PSE

STEP SUMMARY REPORT
DRAFT

January 2025

PSE PUGET SOUND ENERGY

EXECUTIVE SUMMARY

Puget Sound Energy (PSE) implemented the Settlement Targeted Electrification Pilot (STEP or pilot) in 2023-2024 in accordance with PSE's 2022 general rate case (GRC) settlement approved by the Washington State Utilities Commission (UTC). The pilot consisted of the following five implementation channels:

1. Home Electrification Assessments (HEA): An electrification coach conducted a free walk-through of PSE gas customer homes, answered customer questions regarding electrification, and provided a custom list of recommendations and resource referrals pertaining to electrification.
2. Heat Pump Rebates: Rebates were provided to PSE dual-fuel customers (i.e., customers located in both PSE's electric and gas service territories) who either removed or decommissioned their existing natural gas heating system and replaced it with a new ducted or ductless heat pump system. Rebates varied between $2,400 and $4,000 based on the application year and system type. Income-qualified (<=90% area median income, or AMI) customers could receive a $4,000 rebate for a heat pump in 2024.
3. Low-Income Upgrade Track: No-cost conversion of gas space and water heating systems to electric appliances was provided to single-family, dual-fuel residential customers who met the low-income criterion (i.e., <=80% AMI) in conjunction with the Home Weatherization Assistance (HWA) program where participating customers receive whole-home weatherization.
4. Multi-Family Direct Installs: Direct installation of heat pumps was provided to a multi-family site located in a named community.[1] These were provided at no cost and complemented by energy efficiency improvements when needed.
5. Small Business Direct Installs: Direct installation of heat pumps was provided to two small business, dual-fuel customers serving as a non-profit in named communities. These were provided at no cost to the customer and complemented by energy efficiency improvements when needed.

A contractor completed evaluation, measurement, and verification (EM&V) activities for the pilot program, culminating in the Settlement Targeted Electrification Pilot Evaluation Report which included key findings on impacts, performance, and operational issues related to the pilot, as well as opportunities for improvement. PSE completed 11,915 assessments by December 31, 2024,

[1] A Named Community is a community that is highly impacted or vulnerable. A highly impacted community means a community designated by the Washington State Department of Health based on cumulative impact analyses or a community located in census tracts that are fully or partially on tribal land. A vulnerable population means a community that experience a disproportionate cumulative risk from environmental burdens due to adverse socioeconomic factors, such as unemployment, access to food and health care, etc., and sensitivity factors such as low birth weight, and higher rates of hospitalization.

exceeding its goal of 10,000 assessments by the end of 2024. Of these assessments, approximately 32% were completed for low-income households and/or households located in named communities, also surpassing a goal of 30%. Among HEA participants, there were over 1,800 recommended candidates for the low-income weatherization enhancements, 246 enrollments in PSE's Bill Discount Rate program, and 164 enrollments in Flex Rewards which provides customers with incentives to reduce their electricity demand on days with extreme temperatures or inclement weather. As of July 2024, 1,737 rebates were paid through the Heat Pump Rebate initiative, with a total value exceeding $5.5 million at the 2023 close. For the Low-Income Upgrade Track, 37 projects were completed and paid for in 2024, with an average cost of $19,300/project. An additional 12 projects completed in December 2024 are scheduled to be paid for in 2025 once the respective Agencies have submitted their invoices.

PSE initially engaged two multi-family complexes that provided low-income transition housing for unhoused individuals and families through the Multi-Family Direct Installs Program. The first project consisted of 20 ductless heat pump units converted from hydronic systems. However, upon further assessment, it was determined that a service upgrade was required to support the new heat pump systems. PSE is working with the customer and contractor to navigate and pay for the service upgrade in addition to the 20 heat pump systems in 2025 through PSE's Climate Commitment Act (CCA) Decarbonization Program.[2] The second project that was completed as part of the pilot consisted of four ducted heat pump units and six heat pump water heaters. The costs for this project were shared with the CCA Decarbonization Program to maximize available resources.

As an extension of PSE's Small Business Direct Install program, the pilot supported the installation of two energy-efficient heat pump systems for two local non-profit small businesses. One business upgraded to a heat pump water heating system, which now serves their community center. The second business took advantage of both conservation-funded weatherization measures and the pilot-funded ductless heat pump installation to create a more comfortable and sustainable space for their 'Teen Center'.

Table 1 summarizes the high-level impacts of the pilot with regards to energy savings, bill savings, and carbon emission reductions for a sample of 658 pilot participants who received a heat pump rebate.

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[2] In December 2023, the Washington Utilities and Transportation Commission approved setting aside $7.7 million in estimated CCA no-cost allowance auction proceeds for targeted decarbonization projects (Docket UG-230968). The CCA provides natural gas utilities no-cost allowances that decrease over time "[f]or the benefit of ratepayers," which must be in addition to existing legal requirements, or requirements found in other statutes or rules. An increasing portion of no-cost allowances must be consigned by utilities to auctions, and revenues generated from the sale of no-cost allowances at auctions may be used to prioritize low-income customers or minimize cost impacts on low-income, residential, and small business customers through weatherization, decarbonization, conservation and efficiency services, bill assistance, and other actions. For more information, please see PSE's CCA Decarb Program Report from November 15, 2024, which can be found here: https://apiproxy.utc.wa.gov/cases/GetDocument?docID=428&year=2023&docketNumber=230968

During the evaluation period, pilot participants who received a heat pump rebate saw a decrease in their natural gas usage and an increase electric consumption, resulting in a 30% average reduction in combined energy use and almost 20% reduction in site-based carbon emissions. The combined cost of PSE gas and electric utility bills for pilot participants decreased by 3%.

Table 1: Pilot Impacts Summary[3]

METRIC	AVERAGE SAVINGS PER PARTICIPANT PER YEAR	PERCENT SAVINGS
Energy savings	32 MMBTU	30.0%
Bill savings	$72	3.2%
CO_2 emissions reduction	1.267 metric tons	19.7%

Table 2 describes other key findings and recommendations based on the pilot evaluation. PSE plans to consider the findings and recommendations within other relevant fuel switching pilots, programs, and initiatives such as Phase 2 of the Targeted Electrification Pilot.[4]

Table 2: Summary of Key Findings and Recommendations

#	TOPIC AREA	FINDING	ASSOCIATED RECOMMENDATION
1	Energy Impacts	Pilot participants who received heat pump rebates decreased natural gas use by 64% and increased electricity consumption by 51%. The combined energy use of both electric and natural gas resulted in a 30% average reduction in overall energy use.[5]	N/A
2	Customer Cost	Customer feedback received during the pilot indicates that the primary barrier to heat pump installation is upfront cost of installation. Almost 50% of HEA survey respondents said they would be very likely to pursue further electrification if additional incentives were available.	Provide information to PSE customers on existing third-party options to reduce the costs of installing a heat pump, such as state and federal programs and financing options, low-interest loans, and other resources, in addition to PSE rebates.
3	Customer Education	A majority of participants felt well informed about heat pumps as an option after installation, but 25% still felt uncertain about some aspect of heat pump installation, indicating that customer education still represents a barrier.	Provide participants with easy-to-understand written and graphic information. Prior to an assessment, include information about heat pumps, upfront costs, rebates, and available financing options. After an assessment or installation, share information about maintenance costs, projected savings, and heat pump usage functionality.
4	Customer Communication	Participants generally reported that overall communication during the pilot was positive, but communication on rebates has room for improvement with only 24% of HEA respondents feeling very confident in understanding them.	Several ways to enhance communications are listed below: - Diversity marketing materials with infographics and videos, especially around heat pump functionality and usage.

[3] These quantitative results exceeded the statistical significance targets of ±10% precision at the 90% confidence level for all metrics except the combined gas and electric bill savings.

[4] It is important to note that the Targeted Electrification Pilot Phase 2 efforts are contingent upon the approval of funding authorized through PSE's 2024 GRC.

[5] It is important to note that this analysis does not consider electricity impacts from the summer cooling period.

#	TOPIC AREA	FINDING	ASSOCIATED RECOMMENDATION
			- Target email campaigns based on HEA results. - Engage in partnerships with local communities and community-based organizations; duplicating partnership with Energy Smart Eastside (ESE) is recommended.
5	Customer Influences	Environmental friendliness, rebates, desire to add cooling to homes, and federal tax credits were the primary motivators for adopting a heat pump identified by pilot participants.	Provide educational resources that explain the full range of benefits and motivators for adopting a heat pump as was identified from the pilot. Utilizing an online calculator tool would allow customers to estimate potential savings and environmental impacts from switching to a heat pump.
6	Customer Distributed Energy Resource (DER) Adoption	A majority of survey respondents said they have not incorporated DERs such as solar photovoltaic panels into their homes, but they would be interested in this if PSE provided incentives.	Develop educational campaigns that highlight characteristics, costs, and benefits of DERs. Emphasize and cross-market current PSE offerings.
7	Multilingual Support	While most (88%) respondents reported English as the primary language spoken in their households, some reported Cantonese or Mandarin (4%), Hindi (3%), and Spanish (<1%).	Consider offering educational materials in Chinese (simplified and traditional) and Hindi, in addition to Spanish.

1. PILOT OVERVIEW

1.1. BACKGROUND

In 2022, a settlement was reached in PSE's 2022 GRC that, among other requirements, directed PSE to implement a Settlement Targeted Electrification Pilot (STEP or pilot) that would provide a key input for the development of PSE's Targeted Electrification Strategy (TES). The pilot was designed to educate customers about electrification and test various approaches to providing incentives that encourage the adoption of electric home heating appliances such as heat pumps. Pilot development began in early 2023, heat pump rebates were offered beginning in June 2023, and HEAs were offered beginning in September 2023. Customers participating in the HEA were not obligated to take advantage of the heat pump rebate but were encouraged to do so if it was deemed to be a good fit. PSE completed 11,915 assessments, exceeding its goal of 10,000 assessments by the end of 2024.

A third-party consultant conducted EM&V for the Pilot, including a final Pilot Evaluation Report. This report summarizes the Pilot's design, delivery, and performance against overarching goals and objectives for the effort. Objectives of the pilot included:

- Identifying barriers to heat pump adoption;
- Understanding barriers to low-income or vulnerable populations to accessing heat pumps;
- Providing education to customers on utility incentives;
- Evaluating whether providing financial incentives for fuel switching would increase adoption of high-efficiency electric-only appliances; and
- Exploring mechanisms to offset electric system reliability risk.

1.2. PILOT GOALS AND OBJECTIVES

Specific pilot goals and objectives, as stated in the 2022 GRC multiparty settlement agreement,[6] are described in Table 3 as well as how PSE has accomplished each item.

Table 3: Projected Budget for Targeted Electrification Pilot

GOAL / OBJECTIVE	HOW PSE ADDRESSED IT
Engage 10,000 customers through at least two of the following: - Home Electrification Assessments - Heat Pump Rebates - Education on qualified installers and incentives for Low-Income Upgrades	- PSE has completed 11,915 HEAs - PSE has completed 1,737 Heat Pump Rebates - PSE has completed the weatherization and installation of heat pump systems at 37 low-income residential customer homes through the Low-Income Upgrade Track. An additional 12 projects completed in December 2024 will be paid for in 2025.

[6] A full list of goals can be found in the GRC multiparty settlement agreement beginning on page 37 located here: https://apiproxy.utc.wa.gov/cases/GetDocument?docID=2671&year=2022&docketNumber=220066

Identify DER investments for load shifting	PSE assessed DER readiness among participants, which is described in Section 3.3. PSE also conducted benchmarking analysis of how DERs may mitigate system risk, which is described in Appendix DD: BENCHMARKED DER PROGRAMS
Identify barriers to heat pump adoption and develop recommendations for heat pump penetration	PSE identified barriers to heat pump adoption in Section 3.3, and recommendations are discussed in the Executive Summary.
Identify barriers to low-income and vulnerable populations for heat pump adoption	PSE identified barriers to heat pump adoption for low-income and vulnerable populations in Section 3.3.
Develop policies and programs to support adoption of heat pumps by low-income and vulnerable populations	PSE is pursuing the TES Program Portfolio in 2025-26 which includes over a dozen initiatives, most of which are targeted to low-income and vulnerable populations.
Provide education and outreach on qualified installers and utility incentives	PSE details the approach for education and outreach on pilot efforts within Section 1.4.
Evaluate if financial incentives for fuel switching increases adoption of electric appliances	PSE's free ridership analysis in Section 3.2.7 found a net-to-gross (NTG) ratio of 73-84% which indicates the heat pump rebate financial incentive was largely responsible for increasing adoption or was otherwise a major motivating factor. Additionally, PSE found that 76% of total HEA respondents reported being "very much" or "somewhat" likely to pursue home electrification and/or heat pump installation if additional incentives were available, as is described in Section 3.3.

In addition to meeting the pilot goals and objectives identified in the multiparty settlement agreement, the pilot also sought to help inform the TES by generating learnings that were ultimately considered in the development of the TES program portfolio for 2025-26, which includes Targeted Electrification Pilot Phase 2 programs.

1.3. PILOT SCOPE AND DESIGN

The pilot consisted of five distinct components to test approaches to education and incentives that encourage adoption of electric home heating equipment and appliances. These components are described in Section 1.3.1 through Section 1.3.5.

1.3.1. HOME ELECTRIFICATION ASSESSMENTS (HEA)

The HEA component of the Targeted Electrification Pilot provided PSE single-family residential gas customers (gas-only and dual-fuel) with access to electrification coaches,[7] education and outreach regarding electrification benefits, connections to qualified installers, and information about available utility, regional, state, and federal incentives. The HEA captured survey data about customer motivations and barriers to fuel switching to electric-only appliances which could be used to help design and implement future targeted electrification programs and offerings.

[7] An Electrification Coach is a staff member from Contractor #1 in charge of doing the walk-through and completing the HEA for the customer.

