2012-2013 HomePrint Assessment Program Process and Impact Evaluation Report

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This document contains the final Homeprint Assessment Program Process and Impact Evaluation Report, the addendum on Program Participation Overlap Analysis, and Puget Sound Energy's Evaluation Report Response (ERR). PSE program managers prepare an ERR upon completion of an evaluation of their program. The ERR addresses and documents pertinent adjustments in program metrics or processes subsequent to the evaluation.

DNV·GL

2012-2013 HOMEPRINT ASSESSMENT PROGRAM

Process and Impact Evaluation Report

Puget Sound Energy

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1. EXECUTIVE SUMMARY

Puget Sound Energy (PSE) contracted with DNV GL to conduct a comprehensive process and impact evaluation of the HomePrint Assessment Program from 2012-2013, in order to provide recommendations aimed at improving program delivery, review measure savings assumptions and verify measure installations from the program.

1.1 Program Background

The HomePrint Assessment Program provides free assessments of PSE customers' home energy use. PSE-Qualified Specialists, independent business owners who have completed program training through PSE, perform the assessments, and provide recommendations to reduce consumption. The program also provides directly installed measures and leave-behind measures upon request.

1.2 Evaluation Goals and Approach

The study's goals were to identify processes of the HomePrint Program, collect feedback from participants, and develop a savings review of program measures. DNV GL conducted the following tasks as part of the process and impact evaluation of the 2012-2013 HomePrint Assessment Program:

- Reviewed Program Documents and Database
- Program Staff Interviews
- Logic Model Development
- Contractor Telephone Interviews
- Participant Computer Aided Telephone Interviews
- Onsite Surveys
- Savings Review

1.3 Process Evaluation Findings

Program Staff Interview

The program staff interviews addressed program goals, marketing and outreach, customer relationship, contractor relationship, interaction with other PSE programs, direct install measures, and areas for future research. The interviews highlighted a number of important findings, which we have organized into the three categories: program goals, marketing and outreach, and the HomePrint Program's relationship with stakeholders including other PSE departments, HomePrint Program participants, and contractors.

- *Program Goals*: HomePrint successfully addressed program goals, yet also had room to grow and develop, particularly in developing recommendations for homeowners, follow-up opportunities with customers, and geographic distribution of contractors.
- *Marketing and Outreach*: Feedback for marketing and outreach was very positive. Staff interviewees stated that marketing and outreach was varied and active. Some recommended that PSE further tailor the marketing to qualifying customers.
- *Program Relationship with Stakeholders*: The program manager and other staff, particularly the Energy Advisors, regularly talk with contractors to check in and answer questions. Two

interviewees stated that Energy Advisors needed additional information. Two PSE staff mentioned that there was some confusion for contractors with account and referral numbers.

Based on the staff interviews, DNV GL and PSE developed a logic model to display the key program elements, summarizes outcomes and accomplishments, and the rationale behind program activities.

Contractor Telephone Interviews

DNV GL staff conducted 13 interviews with HomePrint contractors to assess their experiences with the program, opportunities for refinements and/or improvements, contractor satisfaction with the program, and other topics.

- *Awareness and Motivation*: Of the 13 contractors interviewed in 2014, six were involved in the program since its inception. Of the contractors no longer participating, all cited personal reasons (health, career change, etc.), and two cited some program issues as the reasons for ending participation. Interviewees stated their companies' primary reasons for participating in the HomePrint program. The majority stated that the program aligned directly with their business values. Roughly one-half of the respondents stated that they joined the program in order to generate more leads for retrofit projects.
- *Satisfaction*: The majority of contractors were satisfied with the program marketing and outreach, and interactions with PSE staff. Contractors also had positive feedback for the LED lights and the recent lighting changes (reducing the number of bulbs to install). Contractors expressed the greatest dissatisfaction with the HomePrint software and the paperwork required by the program.
- *Program Benefits and Challenges*: All of the interviewees stated that association with PSE strengthened their brand, and many also mentioned that the program increased their business and aligned with their organizational values. Contractors also shared some components of the program that were challenging. Some felt that the $100 payment was too low for the time required, and some felt that the program outreach didn't screen ineligible households sufficiently.
- *Conversion Rate*: Of the 13 interviewed, six contractors provide additional retrofit services. They stated that there was a low rate of conversion, with approximately five to 10% of audit recipients requesting additional retrofits. Most of the upgrades resulting from HomePrint Assessments were insulation and air sealing. A few contractors suggested program improvements to increase conversion rates, such as increased report detail and more followup after the assessment.
- *Barriers*: The most common barrier for contractors to participate in the program, according to interviewees, was the amount of compensation for the HomePrint Assessment. Contractors also discussed the difficulty in transitioning HomePrint Assessments into more profitable, and more expensive, projects. Finally, one-half of the contractors interviewees stated that the requirements for customer account and referral numbers were a barrier to administering the program.

Participant Computer Aided Telephone Interviews

DNV GL worked closely with PSE staff to develop a participant computer aided telephone interviews (CATI). The CATI sample was split into eight different strata[1] in order to ensure that the survey reached representative groups with a variety of program experience. DNV GL worked with a subcontractor to conduct the calls. Of the total eligible numbers (881), there were 142 completed

[1] Strata included: 1. HomePrint Assessment only, 2012; 2. HomePrint Assessment only, 2013; 3. CFL only, 20 or less, 2012; 4. CFL only, 20 or less, 2013; 5. CFL only, more than 20, 2012; 6. CFL only, more than 20, 2013; 7. LED lamps included; 8. Showerhead(s) included

interviews, which resulted in a response rate of 16%, which is similar to other process evaluation response rates.

The 2012-2013 HomePrint Assessment Program CATI objectives were to evaluate: satisfaction with the program and products installed, value of the assessment, influence of the assessment on participation in other PSE programs, installation of other measures, sources of information on the program, and motivations to participate. The survey addressed these topics through the following sections:

- *Awareness and Motivation*: One-third of the program participants stated that they learned about the program from bill inserts. Participants also listed PSE event (14%), other marketing tools (such as lawn signs, and door-to-door visits, 14%), friend or relative (11%), and the PSE website (10%). Participants relied on PSE expertise at a number of times throughout the program. The majority (69%) made the initial appointment through a call with Energy Advisors or an event with PSE, and two-thirds of the respondents relied on a referral from PSE when choosing their contractor.
    - The most common reason for participating in the program was energy efficiency (44%). Respondents also often mentioned saving money and saving energy as reasons for participation (39% and 23%, respectively). Most respondents expected to receive recommendations on ways to make their home more energy efficient (90%). Almost one-half (42%) stated that they had expected to receive information on other PSE programs.
- *Measures*: The HomePrint Assessment Program included an on-site assessment, direct install or leave-behind measures, and an emailed report. Almost two-thirds of the respondents remembered that the contractor reviewed the HomePrint report with them during the home visit (63%). Almost two-thirds of respondents stated that the contractor also provided additional recommendations for energy saving actions during the visit (64%).
    - *CFLs*: Of the 2012-2013 HomePrint program participants who reported having received CFL through the program (n=100), most reported that they were satisfied or very satisfied (60%).
    - *LEDs*: All respondents (n=10) who received LED lamps stated that they were very satisfied with them (ratings of 5 on a scale of 1 to 5 as described above).
    - *Showerheads*: 11 respondents received and then installed showerheads, and three removed them by the time of the survey. Two of these three respondents stated that their reason for removing the high efficiency showerheads was low water pressure, and the third said it was because of low water flow. Of the 11 respondents who recalled receiving high efficiency showerheads, approximately two-thirds were satisfied or very satisfied.
    - *HomePrint Report*: Of those respondents who did remember receiving a HomePrint report (n=71), forty-eight percent said that they made additional energy efficiency improvements, though none of the respondents stated that they participated in other PSE programs. Those who did improvements stated that the most common energy efficiency improvement was adding insulation (54%), while some respondents upgraded space heating or upgraded windows (19% and 14%, respectively).
- *Program Satisfaction*: Respondents rated program components and the overall program highly (92% with the appointment scheduling process, 90% with the contractor, and 84% were satisfied with the in-home assessment). Respondents were slightly less satisfied with the usefulness of the report and its ability to meet their expectations (71% provided ratings of 4 or 5 in each case). These results suggest a need for program improvements in these areas. Approximately 25% percent of respondents stated that the PSE HomePrint Assessment Program had in some way changed their views of PSE. Of those respondents who stated that the HomePrint program

changed their views of PSE (n=38), nearly all stated that the program improved their views of PSE (98%).

- *Demographics*: The demographics section comparing survey respondents to PSE customer population. This comparison allowed DNV GL to look at the similarities and differences between the CATI sample of program participants and the larger population of PSE customers. HomePrint customers reported a higher percentage of post-high school education compared to the PSE population (54% of HomePrint respondents versus 30% of the census data). PSE customers who live within the four counties that are completely within PSE service territory had a greater percentage with reported incomes in the highest income bracket compared to PSE HomePrint respondents from the telephone survey (30% versus 21%).

1.4 Impact Evaluation Findings

Table 1 summarizes the findings from DNV GLs review of UES and measure life assumptions for the measures included in the 2012-2013 HomePrint Assessment Program.

Table 1: Summary of Review of 2012-2013 PSE HomePrint Program UES and Measure Life Assumptions

Measure	UES (kWh/year)		Measure Life (years)	
	HomePrint Program	Savings Review	HomePrint Program	Savings Review
Direct Install LED Lamps	32	18	30	12
Direct Install CFLs	23	17	5	6
Leave-Behind Low-Flow Showerheads	260	260	10	10

Table 2 summarizes the findings from our review of UES and measure life assumptions for the measures included in the 2012-2013 HomePrint Assessment Program.

Table 2: Summary of Results of Installation Verification for the 2012-2013 HomePrint Assessment Program, 2014

Program Measures	Percent of Total Installed Measures to Program-Provided Measures	Average Self-Reported Installation Verification Rate	Average Tracking Data Verified Program Installation Verification Rate
Direct Install CFLs	141%	67%	70%
Direct Install LEDs	177%	45%	127%
Low-Flow Showerheads	61%	7%	-

- For homes that were provided with direct install CFLs and LED lamps, we found that on average more CFLs and LED lamps were installed than the quantities that were provided to them; 141 percent of program-provided CFLs and 177 percent of program-provided LED lamps.

- For direct install CFLs, both the number of program measures the participant could identify and the number that could be verified by matching to the tracking data were very similar at just under 70 percent.

- For the most part, 2012-2013 HomePrint Assessment Program participants did not identify the installed low-flow showerheads in their home as being provided to them by the program, with only a 7 percent self-reported verification rate. When we compared the quantity of installed showerheads with quantities in the program tracking data, a substantially higher verification rate resulted (69%).

- Participants who received direct install LED lamps had more LED lamps of the same form factor (shape or style) and wattage installed in their homes at the time of the onsite verification visits.

1.5 Recommendations

Based on the above findings and DNV GL's overall assessment of the program, we offer the following recommendations:

Process Evaluation Recommendations

- **Improve communication and coordination across PSE programs.** These improvements would enable increased promotion of HomePrint Assessments. Staff interviewees recommended that Energy Advisors would benefit from a detailed understanding of program benefits and requirements.

- **Ensure that evaluation results are disseminated among PSE program staff.** Program staff expressed interest in hearing feedback about the program from participating customers and contractors. The evaluation results are a good source of such feedback. PSE may also

want to consider sharing relevant portions of the evaluation findings with Energy Advisors in its customer call center. DNV GL understands that additional methods are underway.

- **Streamline account and referral number tracking.** Interviewees, both PSE staff and contractor, expressed concern about balancing the account number and the referral number. They recommended:
    - Create an automatically generated reminder for the customer to have account number ready
    - Use account number only instead of a separate referral number
    - Pre-validate account number before the assessment occurs
- **Set expectations for future retrofit project costs and payback.** Three contractors stated that if PSE staff were to discuss deeper retrofits with HomePrint participants prior to the assessments, contractors might have greater success in converting HomePrint assessments into participation in broader retrofit projects. PSE could include information such as:
    - Data on average costs and payback
    - Improved awareness of educational messages about energy efficiency projects, house-as-a-system, safety, and comfort
- **Upgrade the online HomePrint Assessment online tool.** Contractors suggested enabling an option to allow users to go back one page in the application. This would make the form much easier to use. Two contractors also recommended adding a pre-assessment questionnaire to collect background information from the homeowner and streamline the assessment process.
- **Improve program information regarding direct install measures.** Only a small percentage of participants expected to receive free CFLs, LED lamps, and/or low-flow showerheads through the program. Also, some participants were disappointed when program contractors were unable upgrade their CFLs to LED lamps because of program restrictions. PSE should consider clarifying the availability of the free lamps in program marketing materials and set appropriate expectations regarding eligibility for LED lamps.
- **Improve program recommendations and follow-up.** Program staff in particular suggested that PSE could better tailor program recommendations and pay greater attention to follow-up opportunities for the customer.
- **Improve access to contractors across PSE service territory.** Program staff noted a lack of program-qualified contractors available to perform the assessment in certain geographic areas within PSE service territory.
- **Tailor program marketing.** PSE should consider various program targeting efforts, including:

- Continue to target homes that have not previously participated in the HomePrint Assessment program.
- Consider a split offering, such as direct install lamps for renters and insulation for homeowners, to reach rental properties.
- Provide additional support to target low income homes. This was recommended by contractors and it is DNV GL's perspective that it might be a useful area of growth for the HomePrint Program.
- Establish a streamlined procedure to avoid outreach to ineligible customers.

- **Consider additional research with LED lamp recipients.** Because of the HomePrint program's shift away from direct install CFLs and toward LED lamps in 2014, DNV GL suggests that PSE consider additional future research with HomePrint program participants who receive LED lamps through the program to better understand the impact of LED installation on HomePrint program savings, and on subsequent lighting purchases (particularly given the small sample size for LED lamp recipients in this study [n=10]).

- **Consider additional research regarding customer satisfaction with the HomePrint Assessment Report.** Participants were slightly less satisfied with the report's usefulness than with other elements of the program, and some suggested that the report did not meet their expectations. PSE may want to consider additional research with participating customers to obtain more nuanced feedback on the report content and specific areas for improvement.

Impact Evaluation Recommendations

- Adopt the Direct Install LED General Purpose and Dimmable, 665-1439 lumens moderate and high use interior savings and measure life from the Regional Technical Forum (RTF) residential lighting workbook for CFLs and LED lamps (version 3.3)[2] for the direct install LED lamp measure.

- To corroborate or refine future estimates of LED lamp measure savings, utilize wattage data from the direct install LED lamp retrofits to compare the program wattage estimates to RTF measure wattage estimates.

- If PSE were to reinstate the direct install CFL measure, DNV GL recommends adopting the Direct Install CFL General Purpose and Dimmable, 665-1439 lumens moderate and high use interior savings and measure life RTF residential lighting workbook for CFLs and LED lamps (version 3.3)[3] for this measure.

[2] http://rtf.nwcouncil.org//measures/res/ResLightingCFLandLEDLamps_v3_3.xlsm, accessed January 5th, 2015.

http://rtf.nwcouncil.org//measures/res/ResLightingCFLandLEDLamps_v3_3.xlsm, accessed January 5th, 2015.

- DNV GL recommends no changes to PSE's existing approaches to estimating showerhead measure savings and measure life.

- Based on the installation verification results, DNV GL recommends that PSE continue to use the RTF installation rate assumptions for HomePrint Assessment Program measures.

2. INTRODUCTION

An overview of the HomePrint Assessment Program and DNV GL's process and impact evaluation of the 2012-2013 program years are provided below.

2.1 Program Overview

The Puget Sound Energy (PSE) HomePrint Assessment Program provides free assessments of PSE customers' home energy use characteristics. The savings goals for the PSE HomePrint Assessment program were 4,100 MWh for 2012, and 4,080 MWh for 2013. PSE Qualified Specialists (contractors) perform the assessments in customer households to provide the customer with a better understanding of their energy consumption, possible ways to reduce consumption, and information regarding how to improve home comfort through more efficient energy use. Through 2013, the program provided up to 45 free CFLs and up to five LED lamps per household (installed by the contractor) for PSE electric customers. Upon request, contractors also left up to two low-flow showerheads with participating PSE electric or gas customers for the customers to install themselves. In 2014, the program transitioned to providing 20 LED lamps (installed by the contractor) and no longer provided CFLs. The contractors who performed the assessments are independent business owners who have completed program training through PSE.

2.2 Evaluation Overview

PSE contracted with DNV GL to conduct a process and impact evaluation of the 2012-2013 HomePrint Assessment Program involving the following three components:

- A comprehensive process evaluation
- Verification of measure installation through onsite inspection
- A review of measure savings assumptions from the Regional Technical Forum (RTF)[4] and methods used to estimate total program savings from tracking system data.

The remainder of this report presents the program evaluation approach; the program logic model; and evaluation findings. Findings are based on program staff interviews, contractor interviews, participant telephone surveys, onsite inspections; and our review of savings assumptions.

2.3 Evaluation Approach

To address the evaluation elements listed above, the DNV GL team performed a number of research and analysis tasks. Table 3 below links these tasks to the three core elements of the evaluation.

4 RTF is a regional advisory committee to develop standards to verify and evaluate conservation savings: http://rtf.nwcouncil.org/.

Table 3: Evaluation Approach – 2012-2013 HomePrint Assessment Program

Research and Analysis Task	Evaluation Element		
	Process Evaluation	Savings Review	Installation Verification
Program Staff Interviews	X		
Logic Model Development	X		
Contractor Telephone Interviews	X		
Participant Telephone Surveys	X		X
Onsite Surveys			X
Savings Review		X	

3. PROGRAM STAFF INTERVIEWS AND LOGIC MODEL

The first task of the process evaluation included in-depth interviews with PSE staff working closely with the program. The objectives of this task were to gain a deeper understanding of the characteristics and context of the program, assist PSE program staff in developing a statement of program theory and a logic model, clarify the rationale for the program design, and identify program outcomes likely to surface in the short, medium, and long terms.

In close collaboration with PSE staff, DNV GL used the program staff interview results to map the resources, activities, and outcomes of the program onto the logic model. A logic model is a planning tool that displays key program elements, summarizes outcomes and accomplishments, and explains the rationale behind program activities. Below, we present first an analysis of key findings by topic from the staff interviews, followed by the logic model.

3.1 Approach

DNV GL staff obtained contact information for four key HomePrint Assessment Program staff from PSE, including the Energy Efficiency Services (EES) Program Implementer, the Residential Energy Management Program Manager, a Senior Energy Advisor, and the EES Program Coordinator. Interviewers worked with the PSE team to identify mutually agreeable times for the interviews and all interviews were conducted by telephone during October, 2014. Appendix A provides the program staff interview guide.

3.2 Findings

The program staff interviews addressed a variety of topics including program goals, marketing and outreach, customer relationship, contractor relationship, interaction with other PSE programs, direct install measures, and areas for future research. The interviews highlighted a number of important findings about the HomePrint program. We have organized these findings into the three categories below, related to program goals, marketing and outreach, and the HomePrint program's relationship with stakeholders including other PSE departments, HomePrint program participants, and contractors.

3.2.1 Goals

As described above, the goals of the HomePrint Assessment Program are to provide:

- A free overview of participating customers' home energy use by an independent, PSE-qualified specialist
- Information on energy consumption and ways to save money on the customer's heating bill
- On-the-spot installations of up to 20 high-efficiency LED lamps, as well as up to two leave behind high-performance low-flow showerheads.

All four PSE staff interviewees shared a similar understanding of the program's goals. They valued that the program strengthened PSE's relationships with contractors and customers because it was easy to participate in and provided immediate benefits (in the form of LED lamps) to customers.

Staff interviewees observed that the program could improve the specificity of HomePrint recommendations to be tailored to individual home needs, increase attention to follow up opportunities for the customer, and recruit more contractors available to perform the assessment in certain geographic areas.

3.2.2 Marketing and Outreach

Staff interviewees reported that in the 2012-2013 program year, PSE was very active in marketing and outreach for the program, which included: web banners, PSE website, social media, cross marketing during other customer engagement and at PSE sponsored events, and supporting contractors to sell the program themselves. Interviewees stated that PSE previously provided door-to-door outreach in neighborhoods where the overall profile of the homes suggested that customers may be eligible for other PSE program rebates (such as weatherization) and then targeted them for HomePrint. Interviewees reported that PSE's customer support team (the "Energy Advisors") also advertised the HomePrint program. Energy Advisors the recommended the HomePrint program when Energy Advisors did not have sufficient information to make energy-saving recommendations over the phone.

Interviewees suggested that PSE's diverse methods of marketing and outreach created benefits as well as challenges. While there are undeniable benefits in widespread awareness of the program and continued customer interest, marketing can potentially be too successful and attract interested customers who are not qualified to participate fully in the program. For example, interviewees stated that immediate installation of lamps to replace incandescent lighting has been an attractive program benefit and was marketed at many events. Interviewees were concerned that some homeowners with CFLs attempted to participate and were dissatisfied because they did not qualify for newer lamps (because the program contractors only install LED lamps to replace incandescent lamps). Staff observed that it is important for the PSE contact or the contractor to set expectations regarding free LED lamp installations before the assessment occurs.

