | 63.4% | 1129 | 60.1%-66.6% | 80.9% | 312 | 75.1%-85.8% |
| Stove Fuel - Natural Gas | 27.5% | 32 | 18.7%-37.6% | 27.6% | 422 | 24.4%-30.8% | 7.1% | 28 | 4.1%-10.5% |
| Stove Fuel - Other | 0.9% | 3 | NA | 9.0% | 190 | 7.2%-11.1% | 12.0% | 25 | 7.4%-16.9% |

## A13.2. Stove Types and Fuel Types by BPA vs Non-BPA

| | BPA | BPA (n) | BPA (CI) | Non-BPA | Non-BPA (n) | Non-BPA (CI) |
|---|---|---|---|---|---|---|
| Stove Oven Combo | 85.2% | 872 | 82.0%-88.1% | 87.4% | 1090 | 85.0%-89.8% |
| Standalone Stovetop | 14.8% | 158 | 11.9%-17.9% | 12.6% | 161 | 10.3%-15.1% |
| Stove Fuel - Electric | 68.7% | 696 | 64.4%-72.5% | 66.6% | 881 | 63.4%-70.2% |
| Stove Fuel - Natural Gas | 22.3% | 204 | 18.5%-26.4% | 25.0% | 278 | 22.2%-28.4% |
| Stove Fuel - Other | 9.1% | 126 | 6.7%-11.5% | 8.4% | 92 | 6.2%-10.8% |

### A13.3. Stove Types and Fuel Types by Ownership

| | Own | Own (n) | Own (CI) | Rent | Rent (n) | Rent (CI) | Unknown | Unknown (n) | Unknown (CI) |
|---|---|---|---|---|---|---|---|---|---|
| Stove Oven Combo | 82.9% | 1365 | 80.5%-85.5% | 98.0% | 549 | 96.6%-99.1% | 75.3% | 48 | 62.9%-87.7% |
| Standalone Stovetop | 17.1% | 290 | 14.5%-19.5% | 2.0% | 15 | 1.0%-3.5% | 24.7% | 14 | 13.0%-37.7% |
| Stove Fuel - Electric | 59.9% | 1037 | 56.5%-63.3% | 87.3% | 500 | 83.7%-90.8% | 64.6% | 40 | 50.1%-79.5% |
| Stove Fuel - Natural Gas | 31.4% | 433 | 28.2%-34.7% | 5.1% | 37 | 3.2%-7.3% | 21.8% | 12 | 9.7%-35.0% |
| Stove Fuel - Other | 8.7% | 182 | 6.9%-10.6% | 7.6% | 27 | 4.6%-10.9% | 13.5% | 9 | NA |

### A13.4. Stove Types and Fuel Types by State

| | ID | ID (n) | ID (CI) | MT | MT (n) | MT (CI) | OR | OR (n) | OR (CI) | WA | WA (n) | WA (CI) | Overall | Overall (n) | Overall (CI) |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| Stove Oven Combo | 90.5% | 370 | 87.3%-93.5% | 88.6% | 226 | 84.6%-92.6% | 87.5% | 631 | 84.5%-90.3% | 84.7% | 735 | 81.4%-87.9% | 86.5% | 1962 | 84.6%-88.4% |
| Standalone Stovetop | 9.5% | 54 | 6.6%-12.3% | 11.4% | 31 | 7.4%-15.3% | 12.5% | 112 | 9.8%-15.5% | 15.3% | 122 | 12.3%-18.6% | 13.5% | 319 | 11.6%-15.4% |
| Stove Fuel - Electric | 66.1% | 278 | 60.3%-71.3% | 62.8% | 161 | 56.3%-69.3% | 69.9% | 486 | 65.4%-74.3% | 67.1% | 652 | 62.9%-71.5% | 67.5% | 1577 | 64.6%-70.1% |
| Stove Fuel - Natural Gas | 26.0% | 85 | 20.8%-31.0% | 24.7% | 61 | 19.1%-30.3% | 26.4% | 213 | 22.3%-30.7% | 21.8% | 123 | 17.9%-25.8% | 23.9% | 482 | 21.5%-26.3% |
| Stove Fuel - Other | 7.9% | 60 | 5.4%-10.7% | 12.5% | 33 | 7.6%-17.9% | 3.7% | 46 | 2.3%-5.1% | 11.1% | 79 | 8.4%-14.2% | 8.7% | 218 | 6.9%-10.3% |

### *A13.5. Stove Types and Fuel Types by Urban vs Rural*

| | Rural | Rural (n) | Rural (CI) | Urban | Urban (n) | Urban (CI) |
|---|---|---|---|---|---|---|
| Stove Oven Combo | 78.1% | 586 | 72.7%-83.2% | 88.6% | 1376 | 86.5%-90.5% |
| Standalone Stovetop | 21.9% | 151 | 16.8%-27.1% | 11.4% | 168 | 9.5%-13.5% |
| Stove Fuel - Electric | 65.4% | 495 | 59.7%-71.1% | 68.0% | 1082 | 64.9%-71.2% |
| Stove Fuel - Natural Gas | 12.8% | 78 | 8.9%-16.9% | 26.7% | 404 | 23.6%-29.4% |
| Stove Fuel - Other | 21.8% | 158 | 16.9%-27.4% | 5.4% | 60 | 3.9%-6.9% |

# A14. Presence of Select Electronics and Appliances (Percent of Homes with 1+ of Each Equipment Type)

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### A14.1. Presence of Electronics and Appliances by Home Type

| | Attached | Attached (n) | Attached (CI) | Detached | Detached (n) | Detached (CI) | Multi-Family | Multi-Family (n) | Multi-Family (CI) |
|---|---|---|---|---|---|---|---|---|---|
| Presence of Air Cleaner (1+) | 11.8% | 20 | 5.8%-18.5% | 16.7% | 271 | 14.5%-19.1% | 15.0% | 56 | 10.9%-19.8% |
| Presence of Computer (1+) | 81.0% | 130 | 73.7%-87.7% | 87.0% | 1466 | 84.8%-89.0% | 66.2% | 243 | 60.3%-71.9% |
| Presence of Dehumidifier (1+) | 2.9% | 3 | NA | 3.3% | 41 | 2.0%-4.4% | 3.0% | 7 | NA |
| Presence of Dishwasher (1+) | 84.6% | 139 | 77.5%-90.5% | 87.9% | 1508 | 85.7%-89.9% | 69.1% | 236 | 63.6%-74.4% |
| Presence of Game Console (1+) | 26.9% | 48 | 18.0%-35.3% | 30.0% | 466 | 27.0%-33.0% | 27.4% | 83 | 21.9%-33.3% |
| Presence of Clothes Dryer (1+) | 83.4% | 132 | 76.5%-89.5% | 95.2% | 1649 | 93.7%-96.5% | 37.1% | 125 | 31.1%-42.9% |
| Presence of Washing Machine (1+) | 85.8% | 136 | 79.6%-91.3% | 96.4% | 1676 | 95.2%-97.5% | 37.5% | 127 | 31.7%-43.8% |
| Presence of Power Strip (1+) | 51.9% | 97 | 41.9%-62.0% | 63.5% | 1125 | 60.5%-66.6% | 47.6% | 179 | 41.0%-53.7% |
| Presence of Freezer (1+) | 25.3% | 44 | 17.6%-34.3% | 43.5% | 854 | 40.4%-46.6% | 6.6% | 21 | 3.6%-9.9% |
| Presence of TV (1+) | 92.8% | 162 | 87.2%-97.8% | 94.4% | 1648 | 92.6%-96.0% | 80.8% | 293 | 75.7%-85.5% |
| Presence of Thermostat (1+) | 76.6% | 143 | 67.6%-84.6% | 91.7% | 1582 | 89.9%-93.5% | 85.8% | 310 | 81.7%-89.6% |
| Presence of Installed LED Lamp (1+) | 99.6% | 172 | 98.8%-100.0% | 98.8% | 1715 | 98.0%-99.5% | 96.4% | 360 | 93.5%-98.7% |