To be eligible for an HEA, a customer needed to have an active residential PSE gas or combination electric and gas account and live in an existing single-family dwelling or attached housing with four units or less that are attached by a contiguous roofline. After completing the assessment, customers received a custom HEA report and a $50 gift card.

1.3.2. HEAT PUMP REBATES

Heat Pump Rebates were offered to PSE dual-fuel residential customers willing to remove or decommission existing natural gas heating systems. In 2023, qualifying customers could receive a $2,400 rebate for a ducted/ductless heat pump to replace their gas heating system. Alternatively, qualifying customers could receive a $4,000 rebate for a Consortium for Energy Efficiency (CEE) rated cold climate heat pump that replaced their gas heating system. Either rebate required the equipment to be IRA Tax Credit eligible. In 2024, qualifying customers could receive a $3,000 rebate for a ducted/ducted heat pump to replace their gas heating system. Income-qualified customers (less than or equal to 90% of the AMI) were eligible to receive a $4,000 rebate for a heat pump to replace their gas heating system. Either rebate required the equipment to match just the Heating Seasonal Performance Factor 2 (HSPF2) component of the IRA Tax Credit requirements to be eligible.

1.3.3. LOW INCOME UPGRADE TRACK

The Low-Income Upgrade Track targeted PSE residential, single-family dual-fuel customers participating in PSE's HWA program. This offering was an add-on to the HWA program in which a participating Community Action Agency (CAA)[8] would identify an electrification candidate, coordinate with contractors to install a heat pump system and fully weatherize the customer's home. This pilot offering covered all equipment and installation costs for the customer, also referred to as a direct install incentive.

1.3.4. MULTI-FAMILY DIRECT INSTALLS

The Multi-Family Direct Install program targeted direct installation of heat pumps to dual-fuel multi-family sites located in named communities. The heat pumps were provided at no cost and were complemented by energy efficiency improvements when needed. The Targeted Electrification Pilot and PSE's CCA Decarbonization Program partnered for this component in order to maximize delivery of customer benefits by the end of 2024.

1.3.5. SMALL BUSINESS DIRECT INSTALLS

The Small Business Direct Installs Pilot component sought to enable PSE dual-fuel, small business customers located in named communities, as well as any small businesses operating with non-profit status, to participate in electrification projects for space and/or water heating. The heat pumps were provided at no cost, and weatherization and other energy efficiency measures are implemented at the same time, when possible.

[8] CAAs are local private and public non-profit organizations that work on community efforts fighting poverty, promoting economic enhancement, or other causes important to a community.

1.3.6. TARGETED ELECTRIFICATION PILOT BUDGET AND SPENDING

The pilot had a preliminary total budget of $12,540,000 to fund the HEAs, Heat Pump Rebates, direct installs, evaluation, and administration costs as shown in Table 4.

Table 4: Projected Budget and Actual Spend for Targeted Electrification Pilot

TARGETED ELECTRIFICATION PILOT ELEMENT	ESTIMATED SPEND	ACTUAL SPEND*
Home Electrification Assessment	$4,720,000	$4,756,308*
Fuel-Switching Heat Pump Rebates	$5,500,000	$5,478,976
Low-Income Direct Heat Pump Installations	$1,570,000	$1,709,548*
Multi-Family Direct Install	$225,000[9]	$75,000
Small Business Direct Installs	$100,000	$91,415*
Targeted Electrification Pilot Evaluation	$165,000	$159,408*
Development, Overhead, Administration, And Marketing	$260,000	$270,467*
Total	**$12,540,000**	$12,541,122*

*Accounts for accruals that will be paid in January 2025 for work done in December 2024 once invoices are received.

1.4. PILOT DELIVERY APPROACH

1.4.1. OVERALL PILOT ADMINISTRATION

PSE partnered with four contractors, four CAA partners, and four community-based organizations (CBOs) to deliver the various components of the pilot. Details on the roles and responsibilities for each of these partners are provided below.

PSE Role and Responsibilities

PSE oversaw overall pilot design, implementation, and coordination with all contractors involved in delivering pilot program components. PSE was primarily responsible for delivering heat pump rebates, but also designed and helped implement other program components including HEAs, the Low-Income Upgrade Track, and direct installs through various partnerships. PSE was also responsible for maintaining pilot tracking systems that contained pilot participant and contractor information, and HEA survey documentation.

PSE held internal pilot check-ins weekly, monthly, and quarterly to ensure key PSE staff were aware of pilot progress, achievements, and challenges. PSE also provided six status updates during the pilot

[9] An additional $334,400 is estimated to be spent from the CCA Decarbonization Program.

through virtual meetings with Settlement Parties to the 2022 GRC agreement. These meetings covered pilot start-up, performance, and other progress updates. Details on topics covered at each pilot update meeting with Settlement Parties are provided in Appendix E.

Contractor Roles and Responsibilities

The first contractor ("Contractor #1") was responsible for implementing the HEA component of the pilot. In this role they educated customers in PSE communities about the pilot through marketing and outreach, provided home assessments to participating customers, collected data on home appliances to assess electrification potential, provided education on each home's potential for electrification (including referrals to PSE for rebates or other incentives), and managed the HEA budget.

The second contractor ("Contractor #2") was responsible for conducting the pilot evaluation. The evaluation focused on program impacts, performance, and operational issues, as well as identifying opportunities for improvement. Further details on this contractor's role evaluating the pilot are provided in Section 2.2, which describes the pilot evaluation methodology.

The third and fourth contractors, "Contractor #3" and "Contractor #4," supported the Multi-Family Direct Install program and the Small Business Direct Install program, respectively. Responsibilities for both included identifying candidate sites, facilitating contractor bids, and ensuring work was completed on time. The actual cost of the installation was paid to the installer of the equipment and Contractor #3 and Contractor #4 received a fee for coordinating these efforts.

CAA and CBO Partnerships for the Pilot

PSE worked with the following four CAA partners for the Low-Income Upgrade Track:

1. King County Housing Authority
2. CAC Lewis Mason Thurston
3. Pierce Country Human Services
4. HomeWise

PSE also worked with the following four CBOs to promote engagement for the Home Electrification Assessments:

1. South King Tool Library
2. Family First Community Center
3. Pierce Conservation District
4. Tacoma Tool Library

To promote incentive stacking, PSE collaborated with Energy Smart Eastside (ESE) on a co-branded postcard campaign, reaching over 30,000 customers and highlighting the opportunity to combine PSE

and ESE rebates.[10] Additionally, PSE partnered with Energize King County to host a series of educational workshops at local libraries, where customers learned about the Low-Income Upgrade track and available rebates from both programs.[11]

1.4.2. HEA PROCESS

HEA pilot processes were defined in a comprehensive program operation manual. This document provided detailed information on Contractor #1 staff roles, responsibilities, and operations for implementing the HEA component of the pilot. The following subsections highlight some of the key elements of HEA implementation as described in the program manual.

HEA Customer Journey

Customers participating in an HEA typically followed these steps to enroll and participate:

1. Customers learned about the program through email, postcards, social media, neighborhood events, word of mouth, or from a community-based organization.
2. Customers provided their contact information, including an email address, which was used to deliver the results of their HEA.
3. Customers scheduled the HEA. Scheduling could be completed through a Customer Service Representative from Contractor #1 or online via the PSE website.
    a. Customers could opt in to receive text, call, and email reminders on how to prepare for their visit (pets contained, access to heating system, etc.).
4. Customers received a courtesy email one day prior to the appointment.
5. An Electrification Coach spent an hour with each customer walking them through their home, teaching them about energy efficiency and electrification opportunities such as improved insulation, efficient windows, electric water heating equipment, and electric heating, ventilation, and air-conditioning (HVAC) systems.
6. Customers received a custom electrification plan based on the assessment findings that also included resources (rebates, tax credits, etc.) that are available for each recommendation. The Electrification Coach walked through the report and emailed it to the customer.

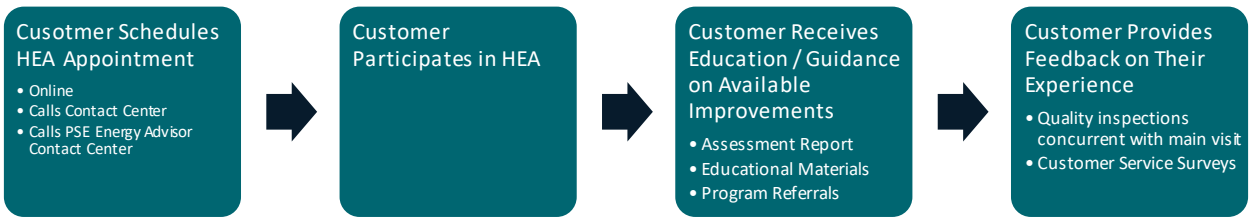
[10] ESE rebates include a $3,000 Income-Qualified Fuel Switching Heat Pump Rebate and $500 ESE Mitsubishi Diamond Dealer Rebate. For more details see here: http://www.energysmarteastside.org/fuelswitchapp; https://discover.mitsubishicomfort.com/fuel-switch

[11] Energize King County rebates include an Income-Qualified heat pump rebate covering 80-100% of costs. For more details about workshops and rebate steps see here: http://www.energizekingcounty.org/.

7. Starting July 2024, Electrification Coaches began offering to help customers sign up for PSE's Flex Rewards,[12] Flex Smart,[13] and Bill Discount Rate[14] when applicable or of interest.
8. At the end of the assessment each customer was given a $50 gift card along with a leave-behind brochure that covered the benefits of electrification. Customers were informed that they can receive up to two $25 e-gift cards for referrals.
9. Customers received an email thanking them for participating and a request to participate in a survey on their experience.
10. Customers received a quality assurance follow-up email to continuously collect feedback on program quality.

Figure 1 provides a summary of the steps in the customer experience for an HEA. At any point in the participation process, customers could receive customer support from Contractor #1 or PSE.

Figure 1: Customer Experience Steps



HEA Customer Service

Customer service was provided through PSE Energy Advisors[15] for general inquiries about energy efficiency programs and available offerings. The Contractor #1 contact center provided more specific

[12] PSE's Flex Rewards is a voluntary program that incentivizes customers to conserve energy on days when electricity is forecasted to peak. Details of the program can be found here: https://www.pse.com/en/rebates/PSE-flex/flex-rewards.

[13] PSE's Flex Smart program allows customers with Wi-Fi enabled thermostats to get rewards for adjusting their temperature on days when electricity usage is forecasted to peak. Details of the program can be found here: https://www.pse.com/en/rebates/PSE-flex/flex-smart.

[14] PSE's Bill Discount Rate program assists with customer energy bills. Customers can save 5% - 45% depending on household income and size. Details of the program can be found here: https://www.pse.com/en/account-and-billing/assistance-programs/bill-discount-rate.

[15] PSE Energy Advisors (EAs) bring efficiency into the homes of PSE customers by guiding them in changing behaviors, understanding their energy use, and assisting them in the selection and use of PSE programs that best match their individual circumstances. EAs also promote and explain PSE's renewable energy programs, available promotions, and tax incentives. The EAs assist customers with these services over the phone, through email, via virtual and in-person events. .

information related to HEA programs, provided support for scheduling HEAs, and handled escalations and any complaints as they emerged.[16]

HEA Program Materials

Leave-behind informational material provided to customers who participated in an HEA included the $50 gift card and a leave-behind brochure (see Appendix A) with information on the customer satisfaction survey, the referral program for HEAs, IRA tax credits, and a phone number and website to contact for assistance. Another version of this brochure was targeted towards low-income customers and included specific information about additional benefits available to those customers including HWA, heat pump installation at no cost offered through the pilot, a Bill Discount Rate, and next steps for pursuing these programs, including contact information to sign up for an HEA.

Additionally, a 2-page HEA overview flyer was developed in both English and Spanish for use in marketing and outreach. This flyer included information on how the HEA is conducted, how to register, a phone number and website to contact for assistance, a QR code for more program information, discussion on the benefits of electrifying, and a table showing the cost comparison of heating systems (provides as Appendix B).

Quality Assurance (QA) and Customer Feedback

To maintain a high level of quality and allow for continuous improvement in program delivery, QA follow-up emails to HEA participants enabled the collection of additional feedback. The scope of QA follow-up emails included:

- Determining adequate thoroughness of assessment and report;
- Determining adherence to badging and identification protocol; and
- Obtaining additional feedback on the specialist that delivered the assessment and/or program for optimization of program and delivery.

The process for documenting customer feedback was as follows:

1. After a customer completed an assessment, the Electrification Coach uploaded the assessment project onto eManager[17].
2. Once successfully uploaded, the status of the project/work order was marked as 'Field Complete'.
3. The updated status automatically triggered a survey email to be sent to the customer.
4. After the customer submitted the survey, the data went into Alchemer[18] and eManager.
5. The Field Manager analyzed the data to create training for Electrification Coaches as needed and documented the feedback.

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[16] This contractor provides extensive instructions in their manual on how to interact in person and over the phone with customers to best service their needs.

[17] eManager is a data tracking software used to track HEA information

[18] Alchemer is a survey management platform. Results from the surveys can be found here: PSE HEAP CSAT - Sharedexplore - Public-view

6. Field manager reported findings to PSE upon request.

1.4.3. HEAT PUMP REBATES PROCESS

The following steps were taken by customers and administrators participating in the Heat Pump Rebate component of the pilot:

1. Customers learned about the pilot through email, postcard, social media, word of mouth, contractor, or from a PSE bill insert.
2. Customers could visit the PSE website or call a PSE Energy Advisor for more information. PSE strongly encouraged customers to get quotes from PSE Recommended Energy Professionals.
3. Customers received heat pump quotes from either in-network or out-of-network contractors.
    a. PSE Trade Allies[19] (in-network) were encouraged to provide an instant/at-time-of-sale rebate to customers.

