BONNEVILLE POWER ADMINISTRATION

Northwest HVAC Sales Insights 2022–2023

APRIL 2025

Report Overview

Bonneville Power Administration (BPA) collaborates with Northwest Energy Efficiency Alliance (NEEA) annually to collect and analyze heating, ventilation, and air conditioning (HVAC) sales data from Northwest suppliers. This report summarizes sales data in 2022 and 2023 from more than half of the known suppliers in the Northwest and includes key residential technologies such as air-source heat pumps (ASHP), variable-speed heat pumps (VSHP), mini-split heat pumps (MSHP), gas furnaces, and central air-conditioners (CAC).

In the report, BPA and Resource Innovations (the research team) describe the collected sales data's coverage of the Northwest HVAC market. The team's analysis shows the collected sales data covers a significant portion of the Northwest residential HVAC market. Therefore, this report focuses on the residential sector and presents the collected data's technology and efficiency mix information for major residential heating and cooling equipment as representative of the total Northwest residential HVAC market. As new federal standards for several residential technologies came into effect in 2023, this report highlights the first-year impact that those standards had on the equipment efficiency mix, among other drivers such as regional efficiency program efforts. The resulting analyses help the region understand trends in residential HVAC sales and inform standard practice baselines. BPA also uses the analysis results to inform market modeling efforts, specifically updates to BPA's Residential HVAC Market Model for the BPA Energy Efficiency Action Plan Period 2022–2027. BPA and NEEA have collected and reported HVAC sales data for seven years.

While this report focuses on data from 2022 and 2023, historical data is available for 2016–2021.[1]

Key Takeaways about 2022–2023 Northwest Residential HVAC Sales

- **New federal standards** helped raise overall market efficiency for heat pumps and CACs.
- Variable-speed units now represent **44%** of all ducted heat pump sales.
- Heat pumps outsold gas furnaces and CACs **two years in a row.**

1 https://www.bpa.gov/-/media/Aep/energy-efficiency/momentum-savings/2016-2021-hvac-sales-data-summary.pdf

Description of Collected Data

NEEA and its vendor D+R International collected the sales data, relying on trusted relationships with regional HVAC suppliers. NEEA and D+R International augment the data by matching equipment model numbers to equipment efficiency attributes from the Air-Conditioning, Heating, and Refrigeration Institute certification database.

The data collected are from suppliers who sell products in Oregon, Washington, Idaho, and/or Montana. Most suppliers have participated consistently over the last several years. Nearly all are traditional HVAC distributors, while a few are manufacturers or manufacturer representatives.

The collected sales data for residential-sized products are mainly distributed among the key technologies listed in Table 1: ASHPs, VSHPs, MSHPs, gas furnaces, and CACs.

A Note on Commercial Sales

While many of the suppliers who provided data sell into both the residential and commercial sectors, none of them distribute solely to commercial buildings. Many commercial sales go through manufacturer representatives, which are currently underrepresented in the data. As a result, the collected data include significantly limited information on commercial equipment, as categorized based on capacity and power requirements.[2] Some commercial buildings use smaller, residential-sized equipment,[3] but the sales data do not provide insights into where technologies are eventually installed. Given the limited commercial data availability, this report focuses on residential-sized equipment. Table 4 in the Appendix provides quantities of commercial equipment from the collected data.

TABLE 1 Description of Key Residential Technologies in the Collected Data

Name	Abbreviation	Description
Air-Source Heat Pump	ASHP	A single- or two-stage outdoor compressor that provides electric heating and cooling to a centrally ducted indoor air handling unit (AHU).
Variable-Speed Heat Pump	VSHP	A variable-speed compressor that provides heating and cooling to a centrally ducted indoor AHU. VSHP includes any ducted MSHPs that manufacturers always pair with an indoor AHU.
Mini-Split Heat Pump	MSHP	A variable-speed outdoor compressor with a side discharge fan that serves one or more indoor units. The indoor units are most commonly ductless but can also be short-ducted, paired with an AHU, or have a combination of ducted/ductless configurations.
Gas Furnace	n/a	An indoor AHU that provides heat from the combustion of natural gas. These can be condensing or non-condensing.
Central Air Conditioner	CAC	An outdoor compressor that provides cooling to a centrally ducted indoor AHU. CACs are typically paired with gas furnaces to provide both heating and cooling.

2 All ASHP, CAC, and MSHP over 60 kBtu/hr, all furnaces over 225 kBtu/hr, and any equipment that requires three-phase power were classified as commercial.