Two respondents were concerned that the PSE bulk email system, one method of marketing and outreach, collected customers' email addresses from multiple sources and events and may be marketing the HomePrint audit to customers who cannot participate. One respondent mentioned an example in which new homeowners would request a HomePrint audit for an address at which PSE had already conducted an audit. The same respondent mentioned other instances in which homeowners requested a second audit under the assumption that a significant change within the home (such as a remodel) qualified them for another audit. In both instances, the audits are not allowed because PSE allows only one HomePrint audit per address. Although PSE staff observed that this was a rare occurrence, it could be a significant challenge in the future as more homes have the HomePrint Assessment.

3.2.3 Program Relationship with Stakeholders

As mentioned in 3.1 previously, the program's stakeholders include program contractors, participating customers, and other PSE departments. PSE's HomePrint Assessment Program manager works closely with contractors during the contractor orientation, approval, and training, which is required for contractors to participate in the program. The Contractor Alliance Network manages the contractor approval process and orientation. The orientation allows for the program team to get to know the contractors who will be going into customer homes, and form relationships with participating contractors. The program manager and other staff, particularly the Energy Advisors, regularly talk with contractors to check in and answer questions. One interviewee also mentioned that PSE increased some quality control checks during 2014, including shadowing contractor visits and introduced a new feedback survey for homeowners to review their experiences with the program and its contractors. Two PSE staff mentioned that there was some confusion for contractors with account and referral numbers. Contractors also observed that requiring both account and referral numbers to qualify was cumbersome.

PSE staff, especially the Energy Advisors, have direct contact with homeowners through the call center. Energy Advisors conduct participant screening (including confirmation that the homeowner has not already received a HomePrint Assessment) and pass on referrals to qualified contractors. After the HomePrint Assessment, PSE has a verification protocol in place to confirm the assessment occurred. There is a phone call follow-up with a certain percentage of customers and a follow-up email reminder sent to all participants to review the report and recommendations.

All four PSE program staff spoke positively of the benefits of the HomePrint program to its stakeholders and expressed interest in ways to reach more customers. Two interviewees stated that Energy Advisors needed additional information to market the program. Those interviewees suggested scheduling time for the Energy Advisors to shadow a contractor on at least one HomePrint visit. At the time of this report, Energy Advisors have begun shadowing HomePrint Assessment contractors in the field. Job shadowing should allow the Energy Advisors to understand the HomePrint program in greater detail. All respondents also expressed interest in hearing feedback on the program from customers and contractors.

3.3 HomePrint Assessment Program Logic Model

A logic model is a framework that explains how a program works. Typically, logic models include the overarching purpose of the program, partners (stakeholders), necessary resources, activities, outcomes, and constraints. A logic model allows program staff and other stakeholders to plan for program needs and build consensus around goals. DNV GL analyzed the program staff interview results and reviewed relevant program documents as a foundation to building the first draft of the logic model. Working closely with PSE staff, DNV GL refined and developed the final HomePrint Logic Model shown below. The logic model in turn guided our development of the contractor interview guide and CATI questionnaires for program partners and participants.

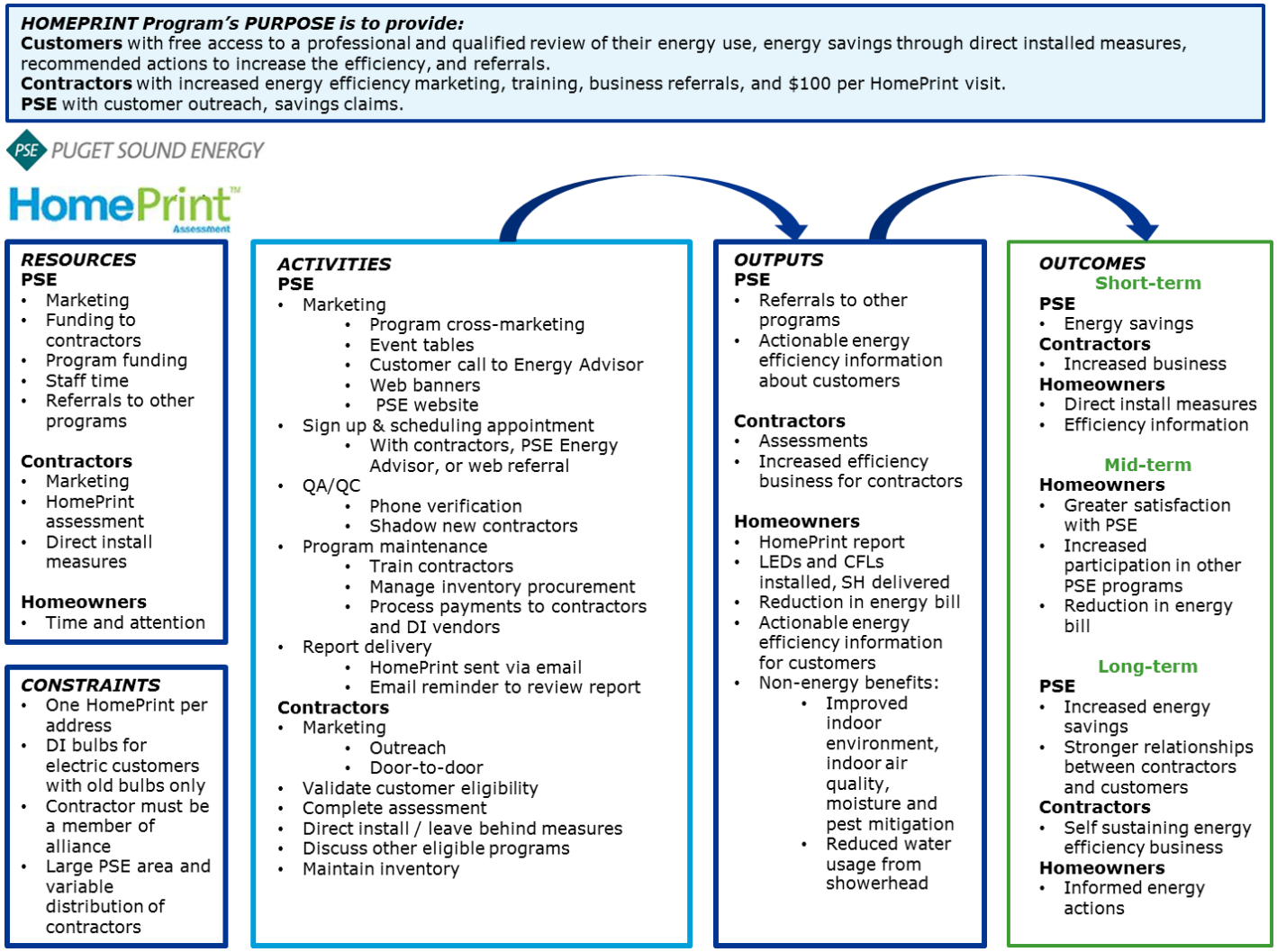

Figure 1: HomePrint Assessment Program Logic Model

4. IN-DEPTH INTERVIEWS WITH PROGRAM CONTRACTORS

The 2012-2013 HomePrint program provided a $100 instant rebate to independent, qualified contractors for each in-home energy assessment and installation of up to 45 free CFLs and five LED lamps per household and a leave-behind high efficiency showerhead.[5] The program is marketed as no cost to the homeowner. All of the contractors must be vetted and approved through Puget Sound Energy's Contractor Alliance Network to be eligible to perform HomePrint Assessments.

4.1 Approach

DNV GL staff conducted 13 interviews with HomePrint contractors to assess their experiences with the program, opportunities for refinements and/or improvements, contractor satisfaction with the program, and other topics. Table 4 provides further detail regarding the interview topics.

[5] Note that in 2014, the program transitioned to providing 20 LED lamps (installed by the contractor) and no longer provided CFLs to HomePrint Assessment Program participants.

Table 4: Topics Included in In-Depth Interviews with Program Contractors

Contractor Interview Topic
Awareness and Motivation
Motivation for participating in the program
Satisfaction
Satisfaction with program process
Program Impacts
Whether/how the program impacted perceptions of PSE
Whether the program improves/validates contractor credibility with the customer
Whether the program helps convince customers to take the next steps
Whether the program helps to broaden project scopes
Barriers
General barriers to participating in the program
Hindrances to contractor ability to provide HomePrint™ Assessments
Whether/how the program and related processes could be improved
Whether/how program communications could be improved
Program Improvement
Free ridership issues
Spill over into other PSE programs
Other topics raised by program staff, partners
Other topics raised by review of program theory and logic model

In addition to feedback from contractors active in the 2012-2013 HomePrint Assessment Program, PSE staff expressed interest in feedback from contractors who had participated in the program previously but were no longer active. PSE and DNV GL developed a stratified sample by business size (based on the number of assessments completed in 2012-2013) and current membership in the program (active or inactive participants). DNV GL consultants set targets for the number of completed interviews in each stratum and reached all of these targets as shown in Table 5. Targets were set in order to include a diverse group of contractors. In total, DNV GL staff interviewed 13 contractor representatives (including representatives of nine active and four inactive businesses). Appendix A provides the data collection instrument.

Table 5: Completed 2012-2013 HomePrint Assessment Program Contractor Interviews by Stratum, 2014

Stratum	Completed Interviews
Active Contractors	9
More than 300 completed assessments	3
100-300 completed assessments	3
Less than 100 completed assessments	3
Inactive Contractors	4
More than 100 completed assessments	3
Less than 100 completed assessments	1
Total	**13**

4.2 Findings

Below we summarize key findings from the in-depth interviews with program contractors. We have organized these findings into five categories:

1. Awareness of the program and motivations for participation
2. Satisfaction with the program
3. Perceptions of the program's benefits and challenges
4. Share of HomePrint participants who implement energy efficiency retrofits (known as the "conversion rate")
5. Barriers to contractor participation in the program.

4.2.1 Awareness and Motivation

Of the 13 contractors interviewed in 2014, six were involved in the program since its inception. Four interviewees were not presently active in the program. Of the contractors no longer participating, all cited personal reasons (health, career change, etc.), and two also cited some program issues (addressed below) as the reasons for ending participation.

Interviewers asked the interview participants to describe their companies' primary reasons for participating in the HomePrint program. As shown in Table 6, each respondent generally listed two or three reasons. The majority (11 interviewees) stated that the program aligned directly with their business values, for example: "*The service PSE provided was consistent with our mission statement.*"

Roughly one-half of the respondents stated that they joined the program in order to generate more leads for retrofit projects, e.g., "*HomePrint is getting my foot in the door for the whole program. Can either get referrals for specific estimates or HomePrint Assessment and then give recommendations. It's the opportunity to meet a customer who has concerns about efficiency or comfort.*"

Table 6: Contractor Reasons for Participating in the 2012-2013 HomePrint Assessment Program, 2014

Reason for Participating	Number of Respondents(n=13)
Energy Efficiency Values	11
Generate leads for retrofit work	6
Additional value to customers	4
Opportunity to work with PSE	2

*Total responses exceed the number of respondents because some provided multiple responses.
Interview question: What are your/your company's reasons for participating in HomePrint?

4.2.2 Satisfaction

Interviewers asked contractors to rate their satisfaction with six different components of the program as well as the overall program on a 5-point scale where 1 means "very dissatisfied" and 5 means "very satisfied" (Figure 5, below). Most contractors were satisfied with the program marketing and outreach (11 out of 13 provided ratings of 4 or 5). As one respondent observed, *"HomePrint has a great marketing and outreach campaign. Some things have worked better than others have, but they continue to get the word out. I hear it on the radio every single day."* Contractors also generally provided positive ratings for their interactions with PSE staff (roughly two-thirds provided ratings of 4 or 5). Respondents stated that PSE staff was *"wonderful, helpful as much as they can be,"* and that PSE was *"very quick to respond to concerns or questions. Often we need answers immediately so that is great."*

Roughly one-half of the respondents were satisfied with the direct-install measures and PSE referrals. Contractors stated that customers were very happy with the LED lamps, but that direct-install measures required a great deal of time and effort on their part. Seven contractors were less than satisfied with PSE referrals because of the prevalence of customers who signed up for the audit only to get free LED lamps. In the words of one contractor, *"[some] customers only want free installation."* Another said that *"there seems to be a lot of customers who want free bulbs and aren't interested in actual retrofit work."*

Contractors expressed the greatest dissatisfaction with the HomePrint software and the paperwork required by the program. Respondents recommended improvements to the software such as allowing the back button to return the user to previous pages, improving account and referral number tracking, and automatically sending a confirmation email to the contractor when the customer receives their HomePrint report to ensure that the email address is correct. Section 4 provides more specific recommendations.

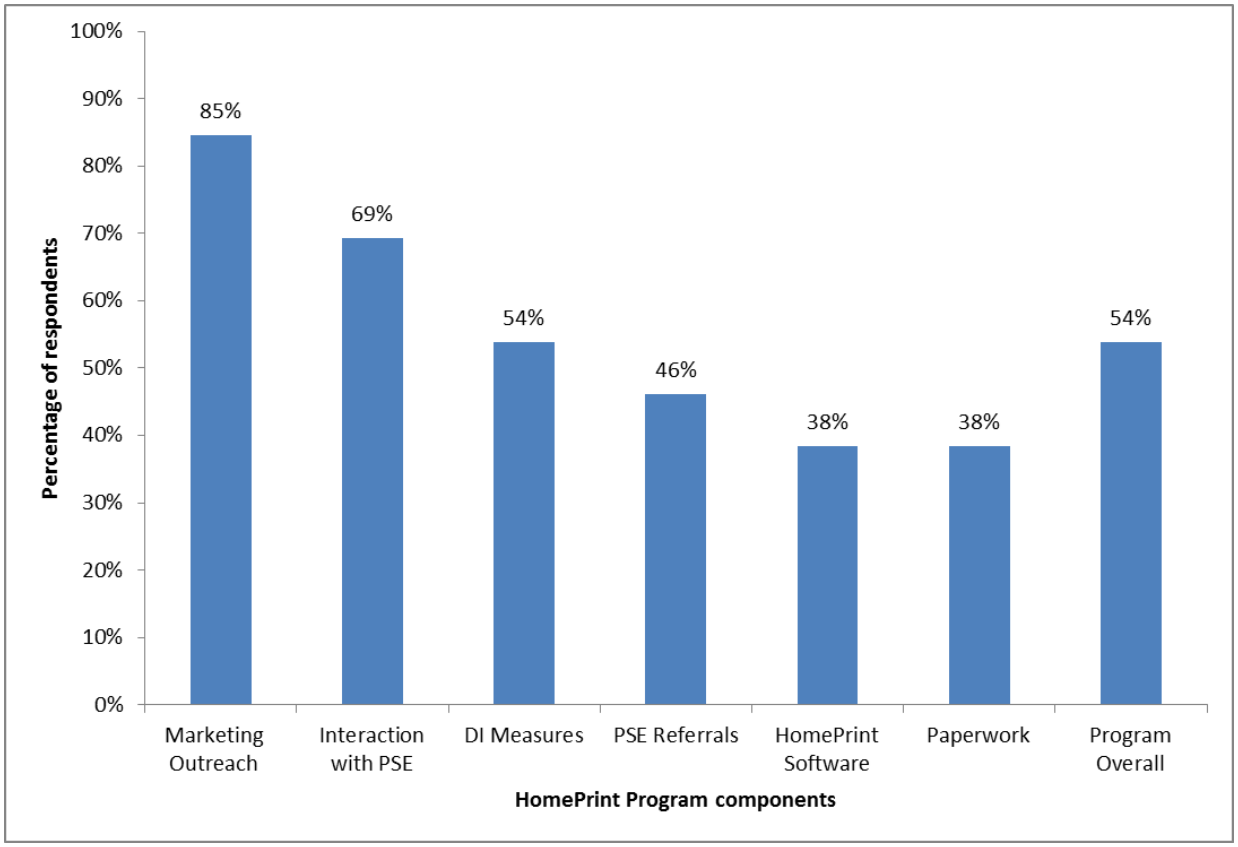

Figure 2: Contractor Satisfaction with 2012-2013 HomePrint Assessment Program Components, 2014, n=13

(Ratings of 4 or 5 on a 5-Point Scale Where 1 Means "Very Dissatisfied" and 5 Means "Very Satisfied")

Interview question: Could you rate your satisfaction with the following topics: Marketing/Outreach; PSE Referrals; DI measures; HomePrint software; Paperwork; Interaction with PSE; Program overall.

4.2.3 Program Benefits and Challenges

Interviewers asked respondents to describe the benefits and drawbacks of participating in the program in terms of influence on the contractor's business reputation. All 13 respondents stated that the program's influence was positive in this regard. Association with PSE strengthened participating businesses' brands and reputations.

The other most common specific benefit mentioned by contractors was additional business (mentioned by roughly two-thirds of respondents). In the words of one respondent, *"it helped us survive the recession, and created income for our company. New construction work was very slow during that period and the rise in retrofit work was great at the time."* Respondents also mentioned that the program aligned with their energy efficiency values and supported a close relationship with PSE.

Ten out of the total thirteen interviewees stated that there were drawbacks to their business for participating. Of those who did mention drawbacks, four stated that PSE's payment of $100 per audit

was too low. One contractor described the HomePrint challenges, *"The costs are high, and the remuneration is relatively low. Usually we are out from 8 AM to 8 PM, at least, on any given HomePrint day. That is a long day. Scheduling people is time consuming. There are many light bulbs to install, which is very time-consuming."* Though this is only one contractor's description, ten out of thirteen contractors did state that some program challenges exit. Presenting interviewees' experience in his or her own words allows program manager to gain insight into how contractors describe the program to a third party.

Contractors stated that overall PSE has done a good job of marketing the program and reaching potential customers. However, contractors suggested that PSE could consider providing mail inserts with information about HomePrint to eligible customers only, rather than blanket marketing across their service territory. Currently, PSE sends each of its customers information about the program even though certain homes may not qualify (such as manufactured homes, condominiums, and previous participants). Contractors also mentioned that low-income homes may need additional program support: *"Low income people have the worst homes because of inadequate maintenance or improvements."* DNV GL team considered this useful feedback because HomePrint is an important gateway to other PSE programs, to further develop this capability it might want to integrate more resources for lower income customers.

4.2.4 Conversion Rate

DNV GL asked respondents to identify the percentage of time they convert a HomePrint Assessment into retrofit work (known as the "conversion rate"). Six contractors provide additional retrofit services. They stated that there was a low rate of conversion, with approximately five to 10% of audit recipients requesting additional retrofits. Contractors who do offer additional retrofit and energy efficiency services stated that most of the upgrades resulting from HomePrint Assessments were insulation and air sealing.

Contractors who used the HomePrint Assessment to generate leads for energy efficiency retrofits mentioned several ways in which the assessment could improve to convince customers to take next steps. One contractor suggested that "*a robust narrative that outlines what the homeowner needs [is most important]. PSE reports are generic and do not give specifics of what the homeowner really needed."* Other contractors also suggested adding financing, increasing instant rebates. Some contractors recommended that the HomePrint Program include an automatic follow-up with customers. This could both ensure that the customers received the HomePrint report by email, and encourage customers to consider other programs.

4.2.5 Barriers

Contractors who participated in the evaluation interviews cited low compensation for the HomePrint Assessment as the most common barrier to contractor participation. As mentioned above, contractors suggested that the $100 payment from PSE was not enough to complete all the tasks involved in an assessment (including scheduling, travel, actual assessment, paperwork, and installing measures) to break even financially. One contractor mentioned that they participated in the program as a 'loss leader' to generate retrofit business, and another dropped out of the program when the payment decreased, stating: "*The end of the detailed whole house audit ended our participation. When the*

price went down the audit became simpler. Before it was $450/audit and people could make a steady living but now it has to combined with sales in order to be worthwhile."

Contractors also discussed common barriers to converting a HomePrint Assessment to retrofit work. The most common barrier according to participating contractors was project cost. Contractors mentioned the cost of doing upgrade, insufficient rebate levels, lack of customer resources to fund the project, and difficulty selling a costly project after a free service. *"Many homeowners are 'lookie-loos' in that they are more than happy to schedule the assessment because it's free but when they actually figure out the real costs; they get lost and say, 'What's that going to do to my energy bills?' Contractors don't have good tools unless they are doing a full diagnostic energy audit. Nobody knows how to convert the clipboard audits to show payback for larger projects."* Without a strong argument for savings from the retrofit, many customers do not continue with a larger retrofit project.

