Evaluation Report Response

Program: Commercial Rebates & Small Business Lighting (SBL) Programs, Schedules E255, E262 & G262

Program Managers:

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Study Report Name: Commercial Rebates and Small Business Lighting (SBL) Programs Evaluation

Report Date: June 3, 2014

Evaluation Analyst: Jim Perich-Anderson

Evaluation Firm: Navigant Consulting, Inc.

Date of ERR: 6/17/14

Overview of Study & Action Plans to Address Findings & Recommendations

PSE contracted with Navigant Consulting, Inc. to provide independent 3rd party evaluation services for three of its program schedules: E255 E262 & G262 for the program years 2011 - 2012. The evaluation addressed three major program elements: Impact, Process and Best Practices. Navigant sought input from numerous sources both within PSE and external to PSE in order to provide input and recommendations from all aspects of program delivery.

Impact Summary: PSE program managers, engineers and supervisors worked with Navigant field staff to address questions and provide program background information to enable Navigant to appropriately evaluate individual program results and establish program realization rates. The study provided "as-reported" realization rates to indicate PSE's accuracy in applying deemed unit energy savings values and tracking efficiency measures. The study also provided "as-evaluated" realization rates to evaluate actual savings being delivered by the measures, which accounts for the impacts of attrition, inaccuracies in field reporting, etc. Overall, the Impact Evaluation found "PSE staff is appropriately tracking and reporting projects as reflected by the near-100-percent as-reported realization rates across both programs". The as-evaluated realization rate for Small Business Lighting was 100.5%. Commercial Rebates As-Evaluated realization rates were 91.6% for electric and 25.1% for natural gas.

Lower realization rates for Commercial Rebates were primarily due to faucet aerator savings analysis approach, misreporting of water heating fuel source, and measure attrition. Prior to the evaluation, PSE had established reduced unit energy savings values for use in 2014-2015 program cycle and requested Navigant Consulting review the revised approach. The impacts of misreported water heating fuel source and measure attrition were more significant than anticipated, given these measures are implemented via a direct install program in which the installing contractor verifies the water heating fuel source when on site and ensures that the new flow rates meet the customer's needs. The evaluation brought to light the need to enhance training of the direct install contractor and to establish in-service rates for aerators to account for attrition. Prior to completing the evaluation, PSE requested further field work by Navigant Consulting to gain further understanding of drivers behind the faucet aerator savings realization rates and to provide recommendations for appropriate actions to improve accuracy of savings claims moving forward.

Additionally, Navigant Consulting provided feedback on opportunities for improving documentation of deemed unit energy savings (UES) values. PSE had already begun making improvements to Commercial Rebate measure development procedures which address these opportunities.

Key Actions: PSE will continue to employ strategies and procedures to ensure we maintain robust as-reported realization rates and will take actions as outlined in this ERR to improve as-evaluated realization rates. Additionally, PSE has improved processes to provide clear, easily accessible standardized documentation to enhance future evaluation efforts.

Process Summary: Navigant spent a significant amount of time meeting with individuals within PSE and with customers and trade allies in order to gain a thorough understanding of PSE processes. Interviews were conducted with a broad spectrum of employees, customers and trade allies who interface with the Small Business Lighting and Commercial Rebates Programs. Key findings were that "customer and trade ally satisfaction with the program is high and the program positively affects participant perception of PSE". The report also pointed out several opportunities for improvement in PSE's communication and program delivery processes.

Key Actions: PSE has taken action to provide more frequent trade ally communications via the Contractor Alliance Network (CAN) and has provided tools that allow for more streamlined and standardized information input for the Business Lighting Program.
PSE will continue to investigate strategies that increase program awareness, improve customer and trade ally communications and improve program processes.

Best Practices Summary: Navigant sought input from multiple information sources internal and external to PSE to provide action-oriented insights designed to enhance PSE's programs and inform PSE of best practices utilized by other utilities.

Key Actions: PSE has reviewed the Navigant Best Practice Recommendations and placed each recommendation into one of three categories: Implementing, Under Consideration, and Not Pursuing. The majority of recommendations are already being implemented, at least in part, where applicable to PSE's programs. All recommendations are discussed in this ERR, with information provided about PSE's implementation or consideration of recommendations, as well as reasons given for not pursuing recommendations that do not align with current PSE strategies.

Impact Evaluation Recommendations

Impact Evaluation Conclusions and Recommendations (Pg. 31-33)

2.4.3 Premium HVAC Service

> The Premium HVAC Service sub-program uses a matrix of inputs to estimate energy savings per ton of cooling for eligible units. Although several supplementary files were available for the evaluation, the basis for the estimated energy savings was unavailable.9 Navigant verified serviced units and inputs to PSE's energy savings matrix, but the team was unable to review the engineering calculations used to estimate the energy savings. As the best possible evaluation option, Navigant reviewed other sources with similar HVAC service measures. ***Navigant concluded PSE's energy savings estimated are reasonable, though a duplicate or original business case analysis is recommended for future implementation and evaluation.***

PSE Response: PSE has updated the Premium HVAC Service business case and has placed a copy of the new business case complete with all supporting documentation in the Measure:Metrics directory. The business case folder is organized such that the business case itself, engineering models, cost effectiveness calculations and other miscellaneous data sources used to develop the business case are clearly identified and accessible to individuals requiring the information.

2.5.1 Program Data Requirements

» ***In the Small Business Lighting Program, PSE can require contractors to submit the rationale behind annual operating hours calculations.*** Currently contractors provide a single annual value for each applicable measure. Such numbers are more difficult to verify than detailed operating profiles. For example, the contractors can document operating profiles for an average week, holidays, and weekends.

PSE Response: As of January 1 2014, the SBL program is no longer accepting applications and the program was replaced by the new Business Lighting Program. For projects with measures

other than deemed savings and rebate values, individuals completing the workbook are required to enter operating hours by line item in order to accurately estimate energy consumption and savings.

Additionally, PSE's internal Quality Control (QC) process requires lighting hours rationale documentation to support claimed hours of operation for any project involving the installation of a custom measure.

