# Dual Fuel Heat Pump Pilot Phase I Evaluation Report

## Energy Trust of Oregon

Submitted by Apex Analytics LLC and Ideal Community Strategies

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## Executive Summary

Energy Trust of Oregon (Energy Trust) initiated the Dual Fuel Heat Pump Pilot (DFHP) to explore the feasibility of developing dual fuel heat pumps as a future Residential measure in its portfolio. DFHP systems are flexible heating and cooling equipment that provide dual-source heating through a central air source heat pump and a natural gas forced air furnace, while also delivering cooling during the summer season. The switch between heating with the heat pump or the furnace is determined by a pre-set switchover temperature based on the outdoor air temperature.

The DFHP Pilot was originally proposed in 2022 and driven by interest in installing air conditioning (AC) for vulnerable low-income populations following Oregon's 2021 "heat dome" event and by staff interest in gaining insights into the technical aspects of performance and customer usage of and experience with it.[1] The pilot originally focused on serving low-income (LI) customers[2] and involved five Oregon investor-owned utilities serving customers with electricity and natural gas. Energy Trust covered 100% of the equipment and installation costs, up to a maximum of $12,000 per unit. Consistent with Energy Trust's board-approved policy[3], with utility ratepayer funding, Energy Trust encourages the adoption of the most efficient equipment of the fuel of the customer's choosing and does not attempt to influence customer fuel choice. This heat pump-related pilot aligns with this policy.

This process evaluation study is the first in a two-phase effort to evaluate the DFHP Pilot, the second being an impact evaluation to quantify the energy use changes resulting from the DFHP system. The overarching research objective for this DFHP Pilot process evaluation was to understand the interaction between the DFHP systems and customers, the trade allies who install them, and Energy Trust as the administrator of the pilot to inform future decisions regarding applicability of DFHP systems to Energy Trust's Residential portfolio. Beyond this, the study also sought to evaluate the pilot effectiveness in terms of its ability to deliver and meet its goals – in other words, how the pilot performed. The evaluation focused specifically on four core areas:

- Assess customer perspectives on the benefits and concerns or drawbacks of DFHP systems.
- Evaluate customer insights, experience, and satisfaction in the pilot, covering recruitment, scheduling, installation, and operation.
- Gather perspectives on the costs, challenges, and process considerations with installing DFHP systems.
- Understand broader market activity, motivations, barriers, and costs of DFHP installations occurring outside of Energy Trust's Pilot.

This executive summary highlights the pilot's key research objectives and provides a high-level assessment of the evaluation results. Overall, the DFHP pilot had two primary goals: the first to

[1] Loikith, Paul. "The 2021 Pacific Northwest Heatwave (Heat Dome)." *The Oregon Encyclopedia*, 20 Apr. 2023, www.oregonencyclopedia.org/articles/heat-dome-2021/

[2] This low-income focus was later relaxed to moderate and then no income requirements.

[3] Aligning with Oregon's Decarbonization Policies, https://www.energytrust.org/wp-content/uploads/2016/11/4.03.000.pdf

test how the DFHP technology may be a viable offering and understand the resulting changes to energy use (and associated bill impacts) while the second is whether the pilot delivery approach – which targeted a priority customer group[4] of low-income households – is successful and can be scaled. An "ideal" study population (i.e., study design of treatment and control) of homes and occupants is needed to successfully test the first goal, while a broader general population or real-world conditions are required to test the second goal. This tension between these two goals resulted in challenges for the pilot.

The pilot was moderately successful in installing new DFHP heating and cooling systems, but fell well short of the original participation targets: the pilot targeted installing 90 DFHP systems, yet had only installed 31 by the time Apex launched the participant survey (September 2025) and another 31 (for a total of 62) by the time of this reporting (February 2026). The DFHP systems substantially improved occupant comfort in the summer (in most homes), though – for a smaller subset of homes – at the expense of anxiety around perceived increased winter heating costs. The Pilot demonstrated collaboration across varied and numerous stakeholders within the constraints of a narrowly focused design. Energy Trust also demonstrated flexibility to make mid-Pilot adjustments to address low enrollment. However, the "moderate" success as noted above is due to this low enrollment rate and the prolonged period of Pilot duration. Recruitment challenges were due to narrow eligibility requirements without corresponding identification and targeting[5], in conjunction with limited opportunity for community-based organizations to provide recruiting support as they have in other efforts.

### *Overall Pilot Performance*

**Key Conclusion: In the Pilot, Energy Trust successfully navigated complex stakeholder collaboration but was restrained by competing stakeholder priorities.** The pilot succeeded in delivering new heating and cooling systems to households to better understand the interaction between participants, their new equipment and ultimately, in Phase II of this evaluation, the resulting changes in energy use. The Pilot went through a co-design process that required coordination and buy-in from five utilities on complex decision-making and balancing the varied goals for all stakeholders involved. Stakeholders praised Energy Trust staff for their effective facilitation of "highly technical" conversations during the co-design process.

However, the program's effectiveness was limited by (initially) narrowly defined customer and site eligibility criteria. This approach combined equity goals with a technical study design while overlooking the logistical feasibility with a diminished response and adjustment to staff or utility feedback, resulting in low enrollment (only 62 completed projects out of a target of 90) and a misalignment of objectives. Further, the co-design process also meant sacrificing a portion of technical feasibility to align with external stakeholder inputs and for the greater good of moving forward with a viable Pilot. These shortcomings limited this study's ability to delve deeper into segmentation and may hamper the second phase impact analysis due to limited participation and usage data, and a mixed composition between income qualified and market rate Pilot participants further diluting the analysis samples.

[4] Energy Trust designates low-income customers as a priority group of customers for program participation. See https://blog.energytrust.org/energy-trust-board-adopts-2026-2030-multiyear-plan/ for details about priority customers.

[5] The available data available (customer lists) lacked the required information to determine eligibility criteria for enrollment.

### *Customer Perspectives on the Benefits and Costs of DFHP Systems*

**Key Conclusion: High satisfaction with adding cooling was tempered by anxiety over winter heating costs.** Participants reported high satisfaction with the systems, driven largely by the life-changing comfort of central air conditioning during summer heat waves, while improving indoor air quality during the wildfire season. Most respondents reported being very satisfied with their new systems, citing benefits including improved sleep, reduced allergies, and quieter operation compared to previous window AC units. The DFHP transformed the home environment for some participants making their homes more comfortable than public spaces (which they had previously believed to offer greater comfort than their homes). Conversely, participants were primarily concerned with potential winter bill increases. Despite pre-installation notice and system walkthroughs, participants expressed concern regarding higher winter electric bills, with some noting that the heat pump was more expensive to run than their previous gas furnace and took significantly longer to heat their homes than the gas furnace alone.[6] There were a few cases of DFHP systems requiring callbacks,[7] requiring contractor visits to address the issue. These included thermostat issues (n=2), self-shutoff (n=1), inability to run cooling cycles (n=1), and a malfunctioning switchover system (n=1) which required an additional five follow-up visits.

### *Customer Insights, Experience, and Satisfaction in the Pilot*

**Key Conclusion: The Pilot delivered strong satisfaction and a smooth experience for most participants.** The high satisfaction was driven largely by the immediate quality-of-life improvements provided by central air conditioning. Participants gave high ratings for the early phases of pilot participation — specifically the home walkthrough and installation— praising the convenience of scheduling, the ease of paperwork, and the polite, efficient nature of the contractors. Furthermore, operational reliability was high, with contractors reporting few participant callbacks thanks to an installation process that prioritized customer education (walkthroughs and clear communication).

### *Program Perspectives on Costs, Challenges, and Process*

**Key Conclusion: Flexible and adaptive management lessened initial enrollment challenges caused by restrictive eligibility criteria but increased costs, and other process challenges remained with stakeholders and contractors.** Program staff successfully boosted participation mid-pilot by relaxing strict income limits and extending the allowable furnace age (and later relaxing the requirement that homes not have central AC to allow homes with non-functional central AC). These changes were necessary because the initial eligibility criteria—specifically the requirement for low-income homes with newer furnaces and no existing AC—created a "needle in a haystack" recruitment situation. Utility partners reported that the initial co-design process felt prescriptive rather than collaborative, and that communication frequency dropped significantly during implementation, requiring them to proactively seek updates. Contractors

[6] Several participants (n=3) complained about DFHP systems taking longer to hit temperature setpoints. Though participants didn't specify why, we believe it was likely due to several factors: a lag in morning setpoint due to overnight setbacks, generally achieving setpoints when turning the system on or during a cold spell. All three cases complained about timing relative to the gas furnace alone.

[7] Callbacks refer to an installation or technical issue that requires the installation contractor to return to the home to address the issue.

had mixed feedback with the Pilot and concerns about the inability to develop their own leads which they believe constrained enrollment as well.

### *Broader Market Activity, Motivations, Barriers, and Costs*

**Key Conclusion: DFHPs are viewed as a resilient, albeit still niche home heating, ventilation, and air conditioning (HVAC) solution, and deeper adoption is dampened by high upfront costs.** Contractors view DFHPs as a clear beneficial heating and cooling solution for rural homes or those dependent on expensive bulk fuels (propane/oil), offering resilience against extreme cold.[8] DFHP systems represent approximately one-fifth of the contractor residential HVAC business, with contractor expectations for continued, yet moderate, growth. For customers, key motivations are cooling benefits and heating system flexibility. However, widespread adoption is limited by high upfront costs—according to interviewed contractors approximately $1,500 more than standard AC—and skepticism regarding electric bill impacts. In colder climates like Central Oregon, contractors remain hesitant to recommend heat pumps – even DFHP – over strictly gas furnaces due to concerns about performance limitations in sub-freezing temperatures. Cost increases associated with recent inflationary pressure and change in refrigerant types (to more costly options) has also contributed to concerns about costs of these systems as well.

### *Recommendations*

Based on these findings, the evaluation offers the following recommendations for future DFHP programs or other pilot offerings:

1. **Refine Customer Education and Support:** The Pilot did a good job of providing walk throughs and key system information to participants, yet some participants still faced challenges and uncertainty about their system. Future programs should develop comprehensive post-installation training materials (leave-behinds) that specifically address thermostat operations, switchover settings, heat pump performance and operations. Education is critical to managing customer expectations regarding the slower heating speed of heat pumps compared to gas furnaces and mitigating anxiety regarding winter electric bill increases.

2. **Align Eligibility Criteria with Technical Objectives:** Future pilots should align eligibility requirements to meet the technical objectives of the pilot, which may be more reflective of the general population. This pilot showed that relaxing income and furnace age-limits was essential for viable participation volume. Furthermore, the program might consider adjusting to a variable income model with partially funded systems for more moderate- or higher-income levels. This would also allow some relaxation of the system cost caps, further broadening the possible range of qualified homes. Loosening other restrictions might also allow a pilot to focus on collecting robust technical and operational data on energy savings relative to a more limited set of homes.

3. **Strengthen Pilot Procedures and Communication:** Establish a formal procedural framework for pilot projects that defines primary strategic goals (e.g., equity vs. technical learning) at the outset. This framework should ensure bi-directional collaboration, ensuring external partners

[8] Contractors also view resilience during power outages as a benefit to DFHPs. While DFHPs do not function without electric power this perspective remains present and, in some edge cases, a DFHP may be powered with a backup generator with less electric draw than a wholly electric HVAC system.

and implementation staff can influence design parameters to avoid misalignment in objectives and ultimately Pilot outcomes. Regular, scheduled updates should replace ad-hoc communication with external partners.

4. **Address Winter Cost Anxiety and Bill Impacts:** Future program messaging must balance the promotion of cooling benefits with the reality of potential winter bill increases (perceived by some participants and true increased bills experienced by others). One option is for future programs to consider exploring "smart switching" controls that utilize time-of-use rates or real-time cost signals to automatically prioritize the most economic fuel source, thereby protecting low-income participants from bill “surprises”.

5. **Strengthen Partnering with Contractors and Community Organizations**: To overcome recruitment challenges, staff should engage with trade ally contractors early in the pilot process to help identify the overall number of potentially eligible households, assess the viability of reaching program targets based on that population size, and identify specific households that are potential participants. Leveraging community-based organizations can serve as warm introductions, validating the legitimacy of the Pilot and as a means of addressing customer concerns over the “too good to be true” upgrades like those offered by the DFHP Pilot. Integrating these partnerships early in the design phase of the Pilot ensures that eligibility criteria align with the technical reality of housing stock in the area.

# Memo

**To:** Board of Directors

**From:** Cody Kleinsmith, Evaluation Project Manager
Andrew Shepard, Senior Project Manager - Residential
Marshall Johnson, Sector Lead - Residential

**cc:**

**Date:** March 27, 2026

**Re:** Staff Response to Phase One of the Dual-Fuel Heat Pump Pilot Evaluation

The Dual-Fuel Heat Pump Pilot originated out of joint interest from Energy Trust, the Oregon Public Utility Commission (OPUC), and utilities in studying the emerging heating, air-conditioning, and ventilation (HVAC) system configuration and fit within Energy Trust's Residential program portfolio in 2022. This memo recaps phase one of the pilot evaluation, with phase two slated to begin in Q4 2026.