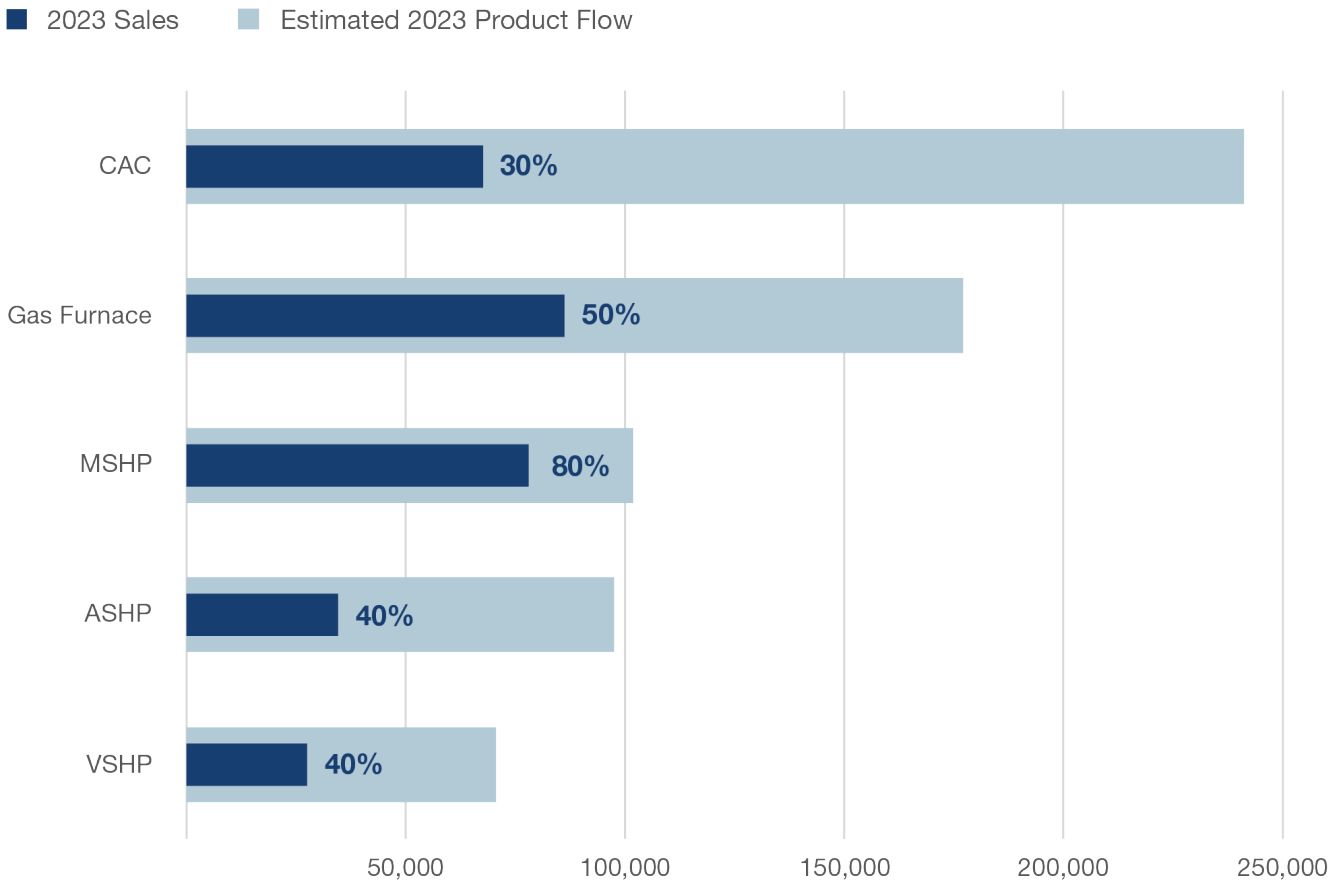
3 https://www.bpa.gov/-/media/Aep/energy-efficiency/momentum-savings/2022-commercial-hvac-permit-database.xlsx

Market Coverage

The 2023 collected sales data contains over 290,000 units covering the above key residential technologies. The Appendix provides the collected sales volume by technology.[4] Since participating suppliers do not constitute all sales in the region, the research team estimated the market coverage of the collected sales data by technology using information from BPA's Residential HVAC Market Model.[5] Figure 1 shows a comparison of sales represented by participating suppliers versus estimated total sales.[6]

MSHPs have the best coverage, with nearly all suppliers reporting sales for that technology and the highest number of reporting suppliers for each state. Reported MSHP sales represent approximately 80% of the overall Northwest residential market, partly due to NEEA's long-standing engagement with MSHP suppliers. ASHP, VHSP, gas furnace, and CAC sales all represent between 30% and 50% of the overall estimated Northwest residential market.

FIGURE 1 Market Coverage of 2023 Collected Residential Sales Data



4 In addition to these main technologies, collected sales data also included small quantities of less common residential-sized technologies, such as packaged ASHPs and variable-speed mini-split air conditioners. See the Appendix for more information.

5 https://www.bpa.gov/-/media/Aep/energy-efficiency/momentum-savings/2016-2021-res-hvac-market-model-report-eo-compliant.pdf

6 BPA's 2016-2021 Residential HVAC Market Model produced technology-specific estimates of total market sales for the main residential technologies using a stock turnover model and various data sources. The research team applied 2020–2023 growth rates from the collected sales data to the model's 2020 total sales estimates to obtain the 2023 total sales estimates.