4. Trade Ally installed the heat pump system, ensuring it services the main living space of their home. The trade ally or the customer then decommissioned or removed their pre-existing gas heating equipment (cut and cap of gas line to equipment was sufficient).

5. Customers (or contractors if an instant rebate was used) went to the PSE website, filled out the needed information for the rebate application, provided a paid or partially paid invoice, and submitted the application.
    a. Customers who have participated in PSE's Efficiency Boost program will have self-declared their income-status as moderate-income (<= 90% AMI) via a checkbox on that form, providing some information on the income levels of participants.

    b. As standard for PSE rebate programs, 20% of applications were flagged for random verification. If a customer was selected, PSE's Verification Team conducted a virtual verification visit with the customer either via FaceTime or through photo documentation to ensure that the installation was completed, equipment installed matched the equipment listed on the invoice, and that the previous natural gas heating system had been removed or decommissioned.
6. The PSE Processing Team reviewed applications and issued payment via check or as a credit toward customers' PSE bill, depending on what preference the customer selected in their application.

[19] A trade ally is a contractor or service provider that participates in a utility-offered energy efficiency program. Trade allies are responsible for educating customers about energy efficiency programs and incentives and installing energy efficient equipment.

1.4.4. LOW INCOME UPGRADE TRACK PROCESS

The following details the steps that customers and administrators took to participate in the Low-Income Upgrade Track component of the Pilot:

1. Customers learned about the Low-Income Upgrade Track from a CAA partner or Electrification Coach and reached out to their local CAA partner:
    a. CAA partners were able to keep a waitlist or referral list of customers who had completed HEAs that might be a good fit for the Low-Income Upgrade Track;
    b. CAA partners could reach out to a customer on these lists if they identified them as a good candidate.
2. CAA partner communicated to PSE when customers were interested in participating in the Low-Income Upgrade Track. PSE then provided the CCA partner documentation for the customers including:
    a. One-page overview on how a heat pump works and how it may affect their home;
    b. Participation agreement with an estimate of: (1) the customer's current heating cost, (2) their heating cost if they switched to a heat pump and weatherized their home, and (3) their heating cost if they switched to a heat pump and weatherized their home and enrolled in PSE's Bill Discount Rate.
3. Customers signed the participation agreement in addition to other CAA partner documents if applicable.
4. The CAA partner hired contractors to complete the installations, and the CAA applied for reimbursement for the electrification measures through PSE's Trade Ally Portal (DSMc):
    a. The CAA partner must have provided the invoice and signed customer participation agreement;
    b. PSE paid for the full cost for heat pump system, heat pump water heaters, electric stove/ranges, and work needed to install electrification measures (rerouting ductwork, panel work, etc.).
5. PSE reviewed and issued payments to the agency.

2. PILOT EVALUATION

2.1. EVALUATION OBJECTIVES

Contractor #2 provided a third-party evaluation of the pilot, including an assessment of pilot impacts, effectiveness of pilot delivery, and analysis and research on customer sentiment around electrification efforts.

2.1.1. IMPACT EVALUATION OBJECTIVES

Impact evaluation activities focused on estimating the changes to energy (electric and gas) consumption and demand for participants in the heat pump rebate component of the pilot. The estimates helped PSE understand billing impacts and inform system planning. For each pilot participant included in the sample, Contractor #2 determined electricity usage, peak electric energy demand, and natural gas consumption before and after installation of the electrification measures and evaluated the reduction of greenhouse gas emissions and potential cost savings associated with participating in the program. Section 2.2 describes the methods used to complete the impact and process evaluations in greater detail.

2.1.2. PROCESS EVALUATION OBJECTIVES

Process evaluation activities focused on the effectiveness of pilot delivery and how customers felt about relevant technologies and initiatives. Process evaluation objectives can be found in Table 5-4.

Table 5: Process Evaluation Activities

RESEARCH OBJECTIVE	ACTIVITY	AUDIENCE	CUSTOMER ANALYSIS METHOD
Identify barriers and recommendations for improving heat pump market penetration and electrification adoption	Survey	Participants and partial participants	Online
Identify barriers and recommendations for improving heat pump market penetration and electrification adoption in named communities	Survey	Participants and partial participants	Online
Identify benefits of electrification to participants including rebates, bill discount enrolls, lower energy costs, improved comfort/non-energy benefits, and financial savings to participants	Survey	Participants	Online
Identify characteristics of electrification participants	Survey	Participants	Online
Quantify the attribution and net impacts of PSE rebates	Survey	Participants	Online
Assess DER readiness among participants, with analysis of how DERs may mitigate system risk	Benchmarking	N/A	Secondary research
Evaluate the performance of electrification outreach channels, success and response rates, and benchmarking comparisons to similar programs	Benchmarking	N/A	Secondary research

RESEARCH OBJECTIVE	ACTIVITY	AUDIENCE	CUSTOMER ANALYSIS METHOD
Quantify short-term and long-term carbon reduction benefits from electrification	Engineering analysis	N/A	Princeton Scorekeeping Method (PRISM) utility bill analysis, engineering analysis
Quantify annual electric energy use, natural gas use, and electric demand of electrification participants	Engineering analysis	N/A	PRISM utility bill analysis, engineering analysis
Provide recommendations for implementing a targeted electrification strategy	Reporting	N/A	Report

2.2. EVALUATION METHODOLOGY

The following sections of the report describe the approach that Contractor #2 used to conduct the impact and process evaluations for the pilot, including the following activities:

1. Tracking Database Review
2. Utility Bill Analysis
3. Materials Review
4. Program Staff Interviews
5. Participation Surveys
6. Benchmarking

Findings from these activities are described in Section 3 of this report.

2.2.1. TRACKING DATABASE REVIEW

Contractor #2 first reviewed pilot program tracking datasets, which are datasets that contain information about program participants, to identify and resolve any potential data-quality issues before conducting data analysis. This preliminary review included the following activities:

- Identification of potentially duplicated records
- Analysis on missing or inaccurate data, including:
  - Participant location
  - Name
  - Contact information
  - Premise ID
  - Account number
  - Measure type (e.g., HEA, heat pump installs)
  - Measure implementation date; and
  - Other PSE program participation measure flags (e.g., pilot participants who received incentives and reported savings through measures from other PSE energy efficiency programs in 2022 or 2023).

2.2.2. UTILITY BILL ANALYSIS

Contractor #2 followed industry best-practice methods established by the International Performance Measurement and Verification Protocol (IPMVP) and the Uniform Methods Protocol (UMP) to evaluate the energy and demand impacts of the pilot. Contractor #2 used the following data to analyze program savings:

- Tracking data for ~800 heat pump rebate pilot participants
- Hourly electric advanced metering infrastructure data and daily natural gas (hundred cubic feet or CCF) usage data from January 2022 to April 2024
- Monthly electric and gas billed usage and the billed amounts from January 2022 to May 2024
- Daily and hourly weather data from January 2022 to April 2024

The preferred approach for obtaining energy and demand estimates is the PRISM modeling of site-level data. However, due to limited post-period data,[20] Contractor #2 conducted a baseline modeling approach that compared predicted usage to actual post-usage data. The baseline predicted usage uses the baseline model to predict the consumption based on the actual weather observed in the post-period. The site-level pre-installation period was defined as the 12-month period before the measure's installation date.

Contractor #2 used the following modeling approaches to determine program impacts: [21]

1. Electric energy savings: Site-level daily PRISM modeling with heating degree days (HDD), [22,23] cooling degree days (CDD)[24]—baseline period, predicted usage compared to actual post-period weather data.
2. Gas energy savings: Site-level daily PRISM Modeling with HDD—baseline period, predicted usage compared to actual post-period weather data.

[20] On average, the participants only had six months of post-heat pump usage and AMI data. The analysis included partial coverage of the winter period. The evaluation timeframe did not enable summer impacts to be considered in the analysis. There were insufficient data to estimate post-period PRISM models.

[21] It is important to note that this analysis does not consider impacts from the summer cooling period.

[22] Heating degree days are a measure of how cold the average daily temperature is, compared to a base temperature and is used to estimate the amount of energy needed to heat a building.

[23] Contractor #2 aggregated the electric hourly AMI data to the daily level for the electricity energy usage analysis.

[24] Cooling degree days are a measure of how hot the average daily temperature is compared to a reference temperature of 65°F.

3. **Demand savings peak period**: Site-level hourly day-type models with heating degree hours (HDH)[25] and cooling degree hours—baseline period, predicted demand compared to actual post-period weather data.
4. **Billed cost savings**: Site-level pre-billed amounts to develop effective per-usage unit rates. Applied per-usage billed rates to energy usage and savings to determine cost savings.

2.2.3. MATERIALS REVIEW

Contractor #2 conducted a materials review to assess the quality, relevance, and effectiveness of the following items:

- Pilot program plan
- HEA program overview
- HEA leave-behind brochure
- Post-HEA report sample

Contractor #2 assessed the materials for:

- Accuracy and consistency across materials;
- Clarity and comprehensiveness;
- Relevance and alignment with the Pilot's objectives; and
- Effectiveness in enhancing program engagement.

The materials review was intended to help identify opportunities to enhance future implementation, delivery, and participant experience while optimizing resources.

2.2.4. PROGRAM STAFF INTERVIEWS

Contractor #2 interviewed PSE and Contractor #1 pilot program implementation staff to gain insight into program design, goals, processes, marketing, and administration. Contractor #2 used these interviews to determine if the pilot performed consistently, achieved PSE's objectives, and met participation targets within the program budget.

2.2.5. PARTICIPANT SURVEYS

Contractor #2 conducted two online surveys for HEA participants and Heat Pump Rebate participants, respectively. The surveys focused on better understanding customer sentiment surrounding heat pump technologies and the impacts of these technologies. The HEA participant survey was

[25] Heating degree hours are a measure of how much and for how long the outside air temperature is lower than a specific base temperature.

implemented from May 30 to June 21. The Heat Pump Rebate participant survey was implemented from June 21 to July 2. The surveys yielded response rates of 23% and 27%, respectively.[26]

2.2.6. BENCHMARKING

Contractor #2 conducted a benchmarking exercise to compare PSE's pilot offerings against similar programs delivered by other regional utilities. The benchmarking review fulfilled the research objective to identify opportunities to deploy DER investment to offset reliability risk during peak load events.

The benchmarking exercise focused on program aspects such as delivery, incentive structure, and the measure mix contributing to savings. The benchmarking review provided valuable insights into best practices and areas for improvement. Contractor #2 also used benchmarking results to inform other process evaluation activities, such as participant surveys. Contractor #2 prioritized research on utilities operating in the Northwest, ultimately reviewing programs delivered by Avista, Idaho Power Company, Pacific Power, and Portland General Electric. For further information on these other utility programs see

[26] Customers who participated in both pilot components only took the Heat Pump Rebate survey.

Appendix DDD.

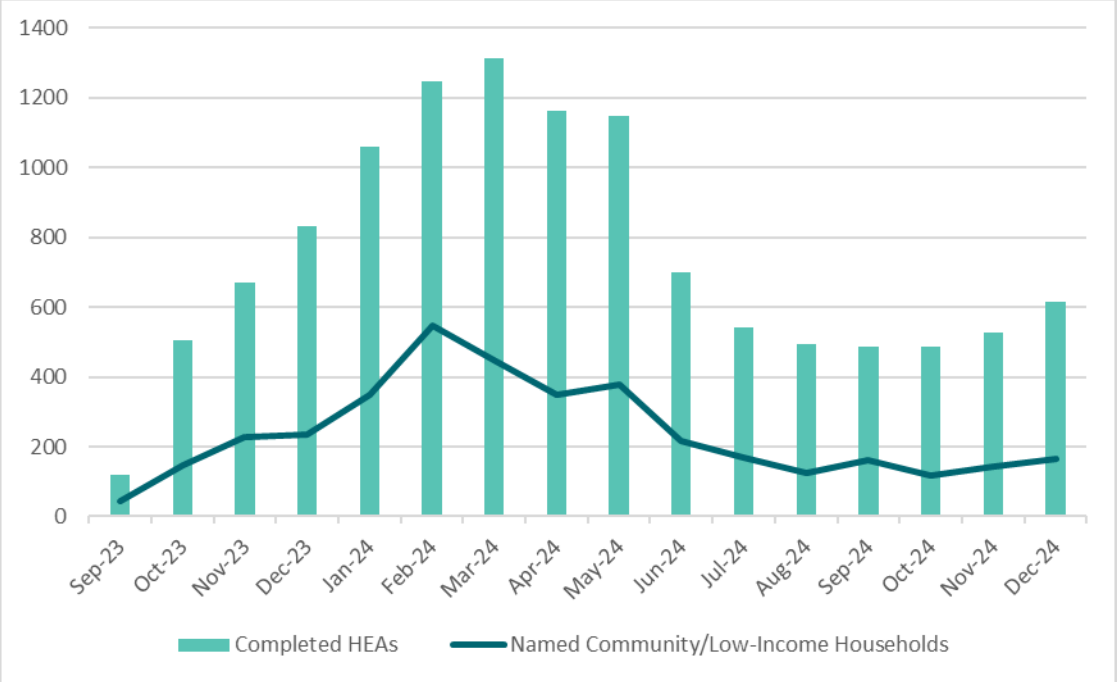
3. PILOT OUTCOMES AND ACCOMPLISHMENTS

3.1. PROGRAM PARTICIPATION

3.1.1. HOME ELECTRIFICATION ASSESSMENTS

In total, 11,915 HEAs were completed, surpassing the original goal of 10,000. Figure *2* shows month-by-month completed HEAs from September 2023 through September 2024. 32% of these were completed in named communities or low-income households. 1,800 households were recommended for low-income weatherization and heat pumps. The HEA program led to 246 Bill Discount Rate enrollments and 164 Flex Rewards/Smart enrollments.