Phase one of the evaluation studied the pilot development and administration process, the customer sentiments about their installed measures, and trade ally perspectives on the pilot and technology overall.

The pilot's design was collaboratively developed between Energy Trust, the OPUC and utilities. The resulting customer and site eligibility requirements attempted to balance multiple objectives and priorities, which included both developing effective technical learnings and serving customers experiencing low incomes. This resulted in difficulties in identifying eligible customers and a large number of disqualifications among customers who submitted applications. Eventually, income, furnace age and presence of air-conditioning eligibility requirements were relaxed to prioritize measure installation while maintaining the key requirements for an effective technical study. This allowed the pilot to recruit from a wider pool of potential participants and the number of installations steadily increased. To address pilot design challenges in future pilots Energy Trust will center discussions internally and with external collaborators around core research objectives first. As additional objectives arise during pilot development, the pilot team will employ iterative reviews of these objectives to determine if they conflict or align with the core research objectives.

In addition to difficulties with identifying eligible customers, Energy Trust staff and trade allies also observed a lack of trust from customers who were identified as eligible. Many potential participants expressed that the program seemed "too good to be true" due to Energy Trust paying for the entire cost of the equipment and installation. In future pilots where Energy Trust identifies that program skepticism may be a barrier to recruiting participants, Energy Trust will identify and utilize different recruitment and marketing approaches. These approaches may include incorporating community-based organizations (CBOs) as recruitment and delivery partners, which has been successful in other pilots and programs where Energy Trust pays the full cost of the measures.

The customers who participated in the pilot expressed high satisfaction with the participation process and high satisfaction with the addition of central cooling to their home. If the pilot leads to a broader offering, this finding will inform future dual-fuel heat pump marketing strategies and campaigns by targeting areas where fewer homes have central cooling, centering the cooling benefit in marketing materials and encouraging

contractors to provide dual-fuel heat pump quotes to customers looking to replace their air conditioning systems.

Customers who participated in the pilot expressed some uncertainty about how to operate their systems effectively after they were installed. Energy Trust developed several educational resources for customers including a frequently asked questions page on its website, on-demand call center support and information included on forms and recruitment materials. However, customers still expressed a lack of knowledge about the resources available to them and how to access them. As part of its HVAC Advocate Pilot in 2026, Energy Trust will explore how to better direct customers to resources and will provide a wide range of resource types for all accessibility levels. This may include printed brochures and leave-behinds, more in-depth education administered directly by program staff, or other support strategies.

Some participants expressed concerns about the changes to their winter heating bills. Potential utility bill impacts were highlighted in recruitment materials and during on-site visits from Energy Trust staff, however participants still expressed anxiety about the scale of these impacts or how they may show up in their home. The scale of utility billing impacts as a result of this pilot will be studied in depth in phase two of the evaluation. As Energy Trust conducts that research and determines the future fit of dual-fuel heat pumps in the Residential Program portfolio, we will determine if additional research on smart controls that select the most cost-effective fuel source and time-of-use rates is an effective way to counteract participants' winter heating cost anxieties.

Energy Trust will begin phase two of this pilot evaluation in Q4 2026. This second phase will evaluate the energy use impacts, energy cost impacts, peak demand impacts and greenhouse-gas emission impacts of the installed dual-fuel heat pump measures for both electric and gas utility fuels. The information gathered from both the first and second phase of the pilot evaluation will be used to determine the measure fit within Energy Trust's Board policies, regulatory framework and implementation of the 2025-2030 Strategic Plan and 2026-2030 Multiyear Plan. Results from the second phase of the evaluation are expected to be published in Q2 2027.

# 1. Introduction

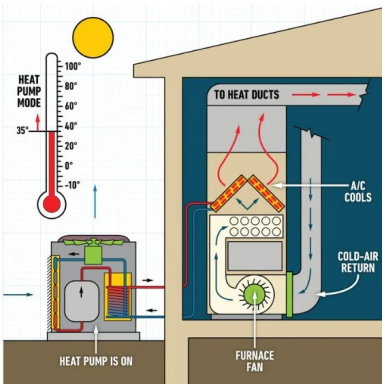
This report details the process-oriented findings for Energy Trust of Oregon's Dual Fuel Heat Pump Pilot (DFHP) evaluation. The report provides details on Pilot history and design and includes insights from qualitative feedback from three groups of stakeholders (internal, implementation, and utility staff), participating trade ally and non-participating HVAC contractors, and an online survey to capture insights into the participant experience and satisfaction with the DFHP pilot.

# 2. Background

Energy Trust, in partnership with the five investor-owned utilities whose customers fund Energy Trust's programs and the Oregon Public Utility Commission (OPUC), is exploring the feasibility of developing DFHPs as a future Residential measure in Energy Trust's portfolio. The goal of the DFHP Pilot is to collect information about the existing market and real-world behaviors of DFHP systems to inform future decisions of their applicability to the Energy Trust Residential program. Energy Trust approaches this pilot as an objective facilitator of data collection and analysis, not as an advocate nor opponent to this technology.

DFHPs are flexible combined building heating and cooling systems: DFHP's offer dual-source heating through an electric central air source heat pump and a natural gas forced air furnace while also delivering summer season cooling through the electric central air source heat pump. The DFHP operates like any other central air conditioning system in the summer, pushing warmer air outside and cooler air inside. As the outdoor temperatures drop and the demand for heating increases, the DFHP system effectively runs in reverse, pumping warm air into the home and purging colder air out of the home. The DFHP system – through a connected thermostat – selects which heating system to run based on a set switchover temperature. A switchover temperature establishes the outdoor temperature at which the system switches from running the heat pump condenser to the natural gas furnace. The advantages of DFHP systems is that they may avoid more substantial electric panel upgrades and offers the flexibility of running the most efficient system during the appropriate season to provide the best home space conditioning comfort while also limiting exposure to high utility bills.

**Figure 1. DFHP System**




*Source: https:/*

*www.familyhandyman.com/article/heat-pump-furnace-dual-fuel-system/?srsltid=AfmBOopawBTXMbXd0Qv4PEYDFW5Mm6xVAEfVuGF8aKEpZ-dkJjeq0-WG*

While Energy Trust supports both natural gas and electric efficiency measures, consistent with board policy (as noted above) it does not promote switching from one fuel to another. As a result, offering DFHPs requires a level of coordination between Energy Trust and its funding utilities that is distinct from other measures. [9]

The DFHP Pilot initially set numerous building, household, homeowner, and other enrollment requirements. These requirements posed challenges to initial qualification and participation, and Energy Trust updated many of them mid-Pilot to increase the pool of eligible participants. Table 1 summarizes the key Pilot elements and the requirements for those elements for qualification and enrollment. A more detailed discussion of each of these elements is covered in the findings section, while a comparison of these qualifications relative to a concurrent Energy Trust Pilot is included in the final report section below.

**Table 1 Energy Trust DFHP Pilot Characteristics**

| Pilot Element | Requirement | Details |
|---|---|---|
| DFHP system cost cap | Max of $12,000 | Total install cost should not exceed $12,000 |
| DFHP system capacity | 2-ton (24,000 btu/hr) | |
| Switchover temperature | 35°F | |
| House type | Single family | Later relaxed to allow several townhome units |
| House vintage | Any | Initially post-1970 as proxy for weatherized home but never enforced |
| Existing Heating System Type | Furnace <= 5 years old | Requirement later relaxed to 10 years |
| Existing Cooling System | No AC | Requirement later relaxed to allow AC but not-in-working order |
| Heat Pump System Type | Central ducted HP only | |
| Income | Low-income only | Requirement later relaxed to allow moderate then no income requirements |
| Building condition | Sufficiently Weatherized | |
| Secondary infrastructure upgrades: Electric Panels and ductwork | Budget cap limited | Did not require significant upgrades that would result in costs above the $12,000 maximum incentive |

Energy Trust paid 100% of the equipment and installation cost (including labor and necessary secondary infrastructure upgrades), up to a maximum of $12,000 per unit. A limited, pre-qualified group of installation contractors determined the appropriate sizing and settings for the DFHP system. The program expected most systems to be two-ton (24,000 btu/hr) capacity. DFHP systems were also expected to have a switch-over temperature to the gas furnace set

[9] https://www.energytrust.org/wp-content/uploads/2016/11/4.03.000.pdf

between 30-and 40-degrees Fahrenheit outside air temperature (depending on site and heat pump characteristics).

# 3. Evaluation Research Objectives

Energy Trust and co-funding utility partners identified four core research objectives for the DFHP Pilot. The overarching research objective was to develop a broad understanding of the existing DFHP market, real-world usage of these systems, and behaviors by users of these systems to inform future decisions of their applicability to the Energy Trust Residential program. A secondary research objective was to provide insights to all organizations involved by evaluating the successes and challenges of the Pilot. Apex therefore focused the specific DFHP Pilot research on assessing perceptions, experience, usage and satisfaction with DFHP systems across participants (customers), contractors, Energy Trust staff and utility partners. A summary of the four research objectives and the associated research activities are summarized in Table 2 below.

**Table 2. DFHP Pilot Phase I Evaluation Research Objectives**

| Research Objective | Pilot Data and Document Review | Staff, PMC, and Utility Interviews | Contractor Interviews | Participant Surveys |
|---|---|---|---|---|
| Program perspectives on the costs, challenges, and process considerations with installing DFHP systems. | ✓ | ✓ | ✓ | |
| Customer perspectives on the benefits and costs of DFHP systems. | | ✓ | ✓ | ✓ |
| Customer insights, experience, and satisfaction in the Pilot (recruitment, scheduling, installation, operation). | ✓ | ✓ | ✓ | ✓ |
| Broader market activity, motivations, barriers and costs of DFHP installations occurring outside of Energy Trust's Pilot. | | ✓ | ✓ | |

# 4. Research Tasks

To address the objectives of this evaluation, Apex conducted data and document reviews, staff and contractor interviews and participant surveys, as detailed below.

## 4.1 Pilot Data Review

Apex reviewed program documents and the three "touchpoint" data sources (including installation/contractor invoices) to capture a holistic view of all Pilot data. As part of this process, Apex categorized the detailed notes from the data sources to identify commonalities while capturing anecdotes to share with Energy Trust staff. Through this review, Apex conducted a qualitative thematic analysis to synthesize findings across all data collection activities. We also reviewed program documents (implementation plans, Pilot objectives, logic models, customer facing promotional releases).

## 4.2 Staff Interviews

Apex conducted interviews with respondents from Energy Trust, the Program Management Contractor (PMC) CLEAResult, and utilities (summarized in Table 3). Apex developed a single interview guide including broad questions applicable to all interviewees as well as more targeted questions relevant to staff in each organization. Apex recruited, scheduled, and conducted one-on-one interviews with Energy Trust staff (n=5), with CLEAResult staff (n=3), and utility staff (n=5).

**Table 3 DFHP Staff Interview Summary**

| Staff | Completed Interviews | Time Period | Pilot Role |
|---|---|---|---|
| Energy Trust | 5 | March-April 2025 | pilot design |
| CLEAResult (PMC) | 3 | April-May 2025 | pilot delivery |
| Utility | 5 | June-July 2025 | pilot design |

## 4.3 Installation Contractor Interviews

Contractors play a significant role in shaping customer expectations, experiences, and understanding of DFHP technology. The Apex team attempted to conduct interviews with all seven partnered contractors participating in the pilot, ultimately interviewing three. In addition, our team interviewed ten non-participating contractors. The non-participant contractors were trade allies that Energy Trust and CLEAResult identified as likely installing DFHPs outside of the Pilot with knowledge of the market and were selected to be representative of the Pilot geographic distribution as well. The contractors interviewed represented technical, on the ground estimators and installers (2), sales staff (4), managers (4), and general managers (3) from companies with experience selling and installing DFHPs. Contractors received a $100 gift card for completing an interview. The sample frame and the number of interviews completed by region and pilot participation are included in Table 4, below.

**Table 4. Contractor Interviews by Participation and Region**

| Region | Sample Frame | | Completed Interviews | |
|---|---|---|---|---|
| | Participant | Non-Participant | Participant | Non-Participant |
| Central | 1 | 2 | 1 | 2 |
| Mid-Willamette | 2 | 5 | 1 | 4 |
| Portland Metro | 2 | 8 | 1 | 2 |
| Southern | 2 | 4 | 0 | 2 |
| **Total** | **7** | **19** | **3** | **10** |

Apex worked with the implementation contractor to make warm introductions and made multiple attempts to reach participating contractors. Yet, it was challenging to reach

participating contractors for a variety of reasons, including firms changing ownership, data collection during the busy spring and summer season, and difficulty reaching appropriate individuals within contractor organizations. Ultimately, we were unable to reach several contractors despite over five recruitment attempts to schedule an interview.

Contractor interviews focused on understanding the heat pump and DFHP market and documenting participating contractors' experiences with the pilot. Interviews also explored contractors' perspectives on the communities and climate regions they serve, the homes where they typically work, necessary upgrades, and the applicability of DFHPs. Specific areas of inquiry included whether a two-ton system was expected to meet local heating and cooling needs, the size and condition of existing ductwork, and how often contractors encounter barriers to DFHP installation in the homes they service. We also asked about current and projected DFHP sales, how contractors compare DFHPs to other HVAC options, and—among participating contractors—their views on pilot communications, customer suitability and education, quality control processes, customer satisfaction, and billing and payment timelines.

