HOME APPLIANCE PROGRAM

Final Report
2022-2023 Impact and Process Evaluation

Puget Sound Energy

Date: January 31, 2024

Table of Contents

List of Figures

List of Tables

Primary Contact
David Avenick, Senior Consultant, Markets and Risk
DNV Energy
David.Avenick@dnv.com

Project Sponsor
Geoff Barker, Senior Consultant, Markets and Risk
DNV Energy
Geoff.Barker@dnv.com

PSE Contract Manager
Jesse Durst, Senior Market Analyst, Energy Efficiency Services
Puget Sound Energy
Jesse.Durst@pse.com

1 EXECUTIVE SUMMARY

This report summarizes the results of the impact and process evaluations of Puget Sound Energy's (PSE) 2021 and 2022 Home Appliance program.

1.1 Program Description

The Home Appliance program is designed to encourage customers purchasing new appliances to invest in energy efficient products. The program currently includes incentives for ENERGY STAR® rated clothes dryers and front load washers. The program is available to all PSE electric customer segments, including hard to reach segments, such as low income or rural customers. Eligible customers include all PSE electric or combined fuel customers.

1.2 Research Objectives

The primary research objective for the impact evaluation was to verify installation of the program rebated appliances to estimate energy savings. As part of the impact evaluation, a DNV engineer also reviewed PSE's savings assumptions for clothes washers and dryers.

Research objectives for the process evaluation included participant satisfaction, program awareness, perceived barriers to program participation, program delivery, and market readiness for heat pump dryers. To satisfy these objectives, DNV conducted participant online surveys and a program manager interview.

1.3 Impact Evaluation Results

DNV conducted an impact evaluation to quantify the evaluated savings of the Home Appliance program. We used a deemed verification approach that involved a deemed savings review by a DNV engineer and installation verification effort, which was conducted via an online participant survey. The combination of the deemed savings review and measure installation verification resulted in a realization rate of 100% for PSE's 2021 and 2022 Home Appliance program. Table 1-1 shows electric and gas savings, number of claims, and the realization rate for the 2021 and 2022 program years.

Table 1-1. Evaluated electric and gas savings and realization rates, 2021-2022

Fuel Type	Number of Claims	Total Evaluated Savings	Total Reported Savings	Realization Rate
Electric (kwh)	17,277	1,810,802	1,810,802	100%
Gas (therms)	6,151	12,239	12,239	100%

1.4 Process Evaluation Results

The process evaluation is designed to provide information on how the Home Appliance program creates savings and how it might increase those savings. This year's evaluation included an interview of PSE Home Appliance program staff and a large-scale online survey of Home Appliance program participants to understand their behaviors and attitudes.

Online survey results revealed that participants most commonly found out about the Home Appliance program through either the PSE website (43%) or from a PSE email (11%), with about a third (34%) reporting that they became aware from signage at a retail store.

Survey respondents were also asked about their satisfaction with various aspects of the program using a 5-point scale, where "5" means "very satisfied" and "1" means "very dissatisfied." Seven distinct aspects were covered in the survey including the rebate and installation process, energy savings since installing the clothes washer and dryers, and interactions with program staff. Respondents were also asked about their satisfaction of the program overall. All categories yielded

moderate to high average satisfaction scores, ranging from 4.0 to 4.3. Participants were most satisfied with the program overall (4.3) and the ease of submitting their application (4.3). Survey results revealed participants were least satisfied with the time to receive the rebate after submitting the application (4.0) and program staff communication (4.0), although an average satisfaction score of 4 still indicates a generally high level of satisfaction.

The online process survey also found that over half of the respondents cited either equipment failure (41%) or needing a new appliance (e.g., for a new home, 10% of respondents) as the primary reason for purchasing the equipment. The evaluation also revealed that over three quarters of survey respondents would have purchased the high efficiency (HE) clothes washers (78%) or clothes dryers (76%) at the same time, even without the program rebates. These results suggest relatively high level of free-ridership among Home Appliance program participants. Although high levels of free-ridership may not be desirable, it does not negatively affect realization rates or claimed savings.

Program participants were also asked questions to assess the market readiness related to heat pump dryers. Survey results found that only a relatively small portion of program participants would purchase a heat pump dryer even if they were offered an incentive of $100. Participants who had installed heat pump dryers through the program were also asked what they like the most and the least about their new program-rebated appliance. Over half (54%) of the respondents reported that they liked that they use less energy and are good for the environment, with slightly fewer stating they liked various features of the heat pump dryer the most, such as it being gentler on clothes (20%) or not requiring a vent (19%). When asked what they liked the least about their heat pump dryer, almost two thirds of respondents (65%) said the heat pump dryer takes longer to dry their clothes.

1.5 Key Findings and Recommendations

Key findings from the Home Appliance impact and process evaluation are as follows:

FINDINGS	The evaluation determined a realization rate of 100% for the Home Appliance program. This was confirmed by both an evaluation of clothes washer and dryer installation rates and a thorough a review of the RTF measure case documentation to confirm inputs, assumptions, and calculations behind the deemed savings. This means that the evaluated savings are equal to the claimed savings, with the program achieving a total of 1,811 MWh of electric savings and 12,239 therms of gas savings.
	Results from the participant online survey suggest the Appliance program is operating well and in accordance with its intended program design. Satisfaction with the program overall was rated 4.3 on average on a 5-point scale, but there are opportunities to improve certain aspects of the program, such as the time for participants to receive rebates and program staff communication with participants.
	Survey responses also indicate that the program's influence on purchase decisions is limited. Over three quarters of respondents said that, even without the program rebates, they would have purchased the HE clothes washers or dryers.
	Approximately a quarter of survey respondents said they would purchase a heat pump dryer if they were offered an incentive of $100, which is what PSE is currently offering. The survey results suggest that a $100 incentive may not be sufficient to shift the residential market to adopt heat pump dryers.
	Over half (54%) of the respondents reported they liked that heat pump dryers use less energy and are good for the environment. Survey respondents also reported that they liked various features of the heat pump dryer, such as it being gentler on clothes (20%) or not requiring a vent (19%).

Based on these key findings, DNV has the following recommendations:

RECOMMENDATIONS
Based on reported satisfaction results, DNV recommends continuing with the current program design, while also looking for opportunities to increase program communication with participants and reduce the time surrounding incentive distribution. However, given that the program represents only about 1% of the residential portfolio of electric savings and less than half a percent of the portfolios gas savings, PSE should weigh these program improvements against the cost effectiveness of the program overall.
PSE should continue to assess how effective heat pump dryer incentives are at transforming the market, given that only a quarter of customers would be influenced to purchase this equipment with an incentive of $100 based on evaluation findings. PSE should also consider integrating non-energy benefits (e.g., good for the environment and gentler on clothes) more explicitly into marketing materials while also explaining that heat pump dryers could lead to increased energy savings.

2 INTRODUCTION

In this section, we provide an overview of Puget Sound Energy's (PSE) 2021 and 2022 Home Appliance program, research objectives, impact evaluation methods, and process evaluation methods.

2.1 Program Overview

The Home Appliance programs is designed to encourage customers purchasing new appliances to invest in energy-efficient products. The program currently includes incentives for ENERGY STAR® rated clothes dryers and front load washers. Eligible customers include all PSE electric or combined fuel customers. The program is also available to all PSE electric customer segments, including hard to reach segments such as low income or rural customers.

The Home Appliance program has been in existence since at least 2004, when it originally offered incentives on clothes washers and dishwashers. The program expanded and adapted over time, adding and removing measures based on cost effectiveness. The program has offered everything from free clothes washer and refrigerator replacement to mail-in rebates on refrigerators, freezers, clothes washers, and clothes dryers. In 2018, avoided cost estimates severely impacted the program and its ability to offer a breadth of measures. As of 2019, the program offers mail-in rebates on ENERGY STAR front loading clothes washers and clothes dryers. In 2020, top loading clothes washers were reintroduced into the program.[1] Top load washers were removed from the program again for most of 2022. Similarly, dryers were removed as a measure for most of 2022 but were reintroduced in 2023.

2.2 Research Objectives

In this section, we provide a summary of research activities and which primary impact and process research objectives they help address. Research objectives for the impact evaluation include verifying the installation of the rebated appliances and a review of the deemed energy savings. Research objectives for the process evaluation included participant satisfaction, program awareness, program delivery, reasons for program participation, and market readiness for heat pump dryers. In Table 2-1 below, we provide an overview of research objectives and activities for both the impact and process evaluations.

Table 2-1. Research activities and primary research objectives for the Home Appliance program

	Objective	Deemed Savings Review	Participant Survey	Program Manager Interviews
Impact	Energy Savings	■		■
	Measure Verification		■	■
Process	Participant Satisfaction		■	
	Program Awareness		■	
	Program Delivery		■	■
	Program Experience		■	
	Heat Pump Dryer Market Readiness		■	

[1] Puget Sound Energy. Home Appliance Program: Program Guide.

2.3 Impact Evaluation Overview

The impact evaluation for this program used a deemed verification approach. There were two components of this verification:

1. Deemed savings review
2. Installation verification effort

DNV engineers performed a deemed savings review of the washer and dryer measures in this program to validate savings inputs, assumptions, and calculations for accuracy. As part of the process evaluation, discussed below, we administered an online survey to verify measure installation. The combination of deemed savings review and measure installation rate determined the savings realization rate for this program.

2.4 Process Evaluation Overview

The process evaluation is designed to provide information on how the Home Appliance program has performed and what the customer experience with the program was like. This year's evaluation included two key components:

1. Interview of PSE Home Appliance program staff
2. Web survey of Home Appliance program participants

The program staff interview was designed to understand challenges and opportunities from the perspective of a program administrator. This interview generated suggestions for program process improvements, a description of any recent program changes, and discussion of how those changes impacted the program.

The online survey was sent to program participants to better understand customer awareness and satisfaction with various aspects of the program. We also focused, specifically, on questions to assess customers experience with the program, factors that may have influenced their participation and decision-making processes, as well as market readiness for heat pump clothes dryers.

2.5 Report Overview

We have organized the remainder of this report as follows:

- **Section 3 Data Sources** describes the evaluation's data sources.
- **Section 4 Impact Evaluation Results** details the results of the impact evaluation.
- **Section 5 Process Evaluation Results** provides the results of the process evaluation.
- **Section 6 Findings and Recommendations** includes the evaluation's key findings and recommendations.
- **Appendix A: Additional Online Survey Results** provides additional results from the participant online surveys.
- **Appendix B: Data Collection Instruments** provides the data collection instruments used for the participant online surveys.

3 DATA SOURCES

This section provides the data sources used to evaluate PSE's Home Appliance program. These data sources include tracking data, a deemed savings documentation review, virtual verification, program staff interviews, and online surveys with participants. We discuss each source in the sections below.