Figure 2: Monthly Completed HEAs



3.1.2. HEAT PUMP REBATES

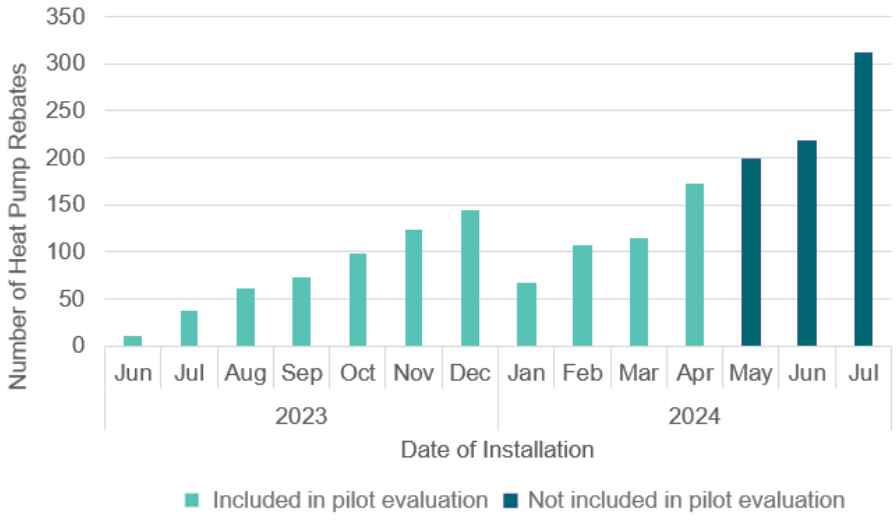
The pilot began offering heat pump rebates in June 2023, with a consistent ramp-up in participation through December 2023. Based on customer and contractor feedback and to further increase participation rates, PSE redesigned the rebate offerings, simplified the equipment requirements, and introduced an increased incentive for moderate-income customers, effective January 1, 2024. During a brief transition period, there was a drop-off in participation in January through April of 2024, but

projects rebounded in May through July.[27] Between June 2023 – July 2024, there were an average of 124 installations per month, and as of July 2024 there were 1,737 completed rebates. In total, Contractor #2 evaluated energy use for 801 pilot participants who installed electric heat pumps between June 2023 and April 2024.

[27] Contractor #2 stopped collecting data at the end of April, as is exhibited in Figure 3. It is worth noting that a significant number of rebates were processed in May through July.

Figure 3 shows the number of heat pump installations by month for both the evaluation period and for the months that were not included in the evaluation.

Figure 3: Average Heat Pump Installations Per Month



3.1.3. LOW INCOME UPGRADE TRACK

In 2024, PSE successfully completed 37 projects through the Low-Income Upgrade Track offering, with an average cost per project of $19,300 (an additional 12 projects completed in December 2024 will be paid for in January 2025). In collaboration with the four CAAs, PSE developed and implemented new processes and established a novel program pathway focused on decarbonization. This effort required significant investment in program development, enabling the CAAs to allocate additional internal resources to support this initiative while continuing to serve their existing Home Weatherization Assistance (HWA) program. Furthermore, through the HEA program, PSE generated a substantial pipeline of potential participants and referred 1,170 customers to CAA partners who were identified as suitable candidates for home weatherization and heat pump conversions and had given permission to be contacted.

3.1.4. MULTI-FAMILY DIRECT INSTALLS

PSE initially engaged two multi-family complexes that provided low-income transition housing for unhoused individuals and families through the Multi-Family Direct Installs Program. The first project consisted of 20 ductless heat pump units converted from hydronic systems. However, upon further assessment, it was determined that a service upgrade was required to support the new heat pump systems. PSE is working with the customer and contractor to navigate and pay for the service upgrade in addition to the 20 heat pump systems in 2025 through PSE's Climate Commitment Act (CCA) Decarbonization Program. The second project that was completed as part of the pilot consisted of four ducted heat pump units and six heat pump water heaters. The Targeted Electrification Pilot and PSE's CCA Decarbonization Program partnered for this component in order to maximize delivery of customer benefits by the end of 2024.

3.1.5. SMALL BUSINESS DIRECT INSTALLS

As an extension of PSE's Small Business Direct Install program, the pilot supported the installation of two energy-efficient heat pump systems for two local non-profit small businesses. One business upgraded to a heat pump water heating system, which now serves their community center. The second business took advantage of both conservation-funded weatherization measures and the pilot-funded ductless heat pump installation to create a more comfortable and sustainable space for their 'Teen Center'. To promote this new offering, PSE developed a marketing campaign, created a dedicated website, and established a waiting list of interested businesses that can receive an energy audit to determine their eligibility for future heat pump upgrades. This framework has now laid the groundwork for an expansion of the SBDI program, which will enable PSE to expand its support for small businesses seeking to adopt energy-efficient heat pump solutions.

3.2. IMPACT EVALUATION

3.2.1. SUMMARY OF RESULTS

Results from Contractor #2's impact evaluation of the pilot are detailed in this section. Results for the bill impact analysis have been annualized using pre-period rates given the limited post-period data, with some participants only having one month of post-period data. Gas and electric impacts have also been extrapolated to a full year. However, given the lack of the summer season's inclusion in the impact evaluation timeframe, cooling impacts on electricity consumption and customer bills were not considered and all annual impacts are based on estimates of annual usage. Greater detail on the impact evaluation methodology can be found in Section 2.2.2 and within the Contractor #2 Evaluation Report filed as Attachment B to this report.

Impact evaluation results estimated that pilot participants who installed a heat pump experienced a 64% average reduction in natural gas consumption, a 51% average increase in electric energy use, and a 3% average decrease in total utility bill costs. When Contractor #2 converted electricity and natural gas to British thermal units (BTUs) and combined energy use, they estimated a 30% average reduction in energy consumption per year for participants. Average winter peak electric demand for Pilot participants who installed a heat pump increased by 1.25 kW on average, a 94% increase. While the average total utility bill costs for participants decreased slightly by $72 per year, some customers also participated in bill rebate programs to limit the impact of increased electricity costs. Table 6 summarizes the overall energy, demand, bill, and emissions impacts resulting from the pilot.

Table 6: Pilot Impacts Summary

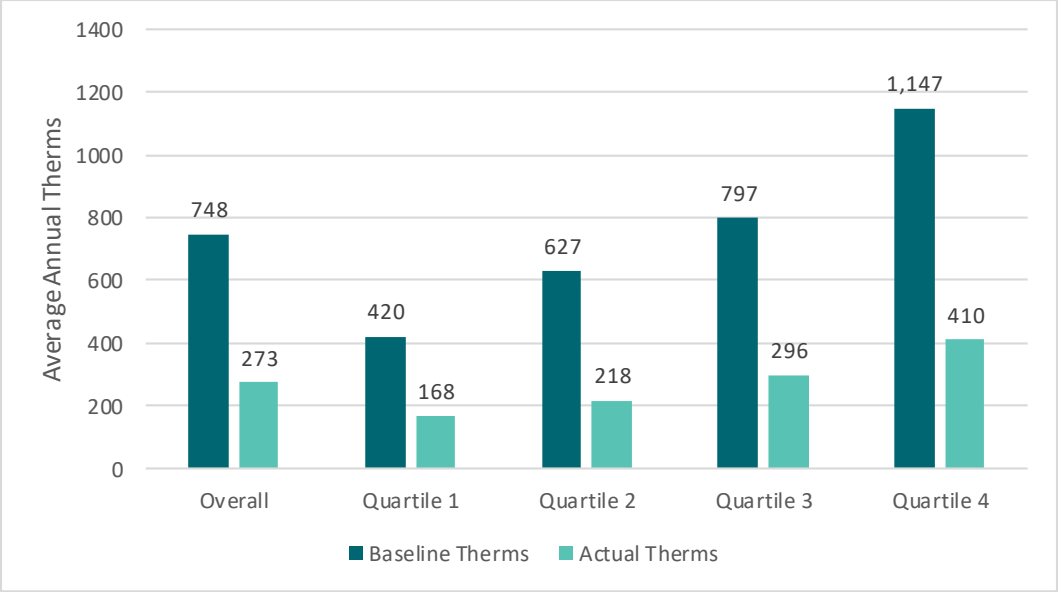
SUMMARY	UNITS	SAMPLE NUMBER OF CUSTOMERS	PREDICTED BASELINE	ACTUAL POST	AVERAGE SAVINGS PER PARTICIPANT PER YEAR	PERCENT SAVINGS	PRECISION WITH 90% CONFIDENCE
Total Energy Savings	MMBtu	658	106	74	32	30%	3%

SUMMARY	UNITS	SAMPLE NUMBER OF CUSTOMERS	PREDICTED BASELINE	ACTUAL POST	AVERAGE SAVINGS PER PARTICIPANT PER YEAR	PERCENT SAVINGS	PRECISION WITH 90% CONFIDENCE
Natural Gas Savings	Therms	599	748	273	475	64%	3%
Electricity Savings	kWh	658	9,010	13,597	-4,588	-51%	5%
Average Winter Peak Demand Reduction	kW	531	1.34	2.60	-1.26	-94%	3%
Morning Winter Peak Demand Reduction	kW	531	1.15	2.75	-1.60	-139%	4%
Evening Winter Peak Demand Reduction	kW	531	1.52	2.44	-0.92	-60%	5%
Total Bill Savings	$	658	$2,261	$2,190	$72	3%	N/A
Natural Gas Bill Savings	$	599	$1,069	$390	$679	63.5%	5%
Electric Bill Savings	$	658	$1,193	$1,800	-$607	-50.9%	9%
CO_2 Emissions Reduction	Metric Tons	-	6.429	5.162	1.267	19.7%	3%
CH_4 Emissions Reduction	kg	-	75.0	27.6	47.4	63.2%	3%
N_2O Emissions Reduction	kg	-	7.5	2.8	4.73	63.0%	3%

3.2.2. ANNUAL NATURAL GAS IMPACTS

Contractor #2 estimated natural gas energy impacts for 599 of the 801 total pilot participants who installed electric heat pumps (75%). Figure 4 shows predicted and actual natural gas use by quartile during the study period. Quartiles represent the customer groups as a function of predicted baseline annual natural gas use. Quartile 1 represents customers with the lowest predicted baseline annual natural gas use, while Quartile 4 represents customers with the greatest predicted baseline annual natural gas use. The evaluation estimated that natural gas usage decreased on average by 475 Therms per year, a 64% reduction from the baseline period.

Figure 4: Baseline and Actual Average Annual Therms Over Study Period

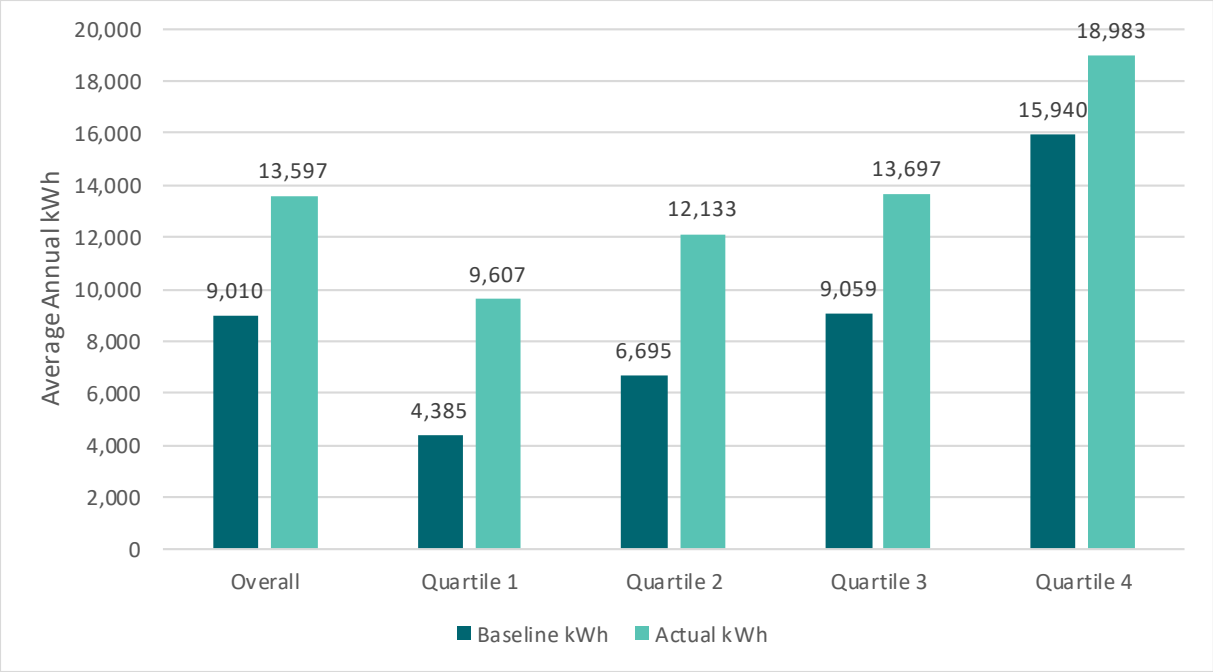


3.2.3. ANNUAL ELECTRIC ENERGY IMPACTS

Contractor #2 estimated electric energy impacts for 82% of the Pilot program participants who installed heat pumps. After heat pump installation, the average customer's estimated electricity consumption increased by 51%, or 13,597 kWh per year.[28] Customers in the lowest quartile exhibited the highest percentage of increase in estimated annual electricity use (119%), while customers in the highest quartile saw the lowest percentage of increase in estimated annual electricity use (19%). These differences may be due to several factors associated with larger homes, including multiple heating systems, higher plug loads (e.g., televisions, computers, and appliances), and a greater number of occupants. Figure 5 shows electric use before and after electrification by quartile.

Figure 5: Electric Usage Before and After Electrification

[28] As noted previously, annual estimates do not factor in unique impacts from the summer cooling period due to the timing of the heat pump projects and the evaluation schedule.