Six contractors stated that verifying and matching the account number and the referral number was challenging. Contractors reported that often homeowners don't realize they need to provide their account number, but the HomePrint Assessment cannot occur without a qualifying account number. One contractor stated that *"the whole responsibility is put on the contractor to validate [home] and that is a challenge. [I would prefer] if there was a clear easy way for the Energy Advisor to check 1) the address qualifies, 2) it is not a manufactured home, 3) confirm email first, before releasing the referral."*

5. PARTICIPANT TELEPHONE SURVEY

DNV GL wrote the 2012-2013 Computer-Aided Telephone Interview (CATI) survey for the 2014 process evaluation. The survey objectives were defined through close coordination between DNV GL and PSE staff, and presented in the evaluation work plan and the Evaluation Overview section of this document. Survey objectives were to evaluate: satisfaction with the program and products installed, value of the assessment, influence of the assessment on participation in other PSE programs, installation of other measures, sources of information on the program, and motivations to participate. The survey addressed these topics through sections on program awareness, participant experience with steps in the HomePrint process, satisfaction with the program, and a short demographics section. Appendix A contains the data collection instruments.

5.1 Approach

DNV GL subcontracted with Pacific Market Research (PMR) to conduct the CATI surveys of program participants. PSE provided DNV GL with a sample of customers who participated in the program during 2012 and 2013. To address specific areas of interest, DNV GL created eight strata according to the date of program participation and types of measures installed or left behind during the assessment (if any) as shown in Table. The participants were split into the eight different strata based on analysis of the distribution of measures within individual HomePrint projects and the kWh savings associated with those projects. The stratum definitions are as follows:

1. Stratum1: Projects that only received a HomePrint Assessment with no energy efficient (EE) measures – 2012

2. Stratum2: Projects that only received a HomePrint Assessment with no EE measures – 2013

3. Stratum3: Projects that received 20 or less direct install CFLs, as well as the HomePrint Assessment. No other EE measures – 2012

4. Stratum4: Projects that received 20 or less direct install CFLs, as well as the HomePrint Assessment. No other EE measures – 2013

5. Stratum5: Projects that received more than 20 direct install CFLs, as well as the HomePrint Assessment. No other EE measures – 2012

6. Stratum6: Projects that received more than 20 direct install CFLs, as well as the HomePrint Assessment. No other EE measures – 2013

7. Stratum7: Any project that included LED lamps, and no leave behind showerhead

8. Stratum8: Any project that included a leave behind showerhead.

Table 7: 2012-2013 HomePrint Assessment Program Particpant Telephone Survey Sampling Approach, 2014

Strata Definition	Number of Projects	Total kWh Savings	Percent of Projects	Percent of kWh Savings	Sample Allocation	Target Completes
1. HomePrint Assessment only, 2012	718	-	9%	0%	4%	6
2. HomePrint Assessment only, 2013	946	-	11%	0%	6%	8
3. CFL only, 20 or less, 2012	1,648	420,348	20%	11%	16%	22
4. CFL only, 20 or less, 2013	1,353	326,945	16%	9%	13%	18
5, CFL only, more than 20, 2012	1,401	1,104,391	17%	30%	24%	33
6, CFL only, more than 20, 2013	993	756,585	12%	21%	16%	23
7, LED lamps included	436	223,293	5%	6%	6%	10
8, Showerhead(s) included	752	828,847	9%	23%	16%	22
Total	**8,247**	**3,660,409**	**100%**	**100%**	**100%**	**142**

The sample allocation was calculated for each stratum based on the average of the percentage of total records associated with that stratum, and the percentage of the total savings associated with that stratum. The one exception is two additional sample points added to Strata 7 in order to achieve more completes with LED lamps.

Table also shows the disposition of all calls made to actual and potential survey participants. PMR made up to six attempts to reach each potential respondent and reached the majority of the strata targets after two weeks of calling. There was a pause in data collection to add an additional sample, which brought the total to 1,086 contacts, to complete the remaining surveys.

Table 8: 2012-2013 HomePrint Assessment Program Participant Telephone Survey Disposition, 2014

Unique Customers	Number Completed
Completed	142
Stratum 1: HomePrint Assessment only, 2012	6
Stratum 2: HomePrint Assessment only, 2013	8
Stratum 3: CFL only (20 or fewer), 2012	22
Stratum 4: CFL only, 20 or less, 2013	18
Stratum 5: CFL only, more than 20, 2012	33
Stratum 6: CFL only, more than 20, 2013	23
Stratum 7: LED lamps included	10
Stratum 8: Showerhead(s) included	22
Dialed – not reached	475
Contacted – not completed	92
Contacted – not eligible	205
Refused	172
Total	**1,086**

Of the total eligible numbers (881), PMR completed 142 interviews which resulted in a response rate of 16%, which is similar to other process evaluation response rates. PMR stopped calling on a stratum once they reached the target number completed.

5.2 Findings

The surveys highlighted a number of important findings about the HomePrint program. We organized results into three categories related to program goals: awareness, measures, and program satisfaction. Finally, we compared the responses on the demographic questions to census data from participating counties. This comparison allowed us to look at the similarities and differences between our sample of program participants and the larger population of PSE customers. All responses in this section have been expansion-weighted to the total participant population based on the sampling approach.

5.2.1 Awareness and Motivation

The HomePrint program uses marketing and outreach efforts to reach potential participants through multiple avenues. DNV GL asked participants how they first heard about the HomePrint program. The most common response was that respondents learned of the program from PSE bill inserts (31%; see

Figuer 3). Others mentioned a PSE event (14%), other marketing tools (such as lawn signs, and door-to-door visits, 14%), friend or relative (11%), and the PSE website (10%). Very few (2%) stated that they first learned about the program from contractors. Although contractors are actively involved in marketing the program, some of their effort may have been captured in other responses such as "PSE events."

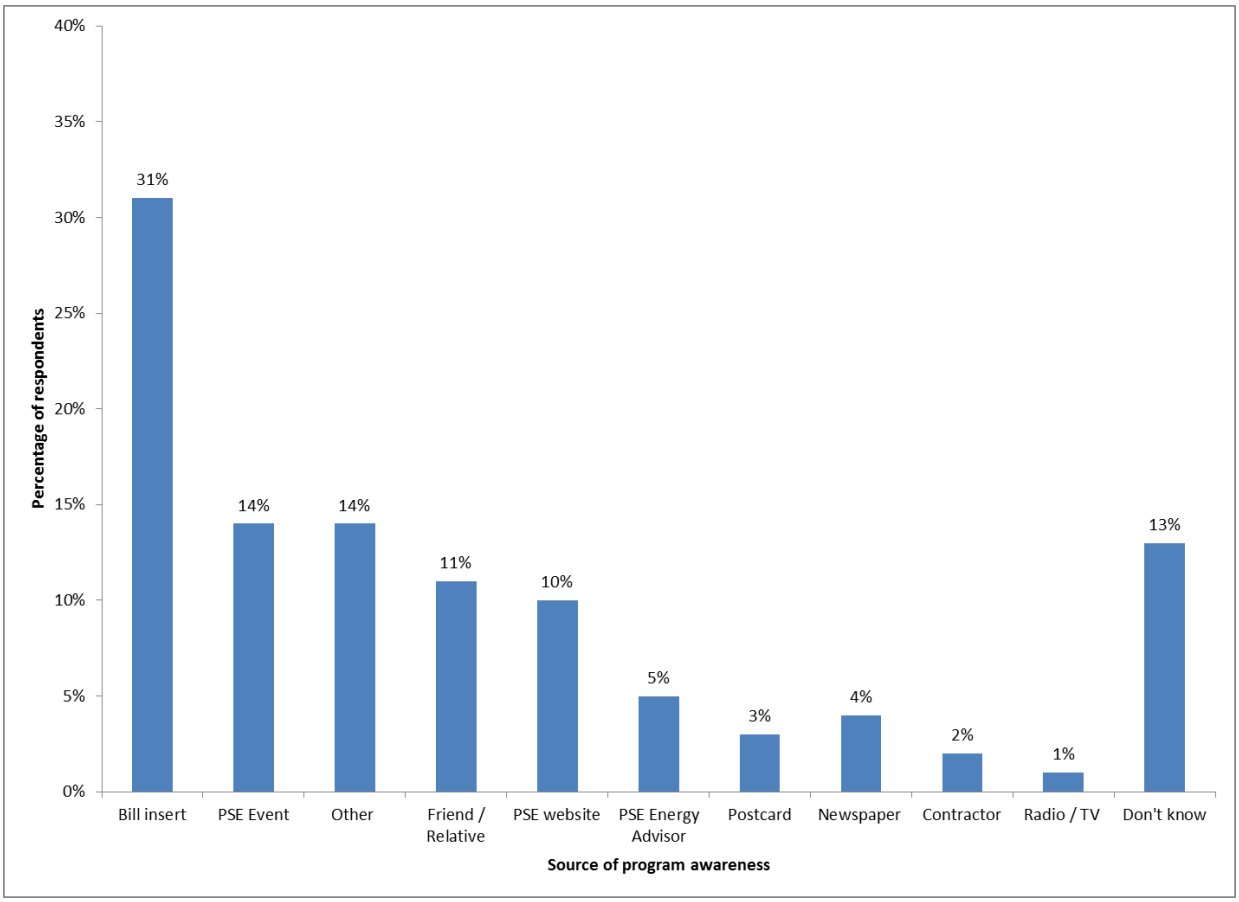

Figure 3: Source of Program Awareness Among 2012-2013 HomePrint Assessment Program Participants, 2014, n=142

Interview question R1: "How did you hear about the PSE HomePrint program?" [Multiple Answers Allowed]

Homeowners were able to make a HomePrint assessment appointment with the qualifying contractor in various ways. According to respondents, the majority (69%) made the initial appointment through a call with Energy Advisors or an event with PSE (Figure 4). Nearly one-fifth of respondents could not recall how they made their appointments for HomePrint Assessments.

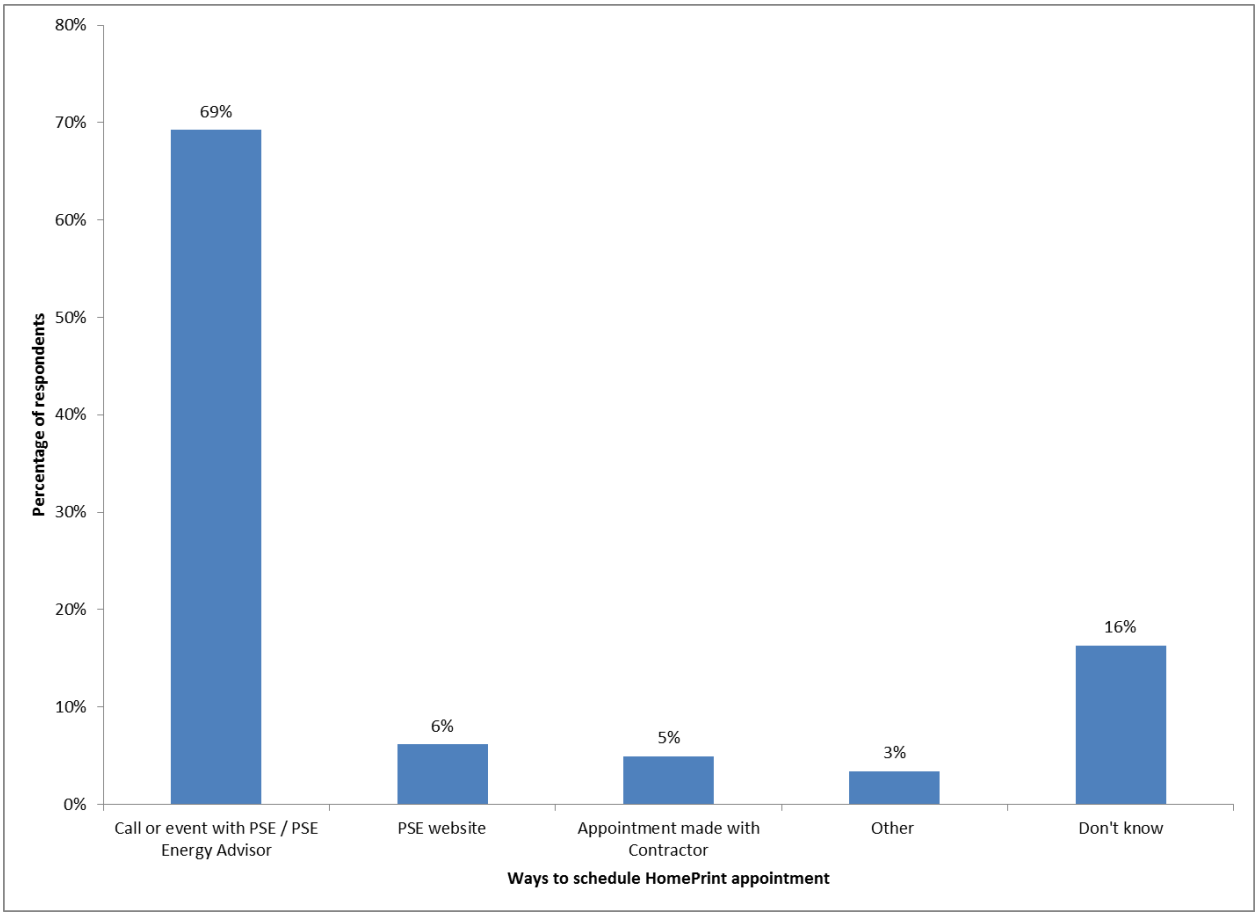

Figure 4: How 2012-2013 HomePrint Assessment Program Participants Made Their Assessement Appointments, 2014, n=442

Survey question R2. "How did you make the appointment for a HomePrint assessment at your house?"

Surveyors asked respondents to identify how they chose a contractor to perform the HomePrint Assessment. Overall, two-thirds of the respondents relied on a referral from PSE (61%; n = 142). Of these, respondents who had LED measures installed used PSE referrals at a statistically significantly higher rate (90%) than those who had CFLs only (62%), HomePrint report only (50%), or showerheads (55%).[6]

A few had prior experiences with the contractor they chose for other projects (3%), though most did not remember how they found the contractor (19%). Seventeen percent stated "Other" ways that they chose the contractor, including an internet search and word of mouth.

[6] Differences in results are statistically significant at the 95 percent level of confidence throughout.

Reason for Participating

Interviewers asked 2012-2013 HomePrint Assessment participants to describe their main reasons for participating in the program. The distribution of reasons is shown in Figure 5. The most common reason cited was energy efficiency (44%). Respondents also often mentioned saving money and saving energy as reasons for participation (39% and 23%, respectively). Twelve percent mentioned comfort and roughly 10% mentioned "Other" factors (including curiosity, education, as a requirement for solar panels, and wanting a HomePrint lawn sign, 11%).

Respondents who had a college or graduate education (56% and 52% respectively) were more likely than respondents with high school education (17%) to mention energy efficiency as a main reason to conduct a HomePrint assessment. This difference was statistically significant.

2012-2013 participants who received the showerheads or CFLs-only cited money significantly more often than other participants did (45% and 47% respectively). Participants who received assessment only or assessment/LEDs-only mentioned saving money less often (14% and 10% respectively).

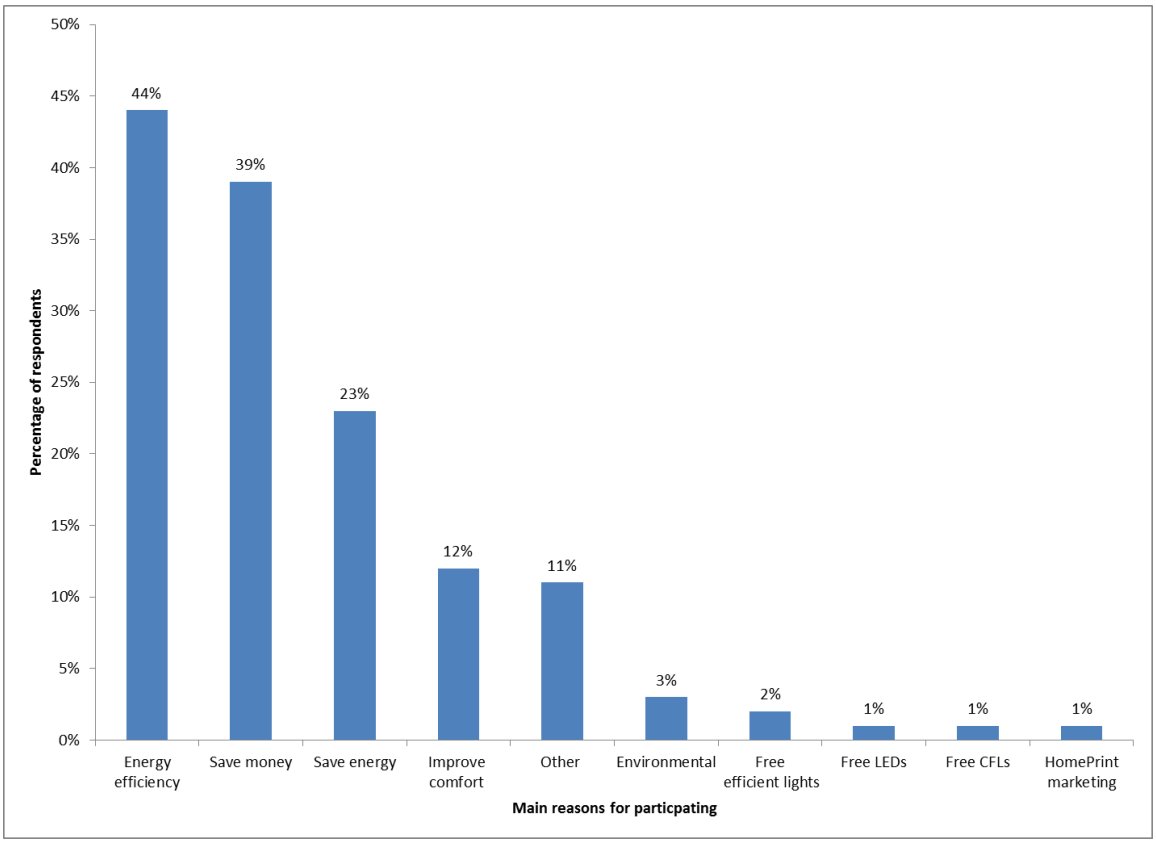

Figure 5: Main Reasons for Participation Among 2012-2013 HomePrint Assessment Program Participants, 2014, n=142

Survey question R4: "What were your main reasons for signing up for a HomePrint Assessment?" [Multiple Answers Allowed]

Interviewers asked 2012-2013 program participants to describe what they expected to receive when they signed up for the program (Figure 6). The majority stated that they expected to receive recommendations on ways to make their home more energy efficient (90%). Almost one-half (42%) stated that they had expected to receive information on other PSE programs. Over one-third stated that they expected to receive free CFLS (39%), while fewer stated that they expected to received free LEDS (21%) and free high performance showerheads (15%).

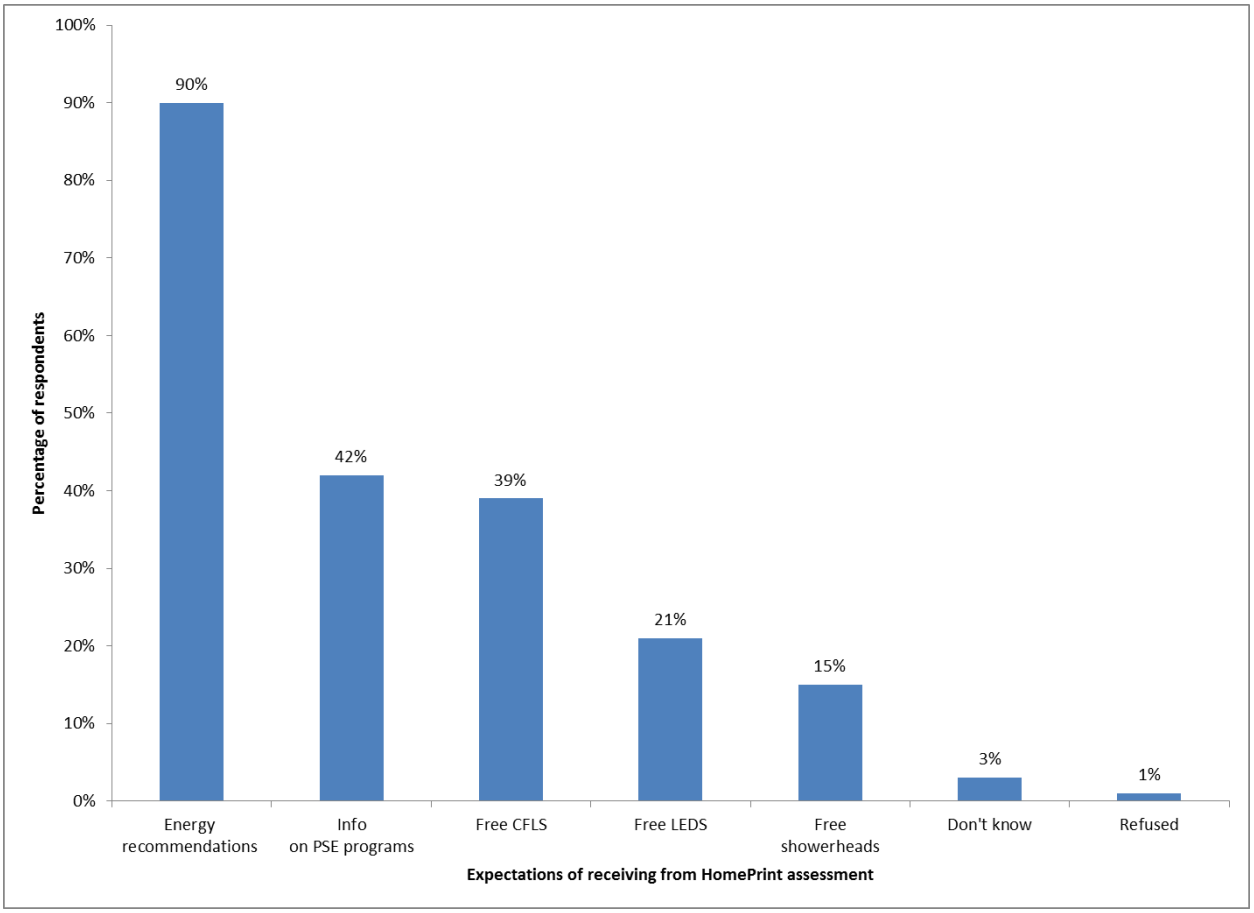

Figure 6: Expected Products and Services Upon Registration for the Program Among 2012-2013 HomePrint Assessment Program Participants, 2014, n=142

Survey question R5: "When you signed up for the program, what did you expect to receive following your HomePrint Assessment?" [Multiple Answers Allowed]

5.2.2 Measures

Interviewers asked respondents whether the HomePrint contractor reviewed the assessment report with them during the home visit. Almost two-thirds of the respondents remembered that the contractor reviewed the HomePrint report with them during the home visit (63%). The majority of the

remaining one-third stated that either the contractor did not review the report (19%) or that they did not remember (18%).