3.1 Program Tracking Data

PSE provided the 2021 and 2022 rebate program tracking data. The tracking data included participant information, account numbers, program name, measures installed, installation dates, and claimed savings. Table 3-1 and Table 3-2 show the electric and gas claimed savings for program years 2021 and 2022 along with the number of sites that received them. The majority of the measures installed were ENERGY STAR clothes dryers and front load clothes washers.

Front load clothes washers accounted for 69% of the claimed electric savings in 2021 and 87% in 2022. At the per-premise level, savings remained nearly identical going from 2021 to 2022.

Table 3-1. Summary of expected electric (kWh) savings

Measure Group	2021			2022		
	Total kWh Savings	No. of Sites	Savings per Site	Total kWh Savings	No. of Sites	Savings per Site
Clothes Dryer – ENERGY STAR	341,256	4,988	68	54,116	786	69
Clothes Dryer – Heat Pump	30,042	127	237	4,000	17	235
Clothes Washer – Front Load	910,078	6,400	142	430,958	3,409	126
Clothes Washer – Top Load	35,308	1,356	26	5,044	194	26

The claimed gas savings show similar trends to the electric savings. Clothes dryers had zero therm savings in both years. Front load clothes washers accounted for 92% of the claimed savings in 2021 and 98% in 2022. Like the electric savings, per-premise savings remained nearly identical between the two years.

Table 3-2. Summary of expected gas (therm) savings

Measure Group	2021			2022		
	Total Therm Savings	No. of Sites	Savings per Site	Total Therm Savings	No. of Sites	Savings per Site
Clothes Dryer – ENERGY STAR	-	-	-	-	-	-
Clothes Dryer – Heat Pump	-	-	-	-	-	-
Clothes Washer – Front Load	7,161	3,405	2	4,400	1,900	2
Clothes Washer – Top Load	591	737	1	87	109	1

3.2 Deemed Savings Documentation

DNV conducted a thorough review of the Regional Technical Forum (RTF) measure case documentation to gain an in-depth understanding of the inputs, assumptions, and calculations behind the RTF deemed savings. The findings from this review for each measure case are summarized below. The savings values in the RTF analysis workbooks matched the tracking data savings for all measure cases.

1. **Clothes washers:** This review covered energy-efficient clothes washers that save energy by using less hot water compared to baseline and existing equipment. The RTF deemed savings are based on the measure application

name “Front Load ENERGY STAR Washer Any fuel type” which estimates 120 kWh per year of savings per unit. The savings were reviewed and verified in the source of savings document ResClothesWashers_v8_0.xlsm.[2]

2. **Clothes dryers:** ENERGY STAR or above certified energy efficient electric dryers. ENERGY STAR dryers use advanced technologies that reduce the energy required to dry clothing for both vented and ventless models. The range of efficiencies covered include utility combined energy factors (UCEF) as low as 3.00 up to 8.00 and ENERGY STAR models. Baseline equipment includes standard efficiency dryers while efficient cases include ENERGY STAR and heat pump dryers. DNV reviewed the savings claims by measure type and compared them against the measure cases in the RTF calculation workbooks. The savings between tracking data and RTF workbooks match and are reasonable. The savings assumptions and savings were reviewed in the savings document ResClothesDryers_v4.1.xlsm.[3]

3.3 Virtual Verification

As part of the online survey, DNV asked participants to verify if the program-rebated clothes washers and dryers were currently installed in their home. Participants were additionally asked why the equipment was not installed, where applicable. The installation rates captured through the online survey were used to help inform the impact evaluation.

3.4 Program Staff Interview

The program staff interview took place in October of 2023 and included the Home Appliance program manager as well as one additional PSE staff member. The primary goals of the program staff interview were to understand any recent and planned program changes, marketing and outreach efforts, and barriers preventing customers from participating. Evaluators also asked the PSE program manager to characterize the quality control processes they use with respect to the installation of program-rebated clothes washers and dryers. For further details on insights gained from this interview, please see Section 5.1.

3.5 Participant Online Surveys

PSE provided DNV with the 2021 and 2022 population of Home Appliance program participants. Prior to launching the survey, evaluators cleaned the participant tracking data. Following this, we wrote and programmed the online participant survey to achieve the process research objectives outlined in Section 2.2.

For the process evaluation, we aimed to find out reasons for participation, satisfaction with program delivery, barriers to participation, and assess the market readiness of heat pump clothes dryers. The survey invitation was delivered to participant’s email and included the following features:

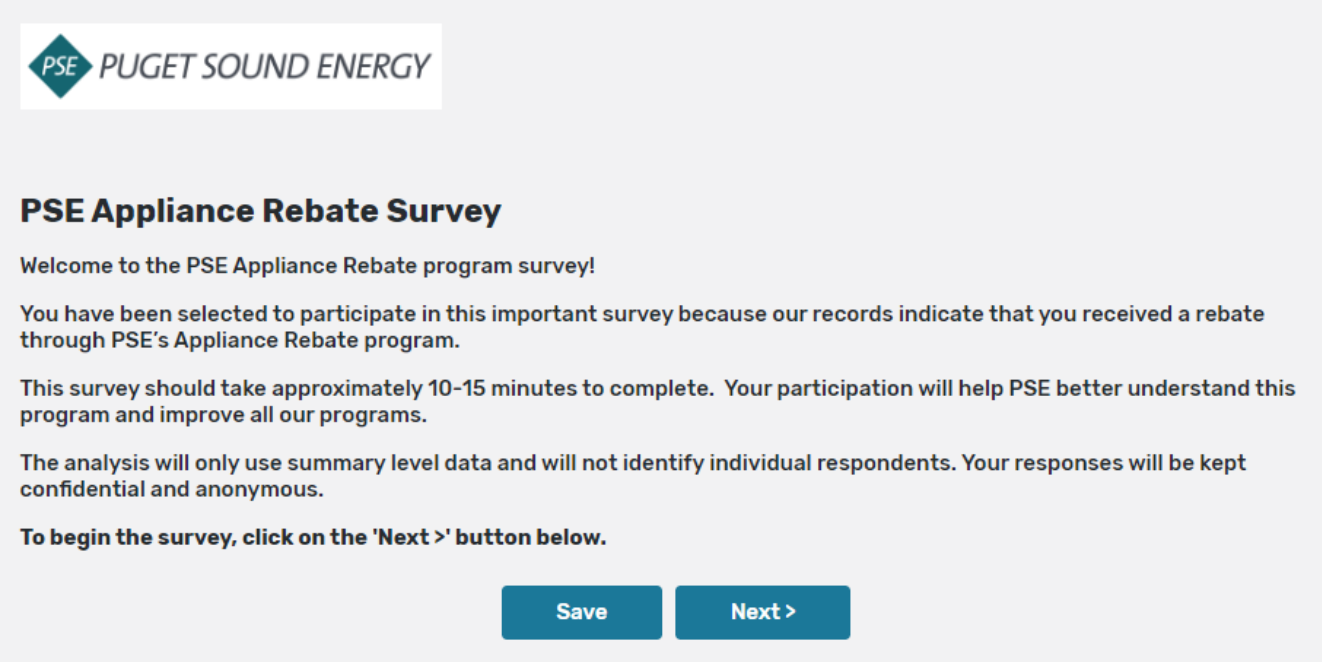
- The survey was preceded by a research bulletin alerting customers of the upcoming survey.
- The survey was branded with a PSE logo on the landing page.
- To motivate respondents to participate in the online survey, the evaluation team held a lottery that offered two e-gift cards incentives of $300 and $200. Respondents who completed the survey were eligible to win one of the prizes, and therefore included in the gift card lottery.
- All respondents were provided the option to opt-out of the survey and opt-out of the gift card lottery.

Figure 3-1 shows the landing page participants view upon accessing the survey.

[2] Version 8.1 of this workbook was released on July 18, 2023. For the purpose of this impact evaluation, DNV reviewed the version released in 2022.

[3] Version 5.0 of this workbook was released on April 18, 2022, and version 5.1 was released on July 18, 2023.

Figure 3-1. Participant survey landing page



The survey was launched on September 6th, 2023 and remained open until October 6th, 2023. Non-respondents received up to three reminder emails to complete the survey. Table 3-3 shows the number of completed and partially completed surveys and response rate. The overall reponse rate was 17%. DNV included all viable responses in the analysis, including the respondents who only partially completed the survey.

Table 3-3. Participant survey completes and response rates

Measure Type	Population Size	Survey Sample*	# of Completes	# of Partial Completes	Response Rate
Clothes Washer	5,885	5,822	884	64	16%
Clothes Dryer	490	487	96	8	21%
Clothes Washer and Dryer	5,409	5,349	854	84	18%
Overall	**11,784**	**11,658**	**1,834**	**156**	**17%**

* When preparing the online survey sample, DNV removed participants from the Home Appliance survey population who either: a.) opted out of receiving emails or b.) did not have valid email addresses.

4 IMPACT EVALUATION RESULTS

In this section, we provide the results of our impact evaluation including an overview evaluation results and methodology, verification of installed measures, and evaluated savings results by measure.

4.1 Results Overview

The evaluation determined a program realization rate of 100%. The engineering review confirmed the claimed savings assumptions that PSE used, which were derived from the RTF (see Section 3.2). Additionally, the participant survey indicated a measure installation rate of 99% (see Section 5.3). Because nearly all program rebated appliances were verified as installed, the evaluated savings are the same as the claimed savings and the program achieved a gross realization rate of 100%.[4]

4.2 Evaluated Savings Results

This section shows the evaluated gas and electric savings by measure by program year and overall. Front load clothes washers accounted for the majority of both gas and electric savings across the two program years. Specific savings values can be seen below. Table 4-1 shows evaluated kWh savings by measure, and Table 4-2 shows evaluated therm savings by measure.

Table 4-1. Evaluated electric savings by measure

Measure Group	2021		2022		Total	
	Reported Savings	Evaluated Savings	Reported Savings	Evaluated Savings	Reported Savings	Evaluated Savings
Clothes Dryer – ENERGY STAR	341,256	341,256	54,116	54,116	395,372	395,372
Clothes Dryer – Heat Pump	30,042	30,042	4,000	4,000	34,042	34,042
Clothes Washer – Front Load	910,078	910,078	430,958	430,958	1,341,036	1,341,036
Clothes Washer – Top Load	35,308	35,308	5,044	5,044	40,352	40,352
Total	**1,316,684**	**1,316,684**	**494,118**	**494,118**	**1,810,802**	**1,810,802**

Table 4-2. Evaluated gas savings by measure

Measure Group	2021		2022		Total	
	Reported Savings	Evaluated Savings	Reported Savings	Evaluated Savings	Reported Savings	Evaluated Savings
Clothes Dryer – ENERGY STAR	-	-	-	-	-	-
Clothes Dryer – Heat Pump	-	-	-	-	-	-
Clothes Washer – Front Load	7,161	7,161	4,400	4,400	11,561	11,561
Clothes Washer – Top Load	591	591	87	87	678	678
Total	**7,752**	**7,752**	**4,487**	**4,487**	**12,239**	**12,239**

[4] The gross realization rate is the ratio of evaluated savings to the original claimed savings.