2.5.2 Program Data Tracking

» PSE uses several databases to track energy savings in the Commercial Rebates Program. A single, comprehensive database with defined ownership would facilitate data analysis and more frequent assessment of program achievements. During the evaluation, Navigant referenced several databases in order to accrue sufficient data to perform the evaluation. For example, the Pre-Rinse Spray Valve sub-program data are found in three primary databases (one of which is reconstructed annually). Although all sub-program data were available in one or a combination of databases, a great deal of Navigant and PSE communication and collaboration were needed to ensure Navigant had all necessary data. This issue was most prevalent for the Pre-Rinse Spray Valve and CFL Markdown programs, where project level data was archived separately from the main Commercial Rebates tracking database. Additionally, typically only the energy savings and rebate amounts were tracked in the main tracking database. Navigant used the project files to fill out the data gaps in the tracking databases—a time consuming process for large sample sizes. Given the requirement for future evaluations, ***Navigant suggests normalization of tracked data and combination of tracking databases as a general best practice.*** Navigant understands PSE's prior awareness of this issue and that a new database is being piloted with the Small Business Lighting Program.

PSE Response: PSE is currently developing functional performance specifications to be incorporated in a Request For Proposal to develop a new comprehensive energy efficiency program management database. In parallel with this enterprise effort, we continue to make incremental improvements in our current tracking processes.

2.5.3 Energy Savings Calculations and Documentation

A. Although already underway at PSE, ***Navigant suggests PSE should standardize business case development and record keeping.*** In some cases, the most up-to-date engineering calculations were not obvious; in occasional cases, the engineering calculations were inaccessible. An archival system with dates/timestamps, authors, and completed/pending updates could facilitate future revisions to business cases as well as future evaluations of programs. Navigant suggests reviewing the Regional Technical Forum and California investor-owned utility (IOU) archival systems.

PSE Response: PSE has standardized the Measure:Metrics business case development process and increased the rigor of analysis with an Energy Management Engineer quality control (QC) review process now required to validate engineering assumptions and analysis approach. Additionally, all cited references are retained Measure:Metrics to ensure they are available for review at a later date.

Furthermore, increased emphasis is being placed on capturing all secondary data sources (project files, etc.) and retaining them in the Measure:Metrics repository.

B. PSE can increase traceability and possibly report more savings if the occupancy sensor reduction factors changed from custom inputs to industry-accepted standards by space type. Navigant suggests the occupancy sensor reduction factors presented in this report and found additional energy savings when recalculating using the adjusted factors. Additionally, ***Navigant suggests a potential strategy using standard factors as the default while allowing contractors to submit custom reduction factors with sufficient evidence.***

PSE Response: PSE currently provides occupancy hours reduction factors based on business type in the Business Lighting Workbook for deemed occupancy sensor rebates. Per unit savings values were developed using the Commercial Building Stock Assessment (CBSA) to determine operating hours by space type, the RTF Lighting Standard Protocol Lighting Calculator Draft (version 12-6-2012) for operating hours reduction percentage provided by an occupancy sensor, and 2012-2013 PSE program participation data for controlled wattage information.

Additionally, contractors or customers entering information in the Custom Measure Workbook may apply a custom hours reduction percentage for each individual line item when occupancy sensors are installed in conjunction with those fixtures. Custom reduction factors are evaluated and vetted through site visits, customer interviews, and PSE's internal QC process.

C. PSE can increase the reliability or accuracy of energy savings forecasts of commercial faucet aerators by implementing an in-service rate factor in the prescriptive savings methodology. In-service rates are the percentage of units rebated that actually get used over the effective lifetime of the measure. In-service rates are typical for such measures with high ease of installation (and removal) and variable customer acceptance. Navigant found 28 percent of the sample aerators were unaccounted for, which translates to a 72 percent in-service rate. These finding was driven by two large projects, thus normalizing for these two projects, ***Navigant recommends building in an in-service rate into the latest business case.***

PSE Response: PSE has already taken several steps to improve accuracy and of savings of faucet aerators:

- **The business case was updated for 2014 and included a more appropriate unit energy savings values.**

- **PSE also began implementing standardized installation expectations for the 3rd party contractor, educating them on where installations are not appropriate due to the increased possibility of removal and minimal faucet usage.**

- **PSE is working with its internal verification team (V-team) to implement inspection protocols to increase installation confidence.**

Additionally, in order to better understand the low realization rate around commercial faucet aerators and to drive the realization rate to 100%, PSE requested Navigant perform additional follow-on field work, analysis, and provide recommendations. The primary result of that work was the determination of individual in service rates by facility type. Realizing that the actions listed above will ensure veracity of savings and increase the realization rates, PSE is reviewing the individual in-service rates reported by Navigant and will include in-service factors in deemed Unit Energy Savings (UES) analyses.

D. ***PSE can increase the traceability and reliability of energy savings for the Premium HVAC Service program by reconstructing or initializing an updated business case.*** Although the current prescriptive energy savings are reasonable when compared to other similar measures outside of PSE, the lack of traceable energy savings could increase the uncertainty in energy savings forecasts and achievements of the program.

PSE Response: PSE has revised the Premium HVAC Business Case. PSE retained Solarc Architecture and Engineering, Inc. to perform computer simulations to establish baseline and post-service conditions for commonly occurring packaged rooftop HVAC systems. In the computer simulations, Solarc used equipment data collected by BPA and PSE as baseline information to establish existing equipment operating conditions. Subsequent computer simulations quantify energy savings from the performance of advanced service procedures. A copy of this report is contained in the business case folder and a copy of the savings tables are contained in the business case. The 2014 updated business case has provided more traceable and reliable results by:

- **Inclusion of well-document assumptions used in each of the computer simulations**
- **Clearly identifying rooftop HVAC equipment energy savings values in 4 commonly-occurring business types**

- **Clear statement of equipment existing condition to rate equipment performance and quantify energy savings.**
- **Use of PSE and BPA metered equipment data as baseline system inputs for computer simulations used to estimate energy savings.**
- **Retention of all documents related to the business case in a folder with clearly labeled, content-specific subfolders.**

Process Evaluation Recommendations

3.3 Process Evaluation Conclusions and Recommendations (Pg. 55-57)

1) **Recommendation:** ***PSE should leverage existing data from within the company whenever possible to limit the amount of information the customers and trade allies need to provide.*** When customers and trade allies do need to provide information, provide a clear list of needed items up front to limit the amount of back and forth.