Interviewers also asked all respondents whether the contractor reviewed any additional recommendations during the HomePrint Assessment visit. Almost two-thirds of respondents stated that the contractor provided additional recommendations for energy saving actions during the visit (64%). Twenty-two percent of respondents stated that the contractor did not review additional recommendations and 13% did not remember.

CFL Measures

The respondent sample records included data on whether the respondent received direct install CFLs and LED lamps, and leave behind high performance showerheads. Interviewers confirmed with the respondent that they had received the measure (e.g., "According to our records, you received some CFLs during your HomePrint Assessment, did the contractor install any CFL bulbs?").

Of the 2012-2013 HomePrint program participants who reported having received CFL through the program (n=100), most reported that they were very satisfied (Figure 7). Respondents indicated their satisfaction using a five-point scale where 5 meant "very satisfied" and 1 meant "not at all satisfied, " and 77% indicated that they were satisfied or very satisfied with the direct install CFLs (ratings of 4 or 5).

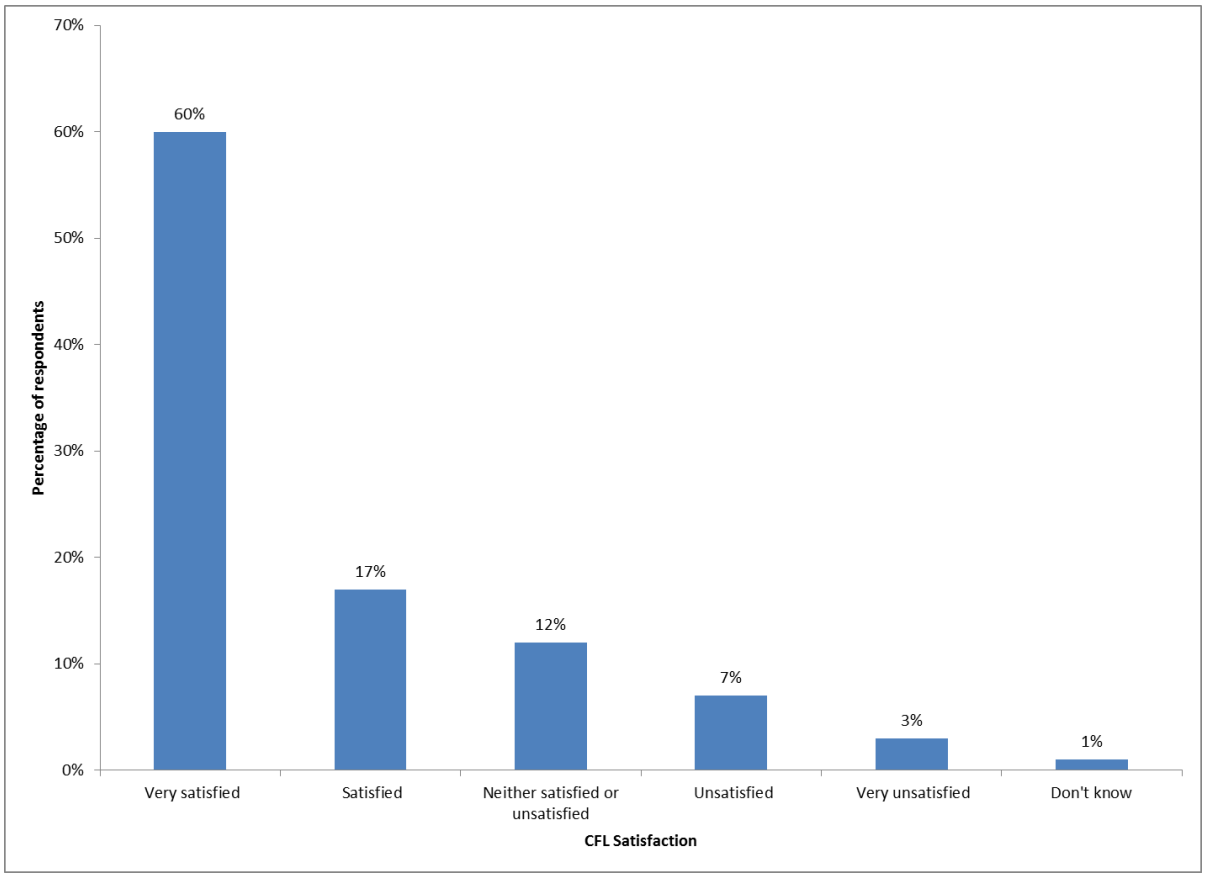

Figure 7: Percent of Respondents Satisfied with CFLs Among 2012-2013 HomePrint Assessment Program Participants Who Received CFLs, 2014 (n=75)

(Ratings of 4 or 5 on a 5-Point Scale Where 1 Means "Very Dissatisfied" and 5 Means "Very Satisfied")

Survey question M7: "On a scale of 1 to 5, with 5 being very satisfied and 1 being very unsatisfied, how satisfied were you with the installed CFLs?"

LED Lamps

The survey asked respondents whether they had LED lamps installed as part of the HomePrint visit. Of the 142 survey respondents, 10 received LED lamps according to the sample data. Only six respondents recalled that there were LED bulbs installed and all were still installed at the time of the survey. All respondents who received LED lamps stated that they were very satisfied with them (ratings of 5 on a scale of 1 to 5 as described above).

High Performance Showerheads

The survey asked respondents whether they received high performance showerhead as a leave behind measure as part of the HomePrint visit. According to sample data, 22 received the leave behind

measure. Of those, 17 respondents stated that they recalled receiving high performance showerheads. Eleven stated that they did install the showerheads. Of the 11 who did receive and then installed showerheads, three removed them by the time of the survey. Two of these three respondents stated that their reason for removing the high efficiency showerheads was low water pressure, and the third said it was because of low water flow.

Of the 11 respondents who recalled receiving high efficiency showerheads, approximately two-thirds were satisfied or very satisfied (nine respondents provided a rating of 4 or 5 on the 1 to 5 scale described above). Two of the three respondents who installed and then removed the showerheads gave them a rating of 5. Additionally, two respondents who did still have the shower head installed gave it a rating of 1. As these results indicate, satisfaction does not always lead to measure retention, or vice versa.**HomePrint Report**

The survey asked respondents whether they received a HomePrint report after the in-home visit. One-half of the respondents stated that they received a HomePrint report (50%), while twenty percent stated that they did not receive a report and thirty percent did not remember. Of those respondents who did remember receiving a HomePrint report (n=71), forty-eight percent said that they made additional energy efficiency improvements and forty-seven percent stated that they did not. None of the respondents stated that they participated in other PSE programs.

The survey asked respondents who stated that they made energy efficient improvements to describe the improvements they made (n=30). The most common energy efficiency improvement was adding insulation (54%), while some respondents upgraded space heating or upgraded windows (19% and 14%, respectively). Thirty percent of respondents who recalled receiving the HomePrint report and reported making energy efficiency improvements, also mentioned other energy efficiency actions such as buying an electric car, sealing the home envelope, and buying additional energy efficient bulbs.

5.2.3 Program Satisfaction

Interviewers asked survey respondents to rate their satisfaction with the program using a five-point scale where 5 meant "very satisfied" and 1 meant "not at all satisfied." Overall, respondents rated the program components highly (Figure 8). The majority was satisfied or very satisfied (ratings of 4 or 5) with the appointment scheduling process and the contractor (92% and 90%, respectively). Eighty-four percent were satisfied with the in-home assessment.

Interviewers also asked respondents to rate the report on clarity, usefulness, and meeting expectations. Respondents were slightly less satisfied with the usefulness of the report and its ability to meet their expectations (only 71% provided ratings of 4 or 5 in each case). These results suggest a need for program improvements in these areas.

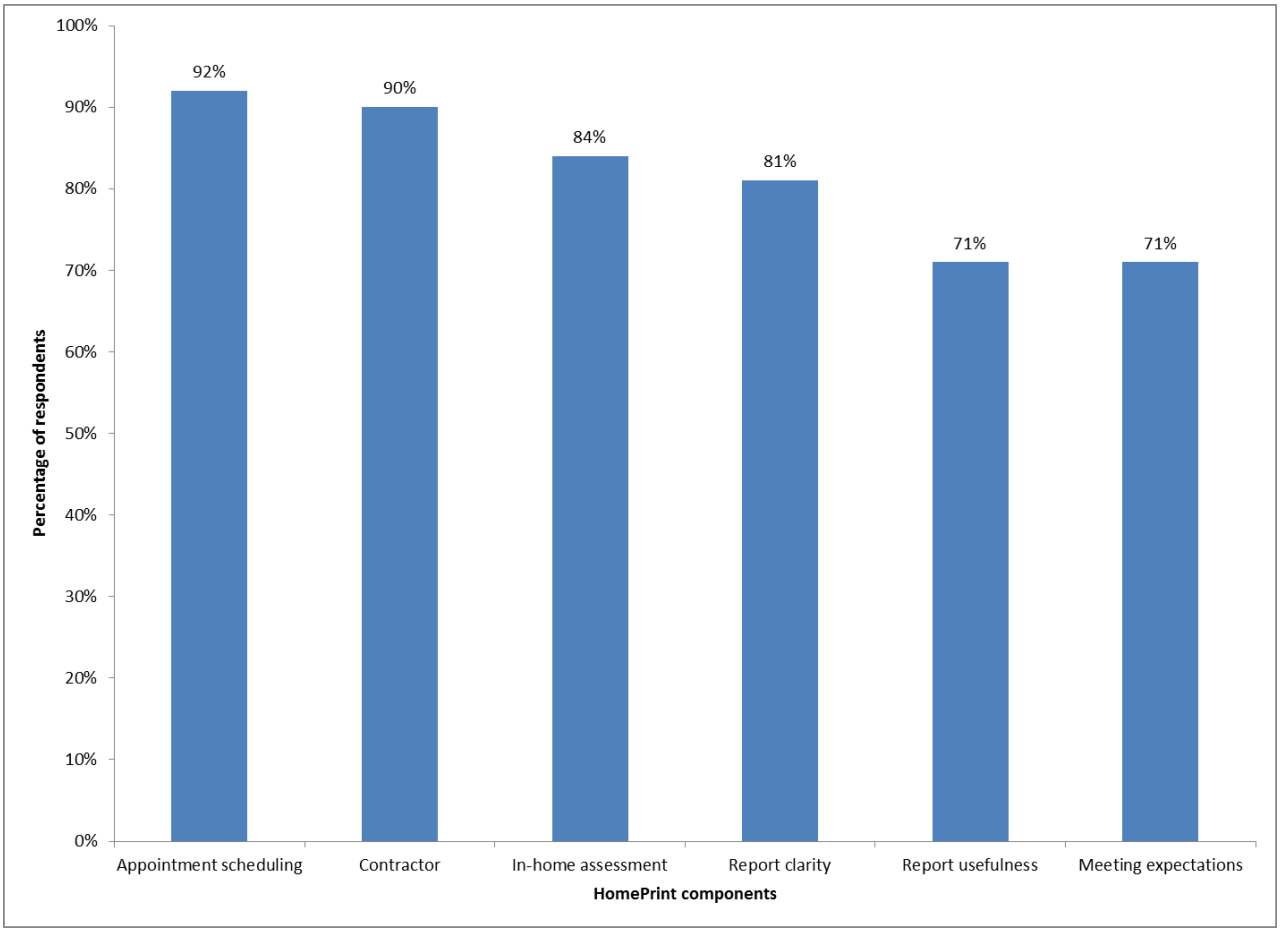

Figure 8: Percentage of Respondents Satisfied with Program Elements Among 2012-2013 HomePrint Assessment Program Participants, 2014 (n = 142)

(Ratings of 4 or 5 on a 5-Point Scale Where 1 Means "Very Dissatisfied" and 5 Means "Very Satisfied")

Survey questions include S0 "how satisfied were you with the" S1: "Appointment scheduling process?" S2: "Contractor who performed the HomePrint assessment?" S3. "Onsite HomePrint assessment experience?" S4. "How clear was information in the HomePrint?" S5. "How useful was the information in the HomePrint report?" S6 "How successful was the HomePrint Assessment Program at meeting your expectations?"

Interviewers asked respondents if participation in the program changed their views of PSE. Approximately 25% percent of respondents stated that the PSE HomePrint Assessment Program had in some way changed their views of PSE. Of those respondents who stated that the HomePrint program changed their views of PSE (n=38), nearly all stated that the program improved their views of PSE (98%). The last remaining 2 percent did not know the impact of the program on their views of PSE.

5.2.4 Demographics

In the last section of the HomePrint Assessment Program survey, interviewers asked the respondents to provide some limited demographic information. As with all items in this survey, none of the questions required answers (i.e., respondents could refuse to answer questions at any time). DNV GL collected this information to compare survey respondents with already existing census data on PSE's service territory.[7] This comparison allowed us to look at the similarities and differences between our sample of program participants and the larger population of PSE customers. For the purposes of this comparison, we included data from the four counties in which PSE's electric service provides complete coverage: Kitsap, Skagit, Thurston, and Whatcom counties. We did not include data from counties only partially served by PSE (including Island, King, Kittitas, and Pierce counties).

Interviewers asked program participant survey respondents to provide their level of education. Over one-half (54%) of the respondents reported that they had a college degree (bachelors or graduate school). This is significantly higher percentage than the census respondents, with 30% reporting a higher education. See Figure 9 below for more information.

[7] http://www.census.gov/easystats/, accessed March 6th, 2015.

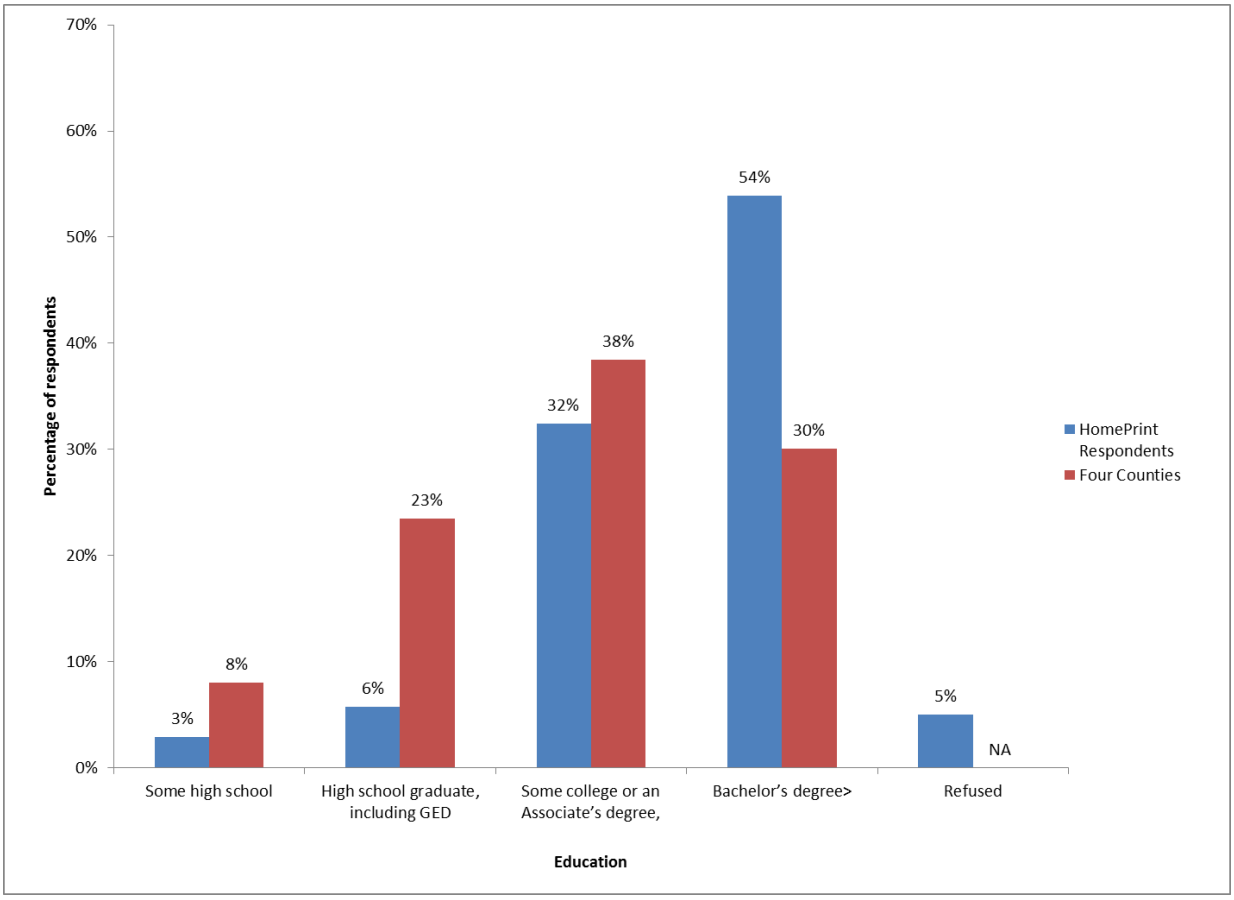

Figure 9: 2012-2013 HomePrint Participant Telephone Survey Respondent Education Compared to Four-County Census Data, 2014 HomePrint Participant Survey and 2013 Census Data

HomePrint survey n =142; Census data n= 556,824 (Kitsap, Skagit, Thurston, and Whatcom counties).
Survey question D5: "For statistical purposes only, what is the highest level of education you have obtained?"

Interviewers asked program participant telephone survey respondents to provide their total annual 2014 household income before taxes. The interviewer read a list of income categories and asked respondents to note the category that best describes their income. Interviewers assured respondents that the information was confidential and only used for characterizing study participants. As with all demographic questions, respondents were able to refuse to answer, and 20% did so. The majority of survey participants responded to this question (80%).

The four counties had a greater percentage of respondents with reported incomes in the highest income bracket compared to participant telephone survey respondents (30% versus 21%). Only 21% of the HomePrint respondents reported household income of $100,000 or more. See Figure 10 below for more information.