5 PROCESS EVALUATION RESULTS

This section summarizes the findings for the Home Appliance process evaluation and includes recent and planned program changes discussed during the program staff interview as well as the results from the participant survey surrounding topics such as awareness of and satisfaction with the program, program experience, barriers to participation, reasons for participation, and market readiness for heat pump dryers.

5.1 Insights from the Program Staff Interview

The program staff interview included the program manager for PSE's Home Appliance program. We provide details below on various aspects of the program, including recent and planned program changes, marketing and outreach efforts, quality control processes, participation barriers, and identification of any missed savings opportunities.

1. **Program Changes:** The biggest changes in the program occurred between 2021 and 2022 with far fewer clothes dryers receiving rebates in 2022 compared to 2021. Rebates for the dryer measure were discontinued in 2022 due to cost effectiveness. PSE increased the number of rebates for ENERGY STAR clothes dryers in 2023 and has expressed interest in expanding the number of rebates for heat pump dyers. In 2024, PSE plans to increase rebates available to Efficiency Boost eligible customers.[5]
2. **Marketing and Outreach Efforts:** PSE does not provide instant rebates for clothes washers or dryers, so their marketing efforts are focused on targeted emails. Customers are directed to the appliance rebate website, which includes links to the online application form and downloadable rebate forms in English and Spanish. PSE also conducts high impact events where they set up a table at a retail store and provide education about the program to potential customers. PSE also partners with select clothes washer and dryer manufacturers to provide limited-time offers with higher rebate amounts a few times per year.
3. **Quality Control:** PSE's verification team verifies the installation of 3% of appliance purchases via phone calls on a monthly basis.
4. **Barriers to Participation:** According to PSE's program manager, the biggest barrier to having more customers participate in the Home Appliance program is the cost of the equipment. Most participants are homeowners with few renters participating in the program. She also noted a drop in participation in 2023 and suspects that PSE customers may have less surplus income.
5. **Missed Savings Opportunities:** PSE looked into expanding the program to include air purifiers but determined that they were not cost effective.

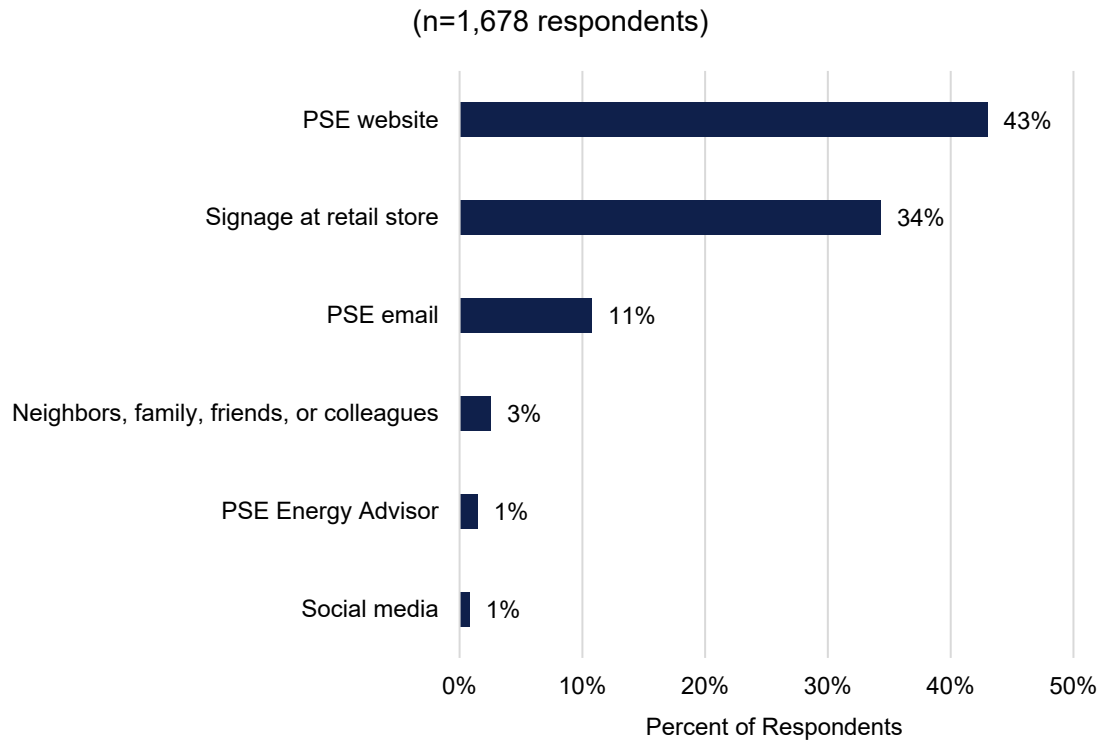
5.2 Awareness

DNV assessed the awareness of PSE's Home Appliance program by asking respondents if they were aware of their participation in the program, and if so, where they heard about the program. The majority (94%) of respondents recalled participating in the program or receiving a rebate, with only 6% of respondents being unaware of their participation.

Over half of respondents who were aware of the program recalled first finding out about the Home Appliance program from either the PSE website (43%) or from a PSE email (11%), with about a third (34%) reporting that they became aware from signage at a retail store (Figure 5-1). Only 5% of respondents reporting hearing about the program from another source such as neighbors, family friends, or colleagues (3%), from a PSE Energy Advisor (1%), or from social media (1%).

[5] Efficiency Boost offers higher rebates on energy efficiency upgrades to income-qualified customers. For further details, please see: https://www.pse.com/en/rebates/efficiency-boost

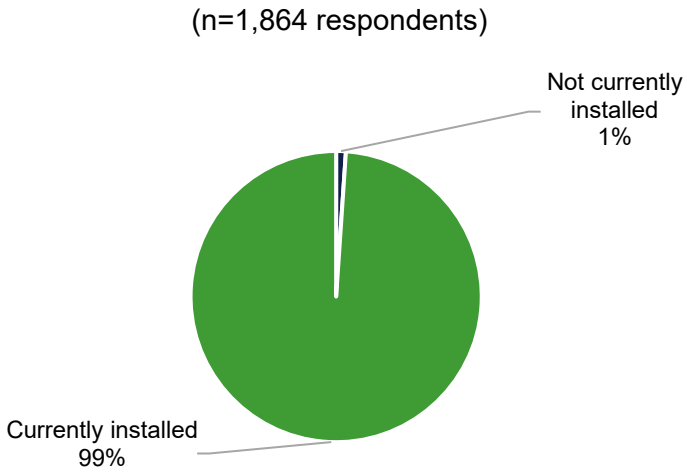
Figure 5-1. Source of program awareness



5.3 Installation Rates

To understand installation rates, DNV asked participants if their program-rebated appliances are currently installed in their home. Almost all (99%) said that their clothes washers or dryers are currently installed in their home. There was not a statistically significant difference in installation rates between customers who purchased clothes washers and clothes dryers.

Figure 5-2. Percent of clothes washer and dryers currently installed



We then asked participants why their clothes washers or clothes dryers are not currently installed (Table 5-1). Participants most frequently reported that they either sold their house and left their appliances behind (35%) or they replaced the equipment (20%) due to equipment failures or participants wanting to upgrade to newer appliances. The remaining survey respondents explained that the equipment was installed in a rental unit (15%), they sold the equipment on the secondary market (15%), or they moved to a new home and took the appliances with them (15%). It is highly likely that the majority of equipment sold with homes and left behind is still receiving energy savings within PSE's territory. Even in the cases where the appliances were installed in a rental unit or sold on the secondary market, it is also likely a significant portion are remaining in Washington and within PSE's service territory.

Table 5-1. Respondent-reported reasons why program-rebated appliances are not currently installed

Reason	Percent of Respondents (n=20)
Sold house – left appliances behind	35%
Replaced equipment	20%
Installed in rental unit	15%
Sold equipment	15%
Moved to new home – took appliances with them	15%
Total	**100%**

5.4 Satisfaction

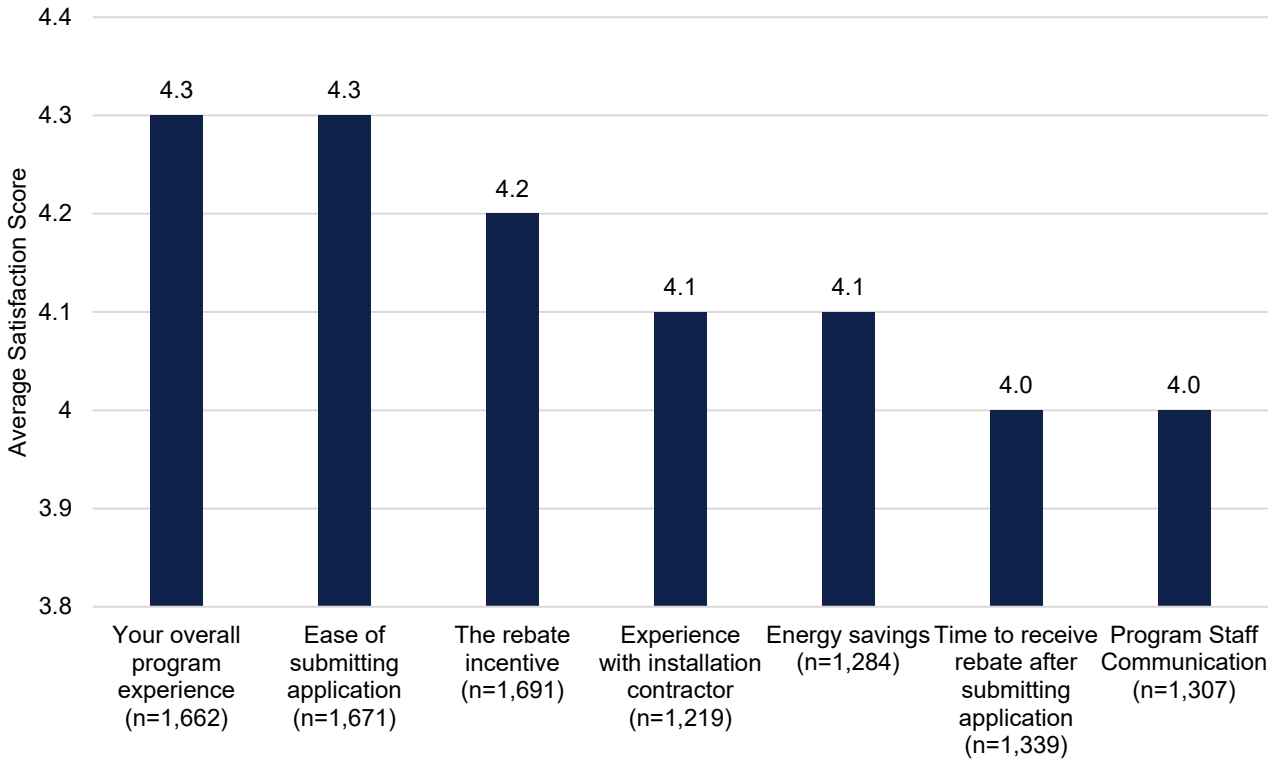
Participant satisfaction was first evaluated by asking respondents to indicate how strongly they agree or disagree with four different statements about the program (Table 5-2). Almost all (97%) of respondents agreed that the benefits of the program (e.g., energy savings or environmental benefits) were important to them. Nearly as many respondents agreed that participating in the program was easy (94%), the costs were clear (93%), and the customer support for the program was readily available (91%).