## 4.4 Participant Surveys

Evaluating the Pilot requires understanding participants' direct experiences with their DFHP systems. To capture these experiences, Apex designed a participant survey based on findings from the document review and staff interviews. Apex distributed recruitment emails to invite a census of DFHP Pilot participants to complete a 10-15 minute online survey through Qualtrics. Our initial target was an approximate 50% response rate given the benefits received through the pilot, advance notification about the survey as a requirement of program participation, and the offering of a generous incentive. Apex used the Tango Card service to distribute respondent incentives in the form of electronic gift cards redeemable at a wide variety of businesses. Given the lower than expected number of participants at the time of the survey (at the time of survey recruitment, there were 35 potential recipients out of a total of 51 who had eventually participated by this reporting timeframe in November 2025), we offered an increased, $75 incentive.

The survey explored topics beyond the original primary research questions, including the following:

- Participants' adjustments to thermostat or DFHP settings
- Participants' setback scheduling (evening, morning, workday) and any adjustments to these setbacks
- Need for contractor callbacks, the issues, and whether they had been resolved
- Participants use of the new air conditioning and benefits (health / safety / comfort)
- Participant perceptions of changes to energy bills

As the DFHP Pilot participation fell short of program targets, we had limited ability to produce findings by segmenting participants into different segments and therefore the analysis lacks the potential to meaningfully differentiate findings across these groups. Yet, the very high response rate is notable at 83% (Table 5) and is a positive indicator of Pilot design and delivery.

**Table 5 DFHP Participant Survey Disposition**

| Participant | Sample Frame (Population) | Successful Completes | Response Rate |
|---|---|---|---|
| All | 35 | 29 | 83% |

# 5. Findings

The findings presented below are structured to follow the general evolution and development of the Pilot. The section begins with a review of the **Pilot design and planning** stage, from inception and design and through the initial development phase. Most of this discussion stems from staff interviews and document review. The next section moves through the **early aspects of implementation and delivery**, including contractor and participant engagement and recruitment, enrollment, and installation from both participant and contractor interviews. The findings then delve into the **installed DFHP systems** including a review of system size, cost, switchover temperature, and thermostats. The system information came from staff and contractor interviews and is compared against actual program tracking data. The findings then shift to the **late-stage implementation and delivery** with perspectives from both participant and contractor lens through the system usage, operation, participant behavior, satisfaction, and includes feedback from participants and contractors alike. We end this section with a discussion of **outlook on the DFHP market and for this Pilot** and this technology in general and a brief comparison of heat pump pilots.

## 5.1 Pilot Design and Planning

The section begins with a review of the Pilot design and planning stage, from inception and design and through the initial planning development phase. Most of this discussion stems from staff interviews and document review.

### 5.1.1 Pilot Inception

The DFHP Pilot was originally proposed in the fall of 2022 by Energy Trust senior executive staff with the goal of demonstrating Energy Trust's commitment to serving low-income (LI) customers by offering free DFHP systems. The initial focus on LI households was particularly influenced by the 2021 "heat dome" event that was directly responsible for over one-hundred heat-related fatalities in Oregon, prompting a strong desire to provide air conditioning (AC) for vulnerable populations.[10] The Pilot was also a response to requests from the Oregon Public Utility Commission (OPUC) and various utilities to study DFHPs. Both gas and electric utilities expressed curiosity about the real-life implementation and usage of a DFHP solution. To date, Energy Trust has maintained a fuel-neutral policy to prohibit incentivizing or promoting one fuel-source over another; incentivizing dual-fuel systems was a new approach and opportunity to study the technology's benefits and drawbacks.

The Pilot moved into design and planning in 2023, which involved a co-design process for the DFHP Pilot where Energy Trust staff, five partner electric and natural gas utilities, and other stakeholders convened to determine the project's structure, eligibility requirements, and

[10] "Heat Dome, 2021." Oregon Encyclopedia, www.oregonencyclopedia.org/articles/heat-dome-2021/.

objectives. The process yielded constructive outcomes while suffering from governance and decision-making challenges. Energy Trust staff facilitated the discussions, earning praise from stakeholders for handling "highly technical" conversations and balancing the competing priorities of all five utilities. Energy Trust staff also described the early design phase as successful and shared that all groups had an "equal opportunity for input." Some utility partners indicated that Energy Trust's high-level leadership had disproportionate influence on the pilot's design.

### 5.1.2 Pilot Objectives

From Energy Trust's perspective, the pilot aimed to inform technical knowledge about dual-fuel heat pump systems in residential applications. A staff member described the primary learning objective of the pilot: "What you're trying to understand is the basic interaction between this equipment, how does it function." The program also aimed to differentiate between installation issues and equipment performance in a controlled environment, with one staff member asking: "Is the main learning we didn't install them right? Or that we installed them right but they didn't perform the way we expected?" Additionally, Energy Trust viewed the pilot as an opportunity to improve utility collaboration practices and described a secondary goal of understanding "how to better coordinate with utilities to do a project like this."

Yet, there was some degree of misalignment of objectives across pilot design stakeholders. As one Energy Trust staff member explained, there was a "mismatch in goals" with "what a pilot is and should be used for." This resulted in a push for a focus on providing cooling to low-income customers. While staff acknowledged this showcased Energy Trust's community support and commitment to equity, they noted it conflicted with the traditional pilot objective of providing technical learnings. The low-income requirement constrained the participant pool, especially when combined with other pilot eligibility criteria like furnace age and lack of AC, limiting the pilot's ability to provide sufficient data for technical analysis.

Both gas and electric utility representatives were interested in collecting data and learning about dual fuel heat pump applications. Utilities participated in the co-design stakeholder sessions. Their primary goal in participating in the pilot was to understand the implications of dual fuel heat pump systems on customers' homes, comfort, and bills.

Program staff and utility stakeholders agreed that providing cooling benefits for customers was a central program benefit, especially after Oregon's 2021 heat dome event highlighted the need for air conditioning in some communities. Staff and stakeholders prioritized reaching customers who wouldn't otherwise have access to cooling. While providing cooling was an essential program outcome for the targeted population, program staff and stakeholders also recognized the risk of increasing customers' energy bills. As staff described, the challenge was providing cooling benefits while "doing no harm" and minimizing the impact to household utility bills.

Utility motivations for participating in the pilot varied significantly by fuel type. Gas utilities approached the pilot with an interest in exploring emissions reduction strategies to meet statewide goals. In contrast, electric utilities were primarily seeking combination solutions with gas utilities to manage potential challenges related to electric peak load and supply. Combined utilities had a desire to learn how dual fuel systems could support both their electric and gas business.

### 5.1.3 Eligibility and Recruitment

The pilot established narrow participant eligibility requirements that created significant recruitment challenges. The Pilot originally targeted installing 90 DFHP systems for a specific home type: in more recently built (post-1970's) low-to-moderate-income owner-occupied single-family homes with natural gas-heat (furnaces installed within the past five years). Homes had to be sufficiently weatherized, determined either by record of participation in a utility or Community Action Agency (CAA)-operated low-income assistance program or through an in-home audit. Other requirements included having compatible ducting and electric panels[11], lack of an existing central air conditioning system, and being a continuously occupied residence with 12+ months of associated natural gas and electric energy use data available. DFHP participants must also be customers of a participating electric (Portland General Electric or Pacific Power) and natural gas (NW Natural, Cascade Natural Gas or Avista Natural Gas) utility within Energy Trust service territory.

An Energy Trust staff member identified income requirements as "the biggest thing" hindering recruitment efforts, although all eligibility requirements were obstacles to some degree. On the other hand, even with relaxing income requirements, the Pilot did not immediately or quickly meet enrollment goals.

One staff member described how beyond the income requirement, each specific program requirement was picked out, to ensure quality of installations, minimize risk of technical issues and customer dissatisfaction, and create regular data for evaluation.

- **Air Conditioning**: "The aspect of not allowing AC in home, that was an aspect of, "if we're putting in heat pumps, we don't want to rip out good equipment, let's go for homes that need the equipment." From an evaluation point-of-view, we wanted all homes to meet this criteria, so we really leaned into 'homes must not have ducted AC.'
- **Gas Furnace**: The decisions around the technical criteria for the homes like the gas furnace needing to be 1-5 years old, that's from how gas furnaces work with heat pumps, and gas furnaces can come with different types of motors. New gas furnaces have ECM motors, they work better with heat pumps and old furnace won't be as efficient. We wanted the equipment to age out together, have furnace to be same vintage of heat pump, be the same age.
- **Duct System**: We wanted the ducting system to be in relatively good order, because heat pumps need a better duct system than gas furnace, need that better air flow. Super important in operation of HP. We thought people could have bad experiences if they have ducting that's really bad and the heat pump doesn't work, so we looked at homes with duct systems without high need of repair.
- **Weatherization**: Same reason we looked for some level of weatherization. Didn't want to lose air through insulation or windows, hard for heat pumps to keep up. We had some evaluation led restraints, technical restraints, layer them all together, you have design of pilot."

[11] 200-Amp electrical panels were given preference over smaller panels which were assessed for eligibility on a site-by-site basis.

The technical specifications ensured equipment compatibility and optimized heat pump performance, but layering these constraints created a narrow pool of “best case” eligible participants.

Multiple Energy Trust staff members felt the eligibility requirements could have been expanded to better represent a real-life household scenario. While the various eligibility requirements created controlled conditions that cleanly framed the technology's performance, the constraints limited staff’s understanding of how the measure would perform across the broader population with typically irregular conditions (e.g., older furnaces). One staff member stated that "I would have liked us to design the pilot in a way to know how the measure would behave in a typical situation and we ended up going with this really complicated set of conditions for who could/couldn't participate."

Utility staff also commented on the eligibility criteria, finding it an obstacle to participants. Multiple utilities had only a few participants at the time of interviews in spring 2024. One electric utility staff member noted the geographic eligibility in hotter Oregon climates clashed with the program requirements for no AC: "They want to be in the hottest climate in the service territory, like Southern Oregon, and there was 114 degrees a few years ago. Good luck finding something without AC." This observation highlighted the disconnect between targeting eligible hotter utility territories and the requirement for homes without existing cooling systems.

CLEAResult staff echoed program staff and utilities, reporting that the pilot's requirements were "extensive," resulting in only a few hundred residents on their marketing lists. They characterized the participant search as seeking a "super specific home" and described the cumulative effect of multiple requirements as finding a "needle in a haystack." The prerequisites for eligibility made recruitment the program's primary obstacle rather than the layered filters acting as screening method.

All three interviewed participating contractors were disappointed that they were required to route any customer leads back through the program staff vetting process and to rely on pilot staff to identify eligible households. Contractors felt this limited the program’s reach and prevented them from helping more people. One contractor believed participation uptake was slow partly because many households assumed the pilot offer was “too good to be true.” One factor contributing to contractor frustration and reluctance to participate in interviews for the evaluation process was the perception that they "didn't see the jobs" despite signing up and investing time and effort for the pilot. In one more recent case, a newly onboarded contractor was required to bring in their own participants, as existing leads were directed to the original contractors for that region.

Contractors believed the Pilot did a good job of aligning requirements with home characteristics that are suitable for DFHP systems. For example, contractor sales representatives and installers typically recommend DFHPs for homes with existing furnaces less than ten years old, adequate insulation, and properly sized, well-sealed ductwork. Ideal candidates have sufficient electrical panel capacity, minimizing upgrade costs and installation complexity. Mid-sized homes, generally under 2,800 square or smaller, with standard floor plans and accessible outdoor space for the heat pump unit are considered the best fit. Newer (1980’s or 90’s and newer) or recently weatherized homes with double-pane windows and modern construction practices perform especially well, as they retain heat efficiently and allow the system to operate near peak performance.

Contractors generally agreed with the factors that disqualified candidates for the Pilot. Factors that may deem a home unsuitable for a DFHP system are poor insulation, limited outdoor space, or requiring significant duct or electrical upgrades. Furnaces with a down flow configuration make it difficult to add a heat pump coil. Older homes with poor insulation, outdated or undersized ductwork, or single-pane windows often need substantial improvements before DFHP systems become feasible. Panel upgrades are also frequently needed in older homes, although one contractor noted that they can sometimes move other appliances over to gas to free up panel space for a heat pump. Yet, early in the pilot, one contractor encountered several cases in which a household was initially told they qualified, only for the contractor to later discover that the home's electrical panel could not support a heat pump. They felt the pilot's initial screening was inadequate and regretted "dashing people's hopes." Otherwise, contractors said pilot staff generally did a good job preparing households for their visits. Two contractors noted that after pilot staff conducted an assessment, they also performed their own site visit before scheduling installation.

One contractor in the Mid-Willamette Valley noted a nearby town's local permitting restrictions prohibited the installation of ducted heat pump systems.[12] Additionally, tight lot sizes and structural challenges such as additions or inaccessible crawl spaces can complicate or rule out DFHP installations.