### *A14.2. Presence of Electronics and Appliances by BPA vs Non-BPA*

| | BPA | BPA (n) | BPA (CI) | Non-BPA | Non-BPA (n) | Non-BPA (CI) |
|---|---|---|---|---|---|---|
| Presence of Air Cleaner (1+) | 17.7% | 162 | 14.4%-21.2% | 14.6% | 185 | 12.2%-17.1% |
| Presence of Computer (1+) | 83.0% | 830 | 80.1%-86.1% | 81.9% | 1009 | 79.1%-84.7% |
| Presence of Dehumidifier (1+) | 4.0% | 28 | 2.3%-5.8% | 2.6% | 23 | 1.4%-3.9% |
| Presence of Dishwasher (1+) | 83.5% | 845 | 80.3%-86.3% | 84.4% | 1038 | 81.9%-87.0% |
| Presence of Game Console (1+) | 28.7% | 251 | 24.6%-32.9% | 29.4% | 346 | 26.0%-33.0% |
| Presence of Clothes Dryer (1+) | 82.8% | 847 | 79.5%-86.0% | 83.1% | 1059 | 80.2%-85.9% |
| Presence of Washing Machine (1+) | 83.3% | 860 | 80.3%-86.2% | 84.8% | 1079 | 82.2%-87.3% |
| Presence of Power Strip (1+) | 57.1% | 605 | 52.5%-61.6% | 60.6% | 796 | 56.6%-64.0% |
| Presence of Freezer (1+) | 31.4% | 401 | 27.4%-35.3% | 36.8% | 518 | 33.3%-40.6% |
| Presence of TV (1+) | 92.5% | 941 | 90.3%-94.5% | 91.1% | 1162 | 88.9%-93.4% |
| Presence of Thermostat (1+) | 90.5% | 928 | 87.6%-92.9% | 87.7% | 1107 | 85.0%-90.3% |
| Presence of Installed LED Lamp (1+) | 98.5% | 1005 | 97.3%-99.4% | 98.5% | 1242 | 97.4%-99.4% |

### *A14.3. Presence of Appliances by Ownership*

| | Own | Own (n) | Own (CI) | Rent | Rent (n) | Rent (CI) | Unknown | Unknown (n) | Unknown (CI) |
|---|---|---|---|---|---|---|---|---|---|
| Presence of Dishwasher (1+) | 91.4% | 1476 | 89.6%-93.0% | 63.5% | 348 | 58.8%-68.4% | 95.7% | 59 | 89.9%-100.0% |
| Presence of Clothes Dryer (1+) | 95.4% | 1566 | 93.9%-96.7% | 51.4% | 286 | 46.6%-56.7% | 88.1% | 54 | 78.5%-95.1% |
| Presence of Washing Machine (1+) | 96.6% | 1591 | 95.3%-97.8% | 52.7% | 292 | 46.8%-57.9% | 90.0% | 56 | 81.1%-97.1% |
| Presence of Freezer (1+) | 43.7% | 820 | 40.6%-47.1% | 13.5% | 80 | 10.0%-17.5% | 27.7% | 19 | 14.6%-41.4% |

### *A14.4. Presence of Electronics and Appliances by State*

| | Overall | Overall (n) | Overall (CI) | ID | ID (n) | ID (CI) | MT | MT (n) | MT (CI) | OR | OR (n) | OR (CI) | WA | WA (n) | WA (CI) |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| Presence of Air Cleaner (1+) | 15.8% | 347 | 13.8%-18.0% | 9.7% | 43 | 6.6%-13.2% | 18.1% | 49 | 13.4%-22.9% | 16.3% | 123 | 13.0%-19.6% | 16.7% | 132 | 13.3%-19.9% |
| Presence of Computer (1+) | 82.4% | 1839 | 80.3%-84.5% | 85.6% | 354 | 81.0%-89.9% | 77.5% | 199 | 72.0%-82.7% | 81.6% | 612 | 77.7%-85.0% | 82.8% | 674 | 79.6%-85.6% |
| Presence of Dehumidifier (1+) | 3.2% | 51 | 2.2%-4.2% | 0.8% | 3 | NA | 2.4% | 8 | NA | 3.2% | 19 | 1.7%-5.0% | 3.8% | 21 | 2.1%-5.6% |
| Presence of Dishwasher (1+) | 84.0% | 1883 | 82.2%-86.1% | 88.1% | 369 | 84.7%-91.4% | 81.9% | 211 | 76.7%-86.7% | 81.0% | 616 | 77.2%-84.5% | 85.1% | 687 | 82.2%-88.0% |
| Presence of Game Console (1+) | 29.2% | 597 | 26.7%-31.6% | 30.3% | 111 | 24.9%-36.2% | 25.9% | 62 | 19.7%-31.7% | 24.8% | 176 | 20.9%-29.1% | 31.8% | 248 | 27.5%-36.0% |
| Presence of Clothes Dryer (1+) | 83.0% | 1906 | 80.8%-84.9% | 92.3% | 396 | 87.8%-96.0% | 91.5% | 234 | 87.3%-94.7% | 79.5% | 609 | 75.6%-83.0% | 81.6% | 667 | 78.6%-84.7% |
| Presence of Washing Machine (1+) | 84.2% | 1939 | 82.2%-86.1% | 92.9% | 400 | 88.8%-96.6% | 93.2% | 237 | 89.7%-96.2% | 82.2% | 627 | 78.8%-85.5% | 82.1% | 675 | 78.9%-85.1% |
| Presence of Power Strip (1+) | 59.2% | 1401 | 56.3%-61.8% | 66.9% | 295 | 60.6%-72.9% | 54.3% | 146 | 47.7%-60.4% | 57.8% | 436 | 53.3%-62.1% | 58.8% | 524 | 54.2%-63.2% |
| Presence of Freezer (1+) | 34.5% | 919 | 31.8%-37.2% | 49.5% | 223 | 43.7%-55.5% | 56.0% | 142 | 48.9%-62.5% | 29.5% | 273 | 25.4%-33.9% | 31.0% | 281 | 26.7%-35.3% |
| Presence of TV (1+) | 91.7% | 2103 | 90.1%-93.3% | 92.5% | 395 | 88.3%-95.9% | 94.8% | 242 | 91.6%-97.5% | 92.1% | 685 | 89.3%-94.5% | 90.8% | 781 | 87.9%-93.1% |
| Presence of Thermostat (1+) | 88.9% | 2035 | 87.0%-90.5% | 95.0% | 395 | 92.3%-97.1% | 93.5% | 239 | 89.9%-96.8% | 81.2% | 639 | 77.1%-85.1% | 91.2% | 762 | 88.9%-93.7% |
| Presence of Installed LED Lamp (1+) | 98.5% | 2247 | 97.7%-99.2% | 97.6% | 414 | 95.0%-99.6% | 99.6% | 253 | 98.6%-100.0% | 99.1% | 737 | 97.9%-99.9% | 98.2% | 843 | 96.9%-99.2% |

### *A14.5. Presence of Electronics and Appliances by Urban vs Rural*

| | Rural | Rural (n) | Rural (CI) | Urban | Urban (n) | Urban (CI) |
|---|---|---|---|---|---|---|
| Presence of Air Cleaner (1+) | 11.1% | 84 | 7.5%-15.1% | 17.0% | 263 | 14.7%-19.3% |
| Presence of Computer (1+) | 83.4% | 591 | 79.0%-86.9% | 82.1% | 1248 | 79.8%-84.4% |
| Presence of Dehumidifier (1+) | 1.5% | 12 | 0.5%-2.9% | 3.6% | 39 | 2.4%-4.9% |
| Presence of Dishwasher (1+) | 86.5% | 622 | 82.9%-89.9% | 83.4% | 1261 | 81.1%-85.7% |
| Presence of Game Console (1+) | 24.4% | 155 | 19.3%-30.0% | 30.3% | 442 | 27.3%-33.4% |
| Presence of Clothes Dryer (1+) | 96.2% | 688 | 94.6%-97.7% | 79.7% | 1218 | 77.4%-82.2% |
| Presence of Washing Machine (1+) | 97.7% | 704 | 96.4%-98.9% | 80.9% | 1235 | 78.5%-83.3% |
| Presence of Power Strip (1+) | 61.8% | 471 | 56.2%-67.3% | 58.5% | 930 | 55.1%-61.6% |
| Presence of Freezer (1+) | 57.5% | 426 | 51.7%-63.2% | 28.9% | 493 | 26.4%-32.1% |
| Presence of TV (1+) | 92.3% | 689 | 87.6%-96.0% | 91.5% | 1414 | 89.8%-93.2% |
| Presence of Thermostat (1+) | 88.9% | 652 | 85.0%-92.1% | 88.8% | 1383 | 86.6%-91.0% |
| Presence of Installed LED Lamp (1+) | 99.0% | 718 | 98.0%-99.8% | 98.3% | 1529 | 97.4%-99.1% |