Table 5-2. Participant agreement with statements about Home Appliance Program

Statement	Strongly Agree	Somewhat Agree	Somewhat Disagree	Strongly Disagree
Customer support for the program was readily available.	56%	35%	7%	2%
Participating in this program is easy.	66%	29%	4%	1%
The benefits of this program (energy savings/ environmental benefits) are important to me.	62%	35%	2%	1%
The costs for this program were clear.	61%	32%	5%	2%

Program participants were also asked to rate their satisfaction with different aspects of the program using a 5-point scale, where "5" means "very satisfied" and "1" means "very dissatisfied." All seven aspects of the program displayed in Figure 5-3 have average satisfaction scores of 4 or above which indicates a relatively high level of satisfaction. On average, participants reported the highest level of satisfaction with their overall program experience and the ease of submitting the application. Notably, only 6% of respondents reported being dissatisfied with their overall program experience. Survey results revealed participants were less satisfied with the time to receive the rebate after submitting the application and program staff communication, although an average satisfaction score of 4 still indicates a generally high level of satisfaction.

Figure 5-3. Average satisfaction ratings among program participations

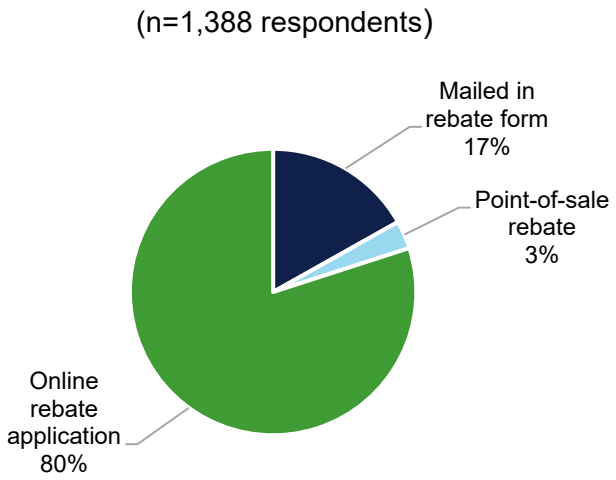


Lastly, participant satisfaction and loyalty were assessed by asking respondents how likely they are to recommend PSE's Home Appliance program to someone they know. Most respondents either reported that they were very likely (70%) or somewhat likely (20%) to recommend the program to others, with 9% citing that they were neither likely nor unlikely to recommend the program. Only a small portion of respondents said they were somewhat unlikely (1%) or very unlikely (1%) to recommend the program. This corroborates the relatively high average satisfaction score (4.3) with participant's overall program experience discussed above.

5.5 Program Experience

Survey respondents were asked various questions surrounding their experience participating in the Home Appliance program. As shown in Figure 5-4, when asked how they submitted their rebate application, the majority (80%) reported using the online rebate application. The remaining respondents either mailed in their rebate form (17%) or received a point-of-sale rebate (3%). Survey results also revealed that almost two thirds (62%) of respondents reported receiving their rebate via a rebate check, with the remaining respondents (38%) choosing to receive credit on their PSE Energy bill.

Figure 5-4. Rebate application method

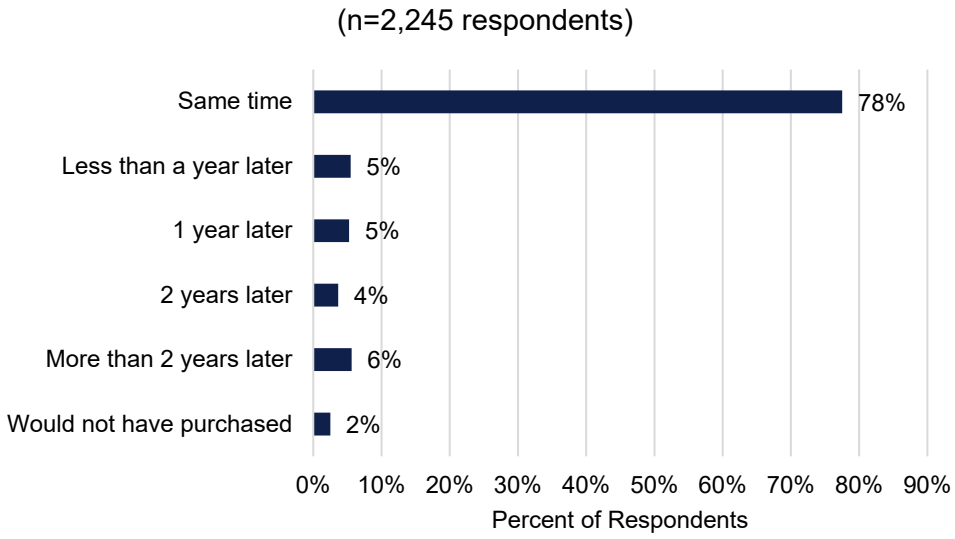


Program participants were also asked if they had received a phone call from PSE to verify that the new equipment was installed and that they received their rebate. Seven percent of respondents reported receiving this verification call from PSE, which is even higher than the 3% verification goal discussed during the program staff interview.

5.6 Program Influence

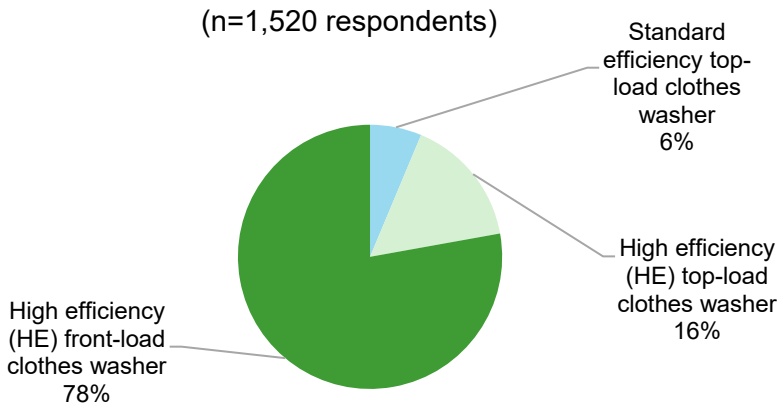
Respondents were asked a series of questions to determine how much influence the program had on their decision to purchase appliance equipment. Program participants were first asked when they would have considered installing a high efficiency (HE) clothes washer or clothes dryer if program rebates were not available. Figure 5-5 shows that over three quarters (78%) of respondents said that, even without the program rebates, they would have purchased the HE clothes washers or clothes dryers at the same time (Figure 5-5). There were no statistically significant differences between responses captured from clothes washer and clothes dryer participants.

Figure 5-5. Timing of appliance installation in absence of program



DNV also asked survey respondents what type of clothes washer and clothes dryer they would have purchased without the program rebate. As shown in Figure 5-6, almost all participants who purchased a clothes washer would have still installed either a HE front-load clothes washer (78%) or a HE top-load clothes washer (16%) with or without the program rebates. Only 6% of respondents said they would have purchased a standard efficiency clothes washer without program rebates. These results, combined with the responses to the timing question discussed above, indicate a high level of free-ridership among clothes washer participants. Although high levels of free-ridership may not be desirable, it does not negatively affect gross realization rates or claimed savings. As noted in the Evaluation Framework, "Consistent with condition (8) (a) of UTC Order 1 approving PSE's 2022-2023 Biennial Conservation Plan, PSE does not estimate net savings for a program or portfolio since the Net-to-Gross ratio is set at 1.0 for cost effectiveness analysis. However, the Company will examine program spillover and free-ridership when it is feasible to do so for program design purposes." [6]

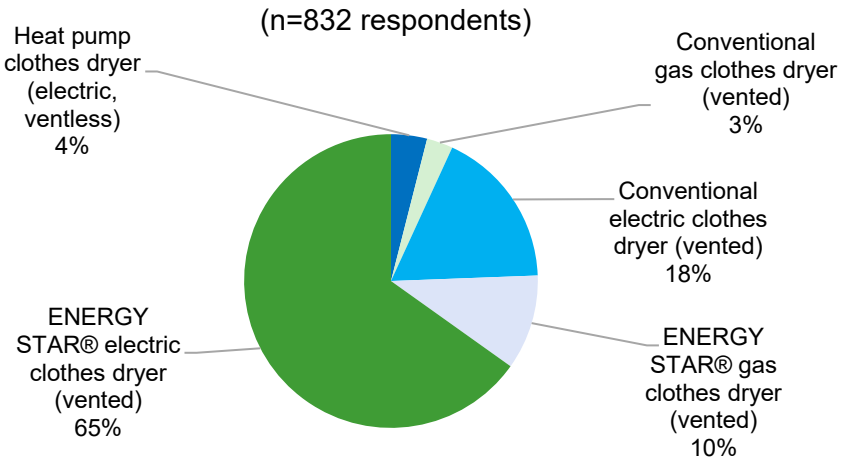
Figure 5-6. Clothes washer type in absence of program



As shown in Figure 5-7, survey responses also indicated high levels of free-ridership among clothes dryer participants, with over three quarters (79%) of respondents stating they would have still purchased either an ENERGY STAR clothes dryer (65% electric, 10% gas) or a HE heat pump clothes dryer (4%) without program rebates. The remaining respondents would have either installed a conventional electric clothes dryer (18%) or a conventional gas clothes dryer (3%).