3.2.4. ELECTRIC DEMAND IMPACTS

Contractor #2 also estimated winter period electric demand impacts from heat pump installations to better understand potential peak demand impacts that, at higher levels of electrification across PSE's system, could necessitate additional electric system infrastructure and power production capacity. PSE's peak periods are defined as follows:

- June to September, non-holiday weekdays only, 4:00 pm to 7:59 pm
- Winter Morning Peak: November to February, non-holiday weekdays, 7:00 am to 9:59 am
- Winter Evening Peak: November to February, non-holiday weekdays, 5:00 pm to 7:59 pm

Table 7 summarizes the average electric demand impacts in winter months for Pilot participants who installed an electric heat pump. The average estimated impact across all peak hours was a 1.04 kW increase. This represents a ~90% increase in per customer peak impacts after the heat pump is installed.

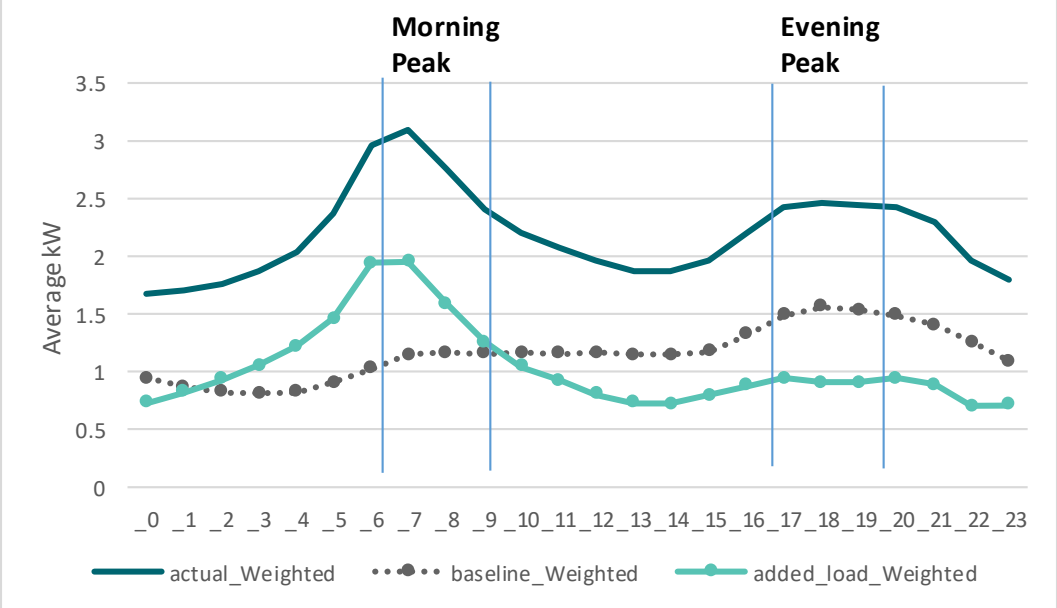
Table 7: Average Demand Impacts in Winter Months by Time of Day

TIME PERIOD	BASELINE PREDICTED DEMAND (KW)	ACTUAL POST DEMAND (KW)	ELECTRIC DEMAND ADDED (KW)	ELECTRIC DEMAND (% INCREASE)	PRECISION AT 90% CONFIDENCE LEVEL
Morning Peak: 7:00–9:59 am	1.15	2.75	1.60	139%	4%
Evening Peak: 5:00–7:59 pm	1.52	2.44	0.92	60%	5%

TIME PERIOD	BASELINE PREDICTED DEMAND (KW)	ACTUAL POST DEMAND (KW)	ELECTRIC DEMAND ADDED (KW)	ELECTRIC DEMAND (% INCREASE)	PRECISION AT 90% CONFIDENCE LEVEL
Average Peak	1.34	2.60	1.26	94%	3%
Average All Hours	1.16	2.19	1.04	90%	2%

Figure 6 illustrates the predicted baseline demand, the post-electrification demand, and the difference between the two across the winter peak period months. The baseline demand varies on average from 0.75 kW to 1.50 kW, while the post-electrification demand ranges from 1.70 kW to 3.00 kW. The graph also indicates that winter morning peak for heat pumps occurs as early as 5:00 a.m. —earlier than the beginning of PSE's currently defined winter morning peak start of 7:00 a.m. These peak-period profiles provide averages across the entire winter period and are not representative of peak-day load shapes.

Figure 6: Average Winter Peak Period Impacts Chart



3.2.5. DECARBONIZATION IMPACTS

As discussed above, the removal of natural gas-fired heating systems and replacement with heat pumps through the pilot resulted in an estimated 51% increase in electricity usage and a 64% decrease in natural gas consumption, excluding the potential influence of a summer cooling season that was not evaluated due to time constraints with the study. Based on current U.S. Environmental Protection Agency (EPA) eGRID emission factors, the burning of natural gas in residential heating systems produces more greenhouse gas (GHG) emissions than the electricity provided by PSE to power heat pump systems. Comparing annual GHG emissions before and after participants converted to heat pumps, carbon dioxide emissions were reduced

by 63.2%, and nitrous oxide emissions were reduced by 63.0%. Table 8 summarizes the average GHG emission impacts from Heat Pump Rebate pilot participants.

Table 8: Average GHG Impacts per Customer from Heat Pump Rebate Participation

GHG	GHG EMISSIONS PRIOR TO HEAT PUMP CONVERSION (KG)	GHG EMISSIONS AFTER HEAT PUMP CONVERSION (KG)	GHG EMISSIONS DUE TO HEAT PUMP CONVERSION (KG)	CHANGE (%)
CO_2 (kg)	6,428.8	5,161.7	-1,267.1	-19.7%
CH_4 (kg)	75.0	27.6	-47.4	-63.2%
N_2O (kg)	7.5	2.8	-4.73	-63.0%

3.2.6. FINANCIAL IMPACTS

Contractor #2 analyzed the impact on total utility bills for pilot participants who installed a heat pump. As discussed earlier, given the study period did not span a full year due to time limitations, cost impacts are annualized and weather-normalized using pre-period rates. Natural gas costs included impacts from participants who enrolled in PSE's Bill Discount Rate (BDR) program as part of their pilot participation.[29]

Table 9 summarizes the average annualized and weather-normalized utility bill impacts before and after heat pump installation. For natural gas, the estimated average bill amount dropped from $1,069 to $390, resulting in a $679 (64%) reduction. The estimated average electricity bill amount increased from $1,193 to $1,800, resulting in a $607 (51%) increase. In aggregate, the estimated average total utility bill decreased from $2,261 to $2,190, resulting in a $72 (3%) reduction.[30]

Table 9: Average Weather Normalized Utility Bill Impacts

GROUP	ANNUAL UTILITY BILL COST PRIOR TO HEAT PUMP CONVERSION	ANNUAL UTILITY BILL COST AFTER HEAT PUMP CONVERSION	ANNUAL UTILITY BILL COST DIFFERENCE ($)	ANNUAL UTILITY BILL IMPACT (%)
Gas	$1,069	$267	-$802	-75%
Electric	$1,193	$1,947	$755	63%

[29] The BDR, funded by the Washington Families Clean Energy Credits Grant Program and PSE ratepayers, provides financial support in the form of credits toward customer utility bills based on household income and size. BDR credits can help lower total utility bill costs by 5% to 45%.

[30] As noted previously, annual estimates do not factor in unique impacts from the summer cooling period due to the timing of the heat pump projects and the evaluation schedule.

Overall	$2,261	$2,214	-$47	-2.1%

3.2.7. FREE RIDERSHIP

This section addresses the research objective of quantifying the attribution of the pilot heat pump rebates on a customer's decision to electrify, effectively looking to understand the level of free ridership[31] associated with the pilot. To analyze this, Contractor #2 estimated net-to-gross (NTG) ratios[32] from self-reported pilot participant survey results. Free ridership was determined to be 16% for cold climate heat pumps and 27% for non-cold climate heat pumps. Spillover[33] was 0% for both types of heat pumps. Given the NTG ratios for cold climate heat pumps and non-cold climate heat pumps were 84% and 73%, the financial incentive was largely determined to be responsible for increasing adoption or was at least a major motivating factor. Table 10 summarizes the free ridership, spillover, and NTG results for the heat pump rebate component for a sample of pilot participants who installed cold climate heat pumps and non-cold climate heat pumps.

Table 10: Pilot Heat Pump Rebates Free ridership, Spillover, and Net-to-Gross Ratio

ANALYSIS CATEGORY	N	FREE RIDERSHIP	SPILLOVER	NTG RATIO
Cold climate heat pump	49	16%	0%	84%
Non-cold climate heat pump	69	27%	0%	73%

3.3. PROCESS EVALUATION RESULTS

This section of the report presents the process evaluation findings identified through a review of pilot participant surveys, pilot materials review, pilot staff interviews, and industry benchmarking.

3.3.1. SUMMARY OF RESULTS

The objective of the process evaluation was to provide a thorough assessment of the pilot, evaluating current practices and identifying areas for enhancement. It also explored customer attitudes towards heat pumps in general based on pilot participant survey findings. Overall, the pilot was successful in accomplishing its objectives with opportunities for improvement identified.

In terms of motivations for installing a heat pump in general, 31% of customers stated they wanted to add cooling to their home and 17% wanted a heating option that was more environmentally conscious.

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[31] Free ridership is the percentage of project participants who would have installed the technology regardless of incentive being available.

[32] The net-to-gross ratio (NTG) is the proportion of net savings to gross savings. It can be calculated as NTG = 1 – (free ridership + spillover)

[33] Spillover is any additional reductions in energy consumption that is not directly associated with program participation.

Capturing energy savings, taking advantage of the rebate, and poor performance of their existing heating system were other motivators for customers to install a heat pump. Notably, 67% of customers located in named communities identified adding cooling as the most important factor influencing their decision to install a heat pump, a significantly elevated rate compared to the general survey population. On the other side, financial concerns, primarily the upfront cost of installing a heat pump, was the most significant barrier to adopting heat pumps identified by survey respondents. 57% of total HEA respondents cited upfront cost or concern about return on investment as a reason to not install a heat pump. As expected, this finding held true for named community customers who also identified upfront costs as the main concern and barrier to installing a heat pump. Further, 67% of named community respondents paid for their heat pumps in cash, potentially indicating restricted access to traditional financial institutions, limited education about financing options, higher obstacles to accessing financial products such as loans, or an unwillingness to pursue a loan with high interest rates.

In terms of the pilot, respondents stated that the installation and ease of rebate claim were the aspects of the pilot that most frequently went well. 69% of all respondents said that the heat pump rebates were clear and easy to understand, indicating overall positive views of pilot program delivery. 28% of total respondents noted that communication could have been improved.

The Pilot evaluation also sought to assess DER-readiness among respondents to determine the level of load shifting that could potentially be captured to offset increased electricity consumption from fuel-switching. PSE and Contractor #2 defined DERs for survey respondents as small-scale energy sources or devices that can generate, store, or manage electricity closer to where it's used, instead of relying solely on big power plants.[34] A large percentage of respondents showed somewhat or high familiarity with DERs, but 51% of total Heat Pump Rebate survey respondents had no DERs in their home at the time of the survey.

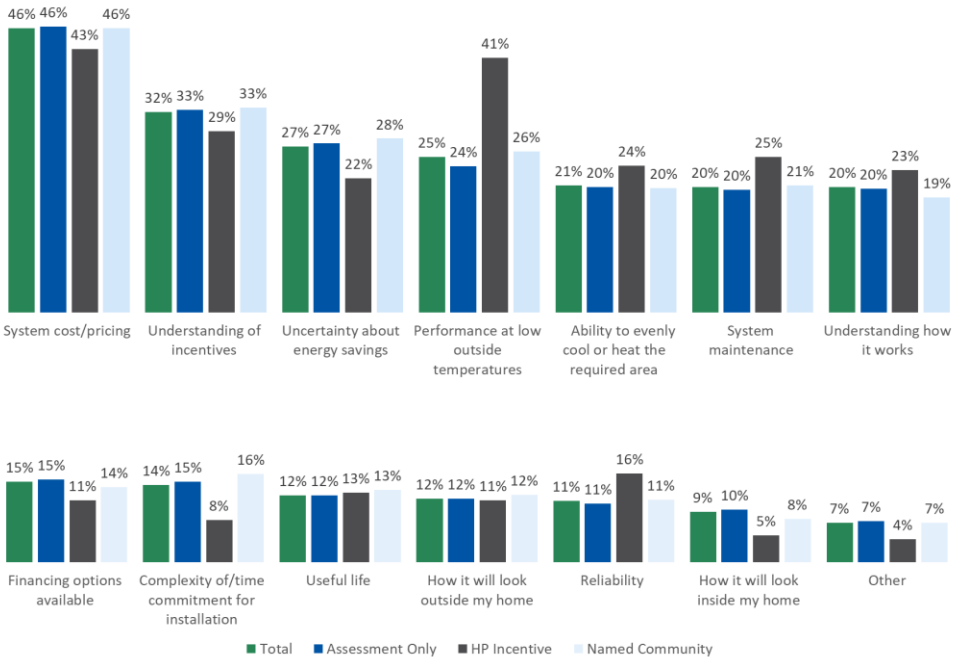
3.3.2. BARRIERS AND MOTIVATIONS TO HEAT PUMP ADOPTION

Contractor #2 asked respondents to the HEA and Heat Pump Rebate surveys what concerns they had about heat pump adoption before participating in the pilot. As shown in

Figure 7, the three largest concerns for survey participants were system cost/pricing (46% for both surveys), understanding the incentives (between 29% and 33%) and uncertainty about energy savings (between 22% and 28%). However, 77% of total respondents reported “Yes” when asked “After receiving the assessment/after your heat pump was installed, were your questions and concerns clarified?”