# A15. Percent of Appliances by Appliance Sub-Type

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### A15.1. Percent of Appliances by Appliance Sub-Type by Home Type

| | Attached | Attached (n) | Attached (CI) | Detached | Detached (n) | Detached (CI) | Multi-Family | Multi-Family (n) | Multi-Family (CI) |
|---|---|---|---|---|---|---|---|---|---|
| Washing Machine - Vertical | 60.1% | 90 | 49.3%-71.7% | 52.9% | 911 | 49.4%-55.9% | 57.3% | 61 | 47.5%-66.5% |
| Washing Machine - Horizontal | 39.5% | 45 | 29.1%-50.4% | 46.4% | 769 | 42.9%-49.7% | 36.3% | 60 | 27.5%-46.6% |
| Washing Machine - Unknown | 0.4% | 2 | NA | 0.7% | 10 | 0.2%-1.3% | 6.4% | 6 | NA |
| Clothes Dryer - Electric | 80.5% | 115 | 70.2%-90.1% | 88.9% | 1494 | 86.4%-91.2% | 99.7% | 124 | 98.8%-100.0% |
| Clothes Dryer - Natural Gas | 8.4% | 8 | NA | 6.8% | 82 | 5.1%-8.8% | 0.0% | 0 | NA |
| Clothes Dryer - Propane | 0.0% | 0 | NA | 0.6% | 16 | 0.3%-1.0% | 0.0% | 0 | NA |
| Clothes Dryer - Other | 0.0% | 0 | NA | 0.0% | 0 | NA | 0.0% | 0 | NA |
| Clothes Dryer - Unknown | 11.1% | 9 | NA | 3.7% | 58 | 2.4%-5.2% | 0.3% | 1 | NA |
| Clothes Dryer - Heat Pump | 1.8% | 1 | NA | 0.8% | 12 | 0.3%-1.4% | 0.0% | 0 | NA |
| Refrigerator RF Top Freezer | 54.0% | 121 | 45.0%-64.3% | 31.5% | 734 | 29.0%-33.9% | 86.2% | 322 | 81.6%-90.3% |
| Refrigerator Side By Side RF | 11.8% | 28 | 6.6%-18.3% | 20.4% | 519 | 18.4%-22.6% | 1.6% | 9 | NA |
| Refrigerator RF Bottom Freezer | 8.6% | 10 | 3.5%-14.0% | 20.4% | 453 | 18.3%-22.7% | 3.8% | 19 | 1.9%-6.0% |
| Refrigerator Full Size R Only | 0.6% | 1 | NA | 2.2% | 51 | 1.4%-3.1% | 0.0% | 0 | NA |
| Refrigerator Side By Side R Only | 0.0% | 0 | NA | 0.0% | 1 | NA | 0.0% | 0 | NA |
| Refrigerator Side By Side RF Bottom Freezer | 16.0% | 21 | 10.1%-22.8% | 14.7% | 382 | 12.9%-16.7% | 3.8% | 16 | 1.8%-6.4% |
| Refrigerator Mini | 8.9% | 15 | 4.2%-14.0% | 10.1% | 231 | 8.6%-11.7% | 4.6% | 14 | 1.9%-7.8% |
| Refrigerator Unknown | 0.0% | 0 | NA | 0.7% | 12 | 0.2%-1.4% | 0.0% | 0 | NA |
| Freezer Upright Full Size | 46.0% | 21 | 28.0%-64.3% | 54.4% | 475 | 50.2%-58.7% | 33.0% | 7 | NA |
| Freezer Chest | 54.0% | 24 | 34.7%-72.4% | 45.6% | 446 | 41.2%-49.8% | 67.0% | 14 | 40.0%-90.8% |

### *A15.2. Percent of Appliances by Appliance Sub-Type by BPA vs Non-BPA*

| | BPA | BPA (n) | BPA (CI) | Non-BPA | Non-BPA (n) | Non-BPA (CI) |
|---|---|---|---|---|---|---|
| Washing Machine - Vertical | 52.0% | 453 | 47.8%-56.8% | 55.6% | 609 | 51.6%-59.5% |
| Washing Machine - Horizontal | 46.0% | 403 | 41.0%-50.8% | 43.9% | 471 | 39.8%-47.7% |
| Washing Machine - Unknown | 1.9% | 11 | 0.7%-3.4% | 0.5% | 7 | NA |
| Clothes Dryer - Electric | 91.2% | 774 | 88.3%-94.0% | 87.2% | 959 | 84.3%-90.3% |
| Clothes Dryer - Natural Gas | 5.2% | 35 | 3.0%-7.7% | 7.2% | 55 | 5.3%-9.4% |
| Clothes Dryer - Propane | 0.5% | 8 | NA | 0.4% | 8 | NA |
| Clothes Dryer - Other | 0.0% | 0 | NA | 0.0% | 0 | NA |
| Clothes Dryer - Unknown | 3.1% | 31 | 1.7%-4.6% | 5.1% | 37 | 3.3%-7.4% |
| Clothes Dryer - Heat Pump | 0.7% | 4 | NA | 1.0% | 9 | NA |
| Refrigerator RF Top Freezer | 40.1% | 506 | 36.6%-43.7% | 42.5% | 671 | 39.5%-45.5% |
| Refrigerator Side By Side RF | 16.2% | 244 | 13.6%-18.9% | 17.3% | 312 | 15.0%-19.7% |
| Refrigerator RF Bottom Freezer | 20.4% | 259 | 17.4%-23.6% | 14.4% | 223 | 12.1%-16.6% |
| Refrigerator Full Size R Only | 1.0% | 21 | 0.4%-1.6% | 2.3% | 31 | 1.3%-3.4% |
| Refrigerator Side By Side R Only | 0.0% | 1 | NA | 0.0% | 0 | NA |
| Refrigerator Side By Side RF Bottom Freezer | 11.5% | 166 | 9.4%-14.3% | 14.5% | 253 | 12.4%-16.6% |
| Refrigerator Mini | 9.7% | 129 | 7.6%-12.1% | 8.8% | 131 | 7.1%-10.5% |
| Refrigerator Unknown | 1.1% | 7 | NA | 0.2% | 5 | NA |
| Freezer Upright Full Size | 57.4% | 223 | 49.8%-64.1% | 50.6% | 280 | 44.9%-55.5% |
| Freezer Chest | 42.6% | 206 | 35.6%-49.2% | 49.4% | 278 | 44.2%-54.7% |

### *A15.3. Percent of Appliances by Appliance Sub-Type by Ownership*

| | Own | Own (n) | Own (CI) | Rent | Rent (n) | Rent (CI) | Unknown | Unknown (n) | Unknown (CI) |
|---|---|---|---|---|---|---|---|---|---|
| Washing Machine - Vertical | 52.1% | 846 | 49.0%-55.7% | 68.9% | 190 | 62.4%-75.6% | 38.0% | 26 | 25.7%-52.3% |
| Washing Machine - Horizontal | 47.1% | 748 | 43.8%-50.6% | 28.1% | 96 | 21.5%-35.0% | 61.5% | 30 | 47.9%-75.1% |
| Washing Machine - Unknown | 0.7% | 11 | 0.2%-1.4% | 2.9% | 6 | NA | 0.5% | 1 | NA |
| Clothes Dryer - Electric | 88.2% | 1415 | 85.7%-90.5% | 94.1% | 272 | 89.7%-97.5% | 83.2% | 46 | 69.0%-94.7% |
| Clothes Dryer - Natural Gas | 6.8% | 81 | 5.1%-8.7% | 1.4% | 3 | NA | 15.7% | 6 | NA |
| Clothes Dryer - Propane | 0.5% | 15 | 0.2%-0.9% | 0.0% | 0 | NA | 1.0% | 1 | NA |
| Clothes Dryer - Other | 0.0% | 0 | NA | 0.0% | 0 | NA | 0.0% | 0 | NA |
| Clothes Dryer - Unknown | 4.5% | 56 | 2.9%-6.2% | 4.5% | 11 | 1.5%-8.5% | 0.2% | 1 | NA |
| Clothes Dryer - Heat Pump | 0.9% | 12 | 0.3%-1.5% | 1.2% | 1 | NA | 0.0% | 0 | NA |
| Refrigerator RF Top Freezer | 29.8% | 666 | 27.5%-32.3% | 81.0% | 483 | 77.2%-85.0% | 33.5% | 28 | 22.8%-44.5% |
| Refrigerator Side By Side RF | 20.1% | 489 | 17.9%-22.2% | 5.4% | 48 | 3.5%-7.7% | 21.7% | 19 | 13.2%-31.4% |
| Refrigerator RF Bottom Freezer | 20.4% | 431 | 18.2%-22.8% | 4.5% | 35 | 2.7%-6.5% | 20.2% | 16 | 11.0%-31.4% |
| Refrigerator Full Size R Only | 2.2% | 49 | 1.4%-3.2% | 0.1% | 2 | NA | 1.6% | 1 | NA |
| Refrigerator Side By Side R Only | 0.0% | 0 | NA | 0.0% | 1 | NA | 0.0% | 0 | NA |
| Refrigerator Side By Side RF Bottom Freezer | 16.7% | 393 | 14.6%-18.9% | 2.0% | 15 | 0.9%-3.5% | 14.3% | 11 | 6.9%-23.0% |
| Refrigerator Mini | 10.0% | 219 | 8.5%-11.8% | 6.8% | 34 | 4.3%-9.5% | 8.6% | 7 | NA |
| Refrigerator Unknown | 0.7% | 11 | 0.2%-1.4% | 0.2% | 1 | NA | 0.0% | 0 | NA |
| Freezer Upright Full Size | 52.9% | 456 | 48.5%-57.3% | 43.4% | 34 | 29.4%-59.2% | 73.8% | 13 | 54.3%-94.5% |
| Freezer Chest | 47.1% | 430 | 42.8%-51.6% | 56.6% | 47 | 41.9%-71.1% | 26.2% | 7 | NA |