[6] Puget Sound Energy. Evaluation, Measurement, and Verification Framework: Exhibit 6, Supplement 1. November 1, 2023. https://apiproxy.utc.wa.gov/cases/GetDocument?docID=9&year=2023&docketNumber=230893

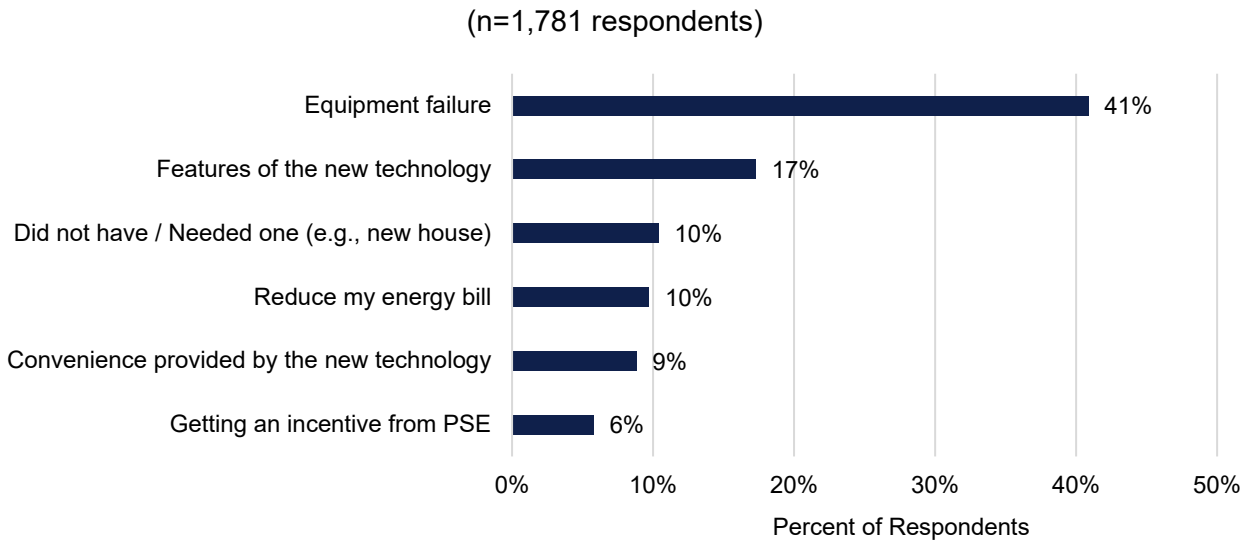
Figure 5-7. Clothes dryer type in absence of program



5.7 Reasons for Program Participation

Program participants were asked what their primary reason was for deciding to purchase their program-rebated clothes washer or clothes dryer. Over half of the respondents cited either equipment failure (41%) or needing a new appliance (e.g., for a new home, 10% of respondents) as the primary reason for purchasing the equipment. As shown in Figure 5-8, only 6% of respondents reported program incentives or rebates as their primary reason for deciding to make the purchase. These survey results further corroborate the findings in Section 5.6 that suggest relatively high free-ridership[7] among program participants.

Figure 5-8. Primary reason for purchasing new clothes washer or dryer

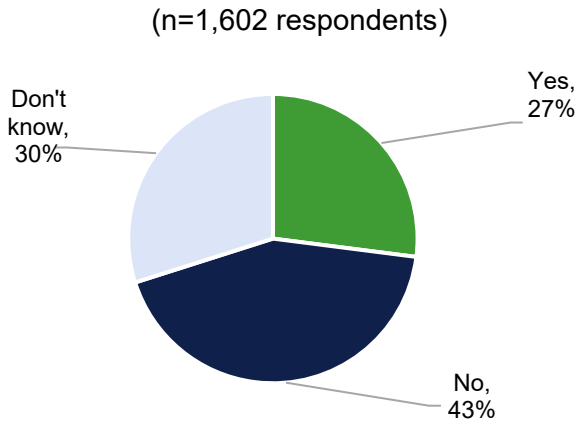


[7] Per the Evaluation Framework cited in Section 5.6, the free-ridership does not negatively affect realization rates or claimed savings.

5.8 Market Readiness for Heat Pump Dryers

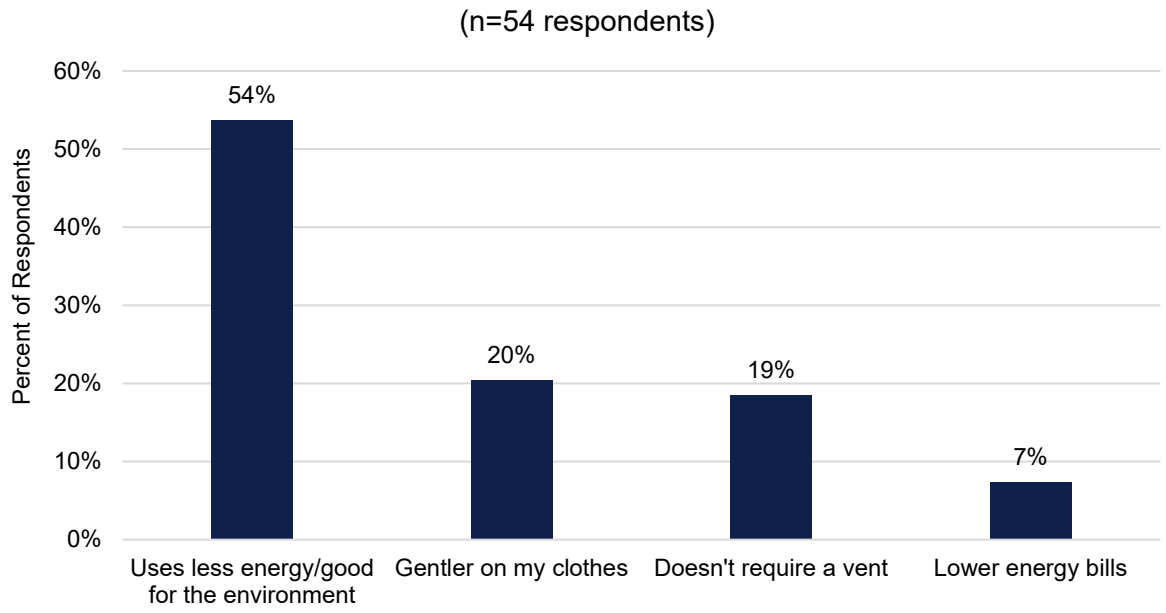
Program participants were also asked a series of questions to assess the market readiness related to heat pump dryers (see Figure 5-9). Participants who did not purchase a heat pump dryer through the Home Appliance program were first informed about the energy savings, equipment benefits (e.g., drying clothes at lower temperatures), and the average cost of the heat pump dryers relative to conventional dryers, and then were subsequently asked if they would consider purchasing this type of dryer. Respondents were almost evenly split, with about a third (35%) saying they would consider making this purchase and slightly fewer (33%) saying they would not, or that they did not know (32%). The same set of respondents were then asked if they would consider purchasing a heat pump clothes dryer if they also received a rebate of $100. Interestingly, only slightly more than a quarter (27%) said they would purchase a heat pump dryer even if they were offered an incentive of this amount. These results suggest that a $100 incentive may not be sufficient to significantly shift the residential market to adopt heat pump dryers, and potentially less effective than marketing the energy savings and equipment benefits.

Figure 5-9. Would you purchase a heat pump dryer with a $100 incentive?



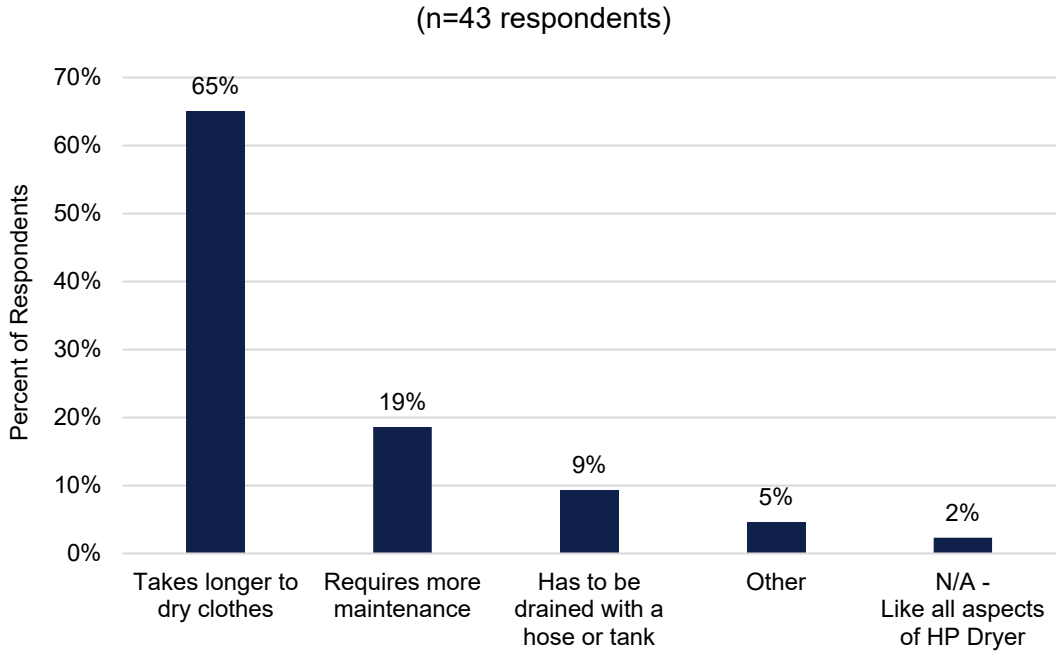
Program participants who purchased a heat pump dryer through the program were asked a different series of question surrounding what they liked and did not like about the equipment. When asked what they liked most about their heat pump dryer, over half (54%) of the respondents cited ‘using less energy / good for the environment’, with slightly fewer stating they liked various features of the heat pump dryer the most, such as it being gentler on clothes (20%) or not requiring a vent (19%) (see Figure 5-10). Only 7% reported that they liked the lower energy bills the most that resulted from new equipment, which indicates that either lower energy bills were not observed, or the lower cost is not a primary driver to adoption among these program participants.

Figure 5-10. Most liked aspect of heat pump dryers



As shown in Figure 5-11, when asked what aspect that they did not like about their program-rebated heat pump dryer, almost two thirds of respondents (65%) said it was that the heat pump dryer takes longer to dry their clothes. About one in five respondents reported not liking that heat pump dryers required more maintenance (19%) in general and that it must be drained with a hose or tank (9%). Only 2% of respondents reporting liking all aspects of their heat pump dryer.

Figure 5-11. Least liked aspect of heat pump dryers



Note: 'Other' responses included "was expensive and difficult to research" and "it doesn't always let me use high heat when I want to".

6 FINDINGS AND RECOMMENDATIONS

In this section, we summarize overall findings from the evaluation and recommendations based on these findings.

6.1 Findings

Key findings from the Home Appliance impact and process evaluation are as follows:

FINDINGS	The evaluation determined a realization rate of 100% for the Home Appliance program. This was confirmed by both an evaluation of clothes washer and dryer installation rates and a thorough a review of the RTF measure case documentation to confirm inputs, assumptions, and calculations behind the deemed savings. This means that the evaluated savings are equal to the claimed savings, with the program achieving a total of 1,811 MWh of electric savings and 12,239 therms of gas savings.
	Results from the participant online survey suggest the Appliance program is operating well and in accordance with its intended program design. Satisfaction with the program overall was rated 4.3 on average on a 5-point scale, but there are opportunities to improve certain aspects of the program, such as the time for participants to receive rebates and program staff communication with participants.
	Survey responses also indicate that the program's influence on purchase decisions is limited. Over three quarters of respondents said that, even without the program rebates, they would have purchased the HE clothes washers or dryers.
	Approximately a quarter of survey respondents said they would purchase a heat pump dryer if they were offered an incentive of $100, which is what PSE is currently offering. The survey results suggest that a $100 incentive may not be sufficient to shift the residential market to adopt heat pump dryers.
	Over half (54%) of the respondents reported they liked that heat pump dryers use less energy and are good for the environment. Survey respondents also reported that they liked various features of the heat pump dryer, such as it being gentler on clothes (20%) or not requiring a vent (19%).