### 5.1.4 Relaxation of Eligibility Requirements

The Pilot faced increasing challenges recruiting viable households due to the strict initial design criteria, requiring a loosening of the requirements to boost recruitment. The eligibility changes occurred in the following order:

**Moderate Income Expansion**: To address the most significant barriers, program staff first loosened income limits to allow moderate-income households (aligned with Energy Trust's "Savings Within Reach" criteria) to participate alongside low-income households. The income expansion occurred in March 2024.

**Furnace Age:** The second eligibility expansion occurred in May 2025. This change increased the maximum allowable gas furnace age from five years to ten years.

**Removal of Income Limits**: As recruitment challenges persisted, the income requirement was relaxed further, eventually opening the pilot to all income levels (market rate) with no restrictions. Energy Trust implemented this change concurrently with the furnace age change, in May 2025.

**Non-Functional AC Allowance**: Finally, the strict requirement prohibiting any existing central air conditioning was modified to allow homes with non-functioning central AC (verified as not working for at least a year) to qualify. Energy Trust implemented this final change between August and September of 2025.

According to staff interviews, the relaxation of the income qualification requirement and the furnace age extension were cited as providing the "biggest bump" in participant enrollment.

[12] This contractor couldn't get a permit to install a ducted heat pump in the City of Detroit (about an hour East of Salem). The contractor noted the city doesn't allow ducted heat pumps because the outside equipment is too big, so only ductless heat pumps can be installed.

### 5.1.5 Coordination and Communication

Utility stakeholders had mixed experiences with the co-design process, with some praising the facilitation between gas and electric utilities, while others felt their input was not incorporated into the pilot design. The utility stakeholders had mixed experiences with the co-design process, with some utilities feeling the process balanced gas and electric utilities well, while others felt the design did not reflect utility input. Utilities who expressed satisfaction with the design phase praised Energy Trust's facilitation between gas and electric utilities and the technical aspects of the discussion. One gas utility shared their appreciation for how Energy Trust managed balancing the different priorities of all five utilities; an electric utility stated that Energy Trust did "a great job of facilitating conversations that were highly technical."

However, some utilities felt that though balancing utility stakeholders in conversation went well, their input and considerations were not incorporated in the program design. One gas utility stated that the process was prescriptive rather than collaborative, with few avenues to influence the pilot structure in a meaningful way. They described the stakeholder codesign process led by Energy Trust as, "This is the parameters and what we have: Jump on board or not, we'll push it through either way." Another gas utility echoed this sentiment regarding specific design elements, noting that on key issues like income targeting and AC requirements, "Our feedback wasn't incorporated into the pilot design."

Notably, multiple utilities described flagging the risk that participation would be constrained by the drafted eligibility requirements. One utility suggested that the restrictive eligibility requirements in the program design were the product of "trying to please too many stakeholders." The result was a process that satisfied some stakeholders while leaving others feeling their input did not meaningfully shape the final program design.

These communication challenges continued beyond design, as ongoing coordination between the program and utilities decreased significantly during implementation. Utility partners consistently shared that they received infrequent updates from Energy Trust, with one utility representative sharing that program updates seemed to have "fell off everyone's radar." Multiple respondents described having to proactively request information, with one stating that "I send emails and see if there's an increase in participation, that's how I get updates." Several utilities requested a more regular reporting structure for the pilot rather than the infrequent communication they experienced.

All three participating contractors described communication challenges with the Pilot. One wished they had been consulted earlier in the pilot’s design, particularly around the home-assessment process and key assumptions. Another said the pilot experienced multiple rounds of PMC staff turnover, making it hard to know who to contact or how to stay updated. They had not heard from the pilot in some time and were disappointed that more families in their community had not been served. A third contractor submitted a household they believed would qualify but received only a brief rejection without follow-up or explanation.

### 5.1.6 Marketing Strategy

Energy Trust conducted varied marketing approaches, primarily direct mail campaigns and website promotion. These varied outreach efforts did not generate much increase in either participant enrollment or general interest. CLEAResult staff noted that direct mail campaigns "have not really worked the way they were expecting to," despite co-branding efforts with

utilities that were intended to increase the credibility of the offer. CLEAResult staff stated that marketing efforts "started too late, and they had a tiny list of people to market to," and timing and lack of urgency compounded with an already small eligibility list. While detailed letters produced higher response rates than postcards or emails, interested households did not often meet the eligibility criteria.

The complexity of dual-fuel heat pump technology and installations did not help communication, as some interviewees reported that the value proposition in marketing materials was unclear, especially to those who had recently received weatherization services and a home energy audit.[13]

## 5.2 Pilot Implementation and Delivery: Early Stage

Energy Trust's PMC, CLEAResult, helped facilitate, organize, recruit and select contractors, and oversee the management of the Pilot. Contractors played an important role in the Pilot, serving as a key contact point for installation and system setup, operations, and guidance. The following section details the recruitment of and involvement of contractors in the delivery of the Pilot along with equipment selection, the installation process, and system setup.

### 5.2.1 Contractor Recruitment

Energy Trust enrolled contractors for the DFHP Pilot by utilizing a structured Request for Proposal (RFP) process to choose a pre-selected group of trade ally installation contractors from their existing network. This approach, informed by prior experience, was intended to limit the contractor group to facilitate Pilot feedback and insights regarding the DFHP system installations, and to ensure Pilot requirements were met with quality installations. The decision to use a small, exclusive group was viewed as a "win-win" by staff, giving contractors unique access to projects. Participating contractors generally found the enrollment process itself to be "straightforward and easy." Due to changes in an existing company ownership during the Pilot, program staff approved a new contractor in one region though this contractor was required to develop their own leads, departing from the other contractor requirements.[14]

### 5.2.2 Participant Intake Process

Energy Trust's residential Program Management Contractor (PMC) oversaw a multi-stage participant intake and audit process. The following steps were the main participant intake steps to enroll customers.

- **Targeting and Outreach:** The program identified potential participants through utility data and direct marketing (letters/emails) based on eligibility criteria.
- **Phone Screening:** PMC staff (CLEAResult) conducted initial phone screenings to verify eligibility criteria (e.g., income, gas furnace age, no existing AC) and explained the Pilot offering, associated benefits, and the potential bill impacts to customers.

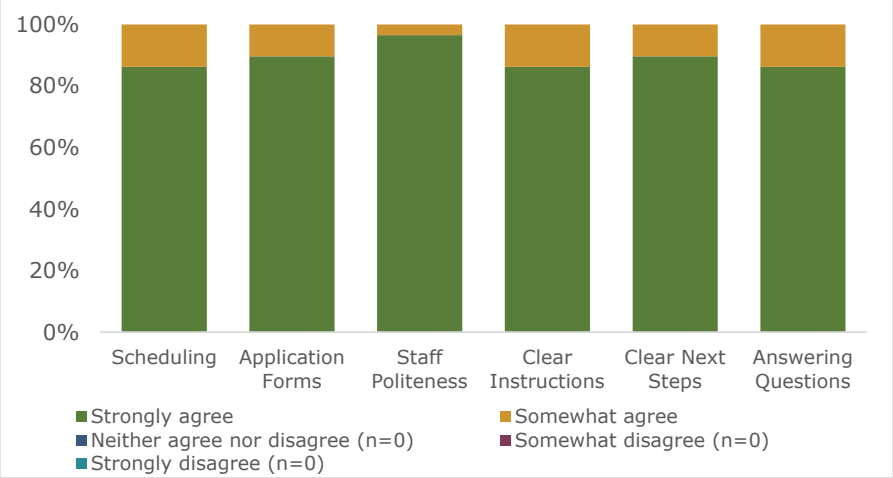
[13] These DFHP candidates were those identified through the CAA participant lists.

[14] To ensure existing partners still received the leads from the program to avoid departing from the original agreement.

- **Program Audit:** For those passing the initial phone screening, program staff performed in-home audits to verify technical requirements (e.g., ductwork, electrical capacity, weatherization) and confirmed customer interest.
- **Contractor Assignment:** Eligible participants were assigned to a pool of seven pre-selected trade ally contractors for installation.
- **Contractor Assessment and Installation:** The assigned contractor conducted their own technical verification, determined DFHP sizing/components, installed and set up the system.
- **Final Verification:** Program staff conducted a post-installation verification visit to test that the system was installed and operating correctly.

Participants reported high levels of satisfaction with the early phase of the Pilot experience, including the home walkthrough and intake process. Survey questions regarding the Energy Trust home walkthrough covered scheduling convenience, ease of completing forms, politeness of the person conducting the walkthrough, understanding what was happening, knowing the next steps, and effectiveness in answering questions. These topics received overwhelmingly positive responses, and participants frequently gave them the highest satisfaction ratings possible (the percentage of respondents strongly agreeing the process was well done is summarized in Figure 2).The remaining percentage of respondents reported somewhat agreeing to the intake process being well done.

**Figure 2 DFHP Participant Intake Process Satisfaction (Percentage Strongly Agreeing Process was Well Done)**




### 5.2.3 Installation

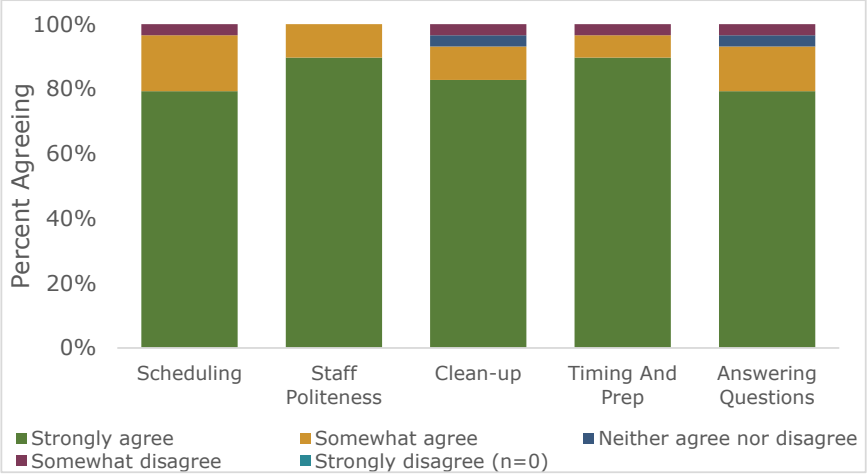
Contractors reported that the installation of DFHP systems was generally smooth and efficient, with few issues reported. Contractors described their processes as well-refined, incorporating customer education throughout each stage of engagement, sales, installation, and follow-up to ensure homeowners understand system operation and maintenance.

Most DFHP Pilot installations proceeded without difficulty, though occasional adjustments were required for ductwork, electrical capacity, or thermostat setup. During our interviews in the

summer, contractors noted that the recent refrigerant transition to R-454B[15] and the related supply challenges disrupted installation timelines throughout the height of their installation season; these issues do not appear to have impacted the perception of the Pilot from the participant perspective.

Participants reported high levels of satisfaction with the Pilot installation process. On survey questions regarding installation, respondents "Strongly Agreed" that they were able to easily schedule the installation at a convenient time, that the installers were polite and respectful, and that installers cleaned up afterward (Figure 3).

**Figure 3 DFHP Participant Installation Process Satisfaction (Percentage Strongly Agreeing Process was Well Done)**




In terms of installation challenges, most contractors reported only a few issues with new DFHP systems post installation, which they attributed to heavy investment in customer education throughout the process. This education begins at the sales call and continues through the home visit and installation to verify that participants can operate equipment. Several contractors also perform customer follow-ups post walk-through to ensure customer satisfaction and provide reminders on using their DFHP.

Contractors said that customers most commonly reported issues included occasional thermostat calibration problems and defrost mode noise complaints. Equipment defects were rare, with most callbacks attributed to homeowner misunderstanding rather than installation errors. Contractors credited consistent communication and system walk-throughs as key to reducing these incidents. On the occasions when issues arose, they were typically addressed through follow-up visits, remote thermostat adjustments, or manufacturer support. One contractor also mentioned a quality incentive program that rewarded their installers for completing jobs without callbacks.

Challenges with installation from the participant perspective involved a small number of respondents who indicated they did not receive sufficient information about operation and performance. Six (out of 24 respondents answering this question) reported not receiving

[15] R32 is another refrigerant that is allowed in the newer requirements.

information about setting the DFHP system to maximize energy savings, seven (out of 27 respondents) reported not receiving information about setting the DFHP system to maximize the comfort of their home, and five (out of 27 respondents) reported not receiving information about maintaining the DFHP system so it continues to operate efficiently. The program provided an engagement guide printout that included high level system operation and performance information to all participants which included details that specifically addressed these operational aspects.