### *A15.4. Percent of Appliances by Appliance Sub-Type by State*

| | ID | ID (n) | ID (CI) | MT | MT (n) | MT (CI) | OR | OR (n) | OR (CI) | WA | WA (n) | WA (CI) | Overall | Overall (n) | Overall (CI) |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| Washing Machine - Vertical | 59.7% | 231 | 53.4%-65.4% | 55.7% | 133 | 48.6%-62.5% | 51.2% | 332 | 46.2%-56.7% | 54.0% | 366 | 48.9%-58.8% | 54.1% | 1062 | 51.2%-57.0% |
| Washing Machine - Horizontal | 40.3% | 171 | 34.8%-45.9% | 43.8% | 105 | 36.9%-50.7% | 48.1% | 292 | 42.7%-53.3% | 44.2% | 306 | 39.5%-49.1% | 44.8% | 874 | 41.7%-47.9% |
| Washing Machine - Unknown | 0.0% | 1 | NA | 0.5% | 1 | NA | 0.6% | 6 | NA | 1.8% | 10 | 0.7%-3.2% | 1.1% | 18 | 0.5%-1.8% |
| Clothes Dryer - Electric | 91.5% | 365 | 88.1%-94.6% | 93.0% | 215 | 89.6%-96.0% | 90.3% | 544 | 87.5%-93.2% | 86.7% | 609 | 83.0%-90.1% | 88.9% | 1733 | 86.7%-90.7% |
| Clothes Dryer - Natural Gas | 4.6% | 16 | 2.5%-7.2% | 5.4% | 12 | 2.4%-8.4% | 6.8% | 39 | 4.3%-9.7% | 6.8% | 23 | 4.1%-9.6% | 6.4% | 90 | 4.9%-8.2% |
| Clothes Dryer - Propane | 1.2% | 5 | NA | 0.4% | 2 | NA | 0.5% | 6 | NA | 0.3% | 3 | NA | 0.5% | 16 | 0.2%-0.8% |
| Clothes Dryer - Other | 0.0% | 0 | NA | 0.0% | 0 | NA | 0.0% | 0 | NA | 0.0% | 0 | NA | 0.0% | 0 | NA |
| Clothes Dryer - Unknown | 2.7% | 10 | 1.1%-4.7% | 1.3% | 6 | NA | 2.4% | 20 | 1.2%-3.8% | 6.2% | 32 | 3.6%-9.1% | 4.3% | 68 | 2.9%-5.8% |
| Clothes Dryer - Heat Pump | 1.4% | 4 | NA | 0.4% | 2 | NA | 0.9% | 4 | NA | 0.8% | 3 | NA | 0.9% | 13 | 0.3%-1.6% |
| Refrigerator RF Top Freezer | 38.0% | 197 | 33.1%-42.5% | 34.7% | 120 | 29.7%-40.1% | 45.7% | 396 | 41.7%-49.6% | 41.1% | 464 | 37.2%-44.8% | 41.5% | 1177 | 39.4%-43.9% |
| Refrigerator Side By Side RF | 23.9% | 140 | 19.9%-27.8% | 16.6% | 61 | 12.9%-20.8% | 15.2% | 166 | 12.4%-18.3% | 16.1% | 189 | 13.5%-18.8% | 16.9% | 556 | 15.4%-18.6% |
| Refrigerator RF Bottom Freezer | 13.8% | 99 | 11.0%-17.2% | 12.7% | 48 | 9.3%-16.5% | 15.1% | 161 | 12.6%-18.0% | 19.2% | 174 | 16.2%-22.2% | 16.8% | 482 | 14.9%-18.8% |
| Refrigerator Full Size R Only | 2.2% | 12 | 1.0%-3.8% | 2.8% | 9 | NA | 1.8% | 19 | 0.7%-3.0% | 1.4% | 12 | 0.6%-2.6% | 1.7% | 52 | 1.1%-2.4% |
| Refrigerator Side By Side R Only | 0.0% | 0 | NA | 0.0% | 0 | NA | 0.0% | 1 | NA | 0.0% | 0 | NA | 0.0% | 1 | NA |
| Refrigerator Side By Side RF Bottom Freezer | 13.6% | 76 | 10.5%-17.2% | 20.2% | 67 | 15.8%-25.0% | 12.8% | 136 | 10.4%-15.5% | 12.4% | 140 | 10.0%-15.3% | 13.3% | 419 | 11.7%-14.8% |
| Refrigerator Mini | 8.4% | 48 | 5.9%-10.9% | 12.5% | 43 | 9.1%-16.2% | 9.0% | 79 | 6.6%-11.3% | 9.0% | 90 | 6.7%-11.3% | 9.2% | 260 | 7.8%-10.6% |
| Refrigerator Unknown | 0.0% | 0 | NA | 0.6% | 2 | NA | 0.4% | 4 | NA | 0.8% | 6 | NA | 0.6% | 12 | 0.2%-1.1% |
| Freezer Upright Full Size | 50.9% | 126 | 44.0%-57.9% | 40.3% | 70 | 32.5%-49.3% | 48.9% | 137 | 41.5%-56.5% | 59.7% | 170 | 52.1%-67.0% | 53.1% | 503 | 48.8%-57.3% |
| Freezer Chest | 49.1% | 122 | 42.7%-56.1% | 59.7% | 83 | 51.1%-67.7% | 51.1% | 150 | 43.0%-58.8% | 40.3% | 129 | 32.9%-47.7% | 46.9% | 484 | 42.7%-51.0% |