Residential Insights

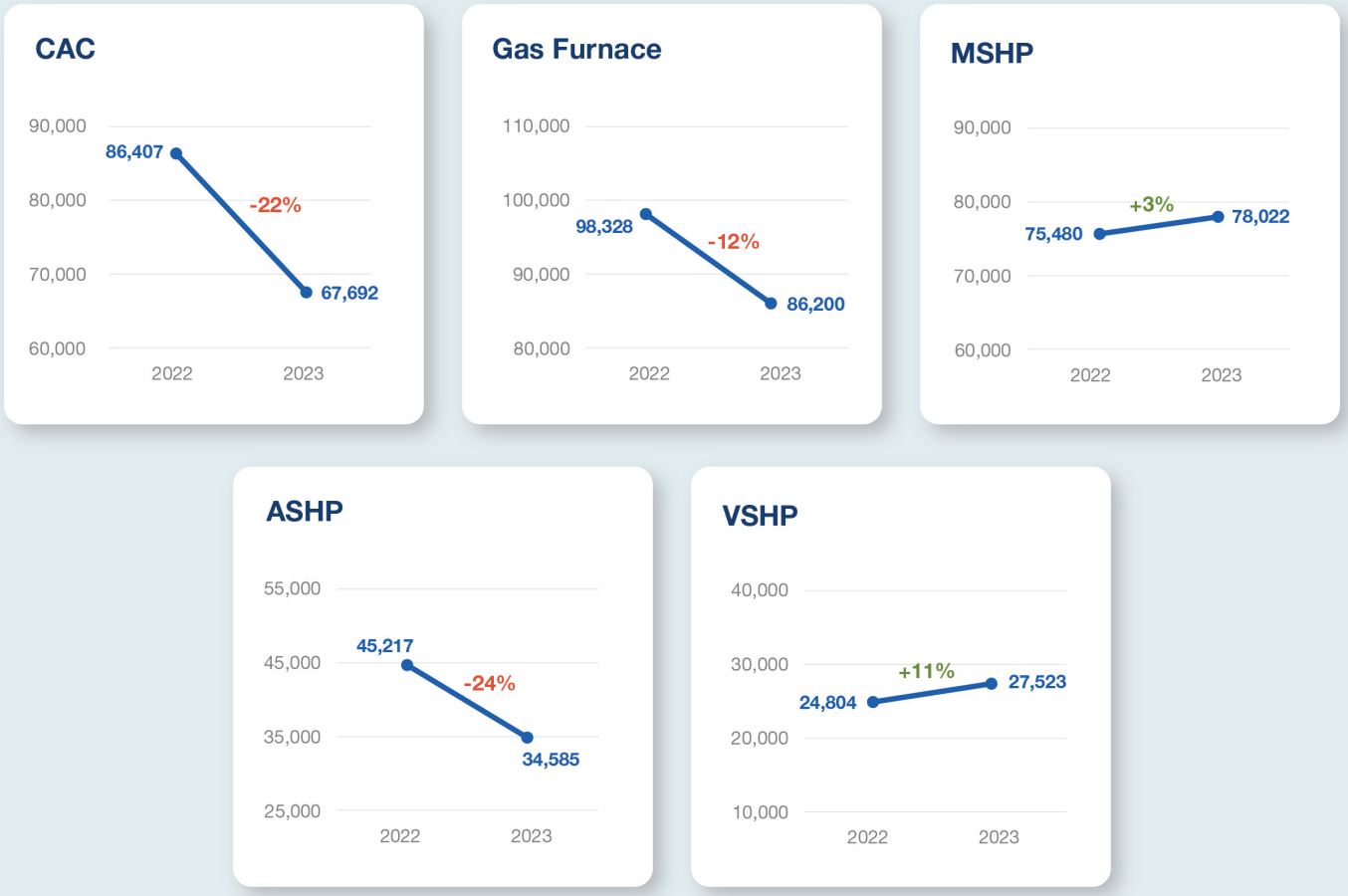
This section provides insights from the 2022–2023 collected sales data for residential applications specific to these five technologies: ASHPs, VSHPs, MSHPs, gas furnaces, and CACs.

As illustrated in Figure 2, sales for CACs, gas furnaces, and ASHPs dropped significantly in 2023, while sales for inverter-based units (ducted VSHP and MSHP) slightly increased. Despite the overall drop in sales for heat pumps, the combined sales of heat pumps (ASHP, VSHP, and MSHP) were still higher than gas furnaces two years in a row. With code updates that encourage heat pumps in Washington[7] and public interest in heat pumps, the research team expects this trend to continue.

Insights from 19 Manufacturer Interviews at 2025 AHR Expo[8]

- Manufacturers expressed market uncertainty under the new administration.
- Heat pump sales continue to grow nationwide and outpacing gas furnaces.
- VSHP and MSHP sales growth expected to continue.
- Cold-climate heat pump sales growing at a slow pace.