## 5.3 Pilot Implementation and Delivery: DFHP Systems

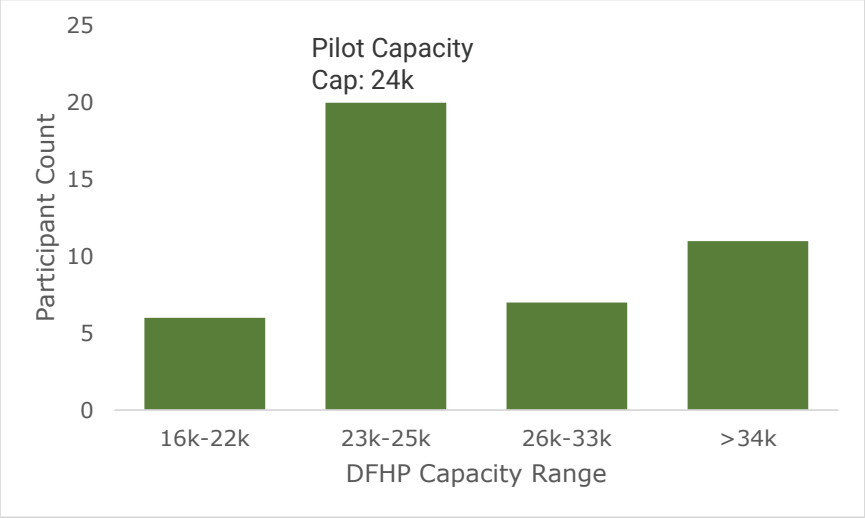
Details around the DFHP systems that were installed through the Pilot are important to help Energy Trust understand contractor preferences and feedback to inform future offerings while also containing important explanatory attributes that will be used for the second phase of this study which will examine system performance and energy use.

### 5.3.1 System Size

The Pilot had originally targeted the installation of two-ton DFHP systems but ultimately allowed contractors to determine the appropriate capacity based on home characteristics and cooling load calculations. Contractors reported that the most common system size they install is between 2.5 and 3 tons, which they noted aligns with the heating and cooling loads of typical single-family homes in Oregon and those installed through this Pilot. Most contractors mentioned performing load calculations to confirm sizing and ensure eligibility for program quality checks, particularly for systems above 3 tons. Almost half – twenty of the 44[16] – DFHP systems provided in the tracking database with capacity data had capacities greater than the original Pilot cap (two-ton).

[16] The tracking database had 51 total sites and while all 51 included total installation cost data only 44 installations included a reported capacity value.

**Figure 4 HP Capacity for DFHP Systems**




### 5.3.2 Project Costs

Interviewed contractors' (both participating and non-participating) estimates of the installation costs for a 2-ton DFHP system, in a home that does not need any upgrades, varied widely based on the type of system the contractor preferred, the capacity, single or variable speed motors, and the efficiency of the system.

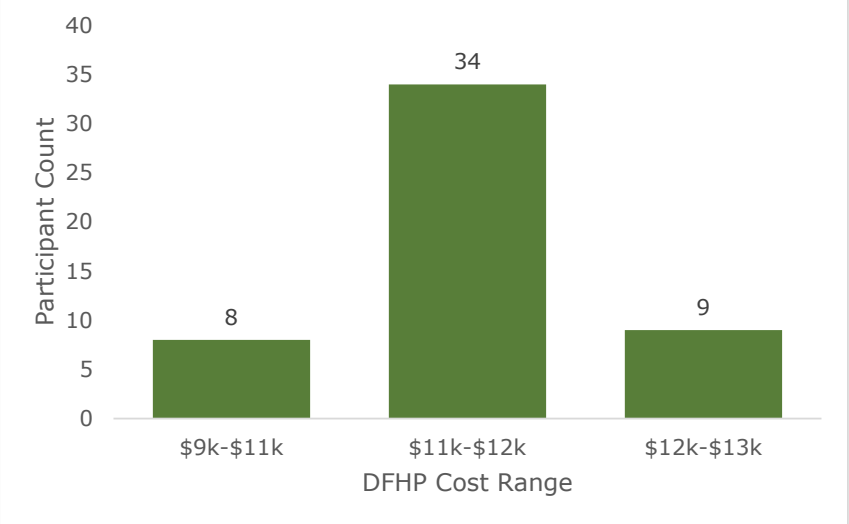
Both participating and non-participating contractors' estimates for total costs largely aligned with the DFHP Pilot cost caps. The Pilot had original targeted for contractors to install no more than a two-ton system and keep total installation costs at or below $12,000. Four interviewed contractors reported that basic DFHP systems with minimal installation barriers typically range from $7,000 to $9,000. Six contractors said that the total cost of a typical 2-ton system generally falls between $12,000 and $14,000. On the high end, two contractors noted that final costs for high-efficiency or inverter-driven models can reach $17,000 to $25,000. Contractors in the Mid-Willamette Valley and Central Oregon felt these parameters were reasonable. However, a Portland-area contractor said the cap forced them to use equipment that was less advanced than what they typically recommend.

Several contractors noted that costs have increased 5–10% in the past year due to manufacturer price adjustments, with tariff impacts expected to raise prices further. On average, contractors estimated DFHP systems are approximately $1,500 more expensive than traditional air conditioning systems. These contractor estimates are similar to the tracking data reporting total installation cost provided by Energy Trust staff. The majority of systems installed fell at or below the $12,000 cost cap, though nine of the 51 DFHP systems provided in the tracking database had total installed costs exceeding the Pilot cap ($12,000).[17] The most

[17] The Pilot allowed this flexibility with the $12,000 cap due to these later period installations.

expensive DFHP systems were still less than ten percent above the price cap and eight of the nine systems were installed more recently (after May 2025). This timing is relevant as contractors had noted the recent and substantial price increases for these systems.

**Figure 5 Total Installed Cost for DFHP Systems (n=51)**




### 5.3.3 Switchover Temperatures

Contractors consistently reported that 35°F is the most common switchover temperature used for DFHP systems, aligning with Energy Trust Pilot guidelines. The switchover temperature Pilot staff initially recommended and which contractors followed is consistent with the findings from a new study conducted for NEEA on DFHP performance.[18] For extended-capacity or variable-speed systems, switchover points are often set lower—typically between 15°F and 20°F, depending on the equipment and the home's insulation and comfort needs. Some installers adjust settings slightly higher (up to 40–45°F) when homeowners prefer warmer indoor temperatures or when fuel costs make early gas engagement more economical.

According to interviewed contractors, while a few customers requested to fine-tune their switchover temperatures, most leave the settings as installed. Contractors typically advise against homeowner adjustments, explaining that improper changes can reduce efficiency and extend warm-up times. Only one DFHP survey respondent indicated making a change to the switchover temperature though the new temperature they provided was 35°F, the same as the Pilot recommended temperature.[19]

[18] Dual-Fuel Heat Pump Systems Analysis, Larson Energy Research, September 4, 2025. https://neea.org/wp-content/uploads/2025/09/Dual-Fuel-Heat-Pump-Systems-Analysis.pdf

[19] One other respondent indicated they changed the switchover but the temperature they provided, 67, would indicate they confused the switchover with the heating setpoint temperature.

### 5.3.4 Thermostats

As a learning outcome from this Pilot, Energy Trust is interested in what systems were installed and are typically recommended or used by trade ally contractors. Further, system information like thermostats will allow greater insights from the second phase of this study where an impact analysis is planned. Contractors all had one or two thermostats they recommend for customers, with Honeywell and Ecobee being the most commonly recommended to customers, as shown in Table 6. According to program tracking data, the thermostats installed for all participants (not just survey respondents) tended to be almost exclusively Ecobee, with two Honeywell and two heat pump system manufacturer-specific.

**Table 6. Thermostats Recommended by Interviewed Contractors and Installed by Pilot**

| Thermostat | Number of Recommendations | Installed in Pilot (tracking data) |
|---|---|---|
| Honeywell (Pro / T6 / 8000) | 6 | 2 |
| Ecobee | 5 | 47 |
| OEM specific | 3 | 2 (Carrier, Lennox) |

Contractors cited the benefits of Honeywell thermostats, describing their reliability, ease of programming, and compatibility with outdoor sensors for accurate switchover control. Ecobee thermostats were found to be popular among tech-oriented homeowners due to mobile app access, though a couple of contractors noted reliability issues in rural areas where Wi-Fi connectivity is weak. In these locations, Wi-Fi-based thermostats may pull outdoor temperature data from remote weather stations, which can result in inaccurate readings and poor switchover performance.

Some manufactures of DFHP systems such as Lennox, Mitsubishi, American Standard, or Daikin require system-specific thermostats. Contractors valued these for their seamless integration and reduced setup errors. In contrast, Nest thermostats were repeatedly flagged as problematic and unable to manage a dual fuel system properly. One contractor stated this should be addressed with the upcoming 4$^{th}$ generation model.

## 5.4 Pilot Implementation and Delivery: Late Stage

The following section details the late stage of Pilot delivery which mostly involves the Pilot and DFHP system experience from the end user perspective, including the participants' experience and satisfaction with their DFHP systems and the key benefits and challenges. The bulk of the feedback for this section came from the participant survey, though contractor interview feedback is included where relevant.

### 5.4.1 DFHP Experience and Satisfaction

Consistent with the primary Pilot objective of providing access to cooling to a vulnerable population, households reported that the improved comfort due to the DFHP's cooling capability was the greatest benefit. A majority (26 of 28 responding to this question) of DFHP participants highlighted their increased home comfort after receiving AC with several (n=4) specifically noting no longer needing to use "inconvenient window AC units." Other notable benefits

included improved health due to improved sleep (n=12), improved health due to reduced allergies (n=5), lower utility bills (n=8), energy savings (n=3), and a quieter system than previous heating/cooling equipment (n=4). No DFHP survey respondents reported the addition of a backup heat system as a benefit. All three program contractors agreed that the pilot delivered real benefits to participating households. Contractors noted this is an increasingly important health and safety measure during Oregon's hotter summers.

Satisfaction with the DFHP system was very high, with the majority of respondents (n=23 of 29) being "Very Satisfied" with the system overall. Five respondents were "Somewhat Satisfied" with their DFHP system and a single respondent was "Somewhat Dissatisfied." This respondent expressed concern around bill increases due to their system, noting, "I am very grateful for the relief in summer. But without question it's much more expensive to run in winter than the gas furnace, and I worry about electric rates going forward."

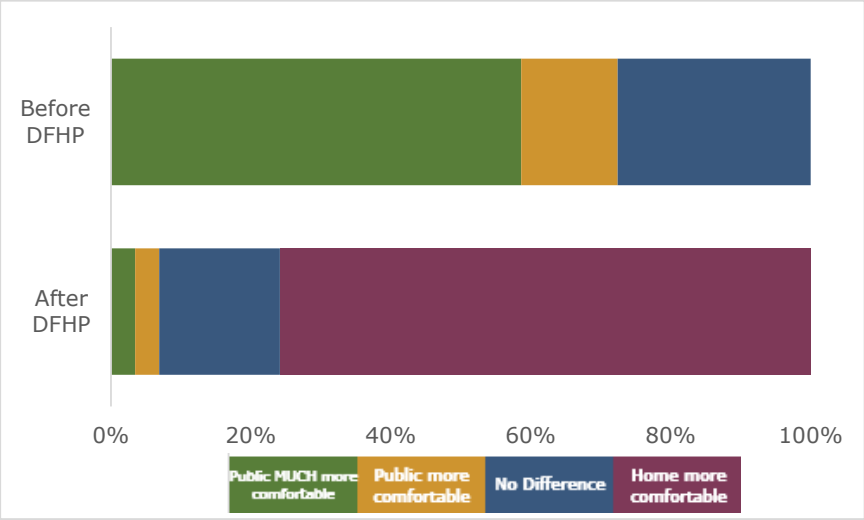
Participants were generous with their praise for the benefits provided by the DFHP system and provided the following feedback:

- "Summer, especially during heat waves, or very warm overnight temperatures, are now completely stress-free. We never have to worry about being uncomfortably hot at home."
- "It's been incredible, especially with guests visiting over the summer and small children in the house. We don't have to worry about their comfort during extreme heat."
- "It's changed my life and made this summers heat wave a breeze."
- "It has been AMAZING. Definitely the biggest and most noteworthy change in the house overall. With central AC it is much quieter in the house running because the window units are loud. Also, the window units weren't connected to any thermostat and so you had to turn them off and on manually. With the central AC, we can set a temp and it just takes care of itself."

Many program and nonprogram contractors (7 of 13) were strong proponents of the DFHP systems, saying they automatically include a DFHP system in their bids for customers with existing gas furnace systems considering adding cooling or replacing their gas furnace system. A smaller group of contractors (3 of 13) said they wait for customers to express interest in a DFHP before they provide more information or a bid for that option. Contractors reported that, in addition to the general benefits of a heat pump system, DFHPs offer the additional benefit of being able to switch fuels for heating. Contractors promote this feature to customers, citing the likelihood of lower overall heating costs, the ability to warm the home quickly, and, especially for those in rural areas, the ability to use a small generator to keep heating the home when there are power outages. One contractor with a large new construction development said that they install gas furnaces with a DFHP for cooling and heating.