### *A15.5. Percent of Appliances by Appliance Sub-Type by Urban vs Rural*

| | Rural | Rural (n) | Rural (CI) | Urban | Urban (n) | Urban (CI) |
|---|---|---|---|---|---|---|
| Washing Machine - Vertical | 49.7% | 365 | 43.6%-56.0% | 55.4% | 697 | 51.9%-59.0% |
| Washing Machine - Horizontal | 49.5% | 339 | 44.0%-55.6% | 43.4% | 535 | 40.1%-46.9% |
| Washing Machine - Unknown | 0.8% | 7 | NA | 1.2% | 11 | 0.5%-2.1% |
| Clothes Dryer - Electric | 88.9% | 629 | 84.2%-93.0% | 88.8% | 1104 | 86.4%-91.1% |
| Clothes Dryer - Natural Gas | 3.9% | 19 | 1.5%-6.9% | 7.1% | 71 | 5.2%-9.5% |
| Clothes Dryer - Propane | 1.8% | 15 | 0.8%-3.1% | 0.1% | 1 | NA |
| Clothes Dryer - Other | 0.0% | 0 | NA | 0.0% | 0 | NA |
| Clothes Dryer - Unknown | 5.4% | 26 | 2.2%-9.7% | 3.9% | 42 | 2.5%-5.6% |
| Clothes Dryer - Heat Pump | 0.1% | 2 | NA | 1.1% | 11 | 0.4%-2.0% |
| Refrigerator RF Top Freezer | 31.4% | 312 | 27.2%-35.9% | 44.4% | 865 | 41.7%-47.4% |
| Refrigerator Side By Side RF | 17.8% | 218 | 14.7%-21.1% | 16.6% | 338 | 14.7%-18.7% |
| Refrigerator RF Bottom Freezer | 20.8% | 187 | 16.8%-25.1% | 15.7% | 295 | 13.9%-17.8% |
| Refrigerator Full Size R Only | 3.2% | 29 | 1.6%-5.3% | 1.3% | 23 | 0.7%-1.9% |
| Refrigerator Side By Side R Only | 0.0% | 0 | NA | 0.0% | 1 | NA |
| Refrigerator Side By Side RF Bottom Freezer | 14.2% | 166 | 11.6%-17.4% | 13.0% | 253 | 11.3%-14.8% |
| Refrigerator Mini | 11.4% | 109 | 8.7%-13.9% | 8.6% | 151 | 7.0%-10.1% |
| Refrigerator Unknown | 1.2% | 7 | NA | 0.4% | 5 | NA |
| Freezer Upright Full Size | 54.6% | 251 | 47.9%-61.6% | 52.3% | 252 | 47.0%-57.6% |
| Freezer Chest | 45.4% | 224 | 39.0%-52.8% | 47.7% | 260 | 42.6%-53.3% |

# A16. Percent of Electronics by Electronics Sub-Type

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## A16.1. Percent of Electronics by Electronics Sub-Type by Home Type

| | Attached | Attached (n) | Attached (CI) | Detached | Detached (n) | Detached (CI) | Multi-Family | Multi-Family (n) | Multi-Family (CI) |
|---|---|---|---|---|---|---|---|---|---|
| Desktop Computer | 36.9% | 50 | 26.7%-48.0% | 36.0% | 677 | 32.9%-39.1% | 23.5% | 69 | 18.1%-29.1% |
| Laptop Computer | 59.2% | 96 | 48.2%-70.7% | 55.8% | 981 | 52.8%-58.9% | 73.5% | 189 | 67.6%-78.7% |
| Other Computer | 3.8% | 10 | 0.8%-7.6% | 8.2% | 201 | 6.6%-9.8% | 3.0% | 9 | NA |
| LCD - LED TV | 67.2% | 136 | 59.7%-74.7% | 64.6% | 1317 | 62.0%-67.3% | 71.9% | 228 | 66.7%-77.0% |
| LCD - Fluorescent TV | 12.4% | 32 | 7.1%-17.9% | 12.7% | 393 | 10.9%-14.6% | 10.1% | 53 | 7.4%-13.4% |
| QLED TV | 1.6% | 2 | NA | 1.5% | 48 | 1.0%-2.0% | 1.0% | 5 | NA |
| OLED TV | 3.4% | 4 | NA | 3.7% | 106 | 2.9%-4.8% | 3.2% | 12 | 1.4%-5.2% |
| Plasma TV | 8.7% | 12 | 2.9%-15.1% | 5.2% | 95 | 3.9%-6.7% | 3.8% | 11 | 1.5%-6.6% |
| Non-CRT Projector TV | 0.2% | 1 | NA | 0.6% | 24 | 0.4%-1.0% | 0.4% | 2 | NA |
| CRT TV | 0.8% | 2 | NA | 1.4% | 45 | 0.9%-2.0% | 0.9% | 3 | NA |
| Other TV | 0.0% | 0 | NA | 0.5% | 6 | NA | 0.2% | 2 | NA |
| Unknown TV | 9.3% | 15 | 4.4%-14.6% | 11.8% | 290 | 10.0%-13.9% | 9.3% | 30 | 5.8%-12.8% |
| Programmable Thermostat | 25.8% | 50 | 16.5%-36.9% | 36.4% | 814 | 33.0%-40.0% | 6.5% | 54 | 4.4%-8.8% |
| Smart - Wifi Thermostat | 0.6% | 2 | NA | 3.8% | 94 | 2.8%-5.0% | 0.0% | 0 | NA |
| Smart Thermostat | 2.9% | 6 | NA | 8.7% | 200 | 7.1%-10.7% | 0.6% | 8 | NA |
| Wifi Thermostat | 0.0% | 0 | NA | 3.1% | 74 | 2.1%-4.2% | 1.2% | 6 | NA |
| Manual Digital Thermostat | 6.0% | 23 | 3.1%-10.3% | 13.8% | 256 | 11.0%-16.8% | 11.1% | 45 | 6.8%-16.2% |
| Manual Analog Thermostat | 64.3% | 75 | 51.7%-74.2% | 34.1% | 444 | 30.1%-38.0% | 80.0% | 220 | 74.0%-84.7% |
| Timer Thermostat | 0.4% | 1 | NA | 0.0% | 2 | NA | 0.4% | 2 | NA |
| On/Off Thermostat | 0.0% | 0 | NA | 0.0% | 1 | NA | 0.0% | 0 | NA |

### *A16.2. Percent of Electronics by Electronics Sub-Type by BPA vs Non-BPA*

| | BPA | BPA (n) | BPA (CI) | Non-BPA | Non-BPA (n) | Non-BPA (CI) |
|---|---|---|---|---|---|---|
| Desktop Computer | 32.5% | 362 | 28.7%-36.1% | 36.1% | 434 | 32.6%-39.8% |
| Laptop Computer | 60.1% | 583 | 56.3%-63.8% | 57.0% | 683 | 53.5%-60.4% |
| Other Computer | 7.4% | 96 | 5.4%-9.7% | 6.8% | 124 | 5.3%-8.5% |
| LCD - LED TV | 65.6% | 738 | 61.6%-69.3% | 65.9% | 943 | 62.7%-69.0% |
| LCD - Fluorescent TV | 11.4% | 208 | 9.1%-13.8% | 13.0% | 270 | 11.1%-15.0% |
| QLED TV | 1.2% | 22 | 0.6%-1.9% | 1.6% | 33 | 1.0%-2.3% |
| OLED TV | 4.3% | 62 | 2.8%-6.0% | 3.2% | 60 | 2.2%-4.3% |
| Plasma TV | 4.1% | 46 | 2.4%-6.1% | 6.3% | 72 | 4.5%-8.3% |
| Non-CRT Projector TV | 0.6% | 13 | 0.3%-1.2% | 0.5% | 14 | 0.3%-0.8% |
| CRT TV | 1.5% | 28 | 0.8%-2.2% | 1.1% | 22 | 0.6%-1.8% |
| Other TV | 0.3% | 3 | NA | 0.5% | 5 | NA |
| Unknown TV | 12.6% | 155 | 9.7%-15.7% | 10.3% | 180 | 8.4%-12.3% |
| Programmable Thermostat | 27.8% | 425 | 23.8%-32.2% | 29.8% | 493 | 26.3%-33.5% |
| Smart - Wifi Thermostat | 2.1% | 40 | 1.3%-3.0% | 3.1% | 56 | 2.1%-4.3% |
| Smart Thermostat | 6.4% | 99 | 4.4%-8.5% | 6.2% | 115 | 4.8%-7.8% |
| Wifi Thermostat | 2.5% | 39 | 1.3%-3.9% | 2.2% | 41 | 1.5%-3.1% |
| Manual Digital Thermostat | 10.1% | 146 | 7.8%-12.6% | 14.3% | 178 | 10.9%-18.2% |
| Manual Analog Thermostat | 50.9% | 364 | 46.1%-55.6% | 44.0% | 375 | 38.9%-48.6% |
| Timer Thermostat | 0.1% | 3 | NA | 0.2% | 2 | NA |
| On/Off Thermostat | 0.1% | 1 | NA | 0.0% | 0 | NA |