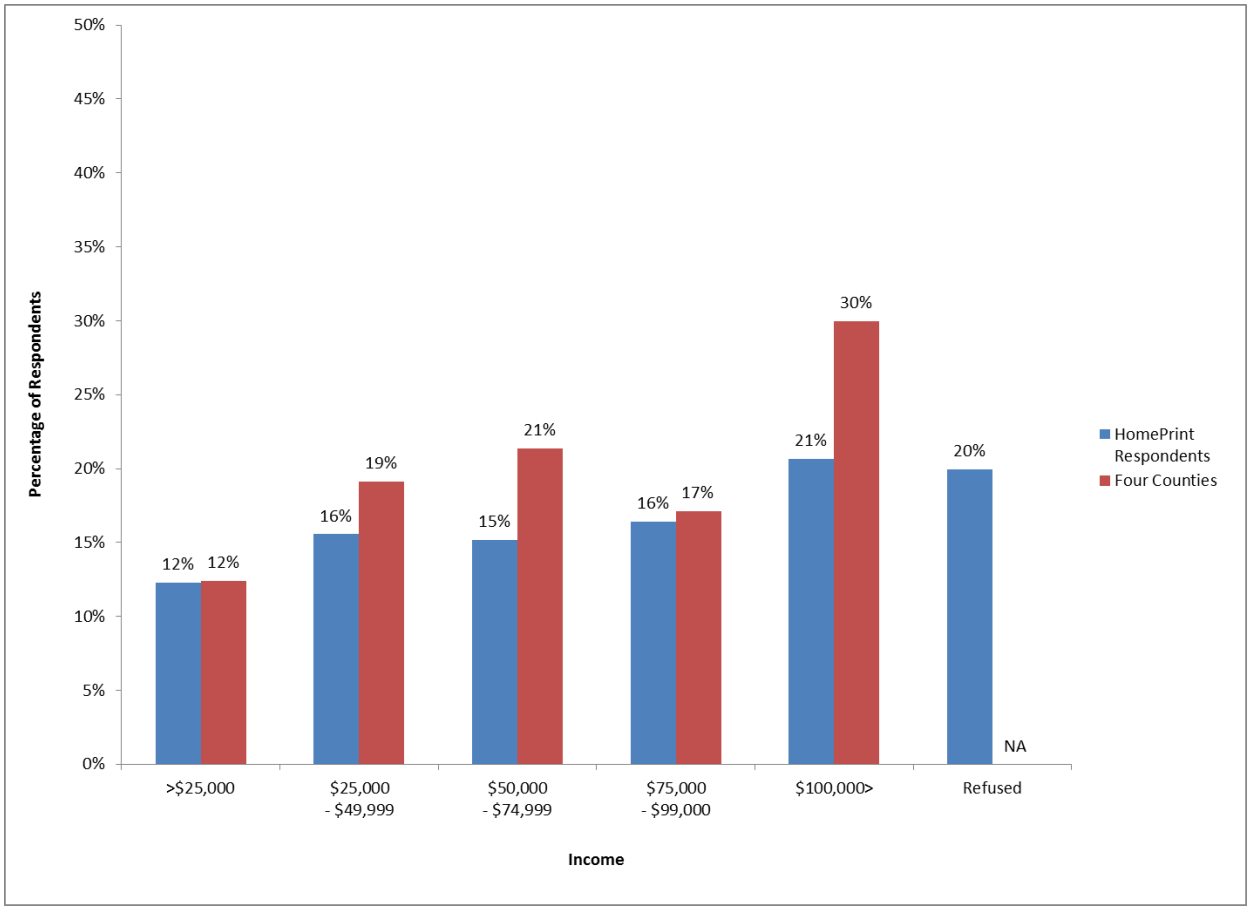

Figure 10: 2012-2013 HomePrint Participant Telephone Survey Respondent Income Compared to Four-County Census Data, 2014 HomePrint Participant Survey and 2013 Census Data

HomePrint survey n =142; Census data n= 556,824 (Kitsap, Skagit, Thurston, and Whatcom counties).

Survey question D7: "For statistical purposes only, I'd like to know your household's total 2014 annual income before taxes. Please stop me when I reach the category that best describes your household's income."

6. INSTALLATION VERIFICATION

The principal objective for this task was to estimate the installation rate for measures installed through the HomePrint Assessment Program.

6.1 Approach

At the end of each participant telephone survey, interviewers invited survey respondents to participate in follow-up onsite visits to verify the installation of measures provided by the program. Each participant was offered a $100 gift card to allow the field staff to visit their home and inventory the measures installed. Table 9 shows the number of completed onsite visits using the same stratification approach as described previously for the consumer telephone survey. No onsite visits were scheduled for participants in strata 1 or 2 because these customers did not receive any energy efficiency measures through the program. During the onsite visit, field staff asked each participant to verify the information provided over the phone, and recorded information on all installed CFLs, LED lamps, and low-flow showerheads in the home.

Table 9: Number of Completed 2012-2013 HomePrint Assessment Program Onsite Visits by Strata, 2014

Strata Definition	Number of Projects	Completed Participant Telephone Surveys	Completed Onsite Visits
1. HomePrint Assessment only, 2012	718	6	0
2. HomePrint Assessment only, 2013	946	8	0
3. CFL only, 20 or less, 2012	1,648	22	9
4. CFL only, 20 or less, 2013	1,353	18	7
5. CFL only, more than 20, 2012	1,401	33	13
6. CFL only, more than 20, 2013	993	23	9
7. LED lamps included	436	10	3
8. Showerheads included	752	22	9
Total	**8,247**	**142**	**50**

6.2 Findings

The program tracking data does not include model number or installation location for program-provided measures, thus it is impossible to verify with absolute certainty that the program provided a given measure installed in the customer's home. Due to this constraint, the installation verification task attempted to verify measure installations three different ways:

1. Total CFLs, LED lamps, and low-flow showerheads installed in the home;

2. Self-reported confirmation of a program measure by the program participant (for CFLs, LED lamps, and low-flow showerheads); and

3. For CFLs and LED lamps only, comparison of the quantity, technology, form factor, and wattage combinations for measures installed to measures provided to the home according to the program tracking data.

For step one in the verification process, we examined measures at the technology level only. Specifically, for CFLs and LED lamps, form factor and wattage of each lamp was not recorded. In step two, program participants identified the lamps and showerheads that the program provided (to the best of their recollections). In the third stage of the verification process, we investigated lamps more carefully and examined combinations of technology, form factor, and wattage to identify whether each installed CFL or LED lamp was of a form factor and wattage available through the program. We describe these approaches and their outcomes in more detail next. All responses in this section have been weighted using expansion weights to the total participant population based on the sampling approach.

6.2.1 Total Measures Currently Installed

The first level of verification involved a simple comparison of the number of program measures included in the tracking data with the total number of similar measures of the same technology installed in the home. For program participants who received direct-install CFLs and/or LED lamps, we made no attempt to identify whether the program provided the lamps, or whether the lamps were of form factors and wattages provided by the program. This information is gathered in later stages of the verification process and described in section 6.2.3.

According to the tracking data, of the 50 homes that had onsite verification visits, there was an average of 23.5 direct install CFLs in 45 homes, 3.9 LED lamps in four homes, and 1.9 low-flow shower heads in eight homes (Table 10). In the homes that received direct-install CFLs and LED lamps, field staff found an average of 28.1 CFLs and 5.4 LED lamps. These results suggest that program participants who received direct-install CFLs and LED lamps through the program have continued to adopt energy-efficient lamps after participation, or that participants already had energy efficient lighting installed before the HomePrint assessment. In the eight homes that received low-flow showerheads through the program, onsite verification found an average of 1.1 installed showerheads of the average 1.9 that were provided through the program. Thus for showerheads, results suggest that some program participants either do not ever install the showerheads left behind by program contractors, or install and later remove one or more of them.

Table 10: Comparison of Measures Provided Through the 2012-2013 HomePrint Assessment Program to Total Installed Measures, 2014

Program Measures	Number of Homes in Sample That Received Measure Through Program	Average Number of Measures Provided Through Program (per Tracking Data)	Average Number of Total Measures Installed in Home	Percent of Total Installed Measures to Program-Provided Measures[8]
Direct-Install CFLs	45	23.5	28.1	141%
Direct-Install LED Lamps	4	3.9	5.4	177%
Low Flow Showerheads	8	1.9	1.1	61%

6.2.2 Self-Reported Program Measures

For the second level of installation verification, participants were asked to identify all installed measures that the program provided. Field staff labeled all lamp measures that the participant identified as program-provided measures regardless if the lamps were of the form factor and wattage combinations available through the program. Table 11 shows the results of the self-reported quantities of program measures installed at the time of the onsite visits.

Table 11: Comparison of Measures Provided Through the 2012-2013 HomePrint Assessment Program to Self-Reported Program Measures, 2014

Program Measures	Number of Homes in Sample That Received Measure Through Program	Average Number of Measures Provided Through Program (per Tracking Data)	Average Number of Self-Reported Program Measures Installed in Home	Average Self-Reported Installation Verification Rate[9]
Direct Install CFLs	45	23.5	19.2	67%
Direct Install LED Lamps	4	3.9	2.4	45%
Low Flow Showerheads	8	1.9	0.5	7%

For the 45 onsite visits where the program provided direct-install CFLs, participants identified an average of 19.2 installed program CFLs, yielding an average installation verification rate for direct-install CFLs of 67%. Participants at the four sites that received direct-install LED lamps though the program identified an average of 2.4 installed program LED lamps, for an average installation

[8] The "Percent of Total Installed Measures to Program Provided Measures" does not represent the ratio of the numbers in the first two columns of this table. The total number of installed measures is compared to the number of program provided measures for each individual site, and this represents the average of those percentages.

[9] The "Average Self-Reported Installation Verification Rate" does not represent the ratio of the numbers in the first two columns of this table. The total number of installed self-reported program measures is compared to the number of program provided measures for each individual site, and this represents the average of those percentages.

verification of 50%. At the eight sites that received leave-behind showerheads, only one participant identified an installed showerhead as provided by the program. This results in an average self-report installation verification of only 7% for showerheads.

6.2.3 Detailed Comparison of Installed Measures to Program-Provided Measures in the Tracking Data

The final level of verification involved a closer examination of lamp form factors and wattages. Recall that for the first verification step, field researchers simply compared the total quantity of lamps installed in participant households for each technology (CFLs and LEDs) with the total quantity of each technology listed in the tracking data. For the final verification step, we further compared the quantity of installed lamps for each combination of technology, form factor, and wattage installed in participants' households with the technology, form factor, and wattage combinations for lamps provided by the program.

During 2012-2013, the program provided five different CFL measures to participants: 23 W twist, 14 W twist, 14 W A-lamp, 9 W globe, and a 14 W reflector (R30). The remaining measures provided to participants were an 11 W LED reflector (BR30) and LED A-lamp (no specified wattage) and up to two low-flow showerheads. For each participant, we compared the quantities of each technology/form factor/wattage combination listed in the program tracking data to the technology/form factor/wattage combination for lamps installed at the site. For example, if the program tracking data indicated that a site received 10 23-W twist CFLs and eight 9 W CFL globes through the program, we flagged all installed 23 W twist CFLs and 9 W CFL globes as program-provided measures.

The quantity of installed lamps flagged as possible program-provided lamps were compared with the program tracking data as shown in Table 12.

Table 12: Comparison of Lighting Measures Provided Through the 2012-2013 HomePrint Assessment Program to Measures Installed in Participant Households, 2014

Program Measures	Number of Homes in Sample That Received Measure Through Program	Average Number of Measures Provided Through Program (per Tracking Data)	Average Number of Measures Installed in Home	Average Tracking Data Verified Program Installation Verification Rate[10]
Direct Install CFLs	45	25.2	18.2	70%
Direct Install LED Lamps	4	3.9	3.9	127%

[10] The "Average Tracking Data Verified Program Installation Verification Rate" does not represent the ratio of the numbers in the first two columns of this table. The total number of installed tracking data verified program measures is compared to the number of HomePrint provided measures for each individual site, and this represents the average of those percentages.

At the 45 sites at which the program contractors installed CFLs, an average of 18.2 CFLs were flagged as program measures. The average installation verification rate for direct install CFLs was 70%, slightly greater than the self-reported average of 67% in Table 11. At two of the four sites that had program-provided direct-install LED lamps, there were greater quantities of installed LED lamps than reflected in the tracking data. This resulted in an installation rate of 127% for LED measures. This could be due to errors in the tracking data, but is more likely because customers installed LED lamps in addition to those received through the program.

7. SAVINGS REVIEW

7.1 Approach

The objective of the savings review was twofold: first, to review the assumptions and algorithms PSE uses to develop unit energy savings (UES) estimates for each measure installed through the program; and second, to ensure that these assumptions and algorithms are consistent with methods used by RTF and reflect the results of recent evaluations where relevant.

DNV GL staff reviewed the measure savings calculations for the three measure groups included in the program. We provide the results of these assessments below.

7.2 Results

Below, we provide the results of our measure savings reviews for LED lamps, CFLs, and low-flow showerheads in existing single-family homes.

7.2.1 LED Lamps

Review of unit energy savings

For LED lamps, PSE calculates UES using assumptions from the RTF measure for a residential LED A-lamp replacing an existing incandescent lamp. PSE utilized the LED A-Lamp deemed value of 32 kWh savings for all LED measure, using the following equation to produce the savings value:

$$kWh\ savings = \frac{(Wattage_{Baseline} - Wattage_{Measure}) \times \left(\frac{Hours}{Day} \times 365\ \frac{Days}{year}\right) \times (1 + IF_{HVAC}) \times (1 - Removal\ Rate)}{1000 \frac{W}{kW}}$$

Table 13 shows the key assumptions included in the calculation.

Table 13: Calculation Assumptions for Residential LED Lamps

Variable	Value	Source
Baseline Wattage	66.8	KEMA Inc., "*California Residential Lighting Metering Study - Preliminary Results*," February 2009.
Measure Wattage	10.0	Based on the GE® PAR30 LED downlight.
Hours per Day	1.9	KEMA, Inc. "*Final Evaluation Report: Upstream Lighting Program,*" prepared for the CPUC, February 2010.
HVAC Interaction Factor	-15.4%	From RTF Standard CFL analysis.[11]
Removal Factor	4.0%	RTF assumption.

Recommendations

DNV GL recommends adopting the UES values from the most recent RTF Lighting–LED measure workbook v.3.3,[12] which replaces the current equivalent wattage approach with lumen range categories, provides a more robust estimate of LED lamp wattage, and incorporates the US Energy Independence and Security Act (EISA) lighting standards into the baseline wattage assumption. The savings equation in version 3.3 of the RTF savings workbook also incorporates slightly modified HVAC interaction and removal rate factors, as illustrated in following the equation:

$$kWh\ savings = \frac{(Wattage_{Baseline} - Wattage_{Measure}) \times \left(\frac{Hours}{Day} \times 365\ \frac{Days}{year}\right) \times IF_{HVAC} \times Removal\ Rate}{1000 \frac{W}{kW}}$$

For direct install LED lamps included in the program, DNV GL recommends that PSE adopt direct-install LED, general purpose and dimmable, 665-1439 lumens, moderate and high-use savings and measure life values from the RTF residential lighting workbook. Table 14 shows the key calculation assumptions for this measure.

[11] Sourced from the RTF 6th power plan load profile: RTF 2009, Load Profile Data - EStarLighting_ExistingFY09v1_1.xlsx

[12] Sunset date for this measure is June 30, 2015.

Table 14: Calculation Assumptions for Direct-Install LED, General Purpose and Dimmable Lamps, 665-1439 Lumens, Moderate and High-Use Interior

Variable	Value	Source
Baseline Wattage	44.0	Ecotope Inc., *"Residential Building Stock Assessment: Metering Study,"* prepared for the Northwest Energy Efficiency Alliance (NEEA), April 2014.
Measure Wattage	11.6	Pacific Northwest National Laboratory (PNNL), "*SSL Pricing and Efficacy Trend Analysis for Utility Program Planning,"* prepared for Office of Energy Efficiency and Renewable Energy, U.S. Department of Energy, October 2013.
Hours per Day	1.8	Ecotope Inc., *"Residential Building Stock Assessment: Metering Study,"* prepared for NEEA, April 2014.
HVAC Interaction Factor	86.0%	From 'Summary of Residential Units' tab in PNWResSectorSupplyCurveUnits_6th_Fnl.xls downloaded from http://www.nwcouncil.org/energy/powerplan/6/supplycurves/default.htm on August 11, 2010.
Removal Rate	2.0% (1-98.0%)	KEMA, Inc., *"ENERGY STAR Consumer Products Program - Market Progress Evaluation Report*," prepared for NEEA, July 2007.

Using these assumptions, RTF calculated an annual savings of 18 kWh for LED lamps.

We recommend that PSE begin collecting data on the post-retrofit wattage of direct install LED measures to provide a comparison of the program wattage to RTF measure wattage estimate for corroboration or refinement of future estimates of the LED lamp measure savings.

We also recommend replacing the current 30-year LED lamp measure life with the RTF measure life of 12 years to account for "unknown long-term removal practices of users," and for the naturally occurring market adoption that will take place over the life of the measure.

7.2.2 CFLs

Next we summarize PSE's approach to estimating UES for CFLs and our recommendations for modifying the current approach.

Review of unit energy savings

For CFLs, PSE relies upon assumptions from the RTF CFL measure version 2.0[13] for residential direct install of ENERGY STAR® CFL measures, using a weighted average for all locations. The deemed

[13] http://rtf.nwcouncil.org//measures/res/archive/ResCFLLighting_v2_0.xlsm, accessed January 5, 2015.

annual savings for this CFL measure is 23 kWh per lamp. The following equation yields this savings value:

$$kWh\ savings = \frac{(Wattage_{Baseline} - Wattage_{Measure}) \times \left(\frac{Hours}{Day} \times 365.25\ \frac{Days}{year}\right) \times (1 - IF_{HVAC}) \times (1 - Removal\ Rate)}{1000\ \frac{W}{kW}}$$

Table 15 shows key calculation assumptions.

Table 15: Calculation Assumptions for Residential CFLs

Variable	Value	Source
Baseline Wattage	57.8	KEMA, Inc. "*Final Evaluation Report: Upstream Lighting Program,*" prepared for the California Public Utility Commission (CPUC), February 2010.
Measure Wattage	17.2	KEMA, Inc. "*Final Evaluation Report: Upstream Lighting Program,*" prepared for the CPUC, February 2010.
Hours per Day	1.9	KEMA, Inc. "*Final Evaluation Report: Upstream Lighting Program,*" prepared for the CPUC, February 2010.
HVAC Interaction factor	13.6%	From 'Summary of Residential Units' tab in PNWResSectorSupplyCurveUnits_6th_Fnl.xls downloaded from http://www.nwcouncil.org/energy/powerplan/6/supplycurves/default.htm on August 11, 2010.
Removal Rate Factor	4.0%	From June 2, 2009 RTF meeting.

Recommendations

While PSE is not currently providing CFL measures through the HomePrint Assessment Program, DNV GL recommends that PSE adopt the most recent RTF Lighting–CFL measure workbook v.3.3[14] should this measure be offered in the future. Version 3.3 of the workbook replaces the current equivalent wattage approach with lumen range categories and incorporates the EISA lighting standards into the baseline wattage assumption. The savings equation in version 3.3 of the RTF savings workbook also

[14] http://rtf.nwcouncil.org//measures/res/ResLightingCFLandLEDLamps_v3_3.xlsm, accessed January 5, 2015.

incorporates slightly modified HVAC interaction and removal rate factors, as illustrated in following the equation:

$$kWh\ savings = \frac{(Wattage_{Baseline} - Wattage_{Measure}) \times \left(\frac{Hours}{Day} \times 365\ \frac{Days}{year}\right) \times IF_{HVAC} \times Removal\ Rate}{1000\ \frac{W}{kW}}$$

If PSE were to continue to offer this measure, DNV GL recommends using the direct-install CFL, general purpose and dimmable, 665-1439 lumens, moderate and high-use interior savings and measure life values from the RTF residential lighting workbook. Table 16 shows the key calculation assumptions for this measure.

Table 16: Calculation Assumptions for Direct-Install CFL, General Purpose and Dimmable, 665-1439 Lumens, Moderate and High-Use Interior

Variable	Value	Source
Baseline Wattage	44.0	Ecotope Inc., *"Residential Building Stock Assessment: Metering Study,"* prepared for NEEA, April 2014.
Measure Wattage	13.6	*Simple Steps, Smart Savings program data and Energy Star QPL.*
Hours per Day	1.8	Ecotope Inc., *"Residential Building Stock Assessment: Metering Study,"* prepared for NEEA, April 2014.
HVAC Interaction factor	86.0%	Pulled from 'Summary of Residential Units' tab in PNWResSectorSupplyCurveUnits_6th_Fnl.xls downloaded from http://www.nwcouncil.org/energy/powerplan/6/supplycurves/default.htm on August 11, 2010.
Removal Rate Factor	2.0% (1-98.0%)	KEMA, Inc., *"ENERGY STAR Consumer Products Program - Market Progress Evaluation Report*," prepared for NEEA, July 2007.

Using these assumptions, RTF calculated an annual savings of 17 kWh for this CFL application.

DNV GL also recommends replacing the current 5-year CFL measure life with the RTF measure life of 6 years, which was calculated using the hours-per-day value and the average ENERGY STAR rating for CFLs, adjusted for *in situ* conditions.[15]

7.2.3 Showerheads

Below we summarize PSE's approach to estimating UES for low-flow showerheads. We recommend no modifications to PSE's current approach.