Figure 7: Questions and Concerns about Heat Pumps Prior to the Assessment

[34] Examples provided to respondents include rooftop solar panels, batteries for storing energy, smart thermostats, electric vehicles, and other gadgets that can help save or produce power.

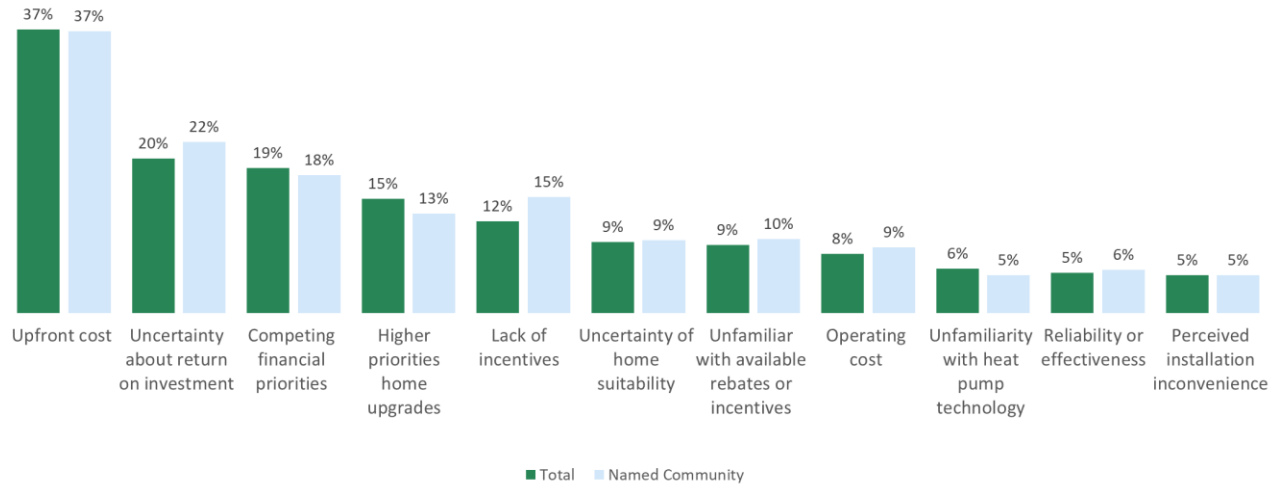


When HEA survey respondents were asked why they decided not to purchase a heat pump, the top three most common answers related to financial concerns with the most common answer being upfront cost as shown in

Figure 8. 75% of total HEA respondents reported being “very much” or “somewhat” concerned about the upfront cost of a new heat pump. These results show that concern around cost is a major barrier to heat pump adoption. When asked how they financed their decision to purchase a heat pump, 67% of named community respondents reported they paid in cash, compared to 52% of the total respondents which may indicate that these communities have restricted access to financial institutions, are provided limited education about financing options, face higher obstacles to access financing, or are less willing to pursue a loan at an interest rate that was particularly high over the pilot timeframe.

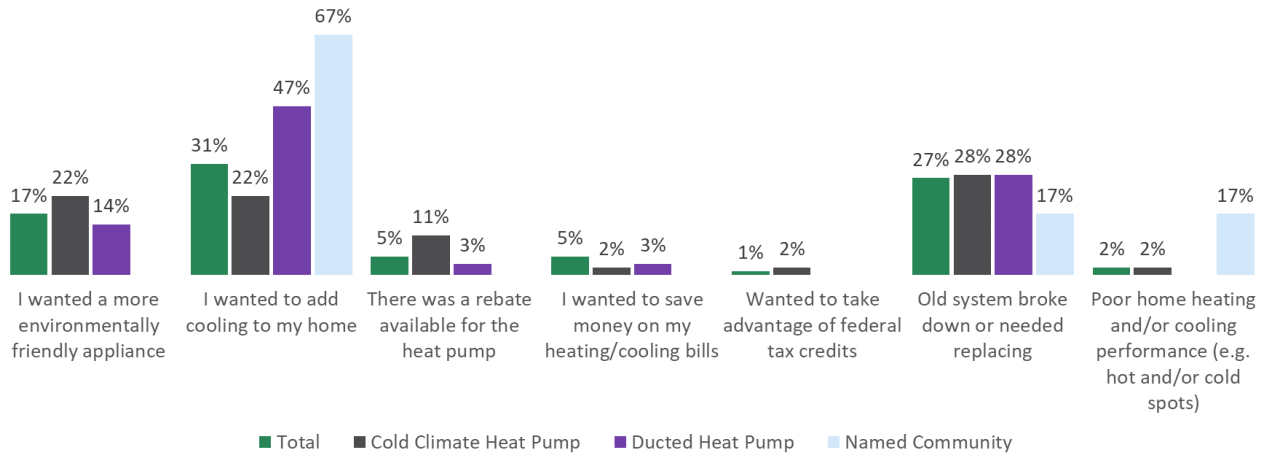
However, 76% of total HEA respondents reported being “very much” or “somewhat” likely to pursue home electrification and/or heat pump installation if additional incentives were available.

Figure 8: Main Reasons HEA Survey Respondents Decided Not to Purchase a Heat Pump



As described in Figure 9, heat pump rebate survey respondents reported that the most influential factors in purchasing a heat pump were environmental friendliness and the desire to add cooling to their homes. Among named communities, 67% listed "wanting to add cooling to their home" as the single most influential factor for installation compared to 31% of total survey respondents listing this. This may be a useful finding as it informs a key benefit of the heat pump incentive that should be communicated in marketing, education, and outreach material for future heat pump rebate initiatives.

Figure 9: Single Most Influential Factor in Purchasing a Heat Pump



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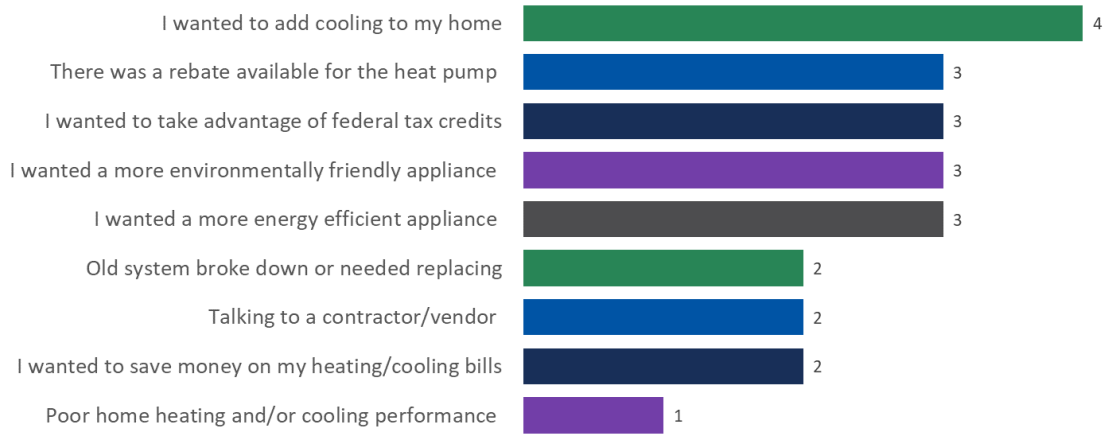
The survey also explored why "Deepest Need Customers"[35] ultimately decided to purchase a heat pump. Figure 10 describes the factors that the four Deepest Need Customers stated influenced their decision. All Deepest Need survey respondents identified adding cooling to their home as an influencing factor.

Figure 10: Factors That Influenced Deepest Need Participants' Decision to Purchase a Heat Pump

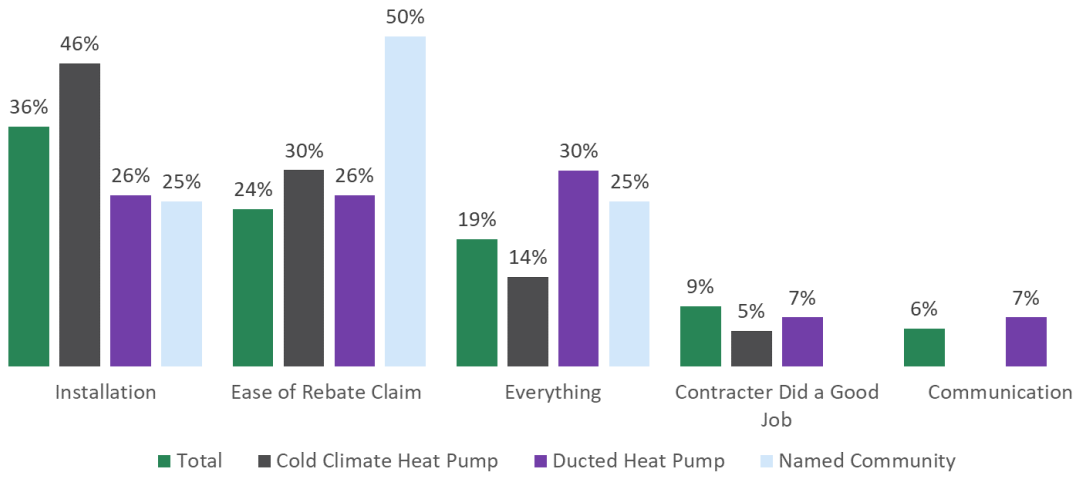


3.3.3. PILOT STRENGTHS AND OPPORTUNITIES

Overall, survey respondents felt many pilot components went well. When asked to choose an aspect of the pilot that went well, 36% reported being satisfied with the installation of their equipment and 24% reported satisfaction with the ease of claiming the rebate. 19% of respondents stated that "everything" went well, with a slightly higher rate from named community customers (25%). Further detail can be found in Figure 11.

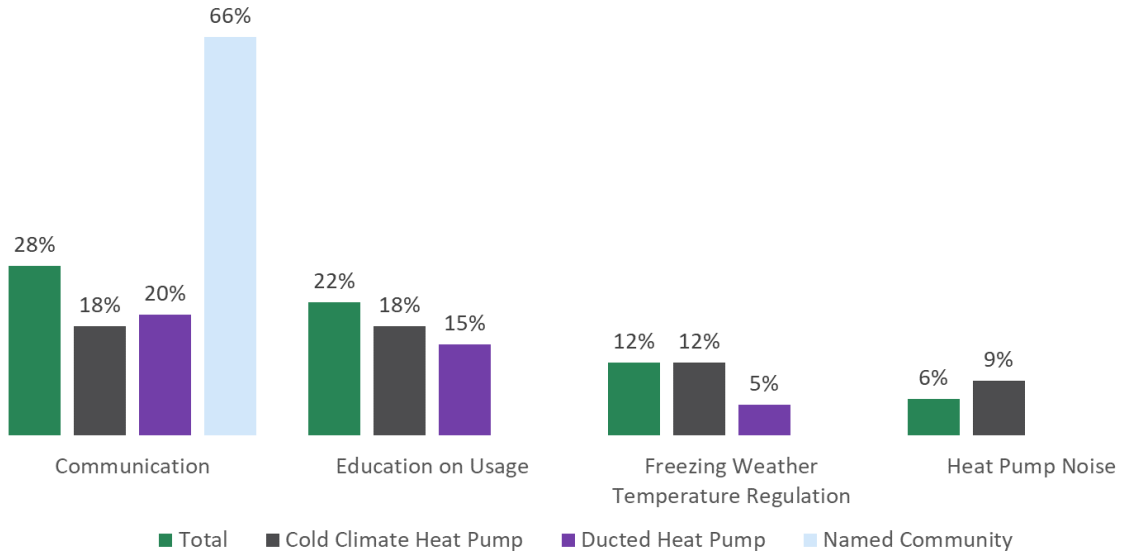
[35] PSE defines customers and communities with deepest need as those living in areas identified as clusters of severe energy burden and multiple compounding factors hindering the ability to access adequate resources. PSE considers economic and non-economic factors in the definition; among them are poor housing quality, extreme heat risk factors, populations of customers belonging to Black, Indigenous, People of Color (BIPOC), or populations with existing health conditions.

Figure 11: Aspects of the Heat Pump Rebate Component That Went Well



Some respondents indicated that the program could be improved by providing greater clarity around rebates and eligibility from various communication channels, which was the greatest area of opportunity that respondents identified. Some respondents felt that education on usage, freezing weather temperature regulation, and heat pump noise could be improved for the Heat Pump Rebate pilot component as shown in Figure 12.

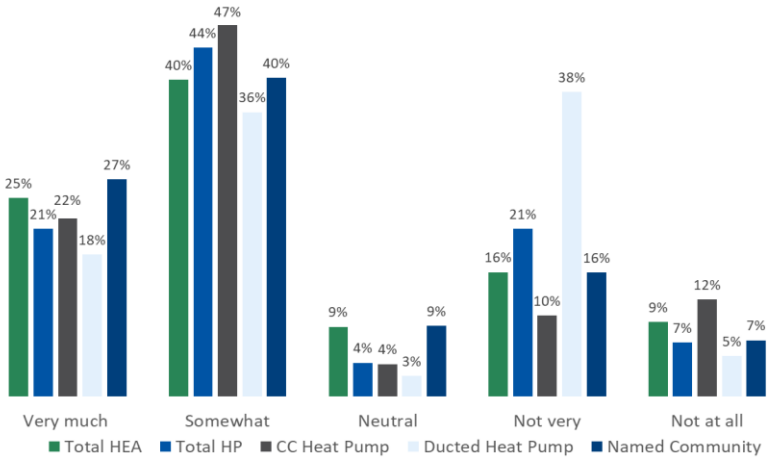
Figure 12: Aspects of the Heat Pump Rebate Component That Can Be Improved



3.3.4. DER READINESS

Survey questions also sought to assess DER Readiness[36] among Heat Pump Rebate survey respondents. Electric vehicles, smart meters, rooftop solar, and battery storage technologies were all classified as DERs for the purpose of this evaluation. The surveys looked at baseline understanding, readiness, and willingness to incorporate DERs. Figure 13 shows the baseline familiarity of Heat Pump Rebate survey respondents with DERs, with a majority indicating they are somewhat familiar. Notably, a larger percentage of named communities, compared to other groups, reported being very familiar with DERs (27%).