### *A16.3. Percent of Electronics by Electronics Sub-Type by State*

| | ID | ID (n) | ID (CI) | MT | MT (n) | MT (CI) | OR | OR (n) | OR (CI) | WA | WA (n) | WA (CI) | Overall | Overall (n) | Overall (CI) |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| Desktop Computer | 34.9% | 147 | 30.0%-40.1% | 32.8% | 83 | 27.4%-38.8% | 34.0% | 270 | 29.6%-38.3% | 35.0% | 296 | 31.0%-39.1% | 34.6% | 796 | 32.1%-37.1% |
| Laptop Computer | 56.5% | 243 | 51.9%-61.6% | 60.7% | 144 | 54.6%-66.9% | 56.8% | 395 | 52.7%-61.0% | 59.2% | 484 | 54.8%-63.5% | 58.3% | 1266 | 55.7%-61.2% |
| Other Computer | 8.5% | 54 | 6.1%-11.1% | 6.6% | 22 | 3.8%-9.8% | 9.2% | 80 | 6.6%-11.9% | 5.8% | 64 | 4.0%-8.0% | 7.1% | 220 | 5.8%-8.5% |
| LCD - LED TV | 71.3% | 332 | 67.0%-75.6% | 63.0% | 186 | 57.9%-68.1% | 64.8% | 530 | 60.9%-68.4% | 65.3% | 633 | 61.6%-69.1% | 65.8% | 1681 | 63.4%-68.3% |
| LCD - Fluorescent TV | 7.7% | 70 | 5.6%-10.1% | 24.5% | 91 | 20.0%-30.0% | 13.9% | 173 | 11.5%-16.7% | 10.9% | 144 | 8.7%-13.4% | 12.3% | 478 | 10.8%-14.0% |
| QLED TV | 2.3% | 12 | 1.1%-3.9% | 1.2% | 6 | NA | 2.1% | 23 | 1.1%-3.3% | 0.9% | 14 | 0.3%-1.5% | 1.4% | 55 | 1.0%-1.9% |
| OLED TV | 0.8% | 9 | NA | 2.4% | 10 | 1.0%-4.1% | 4.8% | 54 | 3.3%-6.7% | 3.9% | 49 | 2.6%-5.3% | 3.6% | 122 | 2.8%-4.6% |
| Plasma TV | 6.4% | 27 | 3.8%-9.2% | 5.3% | 12 | 2.3%-8.9% | 5.7% | 43 | 3.5%-8.3% | 4.9% | 36 | 3.1%-7.0% | 5.4% | 118 | 4.2%-6.8% |
| Non-CRT Projector TV | 0.9% | 8 | NA | 0.1% | 1 | NA | 0.7% | 10 | 0.3%-1.3% | 0.4% | 8 | NA | 0.6% | 27 | 0.3%-0.8% |
| CRT TV | 1.7% | 13 | 0.6%-3.0% | 1.1% | 5 | NA | 1.4% | 15 | 0.6%-2.3% | 1.1% | 17 | 0.5%-1.8% | 1.3% | 50 | 0.8%-1.8% |
| Other TV | 0.0% | 0 | NA | 0.0% | 0 | NA | 0.2% | 2 | NA | 0.6% | 6 | NA | 0.4% | 8 | NA |
| Unknown TV | 11.8% | 75 | 9.1%-14.8% | 4.4% | 23 | 2.5%-6.5% | 8.4% | 94 | 6.5%-10.8% | 13.6% | 143 | 10.8%-16.6% | 11.2% | 335 | 9.5%-13.0% |
| Programmable Thermostat | 30.1% | 183 | 24.2%-36.5% | 25.6% | 103 | 20.2%-31.7% | 29.4% | 320 | 25.1%-34.8% | 28.9% | 312 | 24.7%-32.7% | 28.9% | 918 | 26.2%-31.9% |
| Smart - Wifi Thermostat | 3.3% | 22 | 1.9%-5.1% | 3.2% | 15 | 1.6%-5.1% | 1.9% | 25 | 1.1%-3.0% | 2.7% | 34 | 1.7%-3.9% | 2.6% | 96 | 1.9%-3.4% |
| Smart Thermostat | 7.7% | 48 | 5.2%-10.5% | 3.3% | 16 | 1.5%-5.5% | 9.1% | 89 | 6.8%-11.7% | 5.3% | 61 | 3.7%-7.2% | 6.3% | 214 | 5.2%-7.5% |
| Wifi Thermostat | 2.0% | 9 | NA | 2.9% | 14 | 1.3%-4.8% | 1.0% | 18 | 0.5%-1.7% | 2.9% | 39 | 1.7%-4.3% | 2.3% | 80 | 1.6%-3.2% |
| Manual Digital Thermostat | 14.0% | 87 | 10.4%-18.2% | 15.9% | 56 | 11.5%-20.5% | 11.6% | 77 | 7.7%-15.7% | 11.8% | 104 | 8.2%-15.3% | 12.4% | 324 | 10.1%-14.7% |
| Manual Analog Thermostat | 42.2% | 126 | 34.1%-49.8% | 49.0% | 111 | 41.0%-56.2% | 46.7% | 183 | 39.7%-52.8% | 48.2% | 319 | 43.0%-53.6% | 47.2% | 739 | 43.7%-50.5% |
| Timer Thermostat | 0.7% | 2 | NA | 0.1% | 1 | NA | 0.0% | 0 | NA | 0.1% | 2 | NA | 0.2% | 5 | NA |
| On/Off Thermostat | 0.0% | 0 | NA | 0.0% | 0 | NA | 0.1% | 1 | NA | 0.0% | 0 | NA | 0.0% | 1 | NA |

### *A16.4. Percent of Electronics by Electronics Sub-Type by Urban vs Rural*

| | Rural | Rural (n) | Rural (CI) | Urban | Urban (n) | Urban (CI) |
|---|---|---|---|---|---|---|
| Desktop Computer | 39.3% | 273 | 33.4%-45.2% | 33.3% | 523 | 30.4%-36.0% |
| Laptop Computer | 54.2% | 391 | 47.8%-59.9% | 59.5% | 875 | 56.5%-62.7% |
| Other Computer | 6.5% | 86 | 4.5%-8.9% | 7.2% | 134 | 5.6%-8.7% |
| LCD - LED TV | 64.5% | 561 | 59.9%-68.6% | 66.2% | 1120 | 63.5%-68.9% |
| LCD - Fluorescent TV | 11.8% | 175 | 9.5%-14.2% | 12.5% | 303 | 10.7%-14.3% |
| QLED TV | 1.1% | 16 | 0.5%-1.8% | 1.5% | 39 | 1.0%-2.1% |
| OLED TV | 3.2% | 35 | 2.0%-4.7% | 3.7% | 87 | 2.7%-4.8% |
| Plasma TV | 5.0% | 39 | 2.7%-7.8% | 5.5% | 79 | 3.9%-7.1% |
| Non-CRT Projector TV | 0.9% | 12 | 0.4%-1.5% | 0.5% | 15 | 0.2%-0.8% |
| CRT TV | 1.6% | 21 | 0.8%-2.6% | 1.1% | 29 | 0.7%-1.7% |
| Other TV | 0.7% | 2 | NA | 0.3% | 6 | NA |
| Unknown TV | 12.9% | 119 | 9.3%-17.0% | 10.8% | 216 | 8.9%-13.0% |
| Programmable Thermostat | 30.3% | 318 | 25.8%-35.8% | 28.4% | 600 | 25.2%-31.7% |
| Smart - Wifi Thermostat | 2.7% | 35 | 1.6%-4.0% | 2.6% | 61 | 1.8%-3.5% |
| Smart Thermostat | 4.6% | 53 | 3.0%-6.7% | 6.8% | 161 | 5.5%-8.3% |
| Wifi Thermostat | 2.2% | 36 | 1.3%-3.3% | 2.4% | 44 | 1.5%-3.5% |
| Manual Digital Thermostat | 17.8% | 132 | 12.2%-23.1% | 10.7% | 192 | 8.4%-13.1% |
| Manual Analog Thermostat | 42.2% | 255 | 35.1%-49.0% | 48.7% | 484 | 44.9%-52.7% |
| Timer Thermostat | 0.1% | 2 | NA | 0.2% | 3 | NA |
| On/Off Thermostat | 0.1% | 1 | NA | 0.0% | 0 | NA |

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# A17. Single-Family Shell U-Value and UA Statistics