FIGURE 2 Sales Volume by Technology, 2022–2023



7 Table R406.3 https://sbcc.wa.gov/sites/default/files/2023-10/CR102_WSEC_R_EPCA_complete_101823.pdf

8 Source: 2025 AHR Expo. This is the premier annual tradeshow event for HVAC professionals.

Heating and Cooling Technology Mixes

The heating and cooling technology mixes (Figure 3 and Figure 4, respectively) show each technology's sales as a percentage of all key heating and cooling technology sales in the 2023 collected data. Similar to 2022 data, the combined heat pump sales outnumbered the gas furnace sales in the 2023 collected data. On the cooling side, the combined heat pump sales also outnumbered CAC sales in the 2023 collected sales data.

FIGURE 3 2023 Mix of Key Residential Heating Technologies

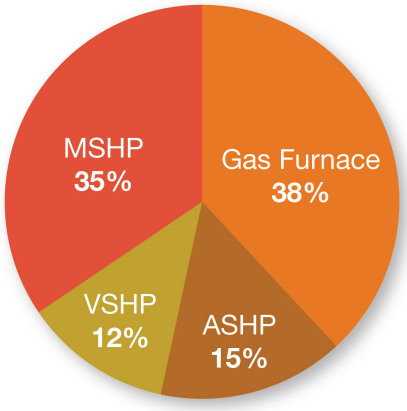
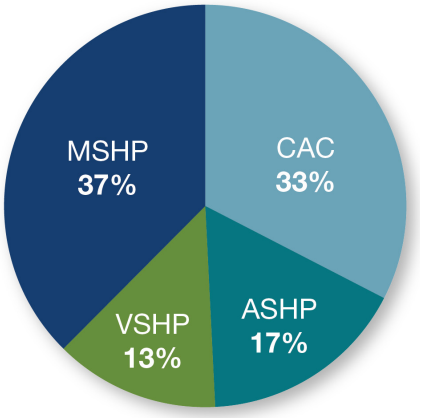


FIGURE 4 2023 Mix of Key Residential Cooling Technologies



New Federal Standards and Efficiency Metrics

Starting on Jan. 1, 2023, new federal standards took effect for heat pumps and CACs. The standards raised the minimum efficiency levels for these technologies and changed the efficiency metrics manufacturers must use to rate equipment. Table 2 highlights both the increased efficiency standards for these technologies, as well as the differences between the old and new metrics. The team's calculation method for converting the old efficiency metrics for equipment sold prior to 2023 is described in the Appendix.

TABLE 2 Previous and Current Efficiency Standards for Residential Heat Pumps and CACs

Technology	Previous Standards		Standards as of Jan. 1, 2023 (using old metrics)*		Standards as of Jan. 1, 2023 (using new metrics)	
	SEER**	HSPF**	SEER	HSPF	SEER2	HSPF2
ASHP & VSHP	14	8.2	15	8.8	14.3	7.5
MSHP	14	8.2	15	8.8	14.3	7.5
CAC	13	n/a	14	n/a	13.4	n/a

* Standards as of Jan. 1, 2023 (using old metrics) are from Table I-1 of 82 FR 1786 https://www.federalregister.gov/documents/2017/01/06/2016-29992/energyconservation-program-energy-conservation-standards-for-residential-central-air-conditioners

** SEER = Seasonal Energy Efficiency Ratio; HSPF = Heating Seasonal Performance Factor

Defining New Efficiency Bins

The research team developed a new system for categorizing equipment efficiency based on the new federal standards and levels specified by the Consortium for Energy Efficiency (CEE). Table 3 contains information on how the efficiency categories developed by the research team relate to the federal standard and CEE efficiency tiers. The top three rows are cooling efficiencies and the bottom two rows are heating efficiencies. Some equipment sold in 2023 is below the new federal standard. Federal law dictates that only the manufacture of equipment must meet the updated standards, but allow for the sales of previously-manufactured units in certain regions, including the Northwest.[9] It is worth noting that the CEE efficiency tiers will become more stringent in coming years, and so the efficiency tiers listed in the table below are subject to change in future analyses.[10]

TABLE 3 Relationships Between Updated Efficiency Bins, Federal Standards, and CEE Tiers and Efficiency Bin Definitions

		Below Standard	Standard	High Efficiency (CEE Tier 1)	Very High Efficiency (CEE Tier 2)
		Below the new federal standard	Above the federal standard, but below CEE Tier 1	Above CEE Tier 1	Above CEE Tier 2
Cooling	ASHP & VSHP	SEER2 < 14.3	SEER2 ≥14.3–15.2	SEER2 ≥ 15.2–17	SEER2 ≥ 17*
	MSHP	SEER2 < 14.3	SEER2 ≥14.3–15.2	SEER2 ≥ 15.2–16	SEER2 ≥ 16
	CAC	SEER2 < 13.4	SEER2 ≥13.4–15.2	SEER2 ≥ 15.2–16	SEER2 ≥ 16
Heating	ASHP & VSHP	HSPF2 < 7.5	HSPF2 ≥ 7.5–8.1	HSPF2 ≥ 8.1–9	HSPF2 ≥ 9*
	MSHP	HSPF2 < 7.5	HSPF2 ≥ 7.5–8.5	HSPF2 ≥ 8.5–9.5	HSPF2 ≥ 9.5

* No CEE Tier 2 available for ASHP and VSHP

9 https://www.ecfr.gov/current/title-10/chapter-II/subchapter-D/part-430/subpart-C/section-430.32
10 https://cee1.my.site.com/s/resources?id=a0V2R00000sUQby

ASHPs and VSHPs

Centrally ducted heat pumps, both ASHPs and VSHPs, now represent over a quarter of heating equipment sales, with similar representation in cooling equipment sales. As noted in Table 1, ASHPs are defined in this report as including only single- and two-stage split-system ducted units, whereas VSHPs are defined as ducted split-system units with variable-speed compressors.