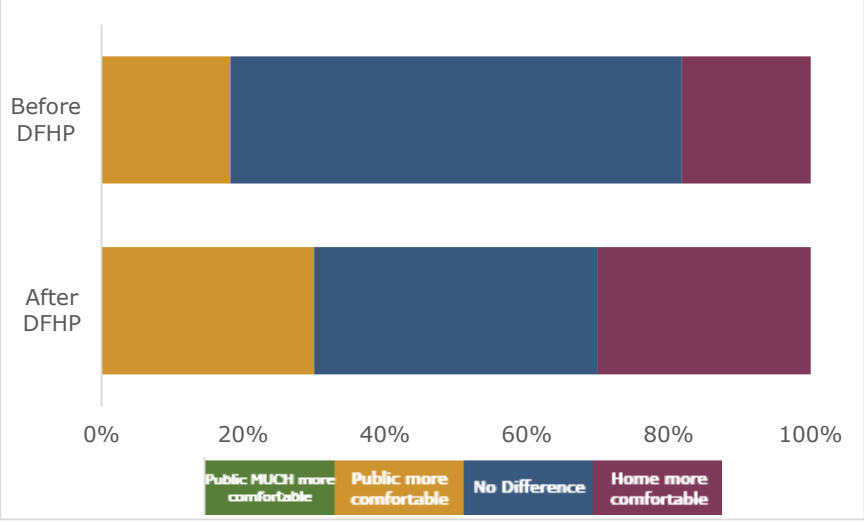
The comfort-related benefits conveyed by the DFHP central AC were also seen in how participants compared the comfort of public spaces (like movie theaters or shopping malls) to their home before and after they received the system. Before the DFHP installation, a majority of participants (n=17 of 29) viewed public places as significantly more comfortable than their homes during very hot days while no respondents rated their home as more comfortable. After the installation, 22 respondents stated that their home is now *more comfortable* than those public places during hot weather. This aligns with staff and contractor input that the biggest benefit perceived by participants was gaining cooling, especially by those who previously lacked any AC or relied on window AC units.

**Figure 6: Summer Home Comfort Compared to Public Places Before and After DFHP (summer n=29)**




Winter comfort results for DFHP participants were mixed, though notably limited by a small sample size (n=11 due to a limited pool of participants having experienced a winter heating season following their Pilot participation). While most participants initially felt their home comfort matched that of public spaces before the DFHP, perspectives diverged following the DFHP installation. Post-installation feedback was split nearly equally among those who found their homes less comfortable, equally comfortable, or more comfortable than public buildings. Survey feedback suggests this dissatisfaction stemmed from a preference for the warmer supply air of gas furnaces compared to the cooler output of heat pump systems.

**Figure 7: Winter Home Comfort Compared to Public Places Before and After DFHP (n=11)**



Respondents were not curtailing their heating use to save money on their old systems, or that they are doing so the same amount with the new systems. Approximately half of the respondents who experienced a heating season with their DFHP (n=7 of 17) reported never keeping their home colder than they would like to save money in the winter. Of the 10 that did report curtailing their winter use before the pilot, five of 17 curtail heating more than they did before getting the DFHP, while five of 17 curtail heating less than they did before getting the DFHP.

Respondents were curtailing their cooling use to save money on their old room AC systems. In the summer, a plurality (n=5 out of 11) reported they never kept their home hotter than comfortable to save energy. Meanwhile, of the 6 that did report curtailing their summer use before the pilot, a small cohort (n=4) reported they no longer have to keep their home warmer to reduce their utility bills since receiving the DFHP. Two respondents reported they still keep their home warmer to reduce their utility bills.

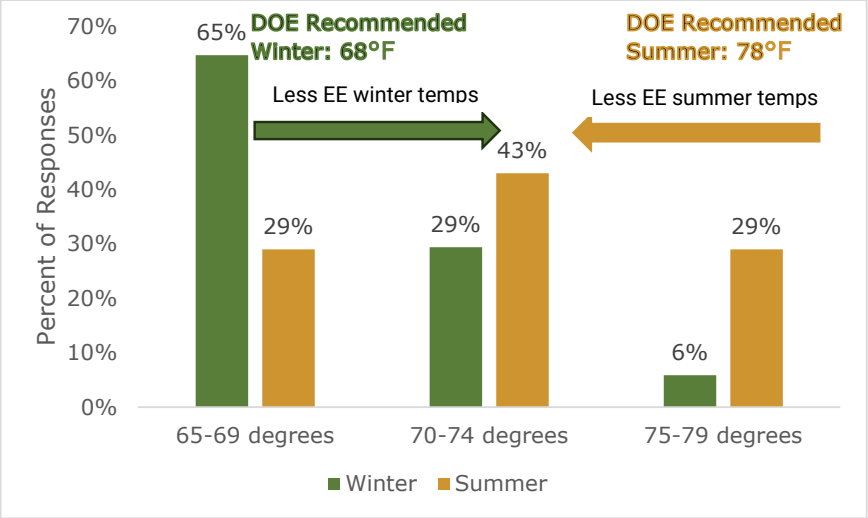
### 5.4.2 DFHP System Awareness, Use, and Behavior

DFHP system awareness was mixed: while eight respondents understood their system's automatic fuel-switching capability, five were unaware of this feature. The program provides this information through the technician and through program materials/handouts. Participants' lack of awareness may reflect some misunderstanding of the equipment, differences in recall, or just indifference to this system feature. Only one reported updating the switchover temperature, setting it to 35°F (however, 35°F is both the program standard and contractors' preferred setting).

DFHP participants are more likely to favor comfort over energy conservation in summer compared to winter. Participants were asked their DFHP setpoint temperature. More participants kept their winter thermostat at the DOE recommended 68°F, while many preferred summer temperatures below the DOE recommended 78°F. Participants tended to follow energy-efficient heating practices in winter but prioritized comfort over efficiency in summer and set thermostats cooler than recommended.[20] These settings may help inform the impacts from the billing analysis taking place next year.

[20] This may also mean that DOE guidelines for heating setpoints better align with what people find comfortable than DOE guidelines for cooling setpoints do.

**Figure 8 DFHP Respondent Temperature Setpoint by Season (summer n = 29, winter n=19)**



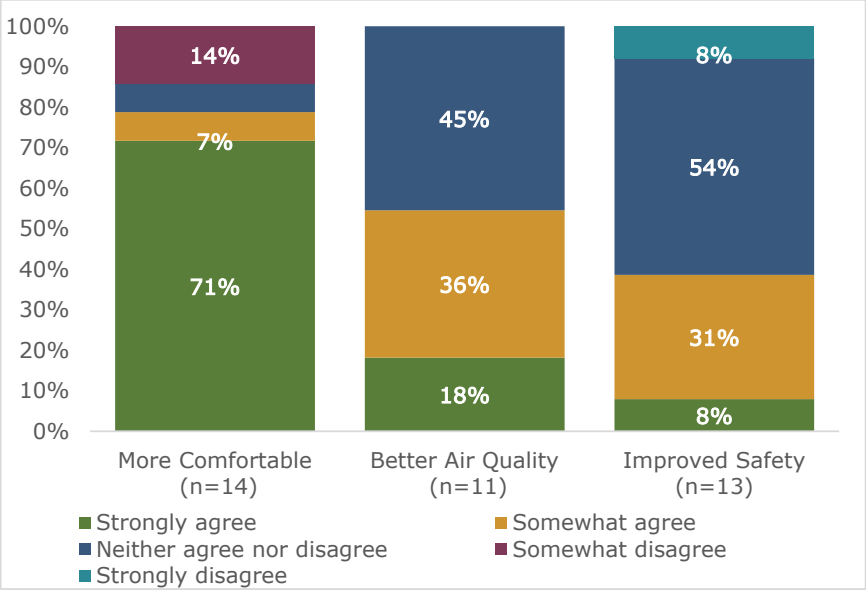

Seven participants reported using supplemental heating, either space heaters or wood stoves prior to participating in the Pilot. Three of the seven reported ceasing use of these after the DFHP. One reported using their supplemental heating "much less" and another reported using theirs "a little less." Two participants reported using their supplemental heating the same amount as before.

As noted in the background section above, DFHP systems deliver heat in a different manner than conventional natural gas furnaces. Heat pump systems deliver air that is cooler than gas furnace forced air systems and require more time to bring homes up to setpoint temperatures. Eight DFHP respondents observed a noticeable difference between their new system and their original gas furnace. Half of the eight who indicated a noticeable change preferred the gas furnace, two preferred the DFHP, and two had no preference.

DFHP participants were asked to rate perceptions of their home environment after the DFHP was installed, including factors like home comfort, air quality, and safety (not distinguishing between the summer cooling and winter heating season). Respondents were overwhelmingly in agreement that the DFHP improved the comfort of their homes, with almost three-quarters (71%) strongly agreeing their home comfort improved. Respondents were in less agreement on the improvements to air quality and safety, where the largest cohort (45% for air quality, 54% for safety) did not perceive a change to these aspects attributable to the DFHP system.[21]

[21] One hypothesis is that people probably don't perceive their existing heating systems as unsafe and did not remove their gas appliance, so there isn't really as clear of a safety benefit for a DFHP system.

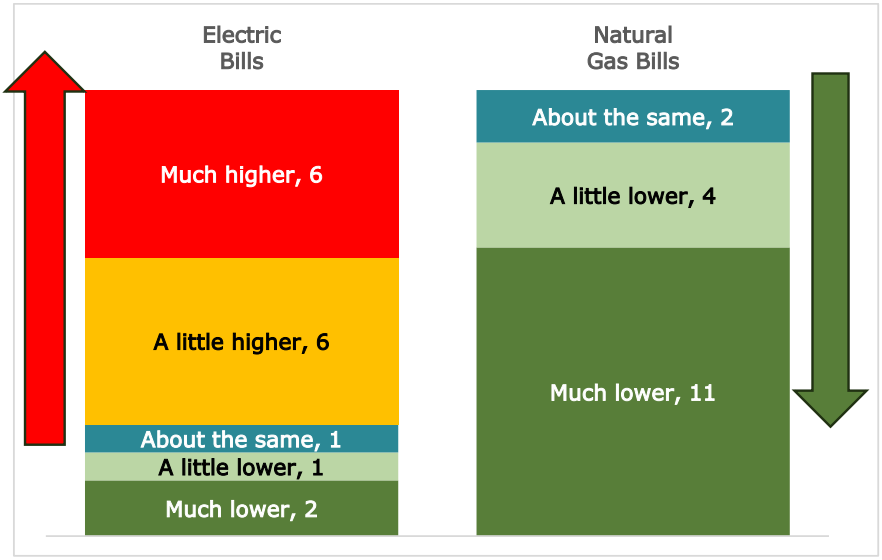
**Figure 9 Changes to Home After DFHP (n=14)**




**Question only asked of those with heating season experience, n=14*

During enrollment, DFHP participants received information about the new system which included clarification about the expected utility bill impacts: *"Your gas bill should go down because your furnace isn't working as hard. Your electric bill will likely go up since you are now heating your home with electricity some of the time. You also now have cooling in your home, which will increase your summertime electricity bill."* Participants who experienced a heating season with the DFHP noted their perceptions about changes to their bills changing in response to the DFHP. Twelve of 17 heating season participants reported seeing their electric bills increase, while fourteen reported their natural gas bills declined. Eleven of 17 heating season respondents reported much lower gas bills, while six reported much higher electric bills. Respondents who experienced much higher electric bills were more vocal about these changes than those experiencing much lower natural gas bills, so there is a perception about the electric bill increases more than offsetting any reduction in natural gas bills. A deeper exploration of this topic and verification of the impacts will be explored in a second phase impact evaluation for this study.

**Figure 10 DFHP Participant Perception of Utility Bill Changes (n=17)**




**Question only asked of those with heating season experience, n=17*

### 5.4.3 DFHP Drawbacks and Challenges

The majority of DFHP survey respondents (n=16 of 29) had no challenges or concerns to date with their DFHP system. In fact, several respondents used the open-ended text entry in the challenges question to note their appreciation of the new system:

- *"There aren't any drawbacks with our Dual Fuel Heat Pump system. And no challenges to speak of regarding the system. It is very easy to use and program."*
- *"None, the system has operated perfectly and we are always comfortable."*

Though some of the challenges survey respondents reported with their DFHP system were relatively minor, a major concern for participants was the potential for higher electric bills and the cost of operation during the winter. Five survey respondents expressed concerns over their electric bills having "increased" since receiving the DFHP system.[22] Several participants stated that it was "much more expensive to run in winter than the gas furnace" and worried about future electric rate increases. The general concern was that the heat pump was "too expensive to use for heating." This perception was confirmed by one participant who noted that although their comfort level was significantly higher, their "electric bill was also higher." Another participant noted that the "electric bill increase even with the help from low-income assistance," although they acknowledged this had been explained to them by the program.

While most respondents reported no technical of operational challenges with their DFHP system, several experienced frustrations with the system operation. Four participants noted that

[22] A reminder that the original Pilot documentation provided to all participants included language around gas bills decreasing and electric bills increasing because of the DFHP system. One respondent even acknowledged this in a survey verbatim response.

the DFHP system "doesn't heat the house as quickly as the gas furnace" and sometimes takes a "LONG time to get warm. Hours." One respondent detailed an extensive, months-long problem requiring multiple technician visits. Their DFHP system would work for a short period in cold months, then the air would turn "freezing cold" and pump hard, suggesting an improper setup related to the switchover temperature when the gas furnace should have kicked in. Other specific problems reported included the system performing a "self-shutoff" and one instance where the system "wouldn't cool the house below 78 degrees" when it first ran. One respondent mentioned that their thermostat constantly reported poor "air quality" requiring a window to be opened.