6.2 Recommendations

Based on these key findings, DNV has the following recommendations:

RECOMMENDATIONS	Based on reported satisfaction results, DNV recommends continuing with the current program design, while also looking for opportunities to increase program communication with participants and reduce the time surrounding incentive distribution. However, given that the program represents only about 1% of the residential portfolio of electric savings and less than half a percent of the portfolios gas savings, PSE should weigh these program improvements against the cost effectiveness of the program overall.
	PSE should continue to assess how effective heat pump dryer incentives are at transforming the market, given that only a quarter of customers would be influenced to purchase this equipment with an incentive of $100 based on evaluation findings. PSE should also consider integrating non-energy benefits (e.g., good for the environment and gentler on clothes) more explicitly into marketing materials while also explaining that heat pump dryers could lead to increased energy savings.

7 APPENDICES

7.1 Appendix A: Additional Online Survey Results

We provide additional demographic results from the online survey below.

Figure 7-1. Program participant housing type

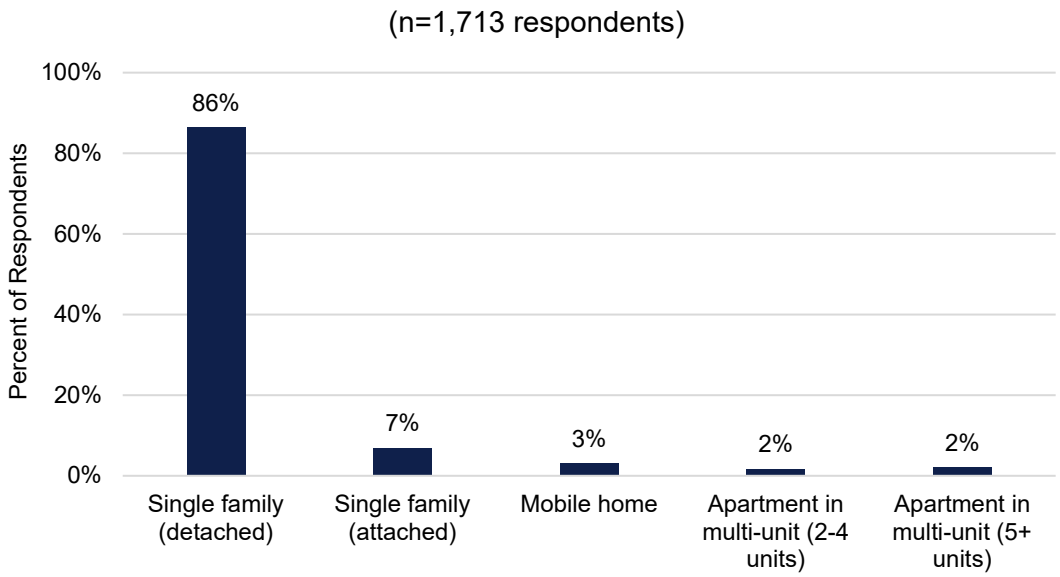


Figure 7-2. Primary household language

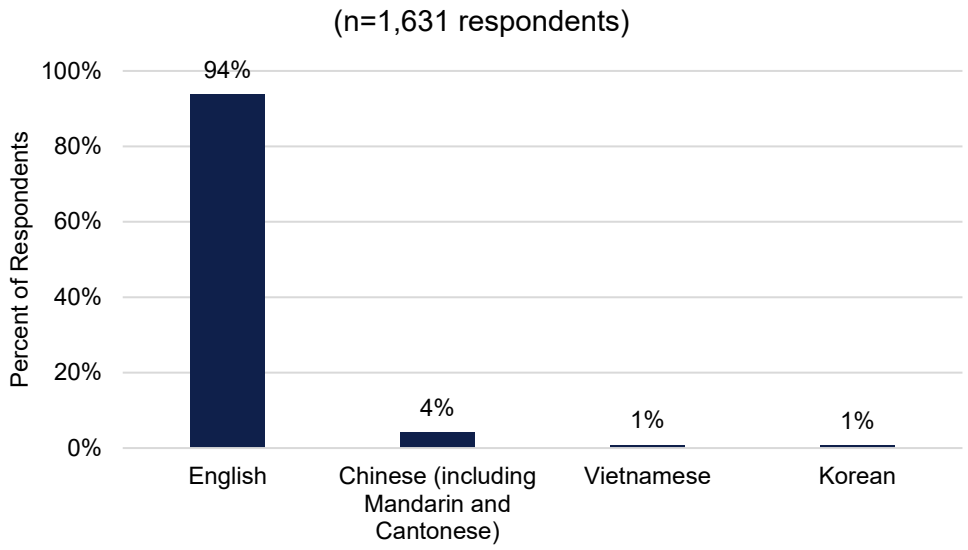


Figure 7-3. Annual 2022 household income

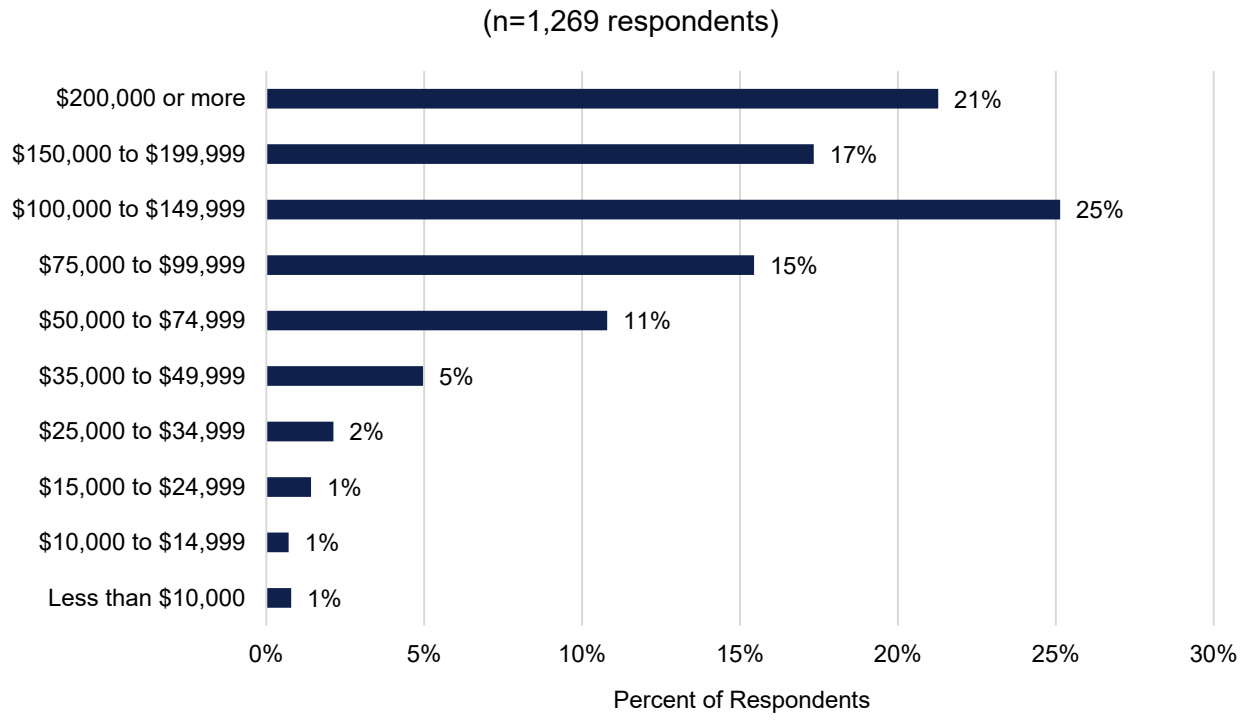
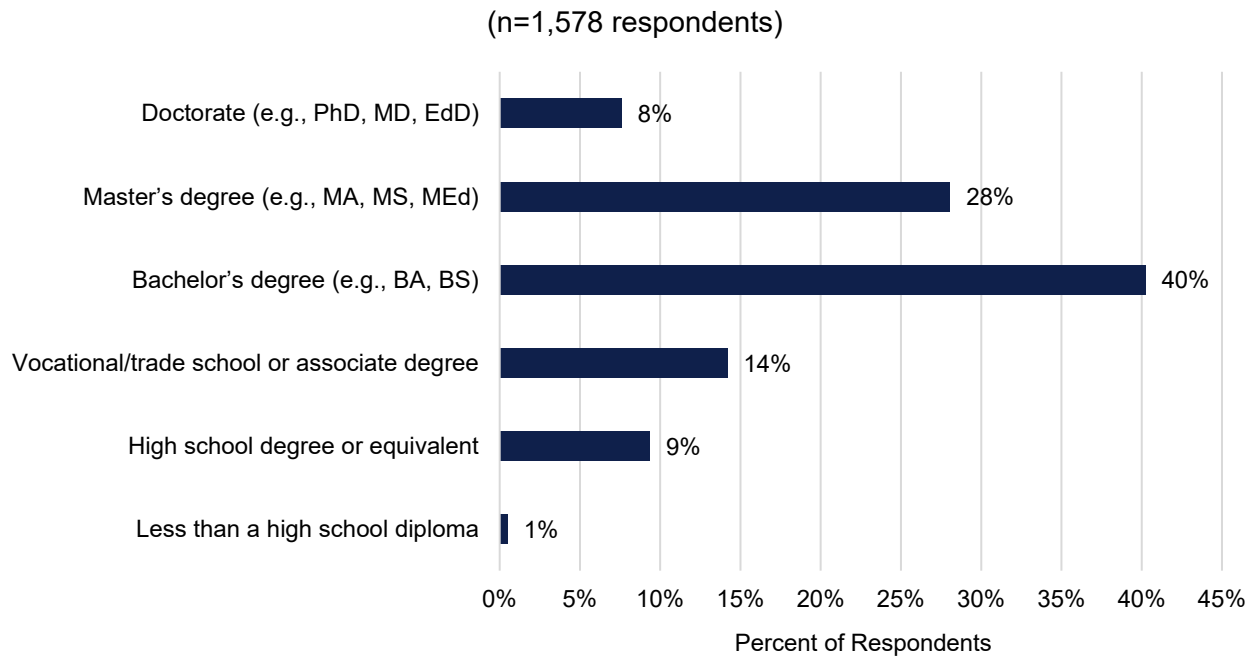


Figure 7-4. Highest degree completed



7.2 Appendix B: Data Collection Instruments

To: Jesse Durst, Puget Sound Energy

From: Katie Ryder, David Avenick, Geoff Barker, DNV

Date: August 10th, 2023

PSE: APPLIANCE REBATE PROGRAM PARTICIPANTS WEB SURVEY GUIDE

1 INTERVIEW GUIDE OVERVIEW

Objective: The Evaluation Team will conduct web surveys with PSE Appliance Rebate program participants assess installation rates, program awareness, satisfaction, and other program-specific topics.