## A17.1. Single-Family Shell Statistics by Home Type

| | Attached | Attached (n) | Attached (CI) | Detached | Detached (n) | Detached (CI) |
|---|---|---|---|---|---|---|
| Ceiling U-Value | 0.1 | 87 | 0.08-0.13 | 0.09 | 1131 | 0.09-0.1 |
| Ceiling UA | 94.7 | 115 | 60.8-141.5 | 127.9 | 1133 | 119.3-137 |
| Wall U-Value | 0.13 | 130 | 0.11-0.14 | 0.13 | 1444 | 0.13-0.14 |
| Wall UA | 181 | 130 | 156.6-211.6 | 261.1 | 1444 | 248.9-275 |
| Floor U-Value | 0.04 | 115 | 0.03-0.05 | 0.04 | 1330 | 0.04-0.05 |
| Floor UA | 78.6 | 88 | 66.9-90.5 | 117.5 | 1024 | 109.5-126.5 |
| Window U-Value | 0.45 | 171 | 0.42-0.49 | 0.47 | 1677 | 0.46-0.48 |
| Window UA | 55.5 | 173 | 47.9-65.7 | 99.9 | 1737 | 95.7-104 |
| Door U-Value | 0.84 | 172 | 0.79-0.89 | 0.73 | 1726 | 0.71-0.74 |
| Door UA | 52.4 | 173 | 46.6-58 | 60.8 | 1737 | 58.1-63.5 |
| Skylight U-Value | 0.4 | 5 | NA | 0.49 | 170 | 0.46-0.53 |
| Skylight UA | 1.7 | 11 | 0.4-3.4 | 4.5 | 338 | 3.5-5.8 |
| Whole House UA | 498.3 | 90 | 401.3-649.9 | 663.5 | 1022 | 638.9-688 |

### *A17.2. Single-Family Shell Statistics by BPA vs Non-BPA*

| | BPA | BPA (n) | BPA (CI) | Non-BPA | Non-BPA (n) | Non-BPA (CI) |
|---|---|---|---|---|---|---|
| Ceiling U-Value | 0.09 | 549 | 0.08-0.1 | 0.1 | 669 | 0.09-0.1 |
| Ceiling UA | 110.8 | 558 | 101.6-120.8 | 132.6 | 690 | 119.1-148.7 |
| Wall U-Value | 0.13 | 716 | 0.13-0.14 | 0.13 | 858 | 0.12-0.14 |
| Wall UA | 253 | 716 | 234.8-274.5 | 248.2 | 858 | 233.2-264.4 |
| Floor U-Value | 0.04 | 641 | 0.03-0.04 | 0.05 | 804 | 0.04-0.05 |
| Floor UA | 105 | 494 | 95.6-115.8 | 117.8 | 618 | 107.7-128.9 |
| Window U-Value | 0.46 | 812 | 0.45-0.48 | 0.47 | 1036 | 0.46-0.48 |
| Window UA | 94.7 | 841 | 89.8-100.1 | 92.8 | 1069 | 87.8-98.7 |
| Door U-Value | 0.72 | 837 | 0.7-0.75 | 0.76 | 1061 | 0.74-0.78 |
| Door UA | 60.3 | 841 | 56.3-64.5 | 59.2 | 1069 | 56.3-62.1 |
| Skylight U-Value | 0.47 | 87 | 0.43-0.52 | 0.5 | 88 | 0.45-0.55 |
| Skylight UA | 3.9 | 173 | 2.6-5.3 | 4.7 | 176 | 3.2-6.5 |
| Whole House UA | 612.9 | 515 | 584.4-643.8 | 664.9 | 597 | 624.2-707.8 |

### *A17.3. Single-Family Shell Statistics by Heating Zone*

| | HZ 1 | HZ 1 (n) | HZ 1 (CI) | HZ 2/3 | HZ 2/3 (n) | HZ 2/3 (CI) |
|---|---|---|---|---|---|---|
| Ceiling U-Value | 0.09 | 614 | 0.09-0.1 | 0.09 | 604 | 0.08-0.1 |
| Ceiling UA | 124.8 | 622 | 113.6-137.6 | 119.4 | 626 | 107.2-132.4 |
| Wall U-Value | 0.13 | 781 | 0.12-0.14 | 0.14 | 793 | 0.13-0.15 |
| Wall UA | 246.3 | 781 | 232.3-260.5 | 262 | 793 | 241.1-285.5 |
| Floor U-Value | 0.05 | 685 | 0.04-0.05 | 0.03 | 760 | 0.03-0.04 |
| Floor UA | 112.8 | 504 | 103.1-124.2 | 112.2 | 608 | 103.9-122.6 |
| Window U-Value | 0.47 | 891 | 0.45-0.48 | 0.46 | 957 | 0.45-0.48 |
| Window UA | 95.2 | 918 | 90.4-100.2 | 89.2 | 992 | 84.5-94.2 |
| Door U-Value | 0.72 | 912 | 0.7-0.74 | 0.81 | 986 | 0.78-0.83 |
| Door UA | 58.9 | 918 | 55.7-62 | 61.5 | 992 | 58.2-64.6 |
| Skylight U-Value | 0.48 | 107 | 0.44-0.52 | 0.54 | 68 | 0.49-0.6 |
| Skylight UA | 4.4 | 212 | 3.2-5.8 | 3.9 | 137 | 2.8-5.3 |
| Whole House UA | 643.3 | 571 | 613.5-679.2 | 639.4 | 541 | 599.1-680.6 |

### *A17.4. Single-Family Shell Statistics by State*

| | Overall | Overall (n) | Overall (CI) | ID | ID (n) | ID (CI) | MT | MT (n) | MT (CI) | OR | OR (n) | OR (CI) | WA | WA (n) | WA (CI) |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| Ceiling U-Value | 0.09 | 1218 | 0.09-0.1 | 0.1 | 294 | 0.09-0.1 | 0.08 | 125 | 0.07-0.1 | 0.1 | 436 | 0.09-0.12 | 0.09 | 363 | 0.08-0.09 |
| Ceiling UA | 123.4 | 1248 | 114.1-132.6 | 141.3 | 301 | 125.9-158.3 | 107.6 | 131 | 90.1-127.7 | 138.7 | 439 | 117.8-163.7 | 109.4 | 377 | 98.6-121.5 |
| Wall U-Value | 0.13 | 1574 | 0.13-0.14 | 0.11 | 308 | 0.1-0.13 | 0.15 | 202 | 0.13-0.16 | 0.13 | 550 | 0.12-0.14 | 0.14 | 514 | 0.13-0.15 |
| Wall UA | 250.2 | 1574 | 237.7-262.6 | 223.2 | 308 | 196.5-256.1 | 299.8 | 202 | 268.2-337.5 | 221.1 | 550 | 206.2-237.7 | 267.3 | 514 | 248.4-286.2 |
| Floor U-Value | 0.04 | 1445 | 0.04-0.05 | 0.04 | 343 | 0.03-0.04 | 0.03 | 175 | 0.02-0.04 | 0.05 | 447 | 0.05-0.06 | 0.04 | 480 | 0.03-0.05 |
| Floor UA | 112.6 | 1112 | 105.1-121 | 112.7 | 288 | 101.9-123.9 | 112.9 | 147 | 94.8-134.6 | 110.1 | 355 | 98.6-123.5 | 114.2 | 322 | 100.6-131.6 |
| Window U-Value | 0.47 | 1848 | 0.46-0.48 | 0.45 | 401 | 0.43-0.46 | 0.48 | 230 | 0.46-0.51 | 0.48 | 599 | 0.46-0.5 | 0.46 | 618 | 0.44-0.48 |
| Window UA | 93.6 | 1910 | 89.9-97.6 | 85 | 412 | 79.5-90.4 | 92.9 | 241 | 83.5-103.3 | 90.3 | 619 | 83.8-97.9 | 98 | 638 | 92.2-104.3 |
| Door U-Value | 0.74 | 1898 | 0.73-0.76 | 0.8 | 411 | 0.77-0.83 | 0.79 | 240 | 0.75-0.83 | 0.71 | 617 | 0.68-0.73 | 0.74 | 630 | 0.72-0.77 |
| Door UA | 59.6 | 1910 | 57.2-62.1 | 61.2 | 412 | 56.6-65.8 | 57.9 | 241 | 53-62.7 | 56 | 619 | 52.6-59.4 | 61.6 | 638 | 57.7-65.8 |
| Skylight U-Value | 0.49 | 175 | 0.45-0.52 | 0.45 | 22 | 0.39-0.53 | 0.6 | 12 | 0.51-0.69 | 0.48 | 96 | 0.44-0.52 | 0.49 | 45 | 0.43-0.56 |
| Skylight UA | 4.4 | 349 | 3.3-5.5 | 3.7 | 42 | 1.9-6.1 | 4.1 | 29 | 2.1-6.2 | 4 | 161 | 3.1-5.1 | 4.6 | 117 | 2.9-6.4 |
| Whole House UA | 642.3 | 1112 | 616.9-670.4 | 676.1 | 238 | 615-747.1 | 633.2 | 123 | 571.5-693.5 | 651.5 | 422 | 595.5-718.7 | 627.6 | 329 | 595.5-661.9 |