A few issues arose related to thermostat settings to maximize the system's benefits. One customer was confused as to the thermostat settings, another was concerned about lack of Wi-Fi capability, and one was confused about what to do during seasonal change when the system switched from cooling to heating, noting, "the technician said to call them in November, and they can come back then." One issue noted was that the "thermostat was not programmed accordingly—or at least I was not fully informed on how to set the settings for maximum efficiency." Staff interviews confirmed that one potential challenge is that customers might not receive detailed information beyond the initial phone screening regarding how to operate the system for maximum benefit. Staff also noted that the benefits depend on the customer's ability to "understand well enough how to use the thermostat to prioritize gas vs electric heat."[23]

Although interviewed contractors were proponents of DFHP technology, they noted concerns that aligned with survey respondent feedback. Contractors reported higher electric prices have been a deterrent for many customers, with one contractor, prior to the pilot, describing one DFHP system with a full satisfaction guarantee from the manufacturer that they ultimately had to completely uninstall for a dissatisfied homeowner. Other contractors spoke of issues with the lower heat temperature at the register being an issue, with a few citing visits to customer homes to increase the switchover temperature. One contractor developed a new protocol for disabling the heating function of the heat pump after a senior was quite unhappy with the system because of winter heating costs and yet not feeling warm. The contractor at that point had only had this customer ask for that adjustment, but was concerned that rising electricity prices could have more customers asking for these changes for their heat pump operation.

## 5.5 DFHP Market Outlook

This section details interviewed contractors and staff (internal and utility) perspectives regarding general sentiment on heat pumps and the DFHP market and their expectations for the near term adoption and interest for this technology.

### 5.5.1 Detailed Interviewed Contractor Characteristics

Contractors, where possible, shared their company background, experience, and level of engagement in the heat pump and DFHP markets. The majority of represented businesses primarily serve the residential market, with only two of the interviewed contractors being from companies with significant business lines in other areas, as shown in Table 7, below. Overall,

[23] To be clear, Energy Trust staff does not expect customers to be modifying their switchover temperature in accordance with their other thermostat settings to maximize benefits; we believe the intent with this statement was to maximize system efficiency and not switchover.

contractors reported their businesses have several decades of experience installing heat pumps. In addition, most had also been installing DFHPs for over ten years. The number of DFHPs installed over the last three years varied widely amongst contractors interviewed, with one company reporting 200 installs cumulatively, and another with 12 DFHP installations total over the same time period. DFHPs, on average, represent almost one-fifth (18%) of the contractors residential HVAC business.

**Table 7. Characteristics of Contractor Firms Interviewed**

| Region | Pilot Project Count | Portion of Business that is Residential | Company Years Experience Installing HPs | HPs as % of Res HVAC Business | Company Years Experience Installing DFHPs | DFHPs as % of Res HVAC Business | DFHP Installs in last 3 years |
|---|---|---|---|---|---|---|---|
| Central | 1 | | 70 | 60% | | 2% | 12 |
| Mid-Willamette | 1 | 90% | 60 | 50% | | 10% | 45 |
| Portland Metro | 5 | 95% | 30 | 50% | | 15% | 50 |
| Central | NP* | 95% | 20 | | 20 | 5% | 15 |
| Central | NP* | | 30 | 30% | 10 | 5% | |
| Mid-Willamette | NP* | 90% | 40 | | 20 | 25% | 200 |
| Mid-Willamette | NP* | 25% | 40 | 60% | 30 | 17% | 50 |
| Mid-Willamette | NP* | 80% | 70 | | 20 | 15% | 126 |
| Mid-Willamette | NP* | 100% | 20 | 50% | 20 | | 40 |
| Portland Metro | NP* | 85% | 10 | 50% | | | |
| Portland Metro | NP* | 75% | 30 | | | 4% | 30 |
| Southern | NP* | 99% | 12 | | 10 | | ~3 |
| Southern | NP* | 10% | 50 | 10% | | 20% | 100 |

NP = non-participant

### 5.5.2 Incentives & Rebates

Incentives and rebates play a central role in both customer decision-making and contractor sales strategies. Contractors reported that rebate and incentive availability is often one of the first topics discussed with homeowners when determining whether a heat pump system is the right fit for their home. In fact, many contractors point to available tax credits, rebates, and incentives as proof to customers that heat pumps are reliable and beneficial.

All contractors interviewed indicated that they actively assist customers in accessing available rebates and credits, often managing the paperwork and submission process directly. Most work with Energy Trust incentives, typically applying them at the project outset to reduce customer out-of-pocket costs. Several also coordinate manufacturer promotions and provide proper paperwork for federal and state tax credits and rebates.

One contractor who participated early in the pilot described the initial paperwork for installations to receive the incentive as “a tad terrible” and said pilot payments were delayed by several weeks, far too slow for a business model that normally requires 50% down at scheduling

and 50% on delivery. Their firm covered the cash-flow gap temporarily and even secured a line of credit in anticipation of additional installs, but no new participants materialized. Both they and another contractor noted that the payment process eventually improved and became manageable.

### 5.5.3 Contractor Market Perspective

Across interviews, contractors emphasized that continued market growth depends on available incentives, customer education, and electricity costs. When asked about the future of DFHPs in Oregon, contractors expressed cautious optimism, describing a market that seems poised for gradual growth. Several contractors emphasized that DFHP adoption remains largely niche, with most homeowners pursuing the technology if they are interested in electrification, pursuing environmental goals, or interested in new technology, especially if it may also help reduce heating bills. Yet, contractors also noted the higher upfront cost of the DFHP system which they consider the most common barrier, with many customers opting out once they saw price differences compared to standard furnace replacements.

Contractors highlighted ongoing technological advances, particularly in cold-climate heat pump models from top manufacturers, expanding the range of homes where DFHPs perform effectively. Several noted increased manufacturing over the last several years may help equipment costs decline, addressing a significant customer barrier. Simultaneously, other contractors raised concerns about the possibility of tariffs depressing the market. Contractors also stated that in many cases, customers simply choose newer versions of the equipment they are replacing, and relatively few seek out a completely new system.

### 5.5.4 Heat Pump Sentiment

The Apex team asked contractors about their experience with and the overall benefits of the broader heat pump market for customers. Contractors indicated that many customers are familiar with the technology and reported that homeowners are most interested in the cost savings, energy efficiency, and air conditioning offered by heat pumps, as shown below in Table 8.

**Table 8. Contractor Selling Points for Heat Pumps (n=13)**

| Customer Interest in HPs | Count |
|---|---|
| Energy/Cost Savings | 8 |
| Addition of Cooling | 5 |
| Incentives | 3 |
| Environmental Benefits | 3 |
| Quiet | 2 |
| Health Benefits | 2 |
| Other | 5 |

Despite the advantages of heat pumps, contractors agreed that several barriers continue to limit adoption, as shown in Table 9. Winter home comfort was a consistent concern for contractors and their customers. According to contractors, homeowners often complain that the air from a heat pump feels cooler than that from a furnace, describing it as less warm or less satisfying. Contractors explained that this is a normal characteristic of the system—producing air temperatures between 98 and 120 degrees rather than the higher thermal output of a combustion furnace—but that the difference can be unsettling for those accustomed to a "warmer" feel. The potential for periods of extended cold weather coupled with rising electricity prices further heighten these concerns.

**Table 9. Issues that Discourage Customer Interest in Heat Pumps (n=13)**

| Drawbacks of Heat Pumps | Count of Contractors |
|---|---|
| Higher Electric Bills | 5 |
| Colder Air for Heating | 4 |
| Upfront Cost | 3 |
| Complexity of System | 2 |
| Other | 2 |

Contractors also cited lingering skepticism about reliability and equipment complexity. In particular, several contractors noted that seniors have been a difficult population to transition to a heat pump successfully. Some homeowners, particularly older ones, worry that heat pumps have "more things to go wrong." Misunderstandings about efficiency, uncertainty (or even skepticism) around bill savings, and system lifespan are widespread, reinforcing hesitation among potential buyers. One contractor said that they had customers switch over to a heat pump for heating, only to get an $800 electric bill in both January and February one year. That year, the firm paid those heating bills and have since been more careful of customer education practices. In general, all the contractors emphasized that education and expectation-setting are essential to overcoming misinformation on heat pumps and ensuring homeowner satisfaction.

### 5.5.5 Measure Potential

Several utility partners indicated plans or even active independent pilots in place to gain "more control and insight into how things are going and what it means for our system." Utilities hoped to receive some of this information from Energy Trust's pilot, but at least three interviewed utilities have moved on to create their own pilots for data collection. Utility interest in control over their own DFHP Pilots stemmed from three main reasons: wanting greater control over research priorities and insights, wanting specific data outcome needs, and a desire to test different eligibility criteria.

Energy Trust program staff expressed skepticism toward the pilot's long-term viability and becoming a measure. One staff member stated: "I don't expect that this is a measure we promote, at least with a baseline of a furnace with AC," and went on to describe their low expectations: "I don't have high hopes that this is going to pencil out in just short or medium term. I think we'll just forget about it." Staff did not see strong potential in the equipment becoming a measure.

### 5.5.6 Contractor Insights on DFHPs by Region

Our team interviewed contractors from around Oregon, including three from the Portland Metro Area, four from the Mid-Willamette Valley, three from Central Oregon, and two from Southern Oregon. Though these markets sit within the same state, they represent notably different climate zones, housing stock, dominant heating fuels, and customer motivations—each of which shapes how DFHPs are positioned and sold.

#### *Portland Metro Area*

In the Portland Metro Area, contractors often frame heat pumps and DFHPs through an environmental and electrification lens. They describe customers, especially those with rooftop solar, as interested in reducing or eliminating fossil fuel use, and they use DFHPs to show a practical path toward that goal while keeping flexibility. The pitch often includes the ability to switch between electricity and gas to take advantage of price fluctuations. For Portland area communities reliant on propane for heating, DFHPs also help take advantage of energy-efficient heating in the warmer winter months and reduce reliance on a more expensive fuel.

Contractors in Portland point to the limitations of the area's older housing stock. Many homes have outdated electrical panels, minimal insulation, or single-pane windows, and these conditions can complicate DFHP adoption or performance. Where customers proceed, installed costs for a new heat pump were cited as markedly more expensive than other areas, ranging from roughly $13,000 up to $25,000.

#### *Mid-Willamette Valley*

In the Mid-Willamette Valley, contractors describe DFHPs as well-matched to the local climate and a solid option for households that want to add cooling. Although DFHPs cost more than installing AC alone, sales staff say customers respond to the resilience and control that come with fuel-switching and backup heat. This is especially true for the number of households relying on propane in their area. These customers like the ability to rely less on propane day-to-day while retaining the furnace for very cold snaps or power outages. Reported install costs in the area vary: one contractor cited completed projects as low as about $7,000, while others—who favor variable-speed systems—put typical totals closer to $12,000–$14,000.

#### *Central Oregon*

Central Oregon contractors generally see the region's colder winters as a reason not to recommend DFHPs, except in the case of a home relying on bulk fuels, which was one company's sales strategy for a couple of years. Two of the three interviewed contractors believe that the technology does not perform as well in their climate zone, where extended subfreezing temperatures are common.

In addition, DFHPs are viewed as too expensive for households that simply want to add cooling capacity to an existing home, with one contractor saying that "the equipment cost and installation complexity made [DFHPs] impractical" for most retrofit scenarios. Another mentioned that many of the homes they service have furnaces configured in a downflow arrangement. This setup, he explained, can make DFHP retrofits more complicated and

expensive because airflow and duct layout need to be carefully redesigned to avoid performance losses.

Contractors, when selling DFHPs in this area provide extensive education on the maintenance needs of the system in winter, reminding customers to keep the outdoor unit clear of snow and ice to ensure proper airflow.

### *Southern Oregon*

Contractors in Southern Oregon are particularly excited about DFHPs. Much of their territory is rural, and customers value the chance to use less propane, and in some pockets, heating oil, without giving up the security of a combustion backup. Pure heat pump solutions are considered risky because winter lows can drop to around −10°F; in those conditions, a DFHP is viewed as the practical choice. One contractor recounted cases of significant winter bill shock—January and February bills around $800—when households relied on the wrong configuration. They also note that DFHPs can work well in manufactured housing and can complement hydronic radiant (hot-water floor) heating when designed appropriately.

## 5.6 Comparison of Energy Trust Heat Pump Pilots

Energy Trust is currently administering two distinct heat pump pilots, this DFHP and a No-Cost Pilot. There are some commonalities and some differences between the two offerings, as summarized in Table 10 below. The DFHP has (at least in the earlier phases) more stringent eligibility requirements while the No Cost distinction is that it collaborates with regional and local community-based organizations to help deliver the Pilot. The No Cost Pilot has experienced high participation rates and experienced greater enrollment relative to the DFHP.