Review of unit energy savings

For the leave-behind showerhead measure, PSE adopted savings from the RTF showerhead measure version 2.1[16] for residential mail-by-request delivery of 1.50 gallons per minute (GPM) showerheads for any shower. The deemed annual savings for this measure is 260 kWh per showerhead. The following series of equations produced this savings value:

$$\frac{Water\ Consumption}{Shower\ Head\ \cdot Year} = \left(\frac{Avg\ Minutes}{Shower} \times \frac{Daily\ Showers}{Person} \times \frac{People}{Shower\ Head} \times \frac{Occupied\ Days}{Year}\right) \times Shower\ Fow\ Rate\ (GPM)$$

$$\frac{Direct\ kWh\ Consumption}{Shower\ Head\ \cdot Year} = \eta_{WH} \times \Delta T_{WH} \times \%Hot\ Water \times \frac{Water\ Consumption}{Shower\ Head\ \cdot Year} \times Uptake\ Rate$$

$$\frac{Indirect\ kWh\ Consumption}{Shower\ Head\ \cdot Year} = Energy\ Intensity_{Water\ Treatment} \times \frac{\frac{Water\ Consumption}{Shower\ Head\ \cdot Year}}{1000\ gallons} \times Uptake\ Rate$$

$$\frac{Total\ kWh\ Consumption}{Shower\ Head\ \cdot Year} = \frac{Direct\ kWh\ Consumption}{Shower\ Head\ \cdot Year} + \frac{Indirect\ kWh\ Consumption}{Shower\ Head\ \cdot Year}$$

$$Annual\ Energy\ Savings = \frac{Total\ kWh\ Consumption}{Shower\ Head\ \cdot Year}_{Baseline} - \frac{Total\ kWh\ Consumption}{Shower\ Head\ \cdot Year}_{Retrofit}$$

Table 17 shows the key assumptions included in these calculations.

[15] *Welcome to the Dark Side: The Effect of Switching on CFL Measure Life*. Corina Jump, Itron, Inc., James J. Hirsch, James J. Hirsch and Associates, Jane Peters and Dulane Moran, Research Into Action, Inc., 2008 ACEEE Summer Study.

[16] http://rtf.nwcouncil.org//measures/res/ResShowerheads_v2_1.xlsm, accessed January 7, 2015. Sunset date for this measure is June 30, 2015.

Table 17: Calculation Assumptions for Residential Showerhead

Variable	Value	Source
Average Minutes per Shower	7.84	Peter W. Mayer, William B. DeOreo, David M. Lewis of Aquacraft, Inc., "*Seattle Home Water Conservation Study. The Impacts of High Efficiency Plumbing Fixture Retrofits in Single-Family Homes*," submitted to Seattle Public Utilities and the U.S. EPA., December 2000.
Daily Showers per Person	0.46	Research Innovations, "*Survey Research for the Home Water Savers Program: Phase I Report*," prepared for Seattle City Lights, April 1993.
People per Shower Head	2.51	Peter W. Mayer, William B. DeOreo, David M. Lewis of Aquacraft, Inc., "*Seattle Home Water Conservation Study. The Impacts of High Efficiency Plumbing Fixture Retrofits in Single-Family Homes*," submitted to Seattle Public Utilities and the U.S. EPA., December 2000.
Occupied Days per Year	350	RTF assumption.
Baseline Shower Flow Rate (GPM)	2.2	SBW Consulting, "*Single Family 2007 Showerhead Kit Impact Evaluation,*" prepared for Seattle City Light. October 2008.
Retrofit Shower Flow Rate (GPM)	1.35	SBW Consulting, "*Single Family 2007 Showerhead Kit Impact Evaluation,*" prepared for Seattle City Light. October 2008.
% Hot Water, Baseline	73.1%	2.5 and 2.0 GPM hot water percentages from: U.S. EPA., "*Water and Energy Savings from High Efficiency Fixtures and Appliances in Single Family Homes,*" 2005.
% Hot Water, Retrofit	78%	1.75 and 1.5 GPM hot water percentages follow the linear relationship between in situ flow rate and hot water percentage from the 2.5 and 2.0 GPM data points
ΔT Water Heater (°F)	75	RTF decision (as cited in an RTF meeting presentation dated February 2, 2010) based on SBW Consulting, Inc., "Energy Efficient Showerhead and Faucet Aerator Metering Study - Single Family Residences," December 1994.
Water Heater Efficiency, Electric (kWh/ gallon · °F)	0.00249	SBW Consulting, Inc., "*Energy Efficient Showerhead and Faucet Aerator Metering Study* - Single Family Residences," December 1994.
Uptake Rate	76%	PSE, "*Low Flow Showerhead Survey Results,*" 2008.

Energy Intensity, Water Treatment (kWh/ 1000 gallons)	5.3	Burton Engineering, "*Water and Wastewater Industries: Characteristics and Energy Management Opportunities,*" Electric Power Research Institute Report, 1996

Recommendations

PSE uses the most up-to-date version of the RTF showerhead measure workbook. We find the calculation assumptions and savings value reasonable and thus recommend no changes to the existing approach to estimating the UES associated with this measure.

8. FINDINGS AND RECOMMENDATIONS

This section includes findings and recommendations for both the process and impact evaluations.

8.1 Process Evaluation

Below we summarize the findings and recommendations from the process evaluation.

8.1.1 Summary of Findings

The process evaluation included program staff interviews, logic model development, contractor interviews, and HomePrint Program participant telephone surveys. Our analysis of the various data sources yielded the following process evaluation findings:

- Program staff had similar and accurate understanding of the program's goals. Staff reported that the program strengthened PSE's relationships with participating contractors and customers. Energy Advisors were interested in learning more program specific information in order to better market the HomePrint Program to customers.

- The program's marketing and outreach efforts were diverse and widespread, and were the mechanism by which most participants first learned about the HomePrint program. Participant telephone survey results suggested that traditional marketing efforts such as bill inserts are successful in reaching potential participants.

- A telephone discussion with PSE Energy Advisors or participation in PSE events were the most common ways to make the initial HomePrint Assessment Program appointments, followed by the PSE website. These avenues provided useful contact points to leverage going forward.

- PSE program staff reported in the interviews that they were interested in feedback from HomePrint Assessment Program participants and contractors.

- Program staff suggested that the program had room for improvement in several areas, including better tailoring program recommendations to individual participants; identifying follow-up opportunities for participants; tailoring marketing and outreach efforts to target only eligible individuals to participate in the program; and improving access to program-qualified contractors throughout PSE's service territory.

- Contractors reported that the HomePrint Program matched their business mission and values. They also appreciated working with PSE and providing their customers added benefits through the HomePrint assessment. Contractors reported that they were satisfied with the program marketing and outreach, and interaction with PSE.

- Contractors suggested that the program has room for improvement in several areas, including

    - Requirements for account and referral numbers were at times difficult to negotiate. PSE program staff mentioned this concern and some contractors were frustrated with

the difficulty in accessing the correct identification in order to ensure customers qualify.

  - There was confusion among participating customers regarding the direct install LED lamps. In some cases, participants who had CFLs installed in their homes expected that the program would replace these lamps with LED lamps, and were disappointed to learn that program contractors install LED lamps only to replace incandescent lamps.

  - Contractors were less than satisfied with PSE referrals, HomePrint software, and the paperwork involved in the program. Contractors were not hesitant in offering suggestions for improvements that would match their needs; please see the following section for further detail.

- Participants were motivated to participate in the HomePrint Program by energy efficiency; more than 40 percent of participants cited this as their primary motivation (44%). A significantly greater share of program participants with higher levels of education cited energy efficiency as their motivation for participant than did customers with a high school education or less. A similar share of all participants cited "saving money" as their reason for participating (39%).

- Generally, participants in the HomePrint Assessment Program during 2012 and 2013 had reasonable and accurate expectations of what they would receive upon signing up for the program – nine out of ten expected to receive recommendations to make their home more energy-efficient (90%) – but far fewer expected to receive free lamps or showerheads through the program (less than 40% expected to receive CFLs, roughly 20% expected to receive LED lamps, and only 15% expected to receive free low-flow showerheads). This may, in part, be a result of program changes since LEDs were not always offered during these program years.

- In general, HomePrint program participants tended to have a higher level of education than the general population in PSE service territory, but also tend to have slightly lower income levels.

- Overall participants were very pleased with the direct install measures and the program components.

- One quarter of respondents stated that the PSE HomePrint Assessment Program had in some way changed their views of PSE. Of those respondents who stated that the HomePrint program changed their views of PSE (n=38), nearly all stated that the program improved their views of PSE (98%).

8.1.2 Recommendations

Based on these findings and DNV GL's overall assessment of the program, we offer the following recommendations:

- **Improve communication and coordination across PSE programs.** These improvements would enable increased promotion of HomePrint Assessments. Staff interviewees recommended that Energy Advisors would benefit from a detailed understanding of program benefits and requirements.

- **Ensure that evaluation results are disseminated among PSE program staff.** Program staff expressed interest in hearing feedback about the program from participating customers and contractors. The evaluation results are a good source of such feedback. PSE may also want to consider sharing relevant portions of the evaluation findings with Energy Advisors in its customer call center. DNV GL understands that additional methods are underway.

- **Streamline account and referral number tracking.** Interviewees, both PSE staff and contractor, expressed concern about balancing the account number and the referral number. They recommended:

    - Create an automatically generated reminder for the customer to have account number ready

    - Use account number only instead of a separate referral number

    - Pre-validate account number before the assessment occurs

- **Set expectations for future retrofit project costs and payback.** Three contractors stated that if PSE staff were to discuss deeper retrofits with HomePrint participants prior to the assessments, contractors might have greater success in converting HomePrint assessments into participation in broader retrofit projects. PSE could include information such as:

    - Data on average costs and payback

    - Improved awareness of educational messages about energy efficiency projects, house-as-a-system, safety, and comfort

- **Upgrade the online HomePrint Assessment online tool.** Contractors suggested enabling an option to allow users to go back one page in the application. This would make the form much easier to use. Two contractors also recommended adding a pre-assessment questionnaire to collect background information from the homeowner and streamline the assessment process.

- **Improve program information regarding direct install measures.** Only a small percentage of participants expected to receive free CFLs, LED lamps, and/or low-flow showerheads through the program, and some participants were disappointed when program contractors were unable upgrade their CFLs to LED lamps because of program restrictions. PSE should consider clarifying the availability of the free lamps in program marketing materials and set appropriate expectations regarding eligibility for LED lamps.

- **Improve program recommendations and follow-up.** Program staff in particular suggested that PSE could better tailor program recommendations that pay greater attention to follow-up opportunities for the customer.

- **Improve access to contractors across PSE's service territory.** Program staff noted a lack of program-qualified contractors available to perform the assessment in certain geographic areas within PSE's service territory.

- **Tailor program marketing.** PSE should consider various program targeting efforts, including:

    - Continue to target homes that have not previously participated in the HomePrint Assessment program.

    - Consider a split offering, such as direct install lamps for renters and insulation for homeowners, to reach rental properties.

    - Provide additional support to target low income homes. This was recommended by contractors and it is DNV GL's perspective that it might be a useful area of growth for the HomePrint Program.

    - Establish a streamlined procedure to avoid outreach to ineligible customers.

- **Consider additional research with LED lamp recipients.** Because of the HomePrint program's shift away from direct install CFLs and toward LED lamps in 2014, DNV GL suggests that PSE consider additional research with HomePrint program participants who receive LED lamps through the program. (In this study, the sample size for LED lamp recipients was small [n=10]). This would enable PSE to see the impact of LED installation on the HomePrint program.

- **Consider additional research regarding customer satisfaction with the HomePrint Assessment Report.** Participants were slightly less satisfied with the report's usefulness than with other elements of the program, and some suggested that the report did not meet their expectations. PSE may want to consider additional research with participating customers to obtain more nuanced feedback on the report content and specific areas for improvement.

8.2 Impact Evaluation

Below we summarize the findings and recommendations from the impact evaluation, including the savings review and measure installation verification.

8.2.1 Savings Review Findings

Table 18 summarizes the findings from our review of UES and measure life assumptions for the measures included in the 2012-2012 HomePrint Assessment Program.

Table 18: Summary of Rreview of 2012-2013 PSE HomePrint Program UES and Measure Life Assumptions

Measure	UES (kWh/year)		Measure Life (years)	
	HomePrint Program	Savings Review	HomePrint Program	Savings Review
Direct Install LED Lamps	32	18	30	12
Direct Install CFLs	23	17	5	6
Leave-Behind Low-Flow Showerheads	260	260	10	10

8.2.2 Savings Review Recommendations

As a result of the review, DNV GL recommends that PSE implement the following changes to its savings and measure life assumptions:

- Adopt the Direct Install LED General Purpose and Dimmable, 665-1439 lumens moderate and high use interior savings and measure life from the Regional Technical Forum (RTF) residential lighting workbook for CFLs and LED lamps (version 3.3)[17] for the direct install LED lamp measure.
- To corroborate or refine future estimates of LED lamp measure savings, utilize wattage data from the direct install LED lamp retrofits to compare the program wattage estimates to RTF measure wattage estimates.
- If PSE were to reinstate the direct install CFL measure, DNV GL recommends adopting the Direct Install CFL General Purpose and Dimmable, 665-1439 lumens moderate and high use interior savings and measure life RTF residential lighting workbook for CFLs and LED lamps (version 3.3)[18] for this measure.
- DNV GL recommends no changes to PSE's existing approaches to estimating showerhead measure savings and measure life.

[17] http://rtf.nwcouncil.org//measures/res/ResLightingCFLandLEDLamps_v3_3.xlsm, accessed January 5th, 2015.

http://rtf.nwcouncil.org//measures/res/ResLightingCFLandLEDLamps_v3_3.xlsm, accessed January 5th, 2015.

8.2.3 Installation Verification Findings

summarizes the findings from the installation verification task. Detailed findings include the following:

- For homes that were provided with direct install CFLs and LED lamps, we found that on average more CFLs and LED lamps were installed than the quantities that were provided to them; participants had 41 percent more CFLs installed and 77 percent more LED lamps installed than the number of lamps the program had provided.
- For direct install CFLs, both the number of program measures the participant could identify and the number that could be verified by matching to the tracking data were very similar at just under 70 percent.
- For the most part, 2012-2013 HomePrint Assessment Program participants did not identify the installed low-flow showerheads in their home as being provided to them by the program, with only a 7 percent self-reported verification rate. When we compared the quantity of installed showerheads with quantities in the program tracking data, a substantially higher verification rate resulted (69%).
- Participants who received direct install LED lamps had more LED lamps of the same form factor and wattage installed in their homes at the time of the onsite verification visits.

Table 19: Summary of Results of Installation Verification for the 2012-2013 HomePrint Assessment Program, 2014

Program Measures	Percent of Total Installed Measures to Program-Provided Measures	Average Self-Reported Installation Verification Rate	Average Tracking Data Verified Program Installation Verification Rate
Direct Install CFLs	141%	67%	70%
Direct Install LEDs	177%	45%	127%
Low-Flow Showerheads	61%	7%	-

8.2.4 Installation Verification Recommendations

Based on the installation verification results, we recommend that PSE continue to use the RTF installation rate assumptions for HomePrint Assessment Program measures.

9. APPENDIX A – DATA COLLECTION INSTRUMENTS

9.1 Program Staff Interview Guide

9.1.1 Overarching topics

- What is the primary goal of the PSE HomePrint Assessment Program?
- What are the secondary goals of the programs?
- What works especially well with this program overall?
- What, if anything, most needs to be improved?

9.1.2 Marketing and outreach

- What is your primary marketing approach to informing customers about the PSE HomePrint Assessment Program?
- What benefits of the HomePrint program to you highlight to customers?
- What other marketing methods have you tried?
- What worked, and what didn't work?
- Do you target specific customers?
    - Renters?
    - Hard-to-reach or low-income customers?

9.1.3 Customer relationship

- What are all the steps that a typical customer goes through?
    - How do customers qualify to participate in the program?
    - How are follow-up visits handled?
- Is there a customer feedback loop with contractors?

9.1.4 Contractor relationship

- What are all the steps that a typical contractor goes through?
    - How do Contractors qualify to participate in the program?

    - Can Contractors recruit participants?
    - How do contractors acquire the direct install and leave behind measures?
- What QA/QC does the program include?
    - Training?
    - Are there ways to check on individual contractor performance?
- How are payments processed?
- How long do payments to contractors typically take?

9.1.5 Relationships with other PSE programs

- Does HomePrint coordinate with other PSE EE programs?
- How are referrals to other programs tracked?
- Do contractors have marketing material from other programs?

9.1.6 Intervention/Measures

- How did you choose the direct install CFLs you use in the program?
- How did you choose the direct install LEDs you use in the program?
- Have you considered any other direct install measures?
- What methods did you use for determining LED savings assumptions?
- Why did you choose SH as the leave behind measure?
- Beyond referrals, what is the goal of the HomePrint report? How do you record HomePrint use in any way?
- How do you verify that the customer reads the HomePrint report

9.1.7 Future research

- Can you talk about what you would most like to know from Contractors?
- Can you talk about what you would most like to know from participants?
- For PSE IDIs, who else should we talk to?

Thank you so much for your time!

9.2 Contractor Interview Guide

9.2.1 Background

- What is your primary business focus?
- How long have you participated in the program?
- [If no longer active] Why are you no longer participating in the program?
- What are your/your company's reasons for participating in HomePrint?

9.2.2 Satisfaction

- Could you rate your satisfaction with the following topics:

	Very Dissatisfied 1	Dissatisfied	Satisfied	Very Satisfied 5	Neutral / N/A
Marketing/Outreach					
PSE Referrals					
DI measures					
HomePrint software					
Paperwork					
Interaction with PSE					
Program overall					

- [For extreme responses] Why? Anything else to add?
- What benefits, if any, do you get for participating?
- What are the drawbacks, if any, to your business for participating?

9.2.3 Impact

- What sort of marketing and outreach does your company do to promote/sell HomePrint?
- How well does the program target eligible homes?
    - What market segments are not targeted well enough?
    - What can be done to increase participation in those market segments?
- Approximately what percentage of the time do you convert a HomePrint Assessment into retrofit work?
    - What is most successful marketing tactic to convert the assessment to additional work?

- What kind of retrofit work most often comes out of preforming a HomePrint Assessment?

- What about the HomePrint Assessment helps convince customers to take next steps?
- In your opinion, what influence, if any, does the HomePrint program have on your business reputation?

9.2.4 Barriers

- What, if anything, has prevented your greater participation in HomePrint?
- What could be improved to help businesses like yours provide HomePrint Assessments?
- What are some of the barriers to converting a HomePrint into retrofit work?

9.2.5 Other - Program Improvement

- What is the most important value of HomePrint to customers?
    - How are you selling that value?
- What are ways that PSE can best prepare a customer to provide necessary info (such as referral number/account number prior to HomePrint Assessment?

9.3 Participant CATI Survey Instrument

PSE HomePrint
Residential CATI Survey

Survey house instructions

1. Text in **bold** should be read.
2. Text in brackets [ ] are instructions for interviewer, minor programming such as skips, or answer choices and should NOT be read.
3. Text in carrots < > are database variables that should be filled in on a case-by-case basis.
4. Text in gray boxes is major programming instruction.
5. **Unless specifically noted, do NOT read answer choices.** [Don't know] and [Refused] should NEVER be read. For those questions that have answers choices read aloud, randomized answer choices.

Programming Notes

Code multiple response questions as a series of variables that have a 0 or 1 value. Mark one variable for each answer option, unless there is an instruction to MARK ALL THAT APPLY.

Database variables

Variable	Definition (Unless otherwise noted, the database can contain more than one of each variable per respondent)
name_first	Contact first name
name_last	contact last name
Address	Address provided by contact at event
Gas_Electric_Both	G = gas customer E = electric customer B = gas and electric customer NA = not customer blank = unknown status (no mailing address provided)
CFL	Number of CFLs customer received
LED	Number of LEDs customer received
SH	Number of showerheads customer received

SCREENER

DIALSCR1 **Hello, my name is _____, and I am calling on behalf of Puget Sound Energy. Can I please speak with** <name_first> <name_last>**?**

I am calling to talk to you about your participation in the HomePrint energy assessment program. Do you recall participating in Puget Sound Energy's HomePrint Assessment Program?

1	Yes	S1
2	No	DIALSCR2
3	Not available right now	DIALSCR2
-98	Don't know	T&T
-99	Refused	T&T

DIALSCR2 **May I speak to someone who is knowledgeable about the HomePrint assessment?**

1	Yes	CELL1
2	No	T&T
3	Not available right now	SCHEDULE CALL BACK
-98	Don't know	T&T
-99	Refused	T&T

[If asked about sales call: **I'm not selling anything; I'd just like to ask your opinions. Your responses will be kept confidential and your individual responses will not be revealed to anyone.**]

[If asked where caller is from**: I'm calling from Pacific Market Research, an independent research firm that the Puget Sound Energy hired to conduct this survey.]**

[If asked who provided their number: **We're calling customers who participated in Puget Sound Energy's HomePrint Assessment Program**]

[If asked who is sponsoring this study: **We are conducting this study on behalf of Puget Sound Energy to help them improve their energy-efficiency programs.**]

[If asked why you are conducting this study: **Studies like this help Puget Sound Energy better understand their customers' need for and interest in energy programs and services.**]

[If asked about survey length: **This call should take about 10 minutes of your time.**]

[If respondent wants PSE confirmation: **If you would like to talk with someone from the Puget Sound Energy about this study, please call Jim Anderson, PSE's Efficiency Evaluation Manager, at (425)462-3529.**]

CELL1 First, I need to ask a few questions before we can get started on the survey, have you received this call on a wireless phone or on a landline phone?