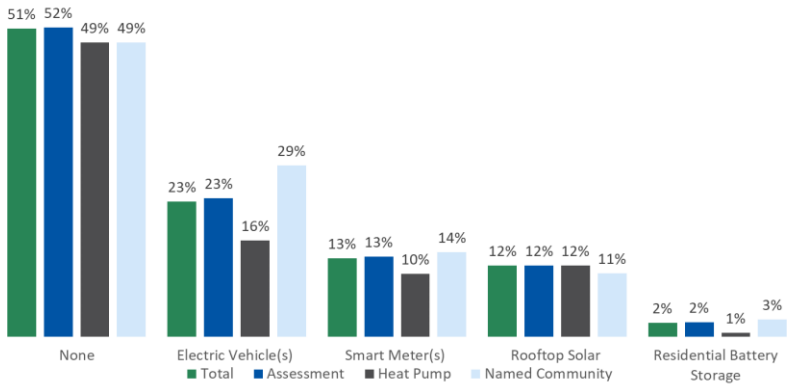
Figure 13: Familiarity of HP Survey Respondents with DERs



Of the 49% of survey respondents who had incorporated DERs into their homes at the time of the survey, the greatest level of adoption was with electric vehicles, followed by smart meters, rooftop solar, and battery storage, as shown in Figure 14.

Figure 14: DERs Installed in Respondents' Homes or in Use

[36] DER readiness is an understanding of opportunities for DER investment and identifying barriers and recommendations for improving heat pump market penetration. PSE and Contractor #2 defined DERs for survey respondents as small-scale energy sources or devices that can generate, store, or manage electricity closer to where it's used, instead of relying solely on big power plants.

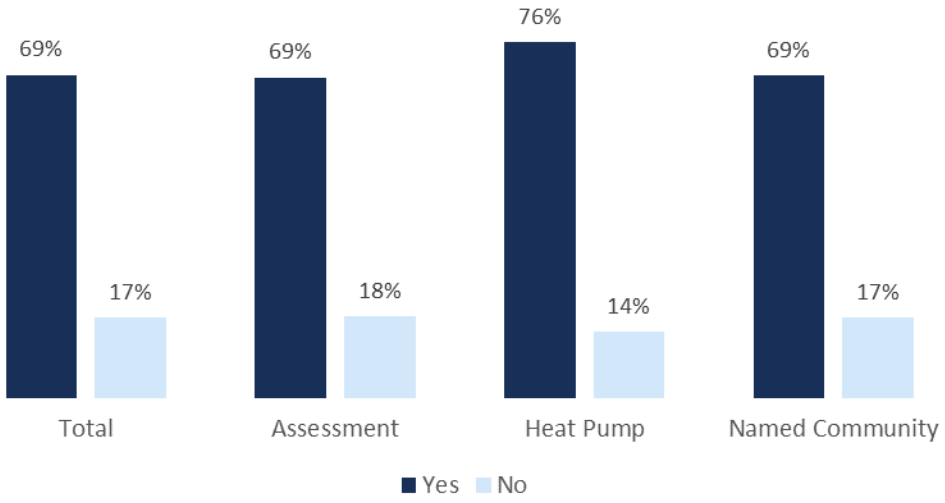


3.3.5. PROGRAM MATERIALS AND MARKETING EFFECTIVENESS

Pilot Participant Perception of Program Material

A high percentage of the respondents to both surveys indicated that the information about the rebates was clear and easy to understand, as shown in Figure 15.

Figure 15: Respondents' Perceptions of Whether the Information about PSE Rebates Was Clear and Easy to Understand



Just 18% of all HEA survey respondents reported the information was not easy to understand. A similar percentage of named community respondents (17%) reported that the information was not clear. When asked about how confident HEA survey participants were in their understanding of the PSE rebates, most respondents (56%) said they were somewhat or very confident in their understanding.

Marketing, Education, and Outreach (ME&O) Strategies and Tactics

Initial outreach efforts for the HEA program included email, postcard, social media, neighborhood events, word of mouth, and community-based organization outreach. HEA marketing was primarily conducted through neighborhood email campaigns. Initial email efforts were somewhat moderate, ramping up mainly when program participation dwindled for a period of time. If email campaigns were

conducted at a high rate from the beginning, there could have been long wait times for customers throughout the pilot. This approach proved effective as participation expectations were exceeded while the average wait time for an assessment was just 19 days. Two enhanced outreach campaigns were also undertaken for named communities, leveraging marketing materials with messaging specifically tailored for named communities. These campaigns also entailed more intensive outreach, including paid social media ads and direct mail targeted to these communities' zip codes.

Additional detail on key ME&O strategies and tactics is provided below:

1. PSE Webpage – PSE's webpage on Heat Pump Rebates included clear and useful information about rebate eligibility and the benefits of switching to a heat pump. It was available in seven languages and included information on additional incentives for income-eligible customers.
2. Email – Email communication highlighted the benefits of electrification and the availability of a $50 gift card incentive for participating in the HEA. Emails had a high open rate[37] and 2-3% click through rates.
3. Direct Program Advertising – Heat Pump Rebate program ads were displayed digitally on consumer websites and on Nextdoor, a hyperlocal social networking service for neighborhoods, which resulted in over 11,000 clicks onto the PSE Heat Pump Rebate program webpage. The click through rate on Nextdoor was 0.42%, and on consumer websites the rate was 0.09%. Additionally, PSE sent bill inserts to 820,000 customers, highlighting the Heat Pump Rebate offering and HEAs.
4. Cross-Program Marketing – Promotion of heat pump adoption was advertised in marketing materials for other related PSE programs to help drive interest in the pilot. For example, information about heat pumps was advertised as part of PSE's Low-Income HWA program. PSE also distributed an Energy Smart Eastside postcard to approximately 78,000 gas heating customers that describes how heat pumps work well in cold temperatures, a valuable insight that could be replicated and amplified in other materials to aid in customers' decision making. Dedicated newsletters and materials about heat pump functionality, especially in cold weather), were also provided with easy-to-understand graphic depictions of heat pump functionality and usage may attract more attention and increase participation.
5. Referral Program – A referral program was also used as a marketing tool for the pilot. The referral program was emphasized in communities where skepticism of utility offers could present a barrier. On average, each referral program participant referred two customers, and in total 460 friends and family referrals completed an HEA.
6. CBO Partnerships – Four Community Based Organizations (CBOs) were engaged to assist in pilot recruitment. Each received a marketing toolkit which included Facebook content, posters, program overviews in English and Spanish, and door hangers. CBOs received compensation for their efforts promoting the program within their communities.
7. Outreach Managers – Furthermore, seven outreach managers were active across PSE service territory as part of enhanced named community campaigns, and program staff attended and promoted the program at five community events. Outreach managers work with PSE's communities on promoting and implementing energy efficiency and customer renewable

[37] The open rate is the percentage of recipients who opened the email.

projects with local governments, businesses, community organizations and directly with customers. They work with local community stakeholders on the design of outreach initiatives to achieve appropriate community involvement in PSE's Energy Efficiency programs, and other PSE programs and services.

4. CONCLUSION AND NEXT STEPS

As demonstrated in this report, PSE's Targeted Electrification Pilot addresses all relevant provisions of Stipulation O in the 2022 GRC Settlement Agreement. Most notably, PSE surpassed the goal of 10,000 HEAs with 11,915 completed, with 32% of participants being in Named Communities or identified as low-income customers, exceeding the 30% target. PSE also installed 1,737 heat pumps via the Heat Pump Rebate pilot component by July 2024.

Overall, the pilot was successful at reducing natural gas consumption without increasing a customer's total energy bill due to the increase in electricity consumption. However, as expected, there was a significant per-customer increase in average electricity demand during the average winter peak after the heat pump was installed, highlighting the need to consider electric system infrastructure impacts of electrification if fuel switching is pursued at scale in the moderate- to long-term. PSE also determined that the heat pump rebates largely influenced customers' decisions to adopt heat pumps, as is supported by high program attribution in the evaluation study.

Overall, pilot participants expressed a positive experience with the pilot. Installation and ease of rebate claim were highly rated aspects of the Pilot; this reflects strengths in heat pump installation quality from PSE trade allies and PSE rebate efficiency. Customers generally felt that the rebate information was clear, and there was a high baseline understanding of rebate options available. Communication was identified as the greatest area for improvement, especially among named community respondents, presenting an opportunity for improving future outreach across PSE's customer base and in named communities. The two primary reasons pilot participants indicated a motivation to add a heat pump was wanting a more environmentally friendly appliance and wanting to add cooling to the home, with the latter being by far the most important factor for customers in named communities. This presents an opportunity for marketing materials of future heat pump initiatives to emphasize that heat pumps provide integrated cooling functionality for customers looking to replace their heating system or add cooling to their home.

In conclusion, PSE plans to leverage learnings from the Targeted Electrification Pilot to inform future PSE pilots, programs, and initiatives such as Phase 2 of the Targeted Electrification Pilot[38] and other PSE conservation programs.

[38] Phase 2 of the Targeted Electrification Pilot is contingent upon approval within PSE's 2024 GRC.

APPENDICES

Appendix A: HEA Leave Behind Brochure

We appreciate your time today

Thank you for completing your home electrification assessment with Puget Sound Energy! We hope you found the information about electrification helpful and that you enjoy your $50 gift card.

Please make sure to complete the satisfaction survey, which will be emailed to you shortly. If you are interested in other offerings from Puget Sound Energy, visit **pse.com**.

Spread the word to receive even more

Do you know someone who would benefit from this offering? If so, you can earn up to two **$25 e-gift cards** when you refer eligible friends or family members who complete a home electrification assessment!

Simply give your referral your unique code and have them provide the code when they schedule their appointment. (Your unique referral code will be emailed to you shortly.) After they complete their own home electrification assessment, we'll send you a $25 e-gift card. It's that easy!

PUGET SOUND ENERGY

Save money while building a green future

Through the 2022 Inflation Reduction Act (IRA), you could receive federal tax credits when you work to cut your home energy use or adopt renewable energy strategies. IRA tax credits can either reduce the amount of taxes you owe or increase your tax refund. Many of these tax credits overlap with Puget Sound Energy programs, so you may be able to combine them with our incentives and rebates to save even more. For example, you could receive up to $2,000 in federal tax credits, plus up to $2,400 in PSE rebates, when you install a qualifying electric heat pump.

Learn more about how it works, along with specific requirements, visit **pse.com/ira**

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Home Electrification Assessment

Thank you for learning more about home electrification

Please find your $50 gift card inside.

The benefits are electrifying

Switching from gas to electric is becoming more and more common. In fact, one in four U.S. homes is currently all-electric,* and the numbers are quickly rising. Whether you're interested in the energy efficiency, positive environmental impact, flexibility for future energy upgrades, or all of the above, here are some of the most effective ways you can enjoy the benefits of electrification.

Heat pumps

Electric heat pumps are up to four times more efficient than traditional HVAC sources, such as furnaces or central air conditioners. And because heat pumps heat and cool your home through a single system, making the switch can lead to lower energy costs all year-round.

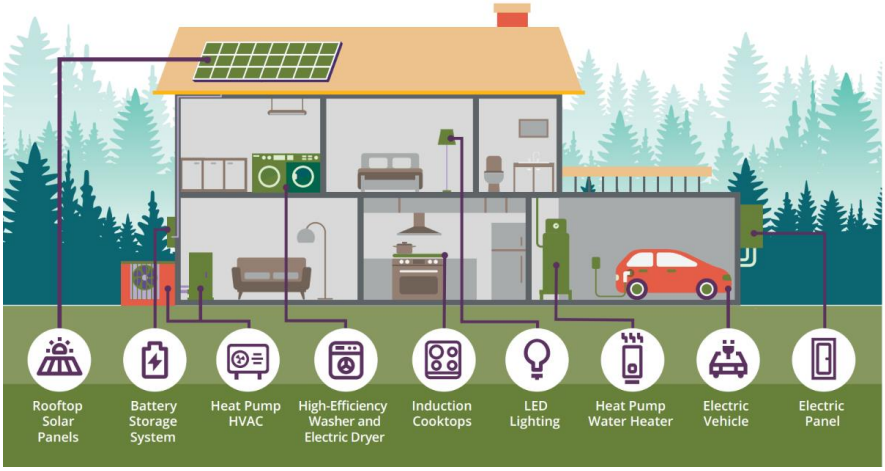
Heat pump water heaters

Compared to a standard water heater, heat pump water heaters can be three times as efficient while still delivering the hot water your household needs. Considering that water heating is one of the highest contributors to the average energy bill, it's a smart choice.

Appliances

Upgrading to ENERGY STAR® certified electric kitchen and laundry appliances is a great way to lower your energy use, without sacrificing reliability or quality. These models also feature innovative technologies that can improve safety and your experience.

* U.S. Energy Information Administration, Residential Energy Consumption Survey (RECS), www.eia.gov/consumption/residential



PUGET SOUND ENERGY

Enjoy your $50 gift card

It's our way of saying thank you for completing a **Puget Sound Energy Home Electrification Assessment**. If you have any questions about your report or next steps, please contact us at **1-866-574-3294**.

(business card goes here)

PUGET SOUND ENERGY

The advantages are electrifying!

Learn how making the switch to electric can benefit you and your home.

Switching from gas appliances and systems to electric alternatives is becoming more and more common. In fact, one in four U.S. homes is currently all-electric,* and the numbers are quickly rising. If you're looking for a way to become more efficient or if you're curious about the all-electric lifestyle, we can help with a free **Home Electrification Assessment**.