Anticipated timing (survey length): Approximately 15 minutes

Method of data collection: Web Survey

Table 1: Research Objectives Mapped to Questions in this Instrument

Question	Instrument Goal
Q1 – Q2	Screening
Q3 – Q13	Background
Q14 – Q18	Participation/Decision Factors
Q19 – Q31	Outcomes/Satisfaction
Q32 – Q37	Household Characteristics
Q38 – Q40	Closing

2 SURVEY GUIDE

Table 2: Overview of Data Collection Approach

Data Collection	Description
Population Description	PSE Clothes Washer Rebate program participants
Sampling Method	Census
Instrument Type	Web Survey
Survey/Interview Length	Approximately 15 minutes
Description of Contact Sought	Those who received rebates as part of the PSE program.

Email Invitation Template

[FROM] Puget Sound Energy

[SUBJECT]: PSE Appliance Rebate Program Survey

Hello **[PIPE IN FROM DATA: Name]**,

You are invited to participate in Puget Sound Energy's Appliance Rebate program survey!

At Puget Sound Energy, we're committed to providing the best products and services for customers like you. As part of this effort, we are conducting an evaluation of the Appliance Rebate program. As a participant in PSE's program, your opinions are important. PSE would like your input and perspectives to understand how to best structure this program in the future for customers like you.

As a token of our appreciation for completing the survey, you'll have a chance to enter a raffle for an e-gift card of up to $300.

To get started, click on this link: [INSERT LINK]

It will take approximately 15 minutes to answer our questions. Participation in this survey effort is voluntary and your individual responses will be kept confidential and anonymous. Any analyses will not identify individuals.

Thank you for your participation.

If you have any questions about this research effort, please contact the PSE Evaluation and Research team at EESEvaluations@PSE.com.

Thank you for participating in PSE's program evaluation. We really appreciate your input!

Puget Sound Energy
355 110th Ave NE
Bellevue, WA 98004

PUGET SOUND ENERGY

- This email was sent by DNV on behalf of Puget Sound Energy. DNV is an authorized agent of Puget Sound Energy. If you have questions about the survey or would like to be removed from future surveys, please contact the study coordinator at: survey.pse@impact.dnv.com.
- To unsubscribe from future energy efficiency promotional emails, contact eesevaluations@pse.com.
- Link to PSE's Privacy Policy: https://www.pse.com/pages/privacy

2.1 Introduction

Welcome to the PSE Appliance Rebate program survey!

You have been selected to participate in this important survey because our records indicate that you received a rebate through PSE's Appliance Rebate program.

This survey should take approximately 15 minutes to complete. Your participation will help PSE better understand this program and improve all our programs.

The analysis will only use summary level data and will not identify individual respondents. Your responses will be kept confidential and anonymous.

To begin the survey, click on the arrow below.

2.2 Screening

Q1. According to our records, you received a rebate for a clothes washer through PSE's Appliance Rebate program. Are you aware of your participation in this program?
[SINGLE RESPONSE, FORCE RESPONSE]

1. Yes **[Skip to Q3]**
2. No

Q2. PSE's Appliance Rebate program provides qualified PSE customers with rebates for ENERGY STAR® certified front load clothes washers and dryers. Customers may apply for the rebate online or via a mail in form. Do you recall receiving a rebate when you purchased a clothes washer?

1. Yes
2. No **[TERMINATION SCRIPT 1]**

[PASSED SCREENING]: Great! You are eligible to take our survey. Let's get started.

[TERMINATION SCRIPT 1]: Thank you for answering our questions. However, we are looking for respondents who received a rebate through the program. Your response has been recorded. Have a great day.

2.3 Background

Q3. Our records show that you purchased the new clothes washer on {Purchase date}. Is the new clothes washer currently installed in your home?

1. Yes
2. No

Q4. **[ASK IF Q3 = 2]** Why is the clothes washer not installed? **[OPEN ENDED] [Skip to Q14]**

Q5. What was the condition of the old clothes washer when it was removed?
[SINGLE RESPONSE]

1. Working but inefficient
2. Working but in need of minor repair
3. Working but in need of significant repair
4. Failed was no longer working
5. No prior Clothes Washer
6. Other (please specify)

Q6. How often do you run a load cycle with the new clothes washer?

1. Several times a week
2. Once a week

3. Twice a month
4. Once a month
5. Less than once a month

Q7. What load cycle do you typically set when using your new clothes washer? Please select the options that best matches the options available on your clothes washer.

1. Soil level:
   A. Heavy
   B. Normal
   C. Light
2. Water temperature:
   A. Hot
   B. Warm
   C. Cool
   D. Cold

Q8. What kind of clothes dryer do you have?

1. Conventional gas clothes dryer (vented)
2. Conventional electric clothes dryer (vented)
3. Heat pump clothes dryer (electric, ventless)
4. Other
98. Don't know

Q9. **[ASK IF Q8 = 3]** What do you most like about your heat pump dryer?

1. Lower energy bills
2. Uses less energy / Good for environment
3. Gentler on my clothes
4. Doesn't require a vent
97. Other, please specify: _____ **[INSERT OPEN-ENDED RESPONSE]**

Q10. **[ASK IF Q8 = 3]** Are there any aspects that you don't like about your heat pump dryer?

1. They take longer to dry my clothes than conventional dryer
2. They have to be drained with a drain hose or tank
3. They require more maintenance than a regular dryer
98. Other, please specify: _____ **[INSERT OPEN-ENDED RESPONSE]**

Q11. **[ASK IF Q8 = 1, 2, or 98]** According to Energy Star, heat pump dryers use about 28% less energy than traditional dryers, so you'll save money every time you wash your clothes. Heat pump dryers dry clothes at lower temperatures and are gentler on most types of fabrics. High efficiency heat pump clothes dryers generally cost between $800 and $1,400, while traditional electric dryers generally cost between $500 and $800. Would you consider purchasing a heat pump clothes dryer?

1. Yes
2. No
97. Other, please specify: _____ **[INSERT OPEN-ENDED RESPONSE]**
98. Don't know

Q12. **[ASK IF Q8 = 1, 2, or 98]** Would you consider purchasing a heat pump clothes dryer with a rebate of $100?

1. Yes
2. No
97. Other, please specify: _____ **[INSERT OPEN-ENDED RESPONSE]**
98. Don't know

Q13. What kind of water heater did you have?

1. Conventional storage water heater (natural gas or propane)
2. Conventional storage water heater (electric)
3. Heat pump water heater (electric)
4. Tankless water heater (electric)
5. Tankless water heater (natural gas)

6. Condensing water heater (natural gas)
98. Don't know

2.4 Participation/Decision Factors

Q14. Thinking back, how did you find out about the Appliance Rebate program?
[SELECT ONE, RANDOMIZE 1-8]

1. PSE website
2. PSE email
3. PSE Energy Advisor
4. PSE press release
5. Signage at retail store
6. Social media
7. Local community event
8. Neighbors, family, friends, or colleagues
98. Don't recall
97. Other, please specify: _____ **[INSERT OPEN-ENDED RESPONSE]**

Q15. What is the primary reason you chose to purchase the clothes washer?
[SELECT ONE, RANDOMIZE 1-6]

1. Getting an incentive from PSE
2. Features of the new technology
3. Convenience provided by the new technology
4. Helping fight global warming/climate change/good for the environment
5. Reduce my energy bill
6. Equipment failure
97. Other, please specify: _____ **[INSERT OPEN-ENDED RESPONSE]**
98. Don't know

Q16. Are there any other reasons you chose to purchase the clothes washer? Please select all that apply.
[MULTIPLE RESPONSE, RANDOMIZE 1-6]

1. Getting an incentive from PSE
2. Features of the new technology
3. Convenience provided by the new technology
4. Helping fight global warming/climate change/good for the environment
5. Reduce my energy bill
6. Equipment failure

97. Other, please specify: _____ **[INSERT OPEN-ENDED RESPONSE]**
98. Don't know

Q17. Without the program rebates, when would you have considered installing a high efficiency (HE) front load clothes washer?

1. Same time
2. 1 year later
3. 2 years later
4. More than 2 years later
5. Never

97. Other (please specify): _____ **[INSERT OPEN-ENDED RESPONSE]**
98. Don't know

Q18. Without the program rebates, what kind of clothes washer would you have installed?

1. **[HIDE IF Q17 = 5]** High efficiency (HE) front load clothes washer
2. High efficiency (HE) top load clothes washer
3. Standard efficiency top load clothes washer
97. Other, please specify: _____ **[INSERT OPEN-ENDED RESPONSE]**
98. Don't know

2.5 Outcomes/Satisfaction

[DISPLAY]: The next section will ask you questions about your experiences with PSE's Appliance Rebate program.

Q19. Have you received a phone call from PSE to verify that the clothes washer was installed and that you received the rebate?

1. Yes
2. No
98. Don't know

Q20. Please indicate how strongly you agree or disagree with the following statements about PSE's Appliance Rebate program.
[INSERT "STRONGLY AGREE", "SOMEWHAT AGREE", "NEITHER AGREE NOR DISAGREE", "SOMEWHAT DISAGREE", "STRONGLY DISAGREE", AND "DON'T KNOW" CHOICES FOR ALL OPTIONS, RANDOMIZE STATEMENTS]

1. The benefits of this program (energy savings/environmental benefits) are important to me
2. The costs for this program were clear
3. Participating in this program is easy
4. Customer support for the program was readily available

Q21. How did you receive the rebate for your clothes washer purchase?

1. Submitted an online rebate application after purchasing the clothes washer
2. Mailed in rebate form after purchasing the clothes washer
3. Point-of sale rebate
4. Don't recall
97. Other (please specify): _____ **[OPEN-ENDED]**

Q22. **[IF Q21 ≠ 3]** How did you choose to receive your rebate?

1. Rebate check
2. Credit on your Puget Sound Energy bill
3. Don't recall

Q23. **[IF Q21 ≠ 3]** How long did it take to receive your rebate?