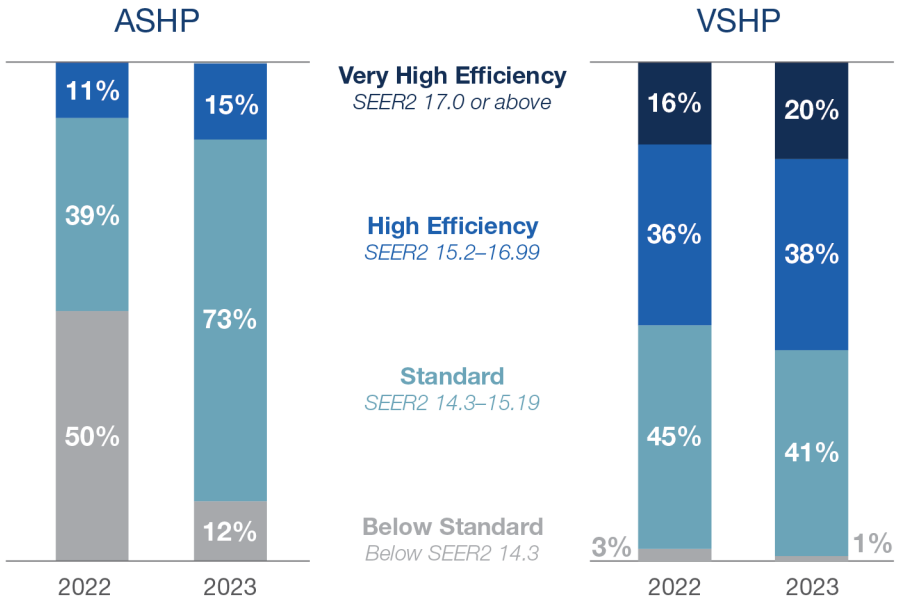
Federal regulations have been effective in increasing product efficiencies, as shown in Figure 5. The percentage of ASHPs that have cooling efficiencies below the current federal standard dropped from 50% in 2022 to 12% in 2023. The research team expects that as the units manufactured pre-2023 are sold off, this below-standard portion will drop to zero in 2024.

VSHPs have seen enormous growth over the past few years and now account for 44% of centrally ducted heat pump sales.

ASHPs and VSHPs, *cont.*

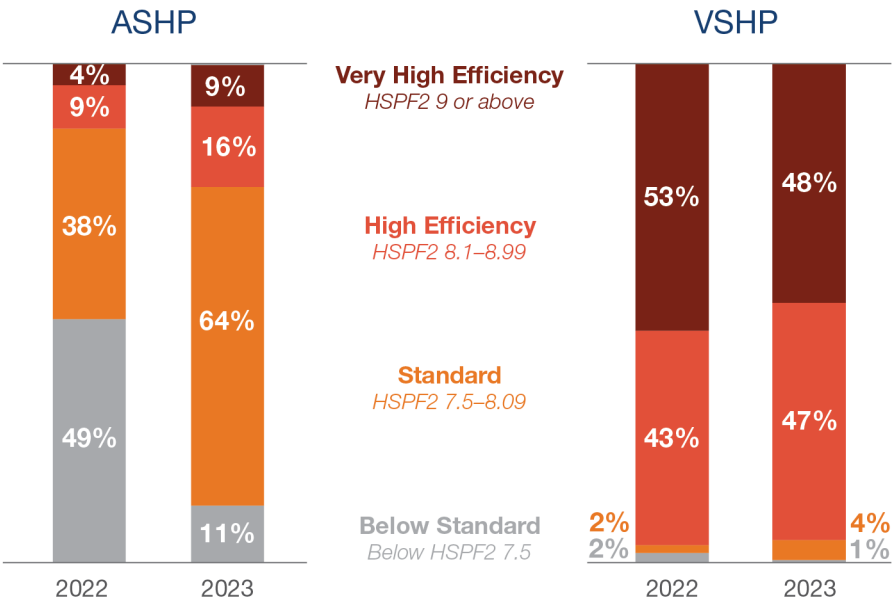
VSHP sales span a variety of cooling efficiency levels above the federal standard, but on average have higher SEER2 than ASHPs. While there are many factors that affect energy use,[11] modeling shows that a typical VSHP consumes less energy than the highest tier of ASHPs.[12]

FIGURE 5 Ducted Heat Pump Cooling Efficiency Levels



Federal regulations have resulted in a similar increase in heating efficiencies for ASHPs (Figure 6). For VSHPs, however, almost all the products are in the "High Efficiency" tier or above, and there is little change between 2022 and 2023.