1	WIRELESS	GOTO CELL2
2	LANDLINE	GOTO I2
99	REFUSED	CALLBACK
98	DON'T KNOW	CALLBACK

CELL2 Are you driving a vehicle or using any equipment or machinery that requires your attention?

[INTERVIEWER: IF RESPONDENT SAYS YES, READ] Due to safety reasons we will need to call you back at a more convenient time. Thank you very much.

1	YES	CALLBACK
2	NO	I2
99	REFUSED	CALLBACK
98	DON'T KNOW	CALLBACK

I2 Do you or anyone else in your household work for a gas or electric utility, including Puget Sound Energy?

1	Yes	SPECIFY:_____ ➔THANK & TERMINATE
2	No	PS1
99	REFUSED	THANK & TERMINATE
98	DON'T KNOW	PS1

PS1 I am calling about <**ADDRESS**>. Do you live at this address?

1	Yes	GOTO SCN1
2	No	Thank and Terminate
99	REFUSED	Thank and Terminate
98	DON'T KNOW	Thank and Terminate

SCN1 **According to our records, Puget Sound Energy, which I will refer to as PSE, provides electricity and/or gas to** <address>**. Is this correct?**

1	Yes	R1
2	No	T&T
98	Don't know	T&T
99	Refused	T&T

REGISTRATION

R1 **Great! First, how did you hear about the PSE HomePrint program?** [MARK ALL THAT APPLY]

1	Insert in my PSE bill	R2
2	Speaking with a PSE Energy Advisor	
3	Contractor	
4	Postcard	
5	PSE website	
6	Newspaper article	
7	Radio/TV advertisement	
8	Friend/Relative	
9	PSE Event	
-77	Other (SPECIFY)	
-98	Don't know	
-99	Refused	

R2 **How did you make the appointment for a HomePrint assessment at your house?**

1	PSE website	R3
2	Call or event with PSE / PSE Energy Advisor	
3	Appointment made with Contractor	R2A
-77	Other (SPECIFY)	R3
-98	Don't know	
-99	Refused	

R2A **Did you initiate contact with contractor for the HomePrint assessment or did the contractor?**

1	Yes – customer	R3
2	No – contractor	
-98	Don't know	
-99	Refused	

R3 **Why did you choose the specific contractor to perform the assessment?**

1	Prior experience with contractor	R3A
2	PSE referral	R4
-77	Other (SPECIFY)	
-98	Don't know	
-99	Refused	

R3A **Which of the following best describes your previous experience with the contractor?** [READ ALOUD, RANDOMIZE]

1	Previous work performed	R4
2	Contact at PSE event	

3	Contractor advertisement	
4	Contractor reached out to me	
-98	Don't know	
-99	Refused	

R4 **What were your main reasons for signing up for a HomePrint Assessment?** [MARK ALL THAT APPLY]

1	To help the environment	R5
2	To save money	
3	To save energy	
4	To make my home more energy-efficient	
5	To improve the comfort of my home	
6	To receive FREE efficient light bulbs	
7	To receive FREE Compact Fluorescent Lamps (CFLs)	
8	To receive FREE LED Lamps	
9	To receive FREE High performance shower heads	
10	PSE's HomePrint Assessment messaging compelled me to do so	
11	To receive referrals for contractors to do the recommended work	
-77	Other (please specify)	
-98	Don't know	
-99	Refused	

R5 **When you signed up for the program, what did you expect to receive following your HomePrint Assessment?** [ROTATED READ 1-6]

1	Recommendations to make my home more energy efficient	M1
2	Information about other PSE programs	
3	Free CFLS	
4	Free LEDS	
5	Free showerheads	
6	Other free items (SPECIFY)	
-77	Other (please specify)	
-98	Don't know	
-99	Refused	

Measures

M1 **Did the contractor review the online report with you during the HomePrint Assessment visit?**

1	Yes	M2
2	No	
-98	Don't know	
-99	Refused	

M2 **Did the contractor go over any additional recommendations with you during the HomePrint Assessment visit?**

1	Yes	M3
2	No	
-98	Don't know	
-99	Refused	

[IF CFL>0, THEN M3. IF CFL=0, LED>0, THEN M8. IF LED=0, SH>0, THEN M13]

M3 **According to our records, you received some CFLs during your HomePrint assessment, did the contractor install any CFL bulbs?**

[If necessary: **CFLs are compact florescent bulbs**]

1	Yes	M4
2	No	[IF LED>0, THEN M8. IF LED=0 SH>0, THEN M13 OTHERWISE GO TO H1]
-98	Don't know	
-99	Refused	

M4 **How many CFL bulbs did the contractor install?** [IF RESPONDENT CAN'T RECALL ASK FOR THEIR BEST ESTIMATE]

1	ENTER NUMBER	M5
-98	Don't know	[IF LED>0, THEN M8. IF LED=0 SH>0, THEN M13 OTHERWISE GO TO H1]
-99	Refused	

M5 **How many of the CFL bulbs that contractor installed are still installed now?** [IF RESPONDENT CAN'T RECALL ASK FOR THEIR BEST ESTIMATE]

1	ENTER NUMBER	M6
-98	Don't know	M7
-99	Refused	

M6 [If M5 < M4] **Why were the CFLs removed?** [MARK ALL THAT APPLY]

1	I didn't like the color	M7
2	They burned out	
3	They took too long to turn on	
4	Put LEDs in instead	
-77	Other (please specify)	
-98	Don't know	
-99	Refused	

M7 **On a scale of 1 to 5, with 5 being very satisfied and 1 being very unsatisfied, how satisfied were you with the installed CFLs?**

5	Very satisfied	[IF LED>0, THEN M8. IF LED=0 SH>0, THEN M13. OTHERWISE GO TO H1]
4	Satisfied	
3	Neither satisfied or unsatisfied	
2	Unsatisfied	
1	Very unsatisfied	
-98	Don't know	
-99	Refused	

M8 **According to our records, you received some LED light bulbs, do you recall the contractor installing any LED light bulbs?**

1	Yes	M9
2	No	IF SH>0, THEN M13 OTHERWISE GO TO H1
-98	Don't know	
-99	Refused	

M9 **How many of the LEDs bulbs did the contractor install?** [IF RESPONDENT CAN'T RECALL ASK FOR THEIR BEST ESTIMATE]

1	ENTER NUMBER	M10
-98	Don't know	IF SH>0, THEN M13 OTHERWISE GO TO H1
-99	Refused	

M10 **How many of the LED bulbs that contractor installed are still installed now?** [IF RESPONDENT CAN'T RECALL ASK FOR THEIR BEST ESTIMATE]

1	ENTER NUMBER	M11
-98	Don't know	M12
-99	Refused	

M11 [If M10 < M9] **Why were the LEDs removed?** [MARK ALL THAT APPLY]

1	I didn't like the color	M12
2	They burned out	
3	They took too long to turn on	
4	Put other bulbs in instead	
-77	Other (please specify)	
-98	Don't know	
-99	Refused	

M12 **On a scale of 1 to 5, with 5 being very satisfied and 1 being very unsatisfied, how satisfied were you with the installed LEDs?**

5	Very satisfied	IF SH>0, THEN M13 OTHERWISE GO TO H1
4	Satisfied	
3	Neither satisfied or unsatisfied	
2	Unsatisfied	
1	Very unsatisfied	
-98	Don't know	
-99	Refused	

M13 **According to our records, you received some high performance showerheads, do you recall the contractor leaving behind any high performance showerheads?**

1	Yes	M14
2	No	H1
-98	Don't know	
-99	Refused	

M14 **Did you or anyone in your home install the high performance showerheads?**

1	Yes	M14A
2	No	H1
-98	Don't know	
-99	Refused	

M14A **Do you recall how many high performance showerheads were installed?**

1	ENTER NUMBER	M15
-98	Don't know	H1
-99	Refused	

M15 **How many high performance showerheads are still installed now?** IF RESPONDENT CAN'T RECALL ASK FOR THEIR BEST ESTIMATE]

1	ENTER NUMBER	M16
-98	Don't know	M17
-99	Refused	

M16 [If M15< M14] **Why were the showerheads removed?** [ACCEPT MULTIPLE RESPONSES]

1	Water flow	M17
2	Water pressure	
-77	Other (please specify)	
-98	Don't know	
-99	Refused	

M17 **On a scale of 1 to 5, with 5 being very satisfied and 1 being very unsatisfied, how satisfied were you with the installed Showerheads?**

5	Very satisfied	H1
~~4~~	Satisfied	
3	Neither satisfied or unsatisfied	
2	Unsatisfied	
1	Very unsatisfied	
-98	Don't know	
-99	Refused	

HOMEPRINT REPORT

H1 **Did you receive an online HomePrint report after the in-home visit?**

1	Yes	H2
2	No	S0
-98	Don't know	
-99	Refused	

H2 **Did you take any actions based on the HomePrint report? ?** [MARK ALL THAT APPLY]

1	Participated in another PSE program	H3
2	Made additional energy efficiency improvements	H4
3	No	S0
-77	Other (please specify)	
-98	Don't know	
-99	Refused	

H3 **Which PSE programs have you participated in?**

1	[SPECIFY]	[IF H2=2, THEN H4. OTHERWISE S0]
-98	Don't know	

H4 **What additional energy efficiency improvements have you made to your house?**

1	Added Insulation	S0
2	Upgraded space heating	
3	Upgraded windows	
4	New energy efficient appliances	
5	Upgraded water heater	
77	Other [SPECIFY]	
98	Don't know	
99	Refused	

PROGRAM VALUE

S0 **I have a few questions about your satisfaction with the HomePrint program experience. On a scale of 1 to 5, with 5 being very satisfied and 1 being very unsatisfied, how satisfied were you with the: ROTATE S1-S3**

S1 **Appointment scheduling process?**

5	Very satisfied	GO TO S2
4	Satisfied	
3	Neither satisfied or unsatisfied	
2	Unsatisfied	
1	Very unsatisfied	
-98	Don't know	
-99	Refused	

S2 **The contractor who performed the HomePrint assessment?**

5	Very satisfied	GO TO S3
4	Satisfied	
3	Neither satisfied or unsatisfied	
2	Unsatisfied	
1	Very unsatisfied	
-98	Don't know	
-99	Refused	

S3 **The onsite HomePrint assessment experience?**

5	Very satisfied	S4
4	Satisfied	
3	Neither satisfied or unsatisfied	
2	Unsatisfied	
1	Very unsatisfied	
-98	Don't know	
-99	Refused	

S4 **On a scale of 1 to 5, with 5 being very easy to understand and 1 being very hard to understand, how clear was information in the HomePrint report?**

5	Very easy to understand	S5
~~4~~	Easy to understand	
3	Neither easy or hard to understand	
2	Hard to understand	
1	Very hard to understand	
-98	Don't know	
-99	Refused	

S5 **On a scale of 1 to 5, with 5 being very useful and 1 being not very useful at all, how useful did you find the information in the HomePrint report?**

5	Very useful	S6
~~4~~	Useful	
3	Neither useful or not useful	
2	Not useful	
1	Very not useful	
-98	Don't know	
-99	Refused	

S6 **Earlier in the survey you stated that your reasons for signing up for PSE were [READ responses to R5]. How successful was the HomePrint Assessment Program at meeting your expectations? Please use a scale scale of 1 to 5, with 5 being very successful and 1 being very unsuccessful.**

5	Very successful	S7
~~4~~	Successful	
3	Neither successful nor unsuccessful	
2	Unsuccessful [SPECIFY]	
1	Very unsuccessful [SPECIFY]	
-98	Don't know	
-99	Refused	

S7 **Has participation in the PSE HomePrint Assessment Program changed your views of PSE?**

1	Yes	S8
2	No	D0
-98	Don’t Know	
-99	Refused	

S8 **Did participation in the PSE HomePrint Assessment Program improve your views of PSE, or make them worse?**

1	Improved my views	D0
2	Made my views worse	
-98	Don’t Know	
-99	Refused	

DEMOGRAPHIC

D0 **My final questions are about your home and household.**

D1 **Do you or members of your household own or rent this home?**

1	Own/Buying	
2	Rent/Lease	
3	Occupied without payment of rent	
-77	Other *[SPECIFY]*	
-98	Don't Know	
-99	Refused	

D2. **How many months per year is your home occupied?**

1	[RECORD #]	
-98	[Don't know]	
-99	[Refused]	

D3. **Including yourself, how many people live in your home at least 6 months per year?**

1	RECORD NUMBER OF PEOPLE	
-98	Don't know	
-99	Refused	

D4a. How old are you?

1	RECORD AGE	[IF D3=1, DK, R THEN SKIP TO D5]
-98	Don't know	
-99	Refused	

D4b. How many people in your household are under 5 years of age?
01 ___ RECORD NUMBER OF PEOPLE

D4c. How many in your household are 5 to 17 years of age?
01 ___ RECORD NUMBER OF PEOPLE

D4d. How many people in your household are 18 to 64 years of age?
01 ___ RECORD NUMBER OF PEOPLE

D4e. How many people in your household are 65-79 years of age?
01 ___ RECORD NUMBER OF PEOPLE

D4f. How many people in your household are 80 years of age or older?
01 ___ RECORD NUMBER OF PEOPLE

[CHECK THAT D3 = Sum(D4a to D4f]
[IF THEY DON'T ADD UP, VERIFY RESPONSES TO D4d THROUGH D4f UNTIL THEY DO]

D5. Next, for statistical purposes only, what is the highest level of education you have obtained?
[READ LIST]

1	Some high school	
2	High school graduate, including GED	
3	Some college or an Associate's degree,	
4	Bachelor's degree	
5	Some graduate school	
6	Graduate or professional degree	
77	Other (specify_____)	
-97	[Don't know]	
-98	[Refused]	

D8. RECORD GENDER [DO NOT ASK.]

1	Male	
2	Female	
-98	[Don't know]	
-99	[Refused]	

Onsite Follow-up Survey Recruitment Section

L2 **T**o better understand the households that participated in the HomePrint Assessment Program, we are going to conduct another research study. This study will involve a visit to your home sometime in January, and we'll pay you $100 in appreciation of your time and cooperation. Can we have one of our researchers contact you to make an appointment for this upcoming study?

[IF ASKED FOR ADDITIONAL DETAILS: The visit should take less than an hour. Unfortunately I don't have any more details at this time. If you have any interest in helping with the next part of the study, I'd suggest agreeing now and when someone calls to schedule the appointment, they'll be able to provide more details at that time. If you decide at that point that you're no longer interested, you're under no obligation to participate in the study.]

[IF ASKED ABOUT TIMING OF VISIT: We'll call you within the next two weeks to set up a visit to your home sometime in January.]

1 Yes
2 No (ATTEMPT TO CONVERT) *[SKIP TO CLOSE]*
-98 Don't know (ATTEMPT TO CONVERT) *[SKIP TO CLOSE]*
-99 Refused (ATTEMPT TO CONVERT) *[SKIP TO CLOSE]*

L2BB Ok, just to confirm – we have your address listed as *[street address, city, state, and zip]*. Is that right? *[IF NECESSARY: The researcher will use this information to find your home when he or she visits you.]*

_____

L2C We currently have your phone number listed as *[PHONE_NO]*. Is this the best number to reach you?
(If no, record new number)

_____

[CLOSE]
Great! Those are all of the questions I have for you today. Thank you for your time, and have a great [day/evening].

9.4 Installation Verification Data Collection Tool

9.4.1 Onsite Protocol

- Identify and introduce yourself as an employee of DNV GL who is performing field work on behalf of PSE to evaluate the HomePrint Assessment Program.
    - If they ask for verification contact information provide contact info for Jim Perish-Anderson:
        - **Jim Perich-Anderson**
          Strategic Business Intelligence -
        - Energy Efficiency Evaluation Lead
          PUGET SOUND ENERGY
          425-424-6435 tel
          425-577-4961 cell
          e-mail: jim.perich-anderson@pse.com
    - Explain the field visit will take about 30-45 minutes of their time, and you will provide the $100 incentive at the end of the visit.
- Ask customer to confirm and show you the information they provided in the telephone survey.
    - Example: "When we talked to you on the telephone recently, you said that the HomePrint Contractor had provided you with 20 CFLs, and that 15 were still installed. Can you please show me the 15 that are still installed?
    - Record all CFLs, LEDs, or Low flow shower heads that the customer says were given to them as part of the PSE HomePrint program.
- Ask customer if they have any other CFLs, LEDs or Low-flow showerheads that were not given to them as part of the HomePrint program.
    - Record all CFLs, LEDs, or Low flow shower heads that the customer says were not given to them as part of the PSE HomePrint program.
- Provide customers with the quantities of measures from tracking data, and ask them if they recall this quantity given to them.
    - If yes, Record all CFLs, LEDs, or Low flow shower heads that the customer says were given to them as part of the PSE HomePrint program.
    - If no, Verify the quantity that they remember receiving.
- Provide customer with $100 Gift card and have them sign incentive release form.
    - Completely fill out release form, including card number.

9.4.2 PSE HomePrint Onsite Verification Data Form

Site ID:		Date:		Time:	
Field Tech:					
Tracking Data					
CFLs:		LEDs:		Shower Heads:	
Telephone Survey					
Telephone Survey: Given by Contractor					
CFLs:		LEDs:		Shower Heads:	
Telephone Survey: Still Installed					
CFLs:		LEDs:		Shower Heads:	

CFLs Installed							
Model	**Shape**	**Wattage**	**Room**	**Control**	**Program**	**Count Installed**	**Count Removed**

LEDs Installed							
Model	**Shape**	**Wattage**	**Room**	**Control**	**Program**	**Count Installed**	**Count Installed**

Low-flow Shower Heads

Model	Count	Prog?

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10. ADDENDUM A - PSE PROGRAM PARTICIPATION OVERLAP ANALYSIS

1. Objectives

This addendum to the 2012-2013 HomePrint Assessment Program Process and Impact Evaluation Report explores how participation in the PSE HomePrint Assessment Program related to participation in other PSE programs. The primary objective of this task was to identify participation overlap between 2012 and 2013 HomePrint program participants and participants in PSE's other 2012, 2013 and 2014 residential programs. Secondary objectives included examining which programs had the greatest overlap, the timing and quantity of any overlaps in participation and providing recommendations regarding how PSE can better track overlapping participation in the future.

2. Methodology

The overlap analysis included two steps:

1. Data preparation and exploration
2. Data merging.

We describe each of these steps in more detail below.

10.1.1 2.1 Data Preparation and Exploration

PSE provided program tracking data for the HomePrint Assessment Program to DNV GL for the years 2012 and 2013 as part of the process and impact evaluation. DNV GL consolidated the program data from both years into one dataset, and identified each individual participant at the premise level. The resulting dataset contained 8,386 records, each representing a unique premise that participated in the HomePrint Assessment Program during 2012 or 2013. For the remainder of this addendum, we refer to this as the "HomePrint participant data."

To complete the overlap analysis, PSE provided DNV GL with data on all PSE residential energy-efficiency program participants for the years 2012, 2013 and 2014. PSE had previously compiled this data to support a joint savings analysis for PSE's Home Energy Reports program. DNV GL removed the HomePrint program data that was included in this dataset because the overlap analyses focused on participation in programs other than HomePrint. After removing the HomePrint data, the file contained 297,456 records. For the remainder of this addendum, we refer to this data as the "PSE program participant data."

While the HomePrint participant data is at the premise level—that is, one record in the database per premise—the PSE program participant data is at the measure and program level. In other words, each record in the dataset represents a combination of the program in which the customer participated and one measure type for which the program provided incentives (including direct installations). As such, some premises are listed more than once in the PSE program participant data. This occurred when a

premise received multiple measures through the same program and/or when a premise participated in multiple programs.

DNV GL compared the HomePrint participant data with the PSE program participant data and identified four variables that were included in both datasets and were used as either premise or account-identifying variables[19]:

1. BUAG – New Customer Account Number (numeric variable, 12 digits)
2. PREMISE_SAP – New premise number (numeric variable, 10 digits)
3. PRMIS_TK – Old premise number (numeric variable, 10 digits)
4. STMT_ACCT_TK - Old Customer Account Number (numeric variable, 12 digits).

Although both datasets included the four identifying variables, they were incompletely and inconsistently populated in both datasets. DNV GL thus used all four variables to identify possible matches between premises in the HomePrint participant data and the PSE program participant data. Additionally, there were 39,482 records in the PSE program participant data for which none of the four identifying variables were populated. As such, DNV GL eliminated these records from the PSE program participant data yielding a final total of 257,974 records in the PSE program participant data available for matching with the 8,386 premises in the HomePrint participant data.

10.1.2 2.2 Data Merging

DNV GL attempted to merge the HomePrint participant data and the PSE program participant data based on each of the four variables (BUAG, PREMISE_SAP, PRMIS_TK, and STMT_ACCT_TK) one by one. DNV GL started the merges with the variable BUAG because of the four variables, it had the greatest number of matches between records across the two datasets. DNV GL continued the data merging attempts for the next three variables in the following order: PRMIS_TK, PREMISE_SAP, and STMT_ACCT_TK. Each successive merge looked for matches that were not found in attempts to match with the previous variable(s). Table 20 shows the number of records that were populated with each variable in both datasets, and the number of matches each variable produced in each successive round of matching attempts.