**Table 10 Concurrent Energy Trust Heat Pump Pilots**

| Pilot Element | DFHP | No Cost HP Pilot |
|---|---|---|
| House type | Single family | Single family, Small MF < 5 units, larger affordable MF |
| Vintage | Any | Any |
| Existing Heating System Type | Furnace <= 5 years old | Any electric or bulk fuel (no natural gas) |
| Existing Cooling System | No AC | Any |
| Heat Pump System Type | Central ducted HP only | Central or Ductless |
| Income | Low-income only (later relaxed) | Low-income only |
| Building condition | Sufficiently Weatherized | Sufficiently Weatherized |
| Project cost cap | $12,000 | $7,200 for a DHP<br>$17,500 for a HP |
| Secondary infrastructure upgrades: Electric Panels and Ductwork | Did not require significant upgrades that would result in costs above the maximum incentive | Do not require upgrades |

| | | |
|---|---|---|
| Trade Ally (contractors) pool | Limited to approved Energy Trust TA list (n=7) | Open to Energy Trust TA's |
| Design Inception | Senior Executive (top-down) | Standard bottom-up |
| Delivery Partners | PMC only | PMC and CBO |
| Utility Involvement | Indirect | N/A |

# 6. Conclusions and Recommendations

The Dual Fuel Heat Pump (DFHP) Pilot delivered "life-changing" cooling benefits to customers while facilitating a deeper understanding of DFHP systems, perceptions, and usage. Despite the complexity of coordinating five partner utilities among other stakeholders, the Pilot delivered high-quality DFHP system installations that provided high value to participating homes at no cost to the resident. However, the Pilot's overall performance was dampened by a design process that initially prioritized strict eligibility requirements over technical feasibility. This dynamic resulted in recruitment bottlenecks that required mid-pilot adjustments to mitigate and resolve. While participants were very satisfied with the Pilot and the addition of summer cooling benefits, the evaluation revealed participants concerns regarding heat pump heating performance, anxiety regarding increased winter electric bills, and some minor confusion around operation and settings.

The following conclusions and recommendations are structured differently than in the Executive Summary. This final report section reviews the key benefits and successes of the Pilot, along with challenges according to each of the primary groups involved in the DFHP Pilot. We include relevant recommendations accompanying each subsection.

### *The Pilot Overall (Program Staff)*

**Key Benefits and Successes:** The primary success of the Pilot administration was staff's iterative responses to recurrent challenges. When initial strict eligibility criteria threatened to stall the pilot, staff successfully diagnosed the bottlenecks and relaxed income limits and furnace age requirements, which provided the biggest bump in participant enrollment.

**Key Challenges: The key challenges to delivery of the Pilot were conflicting goals and recruitment barriers.** Staff noted a mismatch in goals where the initial design objectives focused on serving low-income households conflicted with the staff's need for technical learning. This divergent design created a needle in a haystack recruitment scenario and the qualification criteria—specifically requiring low-income participants, a newer gas furnace, and *no* existing AC—proved too restrictive. Staff identified recruitment as the Pilot's primary constraint, ultimately leading to an extended pilot duration.

**Recommendations:**

• **Formalize Protocols for Mandate-Driven Pilots:** Develop a clear process and decision-making framework for all pilots while ensuring this process captures pilots initiated by leadership requests and external partners. This path should define the primary strategic goal (e.g., equity vs. technical learning) at the outset to ensure resources and design requirements align with that objective.

### *Utility Partners*

**Key Benefits and Successes:** The Pilot successfully brought together five utilities across electric and natural gas industries. Utilities recognized the value of the collaboration, with some praising Energy Trust for doing "a great job of facilitating conversations" that were technically complex and required fuel-neutral facilitation.

**Key Challenges:** While utilities participated in design sessions, many felt the process was prescriptive rather than collaborative. Partners reported that their input on important elements

(such as income targeting and AC requirements) was not incorporated, leading to a feeling that the pilot was trying to please too many stakeholders rather than optimizing for successful delivery of the Pilot. There were gaps in coordination and communication during implementation, mostly attributable to focusing on deeper recruitment. Utilities reported receiving infrequent updates and often had to proactively solicit information regarding participation numbers and project status. Partially stemming from these challenges and partially from interest in retaining control over their own pilots, some utilities opted to run their own DFHP Pilots to test this technology themselves.

**Recommendations:**

• **Strengthen Stakeholder Communication and Collaboration:** Establish a formal communication cadence (e.g., quarterly reviews) with utilities. Future co-developed (or co-designed) Pilots should ensure bi-directional collaboration, allowing utilities to have a voice that may contribute to design conditions that might avoid misalignment with consumer and market realities.

### *Contractors*

**Key Benefits and Successes:** Contractors were strong proponents of the technology for specific use cases, viewing DFHPs as a "best of both worlds" solution for resilience against power outages and extreme cold. Once assigned a project, contractors reported that the installation process was generally smooth and efficient, describing it as "well-refined". Contractors were also aligned with program requirements and with technical best practices by standardizing system sizing around a 30°F balance point and a 35°F switchover temperature to maximize economic efficiency (also consistent with a recent NEEA study, noted earlier).

**Key Challenges:** Contractors expressed frustration that they were not permitted to recruit their own participants. Contractors felt this no-recruitment policy was a missed opportunity, limited the program's reach, and left them waiting for leads that often did not materialize. The $12,000 cost cap was viewed as problematic, particularly in the Portland Metro area. It forced some contractors to install equipment "less advanced than what they typically recommend" (e.g., single-stage vs. variable-speed). Early in the pilot, contractors noted that paperwork was burdensome and payments were delayed, creating cash-flow challenges since they had to front the upfront cost of the system and installation.

**Recommendations:**

• **Enhance Cost Flexibility:** Re-evaluate rigid per-unit cost caps. Future programs should allow for cost variability based on regional pricing and equipment tier (e.g., variable speed) to ensure the best technical solutions are applied. Further, as future pilots may expand eligibility from purely income-qualified to market rate customers, consider including partial cost contributions/offsets from market rate customers to stretch or augment program budgets.

• **Consider Contractor Engagement for co-design and eventual Lead Development:** Leverage the trade ally network by partnering with contractors early in the design phase. Contractor inclusion can help determine the overall number of potentially eligible households, assess the viability of reaching program targets based on that population size, and identify neighborhoods that may represent attractive prospective participants for a pilot. A pilot or program can authorize trade allies to mine their own databases and perform technical pre-screening (the physical equipment eligibility criteria) to identify the specific housing characteristics required,

effectively acting as funnels for eligible homes. Once a candidate is identified, contractors can facilitate a warm handoff to program staff for eligibility (i.e., sensitive income verification), leveraging their trusted relationship to validate the no-cost offer which customers otherwise viewed as too good to be true. The program should also ensure short debriefs or feedback loops for rejections, to ensure trade ally awareness of why the customer was rejected to avoid discouragement of continued lead development.

### *Customers (Participants)*

**Key Benefits and Successes:** Participant satisfaction with the Pilot and with DFHP systems was overwhelmingly positive, driven primarily by the addition of central air conditioning. Prior to installation, many participants found relief in public spaces during summer heat waves relative to their homes; post-installation, this dynamic flipped, with homes the more comfortable option. Participants also rated the Pilot and installation experience highly, noting installers were polite and efficient and the process smooth and seamless.

**Key Challenges:** Despite pre-installation awareness and communication, the most significant customer concern was financial anxiety regarding winter operations. Several participants noted concerns around the expense of running the heat pump in winter relative to previous gas furnace. Some participants perceived the heat pump as heating the home more slowly than their previous gas furnace, sometimes struggling to meet setpoint temperatures or providing cooler supply air than they are accustomed to with their gas furnace. A small cohort reported confusion regarding thermostat settings and how to maximize energy savings.

**Recommendations:**

• **Refine Customer Education:** Provide detailed post-installation training materials (leave-behinds) that specifically address thermostat operations, switchover settings, and expectations regarding heating speed.

• **Address Winter Cost Anxiety:** Future messaging must balance cooling benefits with realistic education about potential winter bill increases. Program design should explore "smart switching" controls that utilize time-of-use rates to automatically prioritize the most economic fuel source.

### *Outlook for DFHP and the Program*

**Conclusion:** The market for DFHPs shows cautious optimism but currently remains a niche offering constrained by customer economics. While the DFHP technology delivers high satisfaction for cooling and resilience, widespread adoption is stalled by high upfront costs and the concern that operating costs (electric bill rates) may increase in regions with continued low gas rates. Technical analysis from a recent NEEA study confirms that sizing systems correctly (30°F balance point) and utilizing smart controls can contribute to a more effective system allowing the economics to work for the average consumer. The second phase of this study, exploring the system performance and energy use changes associated with the DFHP will help reveal additional insights, complemented by findings from this first phase study.

**Recommendations:**

• **Target Resilience and Bulk Fuels:** Marketing and program design should specifically target rural regions and homes dependent on expensive delivered fuels (propane/oil). In these

markets, the economic case for fuel-switching is strongest, and the resilience against power outages and extreme cold provides a clear value proposition.

• **Implement Smart Switching:** To make DFHPs viable for a broader population, future offerings should leverage "smart switching" controls. Utilizing real-time Time-of-Use (TOU) rates or GHG signals to control fuel selection can significantly reduce consumer costs and emissions compared to simple temperature-based switchover.

# Appendix

### Demographics

Apex summarized the demographics of survey respondents. 100% (n=29) of DFHP respondents were English speaking. Only three of the 29 indicated having changed the occupancy of their home during the Pilot. A majority of respondents were white or European-American (n=25).

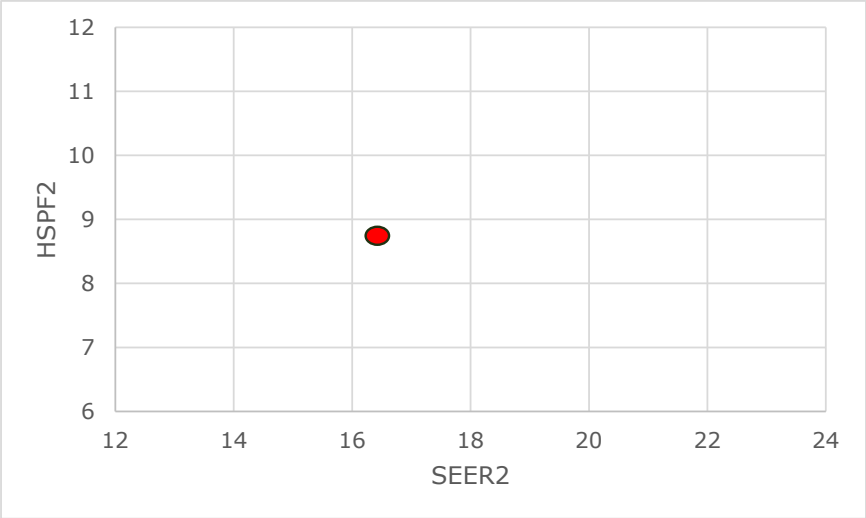
**Table 11 DFHP Respondent Ethnicity**

| Ethnicity | DFHP Pilot Count |
|---|---|
| White or European-American | 25 |
| White or European-American, Hispanic or Latino | 1 |
| White or European-American, Japanese | 1 |
| Filipino | 1 |
| Prefer not to answer | 1 |

### Household (Participant Intake Data)

The following tables summarize the characteristics and demographics of the participant homes based on the provided customer tracking data. DFHP system efficiency varied across the installations, with the average SEER2 cooling efficiency of 8.4 and a HSPF2 heating efficiency of 15.4.

**Figure 11 HP Efficiency (SEER2 and HSPH2) for DFHP Systems**




*Red circle represents Pilot average*

### Home Vintage and Size

The vast majority of projects involve older single-family detached homes, with a median age centered around the 1920s to 1950s. The data shows a high prevalence of homes built between

1920 and 1979. Almost all recorded projects are for "Single-family detached home." Only three entries listed "Multifamily home." Conditioned square footage was varied, from a low of 744 sq ft to a high of 3,000 sq ft.

**Table 12 Home Vintage and Size**

| Home Year Built Range (Approx.) | Count (N=38 projects) | Average Conditioned Square Footage (HH SQ Ft) |
|---|---|---|
| 1906–1920 | 6 | ~1300 sq ft (range: 927 to 1,616) |
| 1925–1937 | 8 | ~1420 sq ft (range: 748 to 2,472) |
| 1940–1958 | 10 | ~1480 sq ft (range: 744 to 2,468) |
| 1965–1998 | 13 | ~1800 sq ft (range: 1,050 to 3,000) |
| 2000–2021 | 5 | ~1630 sq ft (range: 1,209 to 2,100) |

*Note: Three entries had a NULL value for HomeYearBuilt.*

**Geographic Distribution (Major Locations)**

The majority of projects are concentrated in the Portland metropolitan area. Outside of Portland, clusters of Pilot installation occurred in Bend and Klamath Falls, suggesting there was some differentiation in regional coverage beyond the primary Portland metropolitan area.

**Table 13 DFHP Pilot Geographic Distribution**

| City | Project Count (Approx.) |
|---|---|
| **Portland (and surrounding areas)** | 29 |
| **Bend** | 10 |
| **Klamath Falls** | 4 |
| **Salem** | 4 |
| **Redmond** | 4 |

**Existing Conditions and Improvements**

**Existing Heating and Cooling**:

- **Prior Cooling**: The most commonly listed pre-existing cooling system was Portable or window AC, or Fan(s) (ceiling, box, window). One respondent noted having an evaporative cooler.
- **Supplemental Heat**: Several homes used auxiliary heat sources, including electric wall or space heater(s) and wood stove/fireplace or gas fireplace.

**Recent Home Improvements**:

- 10 respondents made recent home improvements.
- The most common improvements cited were roofing, windows, and insulation (including attic insulation) and one rooftop solar array.