FIGURE 6 Ducted Heat Pump Heating Efficiency Levels



11 For example, the sizing of the heat pump, duct sizing, duct insulation, and controls.

12 https://www.bpa.gov/-/media/Aep/energy-efficiency/momentum-savings/2016-2021-res-hvac-market-model-report-eo-compliant.pdf

MSHPs

MSHPs represent 35% of heating equipment sales in 2023. They are one of two technologies, along with VSHPs, whose sales were higher in 2023 than 2022. MSHPs use the same variable-speed compressor technology for their outdoor unit as VSHPs but are typically used in smaller applications. Distributors can sell MSHPs with one or more indoor units: ductless fan coil units, concealed duct ("short duct") systems, or combinations of these in a multi-zone system. Some MSHPs may also get paired with whole-home air handling units. While MSHPs are increasingly used in some form of ducted and/or hybrid configurations, the majority are paired only with one or more ductless indoor head(s) and often referred to as ductless heat pumps.

MSHPs must meet the same federal standards as ASHPs. However, MSHPs are inherently variable-speed, and none of the 2023 sales are below the federal standard. In fact, nearly all 2022 sales met the 2023 federal standards. Figure 7 shows that on the cooling side, almost all MSHPs meet the "Very High Efficiency" tier for both 2022 and 2023. For heating, Figure 8 highlights that while there were fewer MSHPs in the "Very High Efficiency" tier as there were in cooling, the vast majority of MSHPs were above the "Standard" tier. For both heating and cooling efficiencies, there was not a substantial change in MSHP efficiencies between 2022 and 2023.[13]

FIGURE 7 MSHP Cooling Efficiency Levels

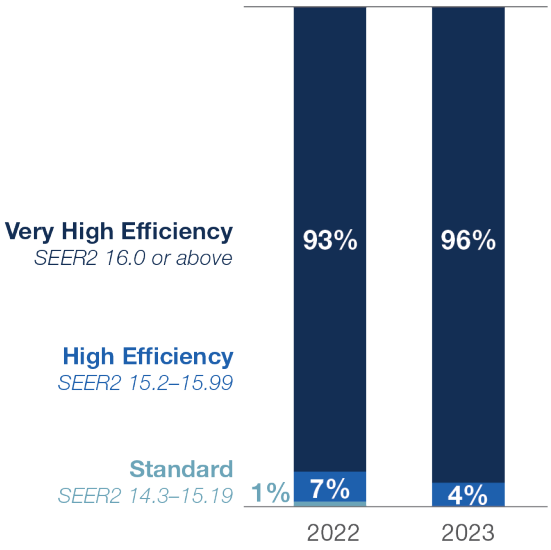
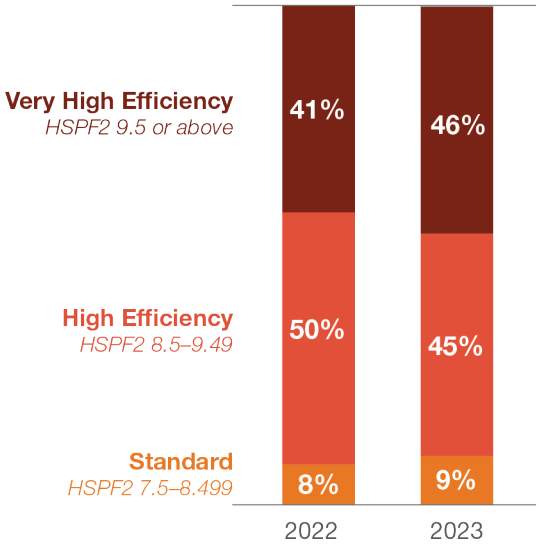


FIGURE 8 MSHP Heating Efficiency Levels

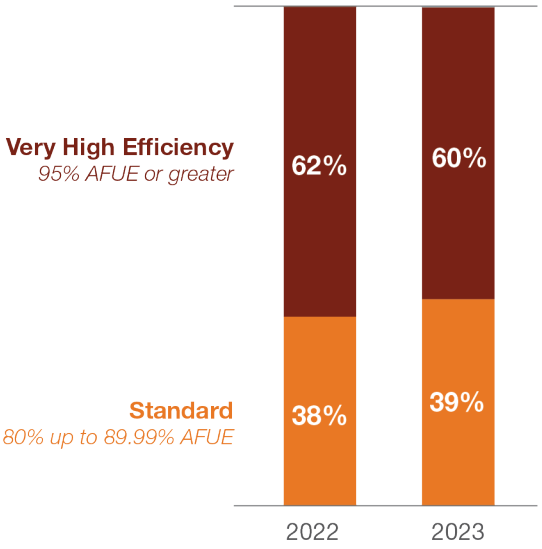


13 Some of the percentages in Figures 7-10 may not add up to 100% due to rounding.

Gas Furnaces

In 2023, the number of gas furnaces sold dropped by 12% from 2022. Furnace sales were again lower than combined heat pump sales, yet they still represent 38% of heating technologies. Figure 9 highlights that gas furnace efficiency continues to be bifurcated, with 40% of unit installs meeting the federal standard and 60% meeting the "Very High Efficiency" tier in 2023. The 60% represented highly efficient gas furnaces with AFUE (Annual Fuel Utilization Efficiency) of 95% or higher. It is worth noting that while only 2% of gas furnaces had AFUE over 97% in 2022, this number increased to 6% in 2023.