2) **Recommendation:** ***Provide a transparent and timely system that allows customers and trade allies to see how their rebate is progressing through the PSE process.*** This could include an online system that allows customers and trade allies to log in and check the status of their application.

PSE Response (covering #1 &#2 above): PSE is currently developing functional performance specifications for a new comprehensive energy efficiency program management database with the intent to release an RFP to software providers during 2014. In parallel with this enterprise effort, Business efficiency programs have continued to make incremental improvements in current tracking processes. For example, Commercial Rebate application forms were redesigned in late 2013 by a customer "Touch Points" team focused on customer service improvements. Additionally, a new Business Lighting Program workbook launched in 2014 contains many useful features designed to minimize the amount of input required by the applicant and to reduce duplicate data entry. Commonly used forms are conveniently located in the workbook. The form was designed so that contractors can use the workbook as a quotation form.

3) Recommendation: ***PSE should strive to ensure that program trade allies have access to up-to-date, accurate information about measure eligibility and available funding.*** To align with program operations, PSE's communications with trade allies could include sending trade allies quarterly program updates via email or training sessions so contractors are aware of upcoming program changes in advance.

PSE Response: PSE has updated program literature and created a website landing page dedicated to business customer needs (http://pse.com/mybusiness).

PSE conducted multiple meetings with trade allies in Q4 2013 to prepare for launch of redesigned business lighting incentives in 2014, and continues providing support to trade allies through follow-on meetings and webinars in 2014.

Furthermore, recent expansion of the Contractor Alliance Network (CAN) into commercial programs is helping PSE to create stronger trade ally relationships. Through this network, contractors receive regular updates on program changes and are afforded training opportunities which clarify PSE expectations and participation requirements. The Alliance also provides a trade ally feedback mechanism for PSE's programs and procedures. Closer ties with trade allies will enhance the customer experience by creating greater customer outreach and awareness.

3) **Recommendation:** ***PSE should explore ways of making the quarterly amount and status of available funding more transparent to trade allies and customers.***

PSE Response: PSE spends significant effort creating budgets that are aligned with markets trends and adaptively manages program portfolios such that we do not need to curtail program participation due to underfunding. We continuously update marketing materials to create awareness and interest in PSE programs. Given previous trade ally comments that PSE programs "run out of money" and trade allies "refrain from promoting the program to avoid wasting the customer's time", we believe that this counterproductive and is not in the customer's or trade allies' best interest to perpetuate the idea that PSE programs may not always be available. Therefore, we will not pursue this recommendation.

4) **Recommendation:** ***PSE should continue to cultivate personal relationships with trade allies, and should explore ways to better connect customers with trade allies.*** For example, PSE could market the CAN to business customers to ensure the network is connecting customers with contractors. Marketing tactics could include messaging about how the CAN worked for similar business via case studies and testimonials.

PSE Response: PSE is currently incorporating commercial efficiency programs into the CAN. The main focus has been to strengthen the number of lighting contractors in the CAN through training sessions that train the contractors on the Business Lighting program and the CAN program. In addition, the training session will also provide training on efficient lighting technologies (LEDs, controls, other technologies) to the contractors. PSE will continue to explore the possibility of incorporating more commercial efficiency programs into the CAN in the future.

5) **Recommendation:** ***PSE should arm trade allies with easy to understand information and tools that explain clearly the amount of savings in terms of energy and cost.*** While average savings may be difficult to calculate since projects vary, case studies of similar sector or size programs could help communicate typical scenarios for customers to

consider. A simple cash flow analysis tool for contractors could be helpful in making the sale.

PSE Response: PSE realizes the value in providing savings estimates in cost and units of energy to assist contractors in the sales process. As part of the Business Lighting Program workbook, we have included a project summary box listing energy and cost savings and simple payback. Customers and contractors are able to see the estimated energy savings and simple payback before and after the estimated PSE incentive.

Additionally, PSE is investigating the possibility of including estimated savings values in the closeout documentation sent to participating rebate customers.

Best Practice Recommendations (pp. 61-80)

PSE's adaptive management of energy efficiency programs includes continuous improvement to incentive structures, savings analyses, program operating procedures and marketing strategies. The evaluation report provides many best practice recommendations. PSE's response to each of the recommendations can be placed into one of three categories:

1) Implementing,
2) Under Consideration (*not committing to implement in this ERR, but pursuing dependent on enterprise-wide investments in software systems, etc.*), or
3) Not Pursuing *(not appropriate to implement under current business environment)*.

Responses to the recommendations are grouped into these categories in the sections below:

IMPLEMENTING

Targeted Marketing Recommendations (Pg. 63)

Recommendation: ***Undertake regular market research including penetration analysis for the program.*** What percentage of the commercial real estate stock in PSE service territory has participated in a PSE program? Can this analysis be refined to include segmentation? Utilize program data and compare it to data from public records kept by constituent municipalities, the Commercial Building Stock Assessment (CBSA), Commercial Building Energy Consumption Survey (CBECS), or other databases.

PSE Response: PSE is pursuing this recommendation along multiple paths:

1) **PSE has established a Customer Intelligence team focused on improving PSE's understanding of customers, their facilities and needs.**
2) **PSE is pursuing a new Customer Relations Management (CRM) system to enable better tracking of customer participation in energy efficiency programs, as well as**

other interactions with PSE, to better understand both program participation rates as well as customer propensity to participate in additional and/or new programs. This is an enterprise-wide investment dependent on multiple departments external to Energy Efficiency, therefore a firm project timeline has not been established and system specifications are still under development.