1. 1-2 weeks
2. 3-4 weeks
3. 1-2 months
4. More than two months
5. Don't recall

Q24. Using a scale of 1 to 5 where 1 means very dissatisfied, 2 is somewhat dissatisfied, 3 is neither satisfied nor dissatisfied, 4 is somewhat satisfied, and 5 is very satisfied, please indicate your level of satisfaction with the following aspects of the program: **[RANDOMIZE 1-8]**

1. Eligibility requirements
2. Ease of application/submitting documentation
3. The rebate incentive
4. Communication with PSE to learn more about the program
5. Experience with installation contractor
6. **[HIDE IF Q21 = 3]** How long it took to receive the rebate after submitting the application
7. Energy savings since installing the clothes washer
8. Your overall program experiences

Q25. **[ASK FOR ANY ITEMS IN Q24 WITH "SOMEWHAT DISSATISFIED" OR "VERY DISSATISFIED" RESPONSE]** Do you have any suggestions for how we can improve the following program element(s) for which you indicated dissatisfaction?

Q26. Did you experience any issues that led you to seek help?

1. Yes
2. No

Q27. **[ASK IF Q26 = 1]** Was the issue(s) successfully resolved?
1. Yes
2. No

Q28. **[ASK IF Q27 = 1]** Which resource proved to be the most helpful for resolving your issue?
1. Visiting the program website or FAQs
2. Emailing customer support
3. Calling customer support
4. Contacting the installation contractor
97. Other, please specify: _____ **[INSERT OPEN-ENDED RESPONSE]**

Q29. **[ASK IF Q27 = 2]** We are sorry you experienced an issue(s) that was not successfully resolved. Do you have any feedback you want to provide on the issue(s) and how it could have been resolved?
1. Yes, please specify: _____ **[INSERT OPEN-ENDED RESPONSE]**
2. No

Q30. Is there anything you would change about PSE's Appliance Rebate program?
1. Yes, please specify: _____ **[INSERT OPEN-ENDED RESPONSE]**
2. No

Q31. How likely are you to recommend PSE's Appliance Rebate program to someone you know?
1. Very likely
2. Somewhat likely
3. Neither likely nor unlikely
4. Somewhat unlikely
5. Very unlikely

2.6 Household Characteristics

[DISPLAY]: Please answer the next set of questions so we can better understand who participates and make sure we have reached a variety of households. Your responses will remain anonymous.

Q32. About when was the building you live in first built? Your best guess is fine.
1. 2020 or later
2. 2010 to 2019
3. 2000 to 2009
4. 1990 to 1999
5. 1980 to 1989
6. 1970 to 1979
7. 1960 to 1969
8. 1950 to 1959
9. 1940 to 1949
10. 1939 or earlier
98. Don't know
99. Prefer not to answer

Q33. Which of the following best describes the type of home you live in?
1. Single family, detached (e.g., freestanding house)
2. Single family, attached (e.g., townhouse or row house)
3. Apartment in multi-unit structure of 2-4 units
4. Apartment in multi-unit structure of 5 or more units
5. Mobile home
98. Don't know
99. Prefer not to answer

Q34. What is the total square footage of your home? Your best guess is fine.
1. Less than 500

2. 500 to 749
3. 750 to 999
4. 1,000 to 1,499
5. 1,500 to 1,999
6. 2,000 to 2,499
7. 2,500 to 2,999
8. 3,000 to 3,999
9. 4,000 or more
98. Don't know
99. Prefer not to answer

Q35. What is the highest degree or level of school you have completed? If you're currently enrolled in school, please indicate the highest degree you have received.

1. Less than a high school diploma
2. High school degree or equivalent
3. Vocational/trade school or associate degree
4. Bachelor's degree (e.g., BA, BS)
5. Master's degree (e.g., MA, MS, MEd)
6. Doctorate (e.g., PhD, MD, EdD)
98. Other (please specify): _____ **[OPEN-ENDED]**
99. Prefer not to answer

Q36. What is the primary household language?

1. English
2. Spanish
3. Chinese (including Mandarin and Cantonese)
4. Tagalog
5. Vietnamese
6. Korean
97. Other (please specify): _____ **[OPEN-ENDED]**
99. Prefer not to answer

Q37. Please select the range that best describes your household's annual 2022 income before taxes:

1. Less than $10,000
2. $10,000 to $14,999
3. $15,000 to $24,999
4. $25,000 to $34,999
5. $35,000 to $49,999
6. $50,000 to $74,999
7. $75,000 to $99,999
8. $100,000 to $149,999
9. $150,000 to $199,999
10. $200,000 or more
98. Don't know
99. Prefer not to answer

2.7 Closing

Q38. Is there anything else you want to tell us about your experience with PSE's Appliance Rebate program?

1. Yes. Please share your comments: _____ **[INSERT OPEN-ENDED RESPONSE]**
2. No

Q39. As a thank you for your participation in this research, your response will be entered into a drawing for an Amazon e-gift card of up to $300. If selected for the e-gift card, you will be notified by email (please check your spam filter). Would you like to be included in the incentive drawing? **[SINGLE REPONSE]**

1. Yes

2. No

Q40. **[ASK IF Q39 = 1]** Please provide your preferred contact information for the drawing:

1. First name: _____ **[INSERT OPEN-ENDED RESPONSE]**
2. Last name: _____ **[INSERT OPEN-ENDED RESPONSE]**
3. Email address: _____ **[INSERT OPEN-ENDED RESPONSE]**

[DISPLAY FOR ALL RESPONDENTS]: You have completed the survey and your responses have been submitted. Your contribution to this survey helps Puget Sound Energy to evaluate and improve its program offerings. Thank you for your participation and time.

About DNV

DNV is a global quality assurance and risk management company. Driven by our purpose of safeguarding life, property and the environment, we enable our customers to advance the safety and sustainability of their business. We provide classification, technical assurance, software and independent expert advisory services to the maritime, oil & gas, power and renewables industries. We also provide certification, supply chain and data management services to customers across a wide range of industries. Operating in more than 100 countries, our experts are dedicated to helping customers make the world safer, smarter and greener.

Evaluation Report Response

Program: Home Appliance

Program Manager: Holly Mulvenon and Dustin Levesque

Study Report Name: Home Appliance Program 2022-2023 Impact and Process Evaluation Final Report

Draft Report Date: December 14, 2023

Evaluation Analyst: Jesse Durst

Date of Final Report Provided to Program Manager: February 1, 2024

Date of Program Manager Response: February 1, 2024

Overview

PSE's Home Appliance program encourages customers to choose energy efficient products when purchasing new appliances. As of January 2024, the program includes incentives for ENERGY STAR® rated clothes dryers, heat pump dryers, and ENERGY STAR® front load washers. Rebates are available to all eligible PSE electric customer segments, including hard-to-reach segments, highly impacted communities and vulnerable populations through enhanced Efficiency Boost rebates.

The Home Appliance program has been in existence since at least 2004, when it originally offered incentives on clothes washers and dishwashers. The program expanded and adapted over time, adding and removing measures based on cost effectiveness. The program has offered everything from free clothes washer and refrigerator replacement to mail-in rebates on refrigerators, freezers, clothes washers, and clothes dryers. Since around 2018, avoided cost estimates have negatively affected the program and its ability to offer a breadth of measures, with the majority of rebates focused on ENERGY STAR front-loading clothes washers and clothes dryers. Top load washer rebates were briefly available between 2020 and 2022, ENERGY STAR dryer rebates were suspended temporarily in 2022, and separate heat pump dryer rebates have come in and out of the program in recent years as well.

Evaluation

The primary evaluation research objectives included both impact and process elements. Research objectives for the impact evaluation include verifying the installation of the rebated appliances and a review of the deemed energy savings. Research objectives for the process evaluation included participant satisfaction, program awareness, program delivery, reasons for program participation, and market readiness for heat pump dryers.

The activities undertaken to fulfill these research objectives included a deemed savings review, participant survey and program manager interview.

- **Deemed Savings Review:** The evaluators performed a deemed savings review of the washer and dryer measures in this program to validate savings inputs, assumptions, and calculations for accuracy. As part of the process evaluation, the evaluators administered an online survey to verify measure installation. The combination of the deemed savings review and measure installation rates determined the savings realization rate for this program.
- **Participant Survey:** The evaluators sent an online survey to program participants to better understand customer awareness and satisfaction with various aspects of the program and to verify measure installation. The survey also focused on customers' experience with the program, factors that influenced their participation and decision-making processes, and market readiness for heat pump clothes dryers.
- **Program Manager Interview:** Evaluators conducted a program staff interview to identify challenges and opportunities from the perspective of a program administrator. This interview explored recent program changes and future opportunities for program process improvements.

Key Findings

The key findings from the impact and process evaluations include:

- The evaluation determined a realization rate of 100% for the Home Appliance program. This was confirmed by both an evaluation of clothes washer and dryer installation rates and a thorough review of the RTF measure case documentation to confirm inputs, assumptions, and calculations behind the deemed savings. This means that the evaluated savings are equal to the claimed savings, with the program achieving a total of 1,811 MWh of electric savings and 12,239 therms of gas savings.
- Results from the participant online survey suggest the Appliance program is operating well and in accordance with its intended program design. Satisfaction with the program overall was rated 4.3 on average on a 5-point scale, but there are opportunities to improve certain aspects of the program, such as the time for participants to receive rebates and program staff communication with participants.
- Survey responses also indicate that the program's influence on purchase decisions is limited. Over three quarters of respondents said that, even without the program rebates, they would have purchased the HE clothes washers or dryers.
- Approximately a quarter of survey respondents said they would purchase a heat pump dryer if they were offered an incentive of $100, which is what PSE is currently offering. The survey results suggest that a $100 incentive may not be sufficient to shift the residential market to adopt heat pump dryers.
- Over half (54%) of the respondents reported they liked that heat pump dryers use less energy and are good for the environment. Survey respondents also reported that they liked various features of the heat pump dryer, such as it being gentler on clothes (20%) or not requiring a vent (19%).

Recommendations

Recommendation

Based on reported satisfaction results, DNV recommends continuing with the current program design, while also looking for opportunities to increase program communication with participants and reduce the time surrounding incentive distribution. However, given that the program represents only about 1% of the residential portfolio of electric savings and less than half a percent of the portfolios gas savings, PSE should weigh these program improvements against the cost effectiveness of the program overall.

PSE Response

PSE will investigate ways in which we can decrease the incentive distribution time and streamline the rebate process. Also, PSE will research opportunities to increase communication points with participants to offer a better experience.

Recommendation

PSE should continue to assess how effective heat pump dryer incentives are at transforming the market, given that only a quarter of customers would be influenced to purchase this equipment with an incentive of $100 based on evaluation findings. PSE should also consider integrating non-energy benefits (e.g., good for the environment and gentler on clothes) more explicitly into marketing materials while also explaining that heat pump dryers could lead to increased energy savings.

PSE Response

PSE will evaluate new options to better integrate messaging about non-energy benefits that have been demonstrated to be a driving factor of adoption in potential customers. This can be done through a multitude of different avenues such as point of purchase material, social media campaigns and emails. PSE will also target these new options towards segments of the market most likely to be persuaded by the information. With the $100 rebate offering only limited influence, PSE will evaluate the ability to increase this rebate while maintaining cost effectiveness and determine if the increased rebate has a more meaningful impact on customer purchases.