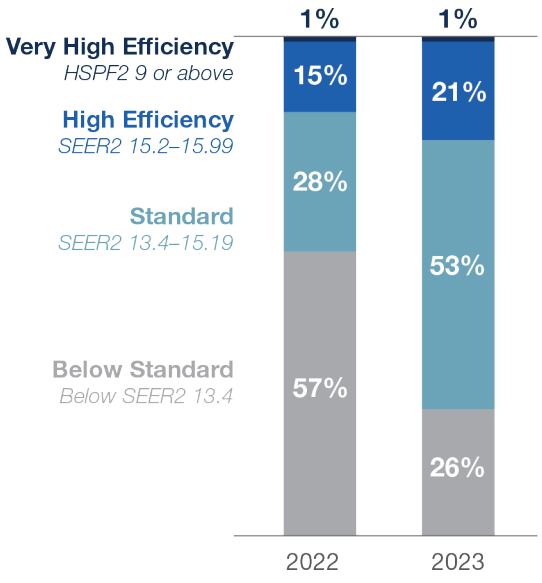
FIGURE 9 Gas Furnace Efficiency Levels



CACs

CAC sales dropped by 22% from 2022 to 2023 and represented only 33% of all cooling equipment sales, their lowest share since data collection started in 2016. Figure 10 demonstrates how the updated federal standard and utility programs contribute to improving CAC efficiency, as the percentage of CACs below the federal standard dropped from 57% in 2022 to 26% in 2023.

FIGURE 10 CAC Efficiency Levels



Supplemental Data on Room Air Conditioners

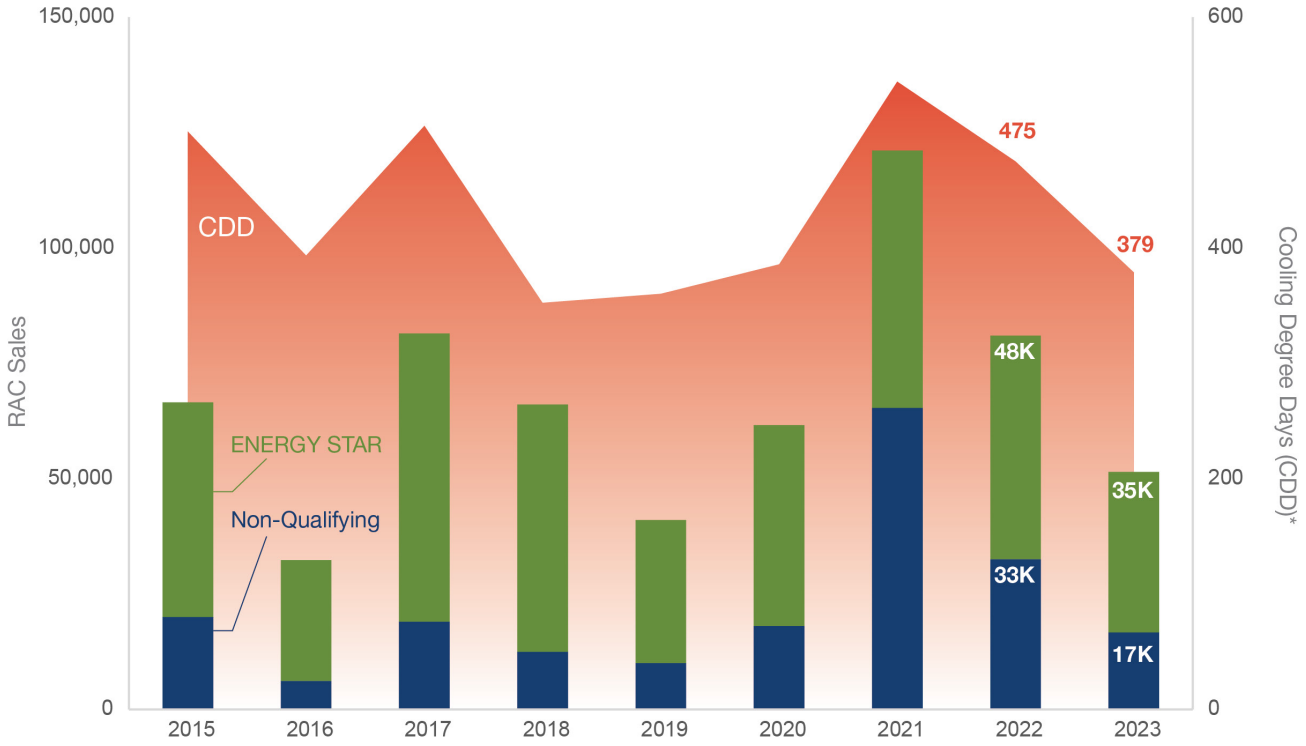
The sales data collected from HVAC suppliers do not include sales of room air conditioners (RACs)—portable units designed to be installed seasonally in windows and powered through standard 120V outlets. However, to provide a comprehensive report on the residential cooling market, this report includes a summary of RAC sales that NEEA obtains from separate, retail sales channels.