3) **PSE is supporting additional oversampling of facilities within its service area in conjunction with the regional Commercial Building Stock Assessment (CBSA).**

Recommendation: ***Identify corridors of "empowerment zones" where DI or community blitzes will be particularly effective***. Other utilities have a list of specific geographic areas with a high concentration of low income small businesses, which make good candidates for community blitz events, or door-to-door direct install campaigns.

PSE Response: PSE seeks to maintain equity in program availability throughout its service area and across all customers, but recognizes some customers and communities require greater encouragement to participate in programs. To address this need, PSE has expanded its outreach staff and in 2014 created a new outreach, education & events team led by a new Manager of Energy Efficiency Outreach. This team leverages internal relationships with PSE's Customer & Community Engagement Teams and external relations with community leaders and efficiency/sustainability focused organizations to target customers needing additional encouragement to participate in PSE's efficiency programs.

Recommendation: ***Recruit program staff, trade allies, or auditors with connections to target communities***. Several urban utilities we spoke with actively recruit bilingual and/or bicultural trade allies or auditors. This effort can be as simple as identifying and recruiting non-participating contractors that could provide inroads into these target markets, or directly recruiting qualified staff from community colleges. Targeting members of bilingual and bicultural communities within cities can yield significant increases in program participation even after only one community member participates, as word of mouth often spreads quickly through these communities.

PSE Response: PSE has experienced success through interactions with bilingual and/or bicultural trade allies. An example of this success was increased program awareness through word of mouth advertising among bilingual members of the Coin Laundry Association. PSE developed prescriptive rebates for commercial laundry hot water heaters and boilers in response to this growth in program interest and out of need to simplify communications to aid in overcoming language barriers. Additionally, PSE's provider of the Small Business Direct Install program has a multilingual call center available to assist in overcoming language barriers encountered in program delivery.

Recommendation: ***Other possibilities for application of this [targeted marketing] strategy include targeting DSM program efforts where there are transmission and distribution constraints***. Deferring transmission and distribution upgrades is highly valuable and changes the cost effectiveness of DSM solutions. "Geo-targeting" DSM efforts in this way is a strategy under development in a number of utilities around the country. This approach falls under the category of "Big Data" or advanced data collection and analytical methods.

PSE Response: PSE utilizes this approach. For example, a targeted DSM initiative was conducted at Point Roberts in 2012. Point Roberts is geographically isolated by international borders (must pass through Canada to travel to Point Roberts by land), increasing power transmission and system maintenance costs in this portion of PSE's service area. A targeted effort by both Residential and Business Programs enabled the implementation of a significant quantity of energy efficiency measures while minimizing border crossings by PSE staff and implementation contractors. This focused effort resulted in the installation of 841 Small Business Direct Install program measures, delivery of Energy Smart Grocer services at four facilities, completion of 28 HomePrint™ assessments, and 41 residential duct sealing/direct install visits. A similar approach was taken in 2008 to reduce loading on a substation in the Renton area. 117 of 205 customers on a heavily loaded circuit were contacted with 46 customers agreeing to have a detailed energy audit. 17 (37%) of customers receiving audit reports implemented one or more of the suggested measures.

Customer Recognition Recommendations (Pg. 64)

Recommendation: ***Use repeat customers to provide testimonials and generate case studies for future marketing efforts***. Have PSE staff think of one customer that provided positive feedback about the program last year. Ask if the customer would be willing to be featured on the website. The feature could be anything from a simple quote to a fully articulated case study and video documentary.

PSE Response: PSE is using this approach through customer recognition ads and case studies. These materials are available online at pse.com, printed as handouts for distribution by PSE staff when interacting with customers and trade allies, and published in print media targeted at business customers.

Recommendation: ***Give small businesses a window sticker or certificate for participation***. Window sticker advertising is common in the small business sector, used effectively by companies like Yelp, Zagat, TripAdvisor, and many others. A PSE-branded window sticker could potentially include lifetime energy savings, carbon mitigation, and payback period estimates. A certificate or plaque, such as that used by the U.S. Green Building Council's Leadership in Energy and Environmental Design (LEED) ratings, may be more appropriate for larger facilities such as schools and municipal offices. In the energy efficiency sector, the U.S. Environmental Protection Agency Energy Star™ program has been very effective at distinguishing products, homes, and businesses with their labels, yard signs, and certificates.

PSE Response: PSE has provided window stickers to participants of the Small Business Lighting program for nearly four years and is expanding this to other programs. To ensure these stickers actually get placed in windows, PSE is beginning to ask third party program implements to affix the sticker to a window rather than leaving behind for the customer to affix at a later date. Additionally, a project completion certificate has been developed for customers and is accompanied by a project summary factsheet suitable for circulation by email or inclusion in the customer's company newsletter, etc. This project "wrap-up" packaged is currently being utilized in the custom grant program and, depending on customer feedback, may be expanded into commercial rebates and other programs.

Recommendation: ***Create a dedicated role at PSE to develop pilot approaches for customer outreach.*** Consider a pilot program with an intern or university student dedicated to discovering the energy needs of a small business segment and advertising directly to that segment. This program could be similar to the Resource Conservation Manager (RCM) program, but rather than targeting a single company or building, they are dedicated to achieving savings within a particular small business segment. This SB-RCM could work to develop case studies, perform market penetration analyses, or implement any of the other recommendations mentioned in this section.

PSE Response: PSE created an Energy Efficient Communities team to focus on this, which has been expanded in 2014 and is now led by a new Manager of Energy Efficiency Outreach. This team works with local business and community organizations to identify and act on opportunities to create greater awareness of and participation in business efficiency programs.

Also, a program similar to the RCM program, call Strategic Resource Management (SRM), has been launched in 2014 to target smaller customers not large enough to participate in the RCM program. SRM is being implemented by a third party that aggregates multiple smaller sites into a group for which RCM-type services are cost effective.