### *A17.5. Single-Family Shell Statistics by Urban vs Rural*

| | Rural | Rural (n) | Rural (CI) | Urban | Urban (n) | Urban (CI) |
|---|---|---|---|---|---|---|
| Ceiling U-Value | 0.09 | 459 | 0.08-0.1 | 0.09 | 759 | 0.09-0.1 |
| Ceiling UA | 132.1 | 460 | 116.7-150.5 | 120.9 | 788 | 110.9-132.7 |
| Wall U-Value | 0.12 | 608 | 0.11-0.13 | 0.13 | 966 | 0.13-0.14 |
| Wall UA | 257.3 | 608 | 232.5-286.3 | 248 | 966 | 234.8-261.1 |
| Floor U-Value | 0.05 | 570 | 0.04-0.06 | 0.04 | 875 | 0.04-0.04 |
| Floor UA | 141 | 451 | 123.6-162 | 102 | 661 | 95.3-109.7 |
| Window U-Value | 0.46 | 704 | 0.45-0.48 | 0.47 | 1144 | 0.45-0.48 |
| Window UA | 107.3 | 728 | 99.7-115.2 | 89.3 | 1182 | 85.2-93.5 |
| Door U-Value | 0.75 | 726 | 0.72-0.78 | 0.74 | 1172 | 0.72-0.76 |
| Door UA | 71 | 728 | 66.8-75.2 | 56 | 1182 | 53.3-58.8 |
| Skylight U-Value | 0.53 | 70 | 0.45-0.61 | 0.47 | 105 | 0.44-0.51 |
| Skylight UA | 6.3 | 138 | 3.3-9.4 | 3.7 | 211 | 2.6-4.8 |
| Whole House UA | 678.7 | 404 | 632.1-730 | 631.9 | 708 | 601.8-665.8 |

### *A17.6. Single-Family Shell Statistics by Home Vintage*

| | Pre 1951 | Pre 1951 (n) | Pre 1951 (CI) | 1951-1970 | 1951-1970 (n) | 1951-1970 (CI) | 1971-1990 | 1971-1990 (n) | 1971-1990 (CI) | 1991-2010 | 1991-2010 (n) | 1991-2010 (CI) | Post 2010 | Post 2010 (n) | Post 2010 (CI) |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| Ceiling U-Value | 0.11 | 241 | 0.1-0.13 | 0.12 | 161 | 0.1-0.14 | 0.09 | 262 | 0.08-0.1 | 0.07 | 343 | 0.07-0.08 | 0.06 | 166 | 0.05-0.07 |
| Ceiling UA | 117.7 | 253 | 96.3-147.9 | 169.2 | 163 | 140.1-204.5 | 122.8 | 273 | 110.6-136.4 | 113.9 | 344 | 102-128.4 | 101.3 | 169 | 79.7-123.4 |
| Wall U-Value | 0.18 | 326 | 0.17-0.19 | 0.16 | 202 | 0.14-0.17 | 0.12 | 360 | 0.11-0.13 | 0.1 | 449 | 0.09-0.11 | 0.09 | 193 | 0.08-0.11 |
| Wall UA | 304.5 | 326 | 277.4-330.4 | 269.6 | 202 | 236.5-308.9 | 220.7 | 360 | 202.5-238.4 | 223.8 | 449 | 200.6-252.5 | 231.4 | 193 | 196.2-270.7 |
| Floor U-Value | 0.05 | 261 | 0.04-0.06 | 0.04 | 168 | 0.03-0.05 | 0.05 | 322 | 0.04-0.05 | 0.05 | 451 | 0.04-0.06 | 0.03 | 195 | 0.02-0.04 |
| Floor UA | 98.9 | 202 | 86-113.8 | 110.6 | 144 | 94.2-134.8 | 120.5 | 251 | 105.7-135.9 | 127.7 | 358 | 110.1-147.4 | 96.8 | 136 | 79.6-116.3 |
| Window U-Value | 0.54 | 376 | 0.52-0.57 | 0.5 | 237 | 0.47-0.54 | 0.49 | 416 | 0.47-0.51 | 0.4 | 531 | 0.39-0.4 | 0.4 | 233 | 0.38-0.41 |
| Window UA | 104.9 | 391 | 95.2-115.6 | 91.3 | 247 | 80.8-101.8 | 89.8 | 426 | 82.2-98.1 | 88.7 | 549 | 83.7-94 | 93.3 | 241 | 82.5-107.5 |
| Door U-Value | 0.63 | 388 | 0.6-0.66 | 0.73 | 245 | 0.7-0.77 | 0.76 | 423 | 0.73-0.79 | 0.8 | 547 | 0.78-0.83 | 0.85 | 240 | 0.8-0.88 |
| Door UA | 38.2 | 391 | 34.6-42.7 | 62.1 | 247 | 56.2-69.1 | 66.2 | 426 | 61.1-71.6 | 68.5 | 549 | 64.2-72.9 | 72.3 | 241 | 64.4-81.5 |
| Skylight U-Value | 0.46 | 39 | 0.41-0.52 | 0.5 | 15 | 0.4-0.67 | 0.56 | 43 | 0.47-0.65 | 0.49 | 63 | 0.44-0.55 | 0.38 | 10 | 0.38-0.4 |
| Skylight UA | 5 | 58 | 2.7-7.5 | 3.4 | 36 | 0.5-7 | 6 | 95 | 3.3-9.3 | 3.2 | 122 | 2.2-4.5 | 3.7 | 19 | 2-5.4 |
| Whole House UA | 694.8 | 226 | 630.6-773.6 | 747.7 | 151 | 667.4-833 | 604 | 240 | 563.3-648.2 | 584.6 | 305 | 546.7-624.5 | 594.2 | 152 | 533.4-657.6 |

# A18. Single-Family Energy Use Intensity (EUI) Statistics

### A18.1. Single-Family Electric EUI by State, by Year

| EUI (kWh/sq.ft.) | 2022 | 2017 | 2011 |
|---|---|---|---|
| Idaho | 6.7 | 7.4 | 7.6 |
| Montana | 5.5 | 8.2 | 5.4 |
| Oregon | 6.7 | 7.5 | 7.4 |
| Washington | 7.7 | 7.9 | 7.7 |
| Overall | 7.1 | 7.8 | 7.4 |

### A18.2. Single-Family Gas EUI by State, by Year

| EUI (therms/sq.ft.) | 2022 | 2017 | 2011 |
|---|---|---|---|
| Idaho | 0.4 | 0.4 | 0.4 |
| Montana | 0.4 | 0.4 | 0.5 |
| Oregon | 0.4 | 0.4 | 0.4 |
| Washington | 0.4 | 0.4 | 0.4 |
| Overall | 0.4 | 0.4 | 0.4 |

### A18.3. Single-Family Other Fuel EUI by State, by Year

| EUI (kBtu/sq.ft.) | 2022 | 2017 | 2011 |
|---|---|---|---|
| Idaho | 7.1 | 4.6 | 8.1 |
| Montana | 12.3 | 7.1 | 10.5 |
| Oregon | 4.5 | 4.2 | 10.1 |
| Washington | 4.3 | 2.5 | 6.7 |
| Overall | 5.4 | 3.6 | 8.2 |

### A18.4. Single-Family Average Annual Electric and Gas Use Per Home, by Year

| kBtu per Home | 2022 | 2017 | 2011 |
|---|---|---|---|
| Idaho | 90,903 | 80,769 | 92,012 |
| Montana | 82,527 | 80,973 | 83,468 |
| Oregon | 82,328 | 83,866 | 77,974 |
| Washington | 81,833 | 81,909 | 84,810 |
| Overall | 83,261 | 82,284 | 83,678 |

### *A18.5. Single-Family Electric EUI by Primary Heating Fuel*

| Electric EUI | EUI (kWh/sq.ft.) |
|---|---|
| Electric Primary Heat | 10.50 |
| Non-Electric Primary Heat | 4.53 |

### *A18.6. Single-Family Natural Gas EUI by Primary Heating Fuel*

| Gas EUI | EUI (therms/sq.ft.) |
|---|---|
| Gas Primary Heat | 0.40 |
| Non-Gas Primary Heat | 0.28 |