About the assessment

Puget Sound Energy is offering our active natural gas customers a free Home Electrification Assessment, where you can:

- Learn more about the details and process of electrification, directly from an expert.
- Gain a clearer sense of the benefits and the resources that are available to you.
- Receive electrification and energy-efficiency recommendations, personalized to your home.
- Receive a **$50 gift card**, just for completing your assessment.

How it works

1. You sign up for a free, 60-minute appointment at a time that works with your schedule.
2. An Electrification Coach will walk through your home with you, answer your questions, and help build a custom list of electrification recommendations. You'll learn about available electrification resources, including rebates and incentives, along with ways you can save energy.
3. At the end of your assessment, you will receive a Home Electrification Report, which includes recommended next steps, and a **$50 gift card**. You'll also learn how you can earn more gift cards through our referral program.

Sign up for your free, no-obligation appointment today!

Call 1-866-574-3294, visit pse.com/electricplan or scan this QR code:

* U.S. Energy Information Administration, Residential Energy Consumption Survey (RECS), www.eia.gov/consumption/residential

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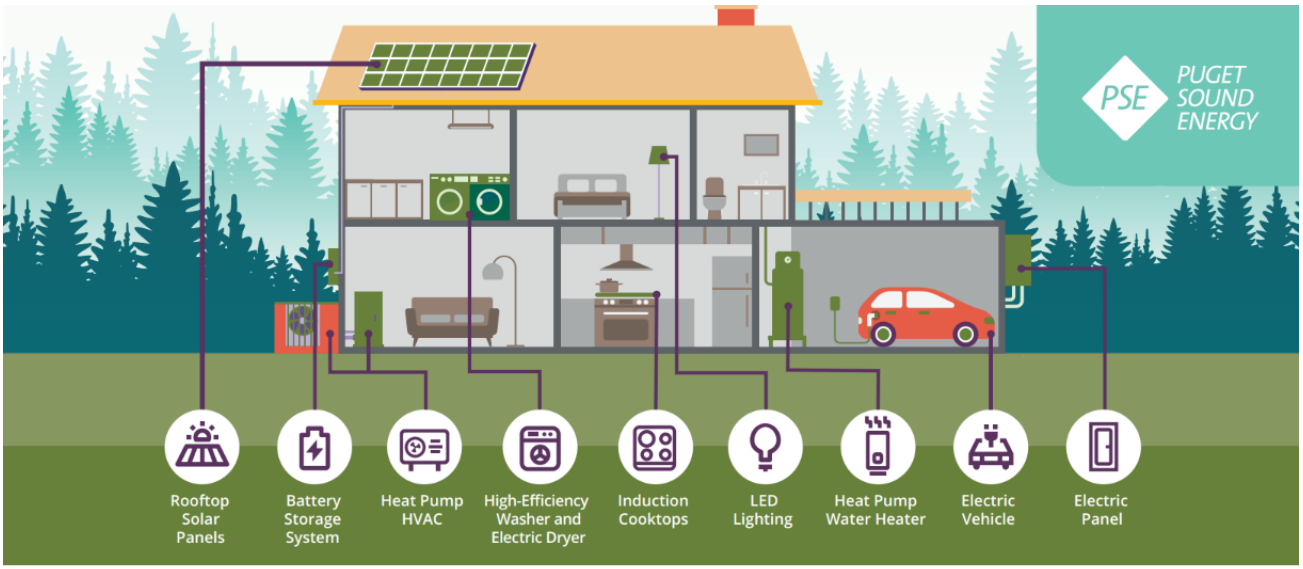
PSE PUGET SOUND ENERGY



Go electric, at home

Whether you're interested in saving energy, making a positive environmental impact, preparing for future upgrades, or all of the above, here are some of the most effective ways you can begin your electrification journey.

Heat pumps

Electric heat pumps are up to four times more efficient than traditional HVAC sources, such as furnaces or central air conditioners. And because heat pumps heat and cool your home through a single system, making the switch can lead to lower energy costs all year-round.

Heat pump water heaters

Compared to a standard water heater, heat pump water heaters can be three times as efficient while still delivering the hot water your household needs. Considering that water heating is one of the highest contributors to the average energy bill, it's a smart choice.

Appliances

Upgrading to ENERGY STAR® certified electric kitchen and laundry appliances is a great way to lower your energy use, without sacrificing reliability or quality. These models also feature innovative technologies that can improve safety and your experience.

Cost comparison: Heating systems

Approximately 40% of the average home's energy use can be attributed to heating and cooling, which means it offers a significant opportunity for energy savings. See how different heating systems compare.

Estimated annual heating costs for PSE gas and electric (dual fuel) customers

Square Footage	0–1,000	1,000–1,500	1,500–2,000	2,000–2,500	2,500–3,000	3,000–3,500	3,500–4,000	4,000 +
Gas furnace (95% AFUE)	$535	$706	$859	$980	$1,225	$1,383	$1,678	$1,870
Electric furnace	$1,116	$1,472	$1,792	$2,044	$2,555	$2,883	$3,500	$3,900
Baseboard/ cadet heaters	$881	$1,162	$1,414	$1,614	$2,017	$2,276	$2,763	$3,079
Ducted heat pump	$421	$555	$675	$770	$963	$1,087	$1,319	$1,470
Ductless heat pump	$285	$376	$457	$522	$652	$736	$893	$995

Estimated annual energy costs do not include added or reduced air-conditioning costs. Gas furnace or heat pump actual efficiency may be less than listed due to ductwork condition, installation practices or equipment wear and tear. Usage based on regional building stock estimates. Actual results may vary depending on home characteristics, occupancy, and customer behavior. Supplemental heat is often necessary for DHP/HP applications; load applies to all existing system calculations. Calculated using PSE gas and electricity rates effective September 2023.

Sign up for your free, no-obligation appointment today!

Call 1-866-574-3294, visit pse.com/electricplan or scan this QR code:

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Appendix C: List of Survey Questions Provided at Completion of HEA Assessment

1. On a scale of 1 to 5 (5 is highest), how likely are you to recommend a Home Electrification Assessment to a friend, family member, or colleague?
2. Can you briefly explain why you would or would not refer others to complete a Home Electrification Assessment?
3. On a scale of 1 to 5 (5 is highest), how satisfied are you with the assessment experience?
4. On a scale of 1 to 5 (5 is highest), how satisfied are you with the Assessment report received?
5. On a scale of 1 to 5 (5 is highest), how satisfied are you with your interactions with the representative who did your Home Electrification Assessment?
6. Tell us more about your Home Electrification Assessment experience.
7. How satisfied are you with your experience scheduling the assessment and the communication process prior to your appointment?
8. How did you hear about the Home Electrification Assessment Program?
9. Why did you have a Home Electrification Assessment performed?
10. Do you plan to implement any of the recommendations from your PSE Home Electrification Assessment?
11. When are you planning to make those upgrades?
12. Now that you've completed your Home Electrification Assessment, can you rate your understanding of electrification benefits and opportunities? On a scale of 1 to 5 (5 is highest)
13. On a scale of 1 to 5 (5 is highest), can you rate your understanding of heat pump systems and their benefits?
14. Do you have any outstanding questions or areas in which you would like more information?

Appendix DD: Benchmarked DER Programs

UTILITY (STATE)	PROGRAM	SECTOR	PROGRAM DESIGN	INCENTIVE TYPE	PARTICIPANTS	ACTUAL SAVINGS
Idaho Power Company (ID, OR)	Flex Peak Program	Commercial/ Industrial	Manual or automatic demand response for commercial and industrial customers	Rebate check or bill credit	139 sites from 61 customers	22.6 MW claimed average demand reduction
Idaho Power Company (ID, OR)	A/C Cool Credit Residential Demand Response	Residential	Manual demand response with dispatchable load control device for residential customers	Bill credit	20,995	18.35 MW claimed average demand reduction
Idaho Power Company (ID, OR)	Irrigation Peak Rewards	Agricultural	Manual or automatic demand response for agricultural customers	Bill credit	2,235	65-235 MW claimed demand reduction on each of 8 peak load days
Pacific Power (OR)	Customer Generation	All sectors	Feed-in tariffs and net metering	Bill credit	Not given	Not given
Portland General Electric (OR)	Flex Pricing and Behavioral Demand Response	Residential	Time-of-use rates, peak-time rebates, behavioral demand response, and hybrid demand response	Rebate check	14,012	2-23% demand reduction in summer; 1-12% demand reduction in winter
Portland General Electric and Pacific Power (OR)	On-site solar	Residential/ Commercial	Incentives and federal tax credits for on-site solar and solar + storage projects	Bill credit	407 commercial; 5,323 residential	Commercial: 33,900 MWh Residential: 30,050 MWh

The benchmarking analysis revealed that DER programs, such as demand response initiatives and on-site solar projects, can help mitigate system risks through peak demand reduction. Idaho Power's Flex Peak and A/C Cool Credit programs demonstrate the potential of manual and automatic demand response mechanisms to achieve demand reductions, with average reductions of 22.6 MW and 18.35 MW, respectively. This indicates a readiness to handle peak loads and suggests these programs can help mitigate system risks by reducing electric system strain during high-demand periods. Additionally, the Irrigation Peak Rewards program for the agricultural sector claims reductions between 65 MW and 235 MW during peak load days, highlighting its effectiveness in managing load among high-volume end users.

Pacific Power's feed-in tariff and net metering programs suggest a strategic approach to integrating distributed generation, though detailed performance data is lacking. This indicates room for improvement in data collection and analysis to understand the impacts of customer generation-based DER programs on system risk mitigation. Regarding electrification outreach, Portland General Electric's Flex Pricing and Behavioral Demand Response program shows a solid participant base with 14,012 participants, achieving demand reduction of 2% to 23% in summer and 1% to 12% in winter. This

indicates that time-of-use rates and behavioral incentives can be used to help drive customer participation and allow utilities to achieve demand-side management goals.

Portland General Electric and Pacific Power's joint on-site solar program reflects the growing adoption of distributed generation resources. With significant energy savings reported (33,900 MWh for commercial and 30,050 MWh for residential), the program underscores the potential of solar incentives and federal tax credits in boosting electrification efforts and reducing grid dependency.

Overall, the benchmarking analysis indicates that programs offering diverse incentives and leveraging advanced demand response technologies are more successful in achieving substantial demand reductions and engaging participants in end-user programs, both behavioral and equipment based. Moreover, integrating distributed generation through solar projects provides a robust pathway for enhancing DER readiness and electrification efforts, contributing to more resilient energy systems.

Appendix E: Settlement Party Engagement and Meetings

DATE	MEETING	TOPICS	FEEDBACK RECEIVED
01/20/23	Kick-off meeting	• Present the scope of the decarb study and discuss the targeted electrification pilot scope	• Feedback highlighted the need for clarity on the targeted electrification pilot's goals, particularly around the interpretation of customer engagement targets and their budget implications. • Settled parties emphasized engaging community partners, associations, and the LIAC to ensure equitable customer targeting. • Concerns were raised about balancing education, assessments, and upgrades within budget limits, ensuring alignment with the settlement language.
02/03/23	Follow up Meeting with JEA regarding STEP Scope	• Refine the scope of the STEP to align with settlement language and address settled parties' feedback	• Feedback emphasizes prioritizing low-income customers and named communities while maximizing pilot benefits by leveraging existing funding sources such as rebates and assistance programs. • Settled partners requested updated cost estimates informed by implementation bids, with a focus on increasing customer reach and fully utilizing the $12 million budget.
03/29/23	Check-in	• Meeting to present further revised pilot scope	• No specific feedback received
05/09/23	Meeting with LIAC	• Rebates and Assessments: Plans for dual-fuel rebates, low-income upgrades, and 10,000 in-depth home assessments with educational materials and enrollment support. • Education and Outreach: Strategies to engage Named Communities, provide educational content, and maximize project impacts through stakeholder collaboration.	• No specific feedback received
05/18/23	Check-in	• Provide details of the refinement of the pilot and timeline to begin offerings	• No specific feedback received
8/30/2023	Check-in	• Review newly launched Pilot efforts and upcoming launch of Home Electrification Assessments • Discuss eligibility, scope, and status of each effort	• Low-Income Upgrade Track project cost management should be clearer. • Clarity should be provided on ongoing discussions with joint utilities concerning carbon reduction efforts
10/25/2023	Check-in	• Remind attendees of pilot efforts and objectives • Communicate initial pilot results and findings • Introduce HEA reference materials	• No specific feedback received
1/10/2024	Check-in	• Provide pilot updates and next steps • Discuss the continuation of the pilot into 2024, including a timeline	• Determine once there is a sufficient sample size for general population

			and thereafter focus analysis on named communities • Focus more time and effort on named communities in general
5/24/2024	Check-in	• Requested feedback on Contractor #1's proposal to continue HEA implementation by the end of the year • Summarized pilot updates and insights gathered • Provided an update on budget status • Described pilot evaluation timeline	• Set up a separate meeting (6/3) to discuss low-income funding for phase 2 of the pilot and CCA Decarbonization Program funding breakdown
6/3/2024	Follow-up Conversation on Low-Income Funding Coordination	• Aligned on magnitude of impact in budget for low-income weatherization and electrification programs on different customer segments • Communicated timeline for Pilot Phase 2 funding decision	• Asked PSE to explore whether weatherization funds can be used for appliance replacement or if gas furnace repair is disallowed • Begin thinking of an approach to fund furnace replacement and gas water heaters if 2024 GRC funding is not approved
11/20/2024	Final Pilot Readout	• Summarized pilot achievements and next steps by pilot component • Detailed pilot evaluation status, and provided initial glance at a few key takeaways	• Ongoing conversations are occurring to discuss details of servicing the low-income track with the CCA Decarbonization Program • As the CCA Decarbonization Program explores expanding small business funding to include non-profits, PSE should consider how to prioritize community-serving non-profits if the program funds eventually become constrained.

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