Developing a Sales Culture (Pg. 66)

Recommendation: ***Cultivate relationships with trade allies, and train them to be program ambassadors.*** Specifically train trade allies in sales techniques; help them to understand the customers' needs and tailor their pitch to promote the appropriate aspects of the program. Encourage the trade allies to mention PSE in their sales efforts and co-brand with PSE to lend credibility to their efforts.

PSE Response: The Contractor Alliance Network (CAN) has been expanded to include commercial lighting and HVAC contractors. As of May 2014, there are more than 30 commercial sector contractors enrolled in the CAN receiving training in the delivery of PSE

energy efficiency incentive programs to customers and authorization to use co-branded marketing materials.

Recommendation: ***Implement advanced incentive techniques where applicable***. If the program wishes to experiment with more sophisticated rebate offerings, be sure to closely monitor program participation and make arrangements to measure the effects of the changes.

PSE Response: "Advanced" incentive techniques utilized in PSE's business rebates programs have included point-of-sale (instant) rebates to customers who purchase energy efficient lighting and energy efficient commercial kitchen equipment. These techniques have utilized sales person incentives, commonly referred to as "SPIF," to motivate vendors and distributors to make the extra effort required to encourage customers to purchase high efficiency equipment utilizing PSE incentives. PSE also uses an "Assignment of Funds" option, enabling incentive payment directly to the contractor installing an efficiency measure to streamline paperwork and accounting for the customer. PSE closely monitors all incentive mechanisms and proactively modifies offerings as required to maintain customer and trade ally participation without providing overly generous incentive amounts or overly burdensome program participation requirements.

Recommendation: ***Develop performance based incentives for key account representatives and trade allies***. Consider developing a system that rewards PSE staff or trade allies with incentives for increasing program participation, meeting savings targets, or delivering high quality work ahead of schedule. Such a system can be an effective motivational tool to encourage innovation throughout the program.

PSE Response: Approximately eight percent of Business Services account representative compensation is funded by PSE's Business Energy Efficiency programs. Account representatives routinely discuss relevant energy efficiency program offerings with customers and provide quarterly reporting of their energy efficiency engagement activities to Business Energy Management. The Contractor Alliance Network (CAN), which currently has more than 30 contractors enrolled in the areas of commercial lighting and HVAC, is a performance-based program requiring positive customer satisfaction and has project delivery quotas to achieve higher tier membership in the program.

Coordinated Rebate Processing: Recommendations (Pg. 69)

Recommendation: ***Assign staff to specific roles to capitalize on their skillsets***. Often highly qualified utility program staff spend considerable time processing and reviewing rebate applications. Ideally, administrative staff can process simpler prescriptive rebates, which will give the qualified engineers an opportunity to perform quality control on custom projects and field inspections on projects that lack sufficient documentation.

PSE Response: A reorganization of Energy Efficiency staff has been implemented in 2014, centralizing prescriptive rebate processing and verification functions into a common team that leverages administrative staff to review and process rebate applications, freeing up rebate program managers to focus on program planning, development, reporting and relations with trade allies and customers.

Recommendation: ***Establish checklists for paperwork review***. Standardized checklists will expedite quality control and rebate application review, and improve the program's consistency. Having a checklist for every step of application review ensures that each application only needs to be touched once by a particular staff member, and reduces the likelihood that an application will be delayed or need to backtrack through the process.

PSE Response: All business rebates utilize a review checklist for the following steps: 1) initial project intake, 2) project processing, 3) QC review, 4) management approval, and 5) final payment processing. Over time, these checklists have grown to include numerous check boxes, with multiple individuals frequently checking the same items. Recognizing a significant amount of time is required to perform QC checks, opportunities for streamlining and building "failsafe" controls into software systems to eliminate the need for select QC review items are being investigated.

Recommendation: ***Request that the rebate processor provide monthly metrics about average processing time, the number of applications processed, and any notable issues with the applications***. Demonstrating an interest in the rebate processor's progress will motivate their staff to be quick and thorough. Customers rarely know the difference between a utility and an implementation contractor, so oversight of the rebate processor is important to ensure customer and trade ally satisfaction. The mere act of reporting and tracking rebate processing metrics can help improve the rebate processor's efficiency and attentiveness to process improvements.

PSE Response: Rebate processing times are monitored for both internally processed and third party processed rebates. In 2014 a reorganization of Energy Efficiency staff has occurred to centralize internal prescriptive rebate processing and verification functions into a central team to enable greater focus on processing times. Third party rebate processors have exhibited a good track record of fulfilling rebate processing timelines, leading the business rebates team to outsource some rebate processing functions for the first time in 2014.

Recommendation: ***Establish internal limits on rebate processing time, and provide employee incentives for process improvements***. Provide incentives to PSE or the rebate processor's employees (formal recognition, competitions, bonuses, etc.) to expedite paperwork processing time. Set firm and realistic deadlines for batches of paperwork to be fully processed.

PSE Response: To expedite paperwork processing time, a reorganization of Energy Efficiency staff has been implemented in 2014, centralizing the residential and business rebate processing teams to enable cross-training of staff to enable shifting of resources when specific programs experience high volumes of activity to maintain acceptable rebate processing times. This team is currently in its initial stages of formation, but as its operational strategies are formalized expectations on rebate processing times will be established.

Application Process Recommendations (Pg. 70)

Recommendation: ***Consolidate all forms on a single web page to simplify the customer's process***. The customer-facing website should make it easy to compare rebate applications. Some programs even have "universal applications" that are not measure or program specific to simplify the customer experience. If a universal application necessitates a costly process redesign, a least-cost method for simplifying the customer experience is to consolidate all the forms needed for any rebate application onto a single web page.

PSE Response: In late 2013, a customer "touch points" focus group on rebates processing initiated a redesign of both residential and business rebate applications. Where possible, application forms were consolidated per the recommendation. Additionally, in 2014 PSE has established a single landing page with quick links to all business efficiency programs and business account management services at *www.pse.com/mybusiness*.