Through its ENERGY STAR Retail Products Platform, NEEA collaborates with national retailers to offer mid-stream incentives for energy-efficient products such as RACs.

RAC sales have shown significant variability in recent years, often reflecting changes in cooling degree days (CDD)—a measure of how "hot" a particular year was. From 2021 to 2023, a distinct pattern emerged: sales of room AC units decreased in response to declining CDD levels, as cooler summers likely reduced consumer demand.

RAC sales fluctuations differed between ENERGY STAR qualified units and non-qualified units. The sales volume of ENERGY STAR qualified units in recent years has been less variable compared to the volume of non-qualifying units, which has seen wider fluctuations.

FIGURE 11 ENERGY STAR vs. non-ENERGY STAR Room AC Sales



* Sum of average monthly cooling degree days from June to September in the NW

Appendix: 2022–2023 Collected Sales Data

This section presents the 2022 and 2023 collected data's aggregated sales volumes by sector and technology. The presented data includes the team's adjustments to fill in minor temporal and geographic data gaps, as well as a sector categorization for residential and commercial equipment using the following criteria:

ASHPs, MSHPs, and CACs

- Residential: capacity of less than or equal to 5 tons (60 kBtu/hr).
- Commercial: capacity of greater than 5 tons (60 kBtu/hr).

Gas furnaces

- Residential: capacity less than 225 kBtu/hr.
- Commercial: capacity greater than or equal to 225 kBtu/hr.

All HVAC equipment

- All ASHP, CAC, and MSHP over 60 kBtu/hr, all furnaces over 225 kBtu/hr, and any equipment that requires three-phase power were classified as commercial.

TABLE 4 2022–2023 Collected Sales by Sector and Technology

		Collected Sales Quantity	
	Technology	2022	2023
Residential	Gas Furnace	98,328	86,177
	MSHP	75,096	77,881
	CAC	86,381	67,681
	ASHP	45,189	34,585
	VSHP	24,801	27,498
	Variable-Speed Mini-Split and Multi-Split AC	2,448	1,964
	Single Packaged Heat Pump	1,247	1,949
	Boilers	n/a*	1,353
	Mini VRF	2,101	1,194
	Single Packaged CAC	584	1,000
	Electric Furnace	1,567	539
	Direct Heating Equipment**	465	127
Commercial	Gas Packaged Unit	3,668	3,685
	Unitary Large Equipment	2,462	2,519
	CAC – Packaged Terminal	146	845
	Water Source Heat Pump	n/a***	462
	Single Packaged Vertical AC & HP	379	214
	Heat Pump – Packaged Terminal	1,574	153
	Variable Refrigerant Flow	165	151

* Boilers were excluded from the analysis in 2022 due to there not being enough supplier submissions.

** Direct heating equipment uses gas and is installed in the room that it is intended to heat. The equipment heats air and distributes the warmed air directly to the room. Common names for this equipment include space heaters, wall heaters, floor heaters, hearth heaters, and room heaters.

*** Water source heat pumps were excluded from the analysis in 2022 due to there being too few units.

Appendix: Translating Between New and Old Efficiency Metrics

As mentioned in the Residential Insights section, new federal standards took effect for heat pumps and CACs starting on Jan. 1, 2023. These federal standards required that manufacturers rate their equipment using SEER2 and HSPF2 rather than SEER and HSPF.

Products manufactured and sold before 2023 typically have efficiencies reported in SEER and HSPF. For these units, the team converted prior efficiency values to SEER2 and HSPF2, allowing comparison to the 2023 data. The team used a conversion methodology provided by Air Conditioning, Heating, and Refrigeration Institute (AHRI).[14] Because the updated testing procedure calculates SEER2 and HSPF2 differently for ducted and ductless equipment, each uses a unique conversion factor based upon the presence of ducts in the HVAC system of interest. The research team used the multipliers shown in Table 5. For example, a ducted ASHP with an HSPF of 10 would be reclassified with an HSPF2 of 8.5.

TABLE 5 Multipliers Used to Translate from SEER to SEER2 and HSPF to HSPF2

System Type	SEER2	HSPF2
Ducted	0.95	0.85
Ductless	1.00	0.90

14 https://www.resnet.us/wp-content/uploads/FS_Adndm71fSEER2_webpost.pdf