[19] PSE switched to a new tracking system in 2013 and began using the new variables (BUAG and PREMISE_SAP). Prior to 2013, PSE was using the old variables (PRMIS_TK and STMT_ACCT_TK) to track accounts and premises.

Table 20 – Data Merging Results

Variable Name	Records Populated in HomePrint Participant Data	Records Populated in PSE Program Participant Data	Number of Records in PSE Program Participant Data Matched to a HomePrint Participant Premise
1) BUAG	4,206	207,856	3,424
2) PRMIS_TK	4,913	93,171	1,505
3) PREMISE_SAP	4,248	149,186	118
4) STMT_ACCT_TK	4,906	120,745	1,037
Total Matches			**6,084**

As shown, these efforts yielded 6,084 records from the PSE program participant data that matched to a premise in the HomePrint participant data. Recall that each record in the PSE program participant data represents a combination of program and measure. To maximize the potential for matches between the datasets, DNV GL did not reduce the PSE program participant data to the premise level until after completing the data merging process. When DNV GL reduced those matches to the premise level we found a total of 2,853 premises for which 2012 and 2013 HomePrint Assessment Program participants participated in at least one other PSE residential energy-efficiency program during 2012, 2013 and 2014. The remaining 5,533 participants in the HomePrint Assessment Program during 2012 and 2013 did not participate in any other PSE programs during 2012, 2013 and 2014.

3. Results

DNV GL staff assessed three elements of participation overlap. The first two of these include:

1. The number of 2012 and 2013 HomePrint Assessment Program participants who participated in 1 or more, 2 or more, and 3 or more additional PSE residential-energy efficiency programs in 2012, 2013 and 2014

2. The number of 2012 and 2013 HomePrint Assessment Program participants who participated in each of the other 2012, 2013 and 2014 PSE residential-energy efficiency programs (by program)

For each of the two elements listed above, we also assessed a third element of participation overlap:

3. The average length of time it took 2012 and 2013 HomePrint Assessment Program participants to participate in their 1st, 2nd, and 3rd (if applicable) additional PSE residential-energy efficiency program(s).

We present the results of these analyses below.

10.1.3 3.1 Number of 2012 and 2013 HomePrint Assessment Program Participants Who Participated in Additional PSE

Residential Programs and Average Length of Time Before Additional Participation

The results from the program overlap analysis found that approximately one-third of 2012 and 2013 HomePrint Assessment Program participants participated in other PSE residential energy-efficiency programs in 2012, 2013 and 2014 (34%; see Table 21 below). Sixty-six percent of HomePrint participants in 2012 and 2013 did not participate in any other PSE residential energy-efficiency programs during 2012, 2013 and 2014.

Less than eight percent of 2012 and 2013 HomePrint participants participated in two or more additional residential programs and less than three percent of 2012 and 2013 HomePrint participants participated in three or more programs. On average, it took HomePrint participants 3.9 months to participate in their first program after HomePrint and 5.5 months to participate in their second PSE program.

When we examine the HomePrint participant data by year of participation, different rates of program participation overlap emerge. In 2012, slightly more than one-quarter of HomePrint participants had matches to other PSE program participant data (26.4%), compared to over forty percent in 2013.

Table 21 – Number of 2012 and 2013 HomePrint Program Participants Who Participated in Other PSE Residential Programs During 2012, 2013 and 2014 and the Average Time to Additional Program Participation

HomePrint Program Participation Year	First Additional Program			Second Additional Program			Third or Subsequent Additional Program(s)			No Additional Programs	
	N	%	Average Time (months)	N	%	Average Time (months)	N	%	Average Time (months)	N	%
2012	1,078	26.4%	3.7	151	3.7%	5.3	49	1.2%	7.9	3,007	73.6%
2013	1,775	41.3%	4.1	495	11.5%	5.5	169	3.9%	4.6	2,526	58.7%
2012 + 2013	2,853	34.0%	3.9	646	7.7%	5.5	218	2.6%	5.4	5,533	66.0%

Table 22 shows the residential energy-efficiency programs in which 2012 and 2013 HomePrint Assessment Program participants participated following HomePrint and the average time it took them to participate in the additional programs. As shown, participation overlap with HomePrint was highest for the Showerhead program with 704 2012 and 2013 HomePrint participants choosing the Showerhead program as their first additional program after HomePrint (8.4%). Additionally, participants averaged only a little over a month after HomePrint participation for participation in the Showerhead program, the shortest elapsed time for any program with meaningful participation.[20] The data also demonstrate that some of the programs that provide incentives for similar measures to those included in the HomePrint program had some of the highest overlap with HomePrint participation. The HomePrint Assessment Program included showerhead measures, and over 9 percent of 2012 and 2013 HomePrint participants also participated in the Residential Showerheads programs for homes with both gas and electric water heating during 2012, 2013 and 2014. This may be a program tracking issue rather than real program overlap -- in other words, it is possible that showerheads left behind during HomePrint assessments were incorrectly attributed to the Showerhead Program in PSE's program tracking database. This would help explain the large overlap from seemingly identical program offerings.

Table 22 also shows noteworthy overlap between 2012 and 2013 HomePrint participants and the Single Family Existing Weatherization program and the Home Appliance program, with almost 600 HomePrint participants choosing each as their first additional program after HomePrint. It took HomePrint participants a little over four months on average to participate in the Existing Weatherization program after HomePrint while it took over 6 months for Home Appliance program participation.

[20] Single Family New Construction had a shorter timeline to participation after HomePrint (less than a month) but only had 3 overlap participants.

Table 22 – Number and Percentage of 2012 and 2013 HomePrint Participants Who Participated in Other PSE Residential Energy-Efficiency Programs During 2012, 2013 and 2014 by Order of Participation after HomePrint

PSE Residential Energy Efficiency Program	First Additional Program			Second Additional Program			Third or Subsequent Additional Program(s)			No HomePrint Participation Overlap	
2012 + 2013	N	%	Average Time (months)	N	%	Average Time (months)	N	%	Average Time (months)	N	%
Fuel Conversion Rebate	16	0.19%	4.4	4	0.05%	4.3	0	0.00%	.	8,366	99.76%
Home Appliances	594	7.08%	6.6	102	1.22%	7.8	11	0.13%	9.2	7,679	91.57%
Refrigerator/ Freezer Decommissioning	19	0.23%	1.6	0	0.00%	.	1	0.01%	2.0	8,366	99.76%
Residential Lighting	161	1.92%	4.8	64	0.76%	6.1	16	0.19%	7.1	8,145	97.13%
Residential Showerheads	704	8.39%	1.1	50	0.60%	6.3	8	0.10%	6.5	7,624	90.91%
SF Existing ARRA Weatherization	10	0.12%	4.9	0	0.00%	.	1	0.01%	3.0	8,375	99.87%
SF Existing Mobile Home Duct Sealing	16	0.19%	10.9	0	0.00%	.	0	0.00%	.	8,370	99.81%
SF Existing Space Heat	448	5.34%	4.2	77	0.92%	6.8	7	0.08%	10.9	7,854	93.66%
SF Existing Water Heat	48	0.57%	4.3	19	0.23%	5.6	2	0.02%	7.5	8,317	99.18%
SF Existing Weatherization	599	7.14%	4.1	109	1.30%	4.9	7	0.08%	4.3	7,671	91.47%
Single Family New Construction	3	0.04%	0.7	0	0.00%	.	0	0.00%	.	8,383	99.96%
Web-Enabled Thermostats	9	0.11%	5.3	1	0.01%	7.0	0	0.00%	.	8,376	99.88%

Table 23 and Table 24 show similar results to Table 22, including the programs in which residential energy-efficiency programs HomePrint Assessment Program participants participated following HomePrint and the average time it took them to participate in the additional programs, except that these tables represent the individual HomePrint program years (2012 and 2013, respectively) rather than the cumulative two-year results shown in Table 22. As shown in Table 23, participation overlap with HomePrint was highest for the Single Family Existing Weatherization program with 262 2012 HomePrint participants choosing the Weatherization program as their first additional program after HomePrint (6.4%). The Home Appliance program was also a popular choice for the first additional program after HomePrint with 259 2012 participants (6.3%). Similar to the cumulative 2012 and 2013 results, it took HomePrint participants over six months to participate in the Home Appliance program after HomePrint versus just 3 months for the Weatherization program.

In 2013, the Showerhead program emerged as the most popular program for HomePrint participants, with almost 12 percent choosing it first and almost 13 percent overall (509 and 558 HomePrint participants, respectively). For 2013 HomePrint participants who chose the Showerhead program as their first additional program after HomePrint, it took less than a month for them to participate. There was an almost identical level of participation in the Home Appliance program and Existing Weatherization program, both as a first program after HomePrint and overall: both programs captured just under 8 percent of 2013 HomePrint participants as a first additional program and around 10 percent of 2013 HomePrint participants overall.

Table 23 – Number and Percentage of 2012 HomePrint Participants Who Participated in Other PSE Residential Energy-Efficiency Programs During 2012, 2013 and 2014 by Order of Participation after HomePrint

PSE Residential Energy Efficiency Program	First Additional Program			Second Additional Program			Third or Subsequent Additional Program(s)			No HomePrint Participation Overlap	
2012	N	%	Average Time (months)	N	%	Average Time (months)	N	%	Average Time (months)	N	%
Fuel Conversion Rebate	6	0.15%	4.5	2	0.05%	2.0	0	0.00%	.	4,077	99.80%
Home Appliances	259	6.34%	6.3	9	0.22%	10.2	2	0.05%	9.0	3,815	93.39%
Refrigerator/Freezer Decommissioning	19	0.47%	1.6	0	0.00%	.	1	0.02%	2.0	4,065	99.51%
Residential Lighting	30	0.73%	9.6	9	0.22%	9.7	1	0.02%	8.0	4,045	99.02%
Residential Showerheads	195	4.77%	1.5	9	0.22%	9.7	0	0.00%	.	3,881	95.01%
SF Existing ARRA Weatherization	4	0.10%	8.5	0	0.00%	.	1	0.02%	3.0	4,080	99.88%
SF Existing Mobile Home Duct Sealing	7	0.17%	9.9	0	0.00%	.	0	0.00%	.	4,078	99.83%
SF Existing Space Heat	165	4.04%	3.0	15	0.37%	4.7	1	0.02%	5.0	3,904	95.57%
SF Existing Water Heat	14	0.34%	4.3	3	0.07%	3.0	1	0.02%	6.0	4,067	99.56%
SF Existing Weatherization	262	6.41%	3.1	35	0.86%	3.9	0	0.00%	.	3,788	92.73%
Single Family New Construction {E}	1	0.02%	0.0	0	0.00%	.	0	0.00%	.	4,084	99.98%

Table 24 – Number and Percentage of 2013 HomePrint Participants Who Participated in Other PSE Residential Energy-Efficiency Programs During 2013 and 2014 by Order of Participation after HomePrint

PSE Residential Energy Efficiency Program	First Additional Program			Second Additional Program			Third or Subsequent Additional Program(s)			No HomePrint Participation Overlap	
2013	N	%	Average Time (months)	N	%	Average Time (months)	N	%	Average Time (months)	N	%
Fuel Conversion Rebate	10	0.23%	4.4	2	0.05%	6.5	0	0.00%	.	4,289	99.72%
Home Appliances	335	7.79%	6.9	93	2.16%	7.6	9	0.21%	9.2	3,864	89.84%
Residential Lighting	131	3.05%	3.7	55	1.28%	5.6	15	0.35%	7.1	4,100	95.33%
Residential Showerheads	509	11.83%	0.9	41	0.95%	5.5	8	0.19%	6.5	3,743	87.03%
SF Existing ARRA Weatherization	6	0.14%	2.5	0	0.00%	.	0	0.00%	.	4,295	99.86%
SF Existing Mobile Home Duct Sealing	9	0.21%	11.8	0	0.00%	.	0	0.00%	.	4,292	99.79%
SF Existing Space Heat	283	6.58%	4.9	62	1.44%	7.3	6	0.14%	11.8	3,950	91.84%
SF Existing Water Heat	34	0.79%	4.3	16	0.37%	6.1	1	0.02%	9.0	4,250	98.81%

SF Existing Weatherization	337	7.84%	4.9	74	1.72%	5.4	7	0.16%	4.3	3,883	90.28%
Single Family New Construction	2	0.05%	1.0	0	0.00%	.	0	0.00%	.	4,299	99.95%
Web-Enabled Thermostats	9	0.21%	5.3	1	0.02%	7.0	0	0.00%	.	4,291	99.77%

4. Recommendations

DNV GL has the following recommendations for PSE based on results of the PSE program participation overlap analysis:

- PSE should implement a single premise-level ID number and a single account-level ID number for all residential accounts and use these numbers for program tracking in all residential programs. The tracking data provided by PSE for this project suggest that there are at least four different ID numbers that serve these purposes, and none of the four are consistently populated in the PSE residential program tracking data.
    - Assignment of a unique identifier to each residential premise would enable more detailed analyses of overlap among PSE's other residential energy-efficiency programs. If such an identifier could be made available, DNV GL recommends that PSE consider doing a more thorough assessment of overlap among its other programs to identify those with the greatest and least degrees of cross-participation. These activities may support modifications or enhancements to current program implementation and/or marketing approaches.
- PSE should continue to use the HomePrint Assessment Program to promote participation in other PSE residential energy-efficiency programs. To maximize uptake of the full range of energy-efficiency measures, PSE should consider focusing cross-promotional efforts on the programs that include measures that differ from those provided through HomePrint.

Evaluation Report Response

Program:	HomePrint Assessment Program
Program Manager:	Luke Giustra
Study Report Name:	2012-2013 HomePrint Assessment Program Process and Impact Evaluation Puget Sound Energy
Report Date:	November, 2015
Evaluation Analyst:	Jim Perich-Anderson
Date of ERR:	12/16/2015

Evaluation Overview, Methodology and Key Findings:

Overview:
The independent process and impact evaluation conducted by KEMA, Inc. of PSE's HomePrint Assessment Program involved three elements:

1. A comprehensive process evaluation
2. Verification of measure installation through onsite inspection
3. A review of measure savings assumptions from the Regional Technical Forum (RTF) and methods used to estimate total program savings from tracking system data

The goal of the independent process evaluation was to identify factors leading to the success of the program, areas for improvement, and overall satisfaction of all stakeholders. Four independent tasks were developed to inform the findings of the process evaluation:

1. Program staff interviews
2. Logic model development
3. Contractor telephone interviews
4. Participant telephone surveys

The goal of the independent impact evaluation was to identify savings realization rates for direct-install and leave behind measures distributed through the program. The impact evaluation included on-site verifications, participant telephone surveys, and standard IPMVP practices. The objectives of the savings reviews were to evaluate PSE's deemed savings algorithms and insure consistency in the methodology of those assumptions with respect to RTF methods.

An addendum to the 2012-2013 HomePrint Assessment Program Process and Impact Evaluation Report explores how participation in the PSE HomePrint Assessment Program related to participation in other PSE programs.

Key Findings/Analysis:
Process Summary: The process evaluation identified areas of improvement from stakeholders including program contractors, program staff, and participants. The findings from program contractors encompassed addressing improvements with program tools, systems, and measure eligibility qualifications and communications. Despite these areas of improvement, "Contractors reported that the HomePrint Program matched their business mission and values. They also appreciated working with PSE and providing their customers added benefits through the HomePrint assessment. Contractors reported that they were satisfied with the program marketing and outreach, and

interaction with PSE." Program staff findings indicated the need for improved follow-on communications with customers directly resulting from the HomePrint Assessment, and "tailoring marketing and outreach efforts to target only eligible individuals to participate in the program." Participant findings illustrate that the program results in "reasonable and accurate expectations of what they would receive upon signing up for the program." In general, the primary motivation for participation is an interest in energy efficiency. And, overall participant satisfaction with the program ranks very high in the areas of scheduling, contractors, and the in-home assessment, with each category eclipsing over 80 percent. Areas of improvement desired by participants include: report clarity, report usefulness, and [the report] meeting expectations.

Impact Summary: As noted above, the impact evaluation utilized a two-pronged approach to assess the estimated savings realization rate of direct-install and leave-behind measures. With respect to installation rates, it is noted in the evaluation that a lack of sufficient detail was present in the program tracking data to identify model numbers or installation locations of program provided measures. As a result, the installation of program measures was verified through three tasks:

1. Total CFLs, LEDs, and showerheads installed in the home;
2. Self-reported confirmation of measures;
3. For CFLs and LEDs, "a comparison of the quantity, technology, form factor and wattage combinations for measures installed to measures provided to the home according to program tracking data."

Program measure installation rates [and measures of like kind] identified through participant surveys and on-site verifications show that "on average more CFL and LED lamps were installed than the quantities that were provided to [participants]." CFL measures could be matched to the tracking database at seventy percent, while showerheads as compared to tracking data resulted in a sixty-nine percent realization rate. These results indicate that the HomePrint Assessment program provides both persistence in the measures delivered and lead to greater uptake of similar products.

The measure savings review resulting from the impact evaluation estimates are illustrated in Table 16 below. The summary of the program measure savings assumptions when compared to RTF values result in lower estimated savings for both categories of direct install lighting. However, showerhead savings remain consistent with claimed assumptions during 2012-2013. KEMA recommends adjusting lighting savings assumptions to align with the RTF residential lighting workbook (version 3.3).

Table 25: Summary of Rreview of 2012-2013 PSE HomePrint Program UES and Measure Life Assumptions

Measure	UES (kWh/year)		Measure Life (years)	
	HomePrint Program	Savings Review	HomePrint Program	Savings Review
Direct Install LED Lamps	32	18	30	12
Direct Install CFLs	23	17	5	6
Leave-Behind Low-Flow Showerheads	260	260	10	10

Program Participation Overlap Analysis (Addendum Report): This analysis assessed, by program, the number of 2012 and 2013 HomePrint Assessment Program participants who proceeded to participate in each of the other 2012, 2013 and 2014 PSE residential-energy efficiency programs. Thirty-four percent of HomePrint participants in 2012 and 2013 did participate in other PSE residential energy-efficiency programs during 2012, 2013 and 2014. On average, it took HomePrint participants 3.9 months to participate in their first program after HomePrint and 5.5 months to participate in their second PSE program. Results did indicate that showerhead

installation (8.4% of initial, follow-on participation) may have in fact been allocation of savings from the HomePrint direct install to the Showerheads program. After the showerheads, the most common follow-on participation was for Single Family Weatherization and Home Appliances (both at 8.5%); followed by Single Family Space Heat (6.3%).

Recommendations: The two recommendations coming out of the evaluation were:

> 'PSE should implement a single premise-level ID number and a single account-level ID number for all residential accounts and use these numbers for program tracking in all residential programs'; and
>
> 'PSE should continue to use the HomePrint Assessment Program to promote participation in other PSE residential energy-efficiency programs.'

Action Plan:

Based on the findings of the process evaluation, PSE will also continue to refine its systems and processes to increase the satisfaction of all stakeholders through its reporting platform, marketing and outreach efforts, and facilitate follow-on communications. The program team will also implement enhanced communications regarding program eligibility through 2016-2017. Some of the actions already taken by the team include the development of an incentive matrix outlining program qualifications on its website (http://pse.com/savingsandenergycenter/Rebates/Documents/6461_HPA_Incentive_Matrix_wb.pdf).

Finally, with the development of PSE's DSMc platform, access to customer eligibility will be more visible to all internal stakeholders.

Since 2014, the HomePrint program has exclusively provided LED lighting options for participants. At this time, PSE has utilized a set of RTF-modified savings for all LED lamps distributed through its programs. These savings estimates have been developed in coordination with RTF staff. Furthermore, the development of these savings estimate account for updated baseline assumptions derived from RBSA data and more specifically applicable to PSE's service territory. PSE will continue to utilize these metrics for LED lighting savings and therefore align with the recommendation presented by DNV GL in the evaluation. There will be no change to savings assumptions for leave-behind showerhead measures for homes with PSE electric or PSE natural gas water heat.

In relation to the addendum report, PSE has already addressed the recommendation to utilize a single premise and account number for tracking and reporting purposes. The tracking data provided to DNV GL included the multiple premise and account numbers due to the fact that PSE was transitioning from old premise and account numbers, formerly 9-digit, to revised 12-digit format. As of this time, all account and premises are in the revised format and utilized for account validations and tracking and reporting functions. The addendum report also recommends that PSE utilize the HomePrint program as a platform to market additional programs and rebate offerings. Over the last two years, PSE marketing has utilized a mix of HomePrint data and propensity modeling to design marketing and communications to prospective customers. PSE will continue to integrate HomePrint data into its marketing and outreach campaigns. In addition to this, PSE will also work with its qualified network of Contractor Alliance Network contractors to facilitate direct referrals either through the report or during the time of service.