Recommendation: ***Create a roadmap of the customer experience.*** Determine time spent on the various tasks and review the flowchart for bottlenecks. Make an effort to see the program from the customer's perspective. Work with a customer through the rebate process from start to finish, and record their feedback in real time. Consider web site usability testing—a type of research that observes customers using the website while they vocalize their thought processes. Physically draw a map of the customer experience, identify the number of discrete actions they need to take to participate in the program, and determine if it is possible to eliminate or streamline some of those actions. This process has proven successful among many private-sector companies offering complex services to customers, including utility companies. If this proves to be a successful exercise, map the experience of a company attempting to join the Contractor Alliance Network, a partnering vendor, a trade ally submitting a batch of applications, or the experience of any other crucial member of the program's ecosystem. Understanding how these parties interact with the program on a practical and everyday level can lead to numerous insights about how to streamline the overall program operations.

PSE Response: In late 2013 a customer "touch points" focus group convened full time for 30 days to map out the customer experience in participating in both residential and business rebates. Many process changes have been implemented as a result of this effort, including a

major reorganization of Energy Efficiency program staff to streamline rebate processing and significant rebate application redesigns. While website usability testing has not been conducted, significant enhancements to website design have occurred, including development of a single landing page with quick links to all business efficiency programs and business account management services at *www.pse.com/mybusiness*. Furthermore, PSE communications staff has performed analytics on website traffic regarding business energy efficiency incentives between December 2013 and February 2014 and is using this data to improve website structure and design.

Forming Partnerships Internally and Externally: Recommendations (Pg. 72)

Recommendation: ***Add value and build trust among trade allies by offering classes and trainings to educate them on program offerings and new technologies***. In interviews, PSE staff expressed a specific interest in cultivating interaction among other PSE DSM programs. PSE could host events where staff from other programs join members from the CAN to learn about program offerings, technical best practices, or new technologies. Contractors, equipment dealers, and installers acting as program partners can serve as highly effective ambassadors for all DSM programs, not just the programs they represent.

PSE Response: ***Internally*****, the approach currently taken by PSE to cultivate interaction and knowledge transfer between programs is the use of "embedded" staff from Corporate Communications, Energy Efficient Communities, Energy Advisors, and Contractor Alliance Network teams in both residential and business efficiency programs. The "embedded" staff members attend all business and residential team staff meetings and are focused on developing comprehensive approaches to interacting with customers and trade allies. A specific area of focus in 2014 is "cross-pollination" between business and residential programs, which may be accomplished by informing employees of efficiency programs they may use in their home when PSE is on site at a business communicating about business efficiency programs.**

Externally**, it has been PSE's experience that contractors, equipment dealers and other trade allies tend to be focused intently on either commercial or residential markets, with occasional overlap tending to occur in the small commercial sector. Therefore, efforts to make trade allies "ambassadors for all DSM programs" has been structured around awareness and general promotion rather than expecting trade allies to have in-depth knowledge of PSE programs across both residential and business sectors.**

Recommendation: ***Consider organizing a yearly trade ally conference to recognize successful projects and assemble case studies***. Provide awards for the most savings per trade ally, meet with trade allies on a quarterly basis to share ideas, convert them to program ambassadors, and obtain frequent feedback from the field.

PSE Response: PSE supports a major event each year to promote trade ally and customer interaction (West Coast Energy Management Congress in even years & Powerful Business

Conference in odd years.) These events routinely include presentations on successful projects and latest innovations in energy efficiency programs. Additionally, PSE provides awards and recognition to trade allies and customers who successfully participate in energy efficiency programs. Awards have been given not only for most savings, but also for highest customer satisfaction, quality of work and quantity of projects completed. PSE also frequently solicits feedback from the field by holding focus group meetings with trade allies to inform program modifications and new program design. Recent examples include focus groups with lighting contractors in developing new business lighting incentives for 2014, focus groups with commissioning agents to inform modifications to the Comprehensive Building Tune-Up (CBTU) program in late 2013, and meetings with resource conservation managers to guide program modifications for 2014 made in response to impact and process evaluation results of 2013.

Adapting: Recommendations (Pg. 77)

Recommendation: ***Consider a comprehensive potential study.*** In the long term, Navigant suggests a comprehensive energy efficiency potential study. The goal of such a study would be to provide the technical, economic, and market (achievable) potential for electric and gas energy savings in PSE's service territories and to provide a range of possible outcomes considering uncertainties in key study inputs. Such a study would help PSE more precisely target its efficiency programs where the energy efficiency potential is greatest.

PSE Response: PSE completes a Conservation Potential Assessment every two years in developing its Integrated Resource Plan.

Recommendation: ***Develop and test a methodology for forecasting program participation.*** Use program data and supplemental data from third party sources to examine trends of electric and gas savings by participant type, time of year, or the effectiveness of past marketing efforts. Update the forecast on a monthly basis when new data is received from implementation contractors. Compare the ex ante forecast with the reality at the end of the year to refine and reiterate the forecasting methodology. Forecasts of program participation can also leverage efforts outlined in the marketing section—for instance, the forecast could be informed by the potential customers' propensity-to-participate scores.

PSE Response: Forecasting and review meetings are held every month by the entire Energy Efficiency team (Residential, Business, New Program Development & Verification, Communications, etc.) to review program performance trends and expenditures. Progress toward annual savings goals is tracked, compared to previous years and forecasted for remaining months of the year with market trends and external drivers reviewed and discussed.

Recommendation: ***Establish a "pipeline" of projects that can be tapped if programs are below targets.*** Track previous customers and determine if they are likely to participate again as part of

PSE's customer relationship management (CRM) strategy. Implement the marketing ideas mentioned in previous sections if the program is below targets. Use CRM to establish relationships with customers in the "pipeline" that may be willing to delay a project until the following year if the program is on track to exceed goals.

PSE Response: PSE continuously monitors its "pipeline" of projects through regular check-ins with third party program implementers, trade allies & vendors, as well as monitoring progress of contracted custom grant projects which typically have a longer timeline for completion. PSE generally does not like to ask customers to delay projects and normally encourages early completion where possible, even if it results in a program exceeding its goals.

Recommendation: ***Develop a list of actions to take based on the results of a forecast.*** Such a list can include the most dispatch able measures, communities or companies that are part of the project pipeline, pre-approved applications that can serve as leads for members of the CAN, and many other actions.

PSE Response: Forecasting meetings are held each month by all Energy Efficiency teams (Residential, Business, New Program Development & Verification, Communications, etc.) to review program performance and progress toward achieving savings goals. These meetings conclude with a review of action items that program teams will take to adaptively manage energy efficiency program operations to remain on track to meet or exceed overall savings and budget goals of the program portfolio.

Leading: Recommendations (Pg. 79)

Recommendation: ***Increase utilization of social media***. Social media is becoming an increasingly important means of communication among consumers. Consider expansion of the utility's social media presence. Move communications away from mail to email, tweets, and text messages. Social media is an excellent platform to build program awareness and increase customer satisfaction. An effective strategy for social media is to create social media profiles of energy efficiency "characters" and monitor these accounts on a continuous basis. Social media platforms may also be effectively utilized to obtain customer feedback in real time. PSE has been commended for its existing social media efforts, with positive responses for its Twitter and Facebook presence.

PSE Response: The Business Energy Management team has begun using social media to a greater extent. For example, in May 2014 PSE will be posting approximately 40 "shout outs" to customers via Facebook praising them for making energy efficiency an important part of their business and thanking them for recently completing an energy efficiency upgrade with

PSE funding. Greater emphasis has also been placed on utilizing Twitter to create customer awareness of energy efficiency program activities.

UNDER CONSIDERATION

Targeted Marketing Recommendations (Pg. 63)

Develop a methodology for assigning propensity scores to potential program participants. Performing data analytics on current program participants allows some programs to target efforts toward customers most likely to participate. These customers are assigned a "propensity score" based on their business type, history of program participation, billing data, location, membership in community organizations, and other factors.

PSE Response: In 2013 PSE completed an Energy Efficiency Propensity Modeling Pilot. This pilot operated in the residential sector with a focus on owners of single family homes. Propensity models were developed and, based on the model results, targeted campaigns were conducted to recruit customer participation in PSE's water heat, weatherization, refrigerator decommissioning and HomePrint™ programs. Results of the pilot showed promising results with follow-on work under consideration once the new Customer Information System is stabilized. Implementation is expected to first occur in the residential sector since there is a greater connection between the individual responsible for bill payment and the decision maker for energy efficient purchases and practices.

Customer Recognition Recommendations (Pg. 64)

Recommendation: ***Highlight non-energy benefits with case studies.*** Advertisement of non-energy benefits of the program is currently a priority for PSE staff. A case study is a great way to highlight water savings, better lighting quality, increased comfort, indoor air quality, free publicity, or other non-energy benefits of the program.

PSE Response: Increased emphasis on non-energy benefits efficiency measures will be considered in developing future advertising and marketing content.

Recommendation: ***Create "accounts" to add convenience to repeat customers.*** Customers that participate in the program multiple times or across multiple business locations should receive special treatment. Having an account that tracks their participation would allow rebate forms to be pre-populated and expedite processing. Reliable customers could qualify for enhanced rebate offerings, special financing options, or other perks.

PSE Response: PSE seeks to maintain equity and fairness in program delivery across its customer base and works to avoid providing special or preferential treatment to specific customers.

PSE is pursuing a new Customer Relations Management (CRM) system to enable better tracking of customer participation in energy efficiency programs, and this system will likely contain the recommended feature of pre-populated forms, which may lead to faster incentive

processing. The CRM is an enterprise-wide investment, dependent on multiple departments external to Energy Efficiency, therefore a firm project timeline has not been established and system specifications are still under development.

Enhanced rebate offerings are currently part of PSE's incentive structure. An example of this is the Enhanced Lighting offering for comprehensive projects that implement all cost effective lighting measures identified at a facility in a single project.

Recommendation: ***Proactively call certain customers***. Most customers only talk to their utility company when they have a problem. A best practice is to find a positive reason to call a customer. Because of high turnover in commercial real estate, there are many new customers each year. An informational, proactive phone call during the first three months of service can improve customer satisfaction and increase program participation. On the call, the PSE representative can ask the customer if they have any questions about their service, or are interested in knowing which rebate programs they may qualify for. For repeat customers, make it a policy to personally call and thank customers that achieve a certain amount of savings for the program.

PSE Response: PSE has begun to be more proactive in its communication with business customers. In 2013 PSE differentiated its approach to management of inbound business customer calls with the creation of business accounts phone and email contacts. Additionally, outbound calls were made to business customers by Business Services staff in 2013 during the transition to a new Customer Information System (CIS) and energy efficiency program messaging was included in this communication.

Significant work is also underway to improve the customer on-boarding process for new accounts. These efforts are primarily addressing non-energy efficiency concerns at this time, but as processes are improved the addition of proactive energy efficiency messaging will be considered.

While not a personalized call, PSE is proactively reaching out to business customers through its energy efficiency programs by operating a Business Energy Reports pilot program through Opower that is targeted to communicate with up to 10,000 business customers about their energy use and opportunities for energy savings beginning in late 2013. Also, to say "thank you" to customers for their participation, a project completion certificate has been developed for customers and is accompanied by a project summary factsheet suitable for circulation by email or inclusion in the customer's company newsletter, etc. This project "wrap-up" packaged is currently being utilized in the custom grant program and, depending on customer feedback, may be expanded into commercial rebates and other programs.

Developing a Sales Culture (Pg. 66)

Recommendation: ***Bulk Discounts:*** "We want it all, and we are willing to pay for it!" – proclaims PSE's website describing the whole building lighting retrofit incentive bonus.

Perhaps similar bonuses could be applied to other programs, such as providing an enhanced incentive for installing variable speed drives on every HVAC unit serving a particular building.

PSE Response: PSE currently deploys this strategy with its Enhanced Lighting, Small Business Direct Install, and New Construction Whole Building Approach offerings. Additionally, bundling of measures is an available option under the Custom Grant program to enable longer payback measures to be combined with short payback measures to create a larger comprehensive project with greater savings and an acceptable return on investment. However, opportunities for improved promotion of comprehensive upgrades likely exist and will be investigated in future program planning efforts.

Recommendation: ***Upselling:*** United Illuminating in Connecticut provides a 10 percent bonus on incentive payments for projects that address multiple end-use categories. A project can potentially earn a 20 percent bonus by addressing lighting, HVAC, and refrigeration. This encourages a comprehensive approach for energy efficiency, and may provide an opportunity for a cash-strapped business to undertake more expensive HVAC upgrades in conjunction with relatively inexpensive lighting upgrades.

PSE Response: PSE has used "upselling" approaches to effectively encourage more in-depth projects in the areas of lighting retrofits (Enhanced Lighting) and new construction (Whole Building Prescriptive Approach). Additionally, PSE allows bundling of measures in the Custom Grant program to encourage more comprehensive projects that still offer the customer an acceptable return on investment. However, feasible opportunities for additional "upselling" likely exist and will be investigated in future program planning efforts.

Application Process Recommendations (Pg. 70)

Recommendation: ***Consider implementing an online application***. Online applications have the potential to be very convenient for program staff, expedite rebate processing time, and reduce errors. However, a complex measure may not be appropriate for an online form, as customers can experience dissatisfaction due to browser time-out or refresh errors. Automatic error checking should not withhold information from those filling out the form, nor prevent them from filling in a certain portion of the form. Instead, error checking is most effective as "flags" that warn participants of missing information, unrealistic numbers, or other potential flaws. This system is best piloted with certain programs before attempting a portfolio-wide rollout. In any case, customers should always have a paper alternative to the online form.

PSE Response: Online applications are being pursued, but a timeline for implementation is uncertain depending on enterprise-wide software investments. An online application is currently being testing for the Business Lighting program, but submitted information does not automatically populate the CSY project management system, requiring manual transfer of data. Ultimately, an online application process in which customer account and contact information is automatically populated in form fields and energy efficiency measure

information is automatically loaded into the project management system is desired. Implementation timeline will be dependent on timing of investments in Customer Relations Management (CRM) and Demand Side Management (DSM) software systems.

Functional Databases: Recommendations (Pg. 71)

Recommendation: ***Expand on the Oracle database to consolidate PSE customer information into one place.*** PSE is currently in the process of piloting an Oracle database for the Small Business Lighting Program to shift away from a large and nearly dysfunctional Excel spreadsheet. Navigant recommends using this transition period as an opportunity to consider the myriad capabilities of a sophisticated database. Customer billing data, past program participation, future program eligibility, and a record of interactions with PSE should all be searchable by customer account number.

PSE Response: PSE's Energy Efficiency department is currently pursuing a comprehensive upgrade to a new program management software platform that will consolidate multiple databases including CSY, CMS and Excel tracking spreadsheets. At this time, functional performance requirements are being developed with the intent of issuing an RFP for software providers in late Q2 2014.

Recommendation: ***Permit different parties to edit certain information in the database so it becomes a tool for collaboration.*** Consider allowing input from members of the Contractor Alliance Network. Some utility databases have a page for each customer, where the contractor can add qualitative and quantitative data about the customers' specific building, propensity to participate in future programs, and levels of customer satisfaction. These data can then be used to inform future program plans and marketing efforts.

PSE Response: PSE is currently pursuing a comprehensive upgrade to a new program management software platform. Opportunities for third party access to the database with potential editing capabilities will be considered as appropriate during the project. Security of program data and confidential customer information will need to be ensured.

Forming Partnerships Internally and Externally: Recommendations (Pg. 72)

Recommendation: ***Partner with financing organizations to shorten payback time for cash-strapped businesses.*** Energy efficiency financing is complex yet widely successful in a variety of contexts. The numerous caveats and considerations associated with offering financing packages to cover the upfront cost of efficiency are beyond the scope of this best practice review. However, many utilities have unlocked huge savings through the use of financial mechanisms. Several utilities Navigant interviewed suggested that financing a project so it is immediately cash flow positive for a business can substantially broaden the customer base and increase program appeal. Consider developing a simple cash flow analysis tool to aid trade allies in explaining the implications of EE investments and the use of financing on monthly cash flows to aid them in making a sale.

PSE Response: PSE continues to weigh the risks and benefits of involvement in project financing and may pursue options such as financing or equipment leasing to enable greater customer participation in energy efficiency programs.

Recommendation: ***Capitalize on potential spillover from other programs, even residential.*** Small business owners also tend to be homeowners. Provide those who interact with customers on a daily basis with brochures describing the overall DSM portfolio and suite of potential incentives to leave behind after a successful audit or installation. Train customer-facing program representatives (e.g., trade allies, vendors, implementation contractors) to answer questions and promote all of PSE's program offerings. For vendors, PSE could provide retailers with point-of-purchase marketing materials, in store applications, training, and other tools to encourage store staff promotion of the program.

PSE Response: PSE's Energy Efficient Communities team is focused on developing comprehensive approaches to "cross-promoting" residential and business efficiency programs. Additionally, literature and information regarding PSE's efficiency programs (both residential and business) may be provided to third party program implementers for distribution when on site interacting with business customers to raise their awareness of additional business efficiency incentive programs as well as residential programs for their home.

Recommendation: ***Work with local organizations to help facilitate the "community blitzes" for marketing.*** Some examples of local organizations for outreach include Washington Restaurant Association, Northwest Environmental Business Council, Building Owners and Managers Association (Washington Chapters), Building Industry Association of Washington, Northwest Energy Efficiency Council, Northwest Energy Coalition, Washington State Hotel and Lodging Association, National Association of Industrial and Office Properties (Washington Chapter), Washington Retail Association. Other partnerships could be formed through collaboration with PSE's Energy Efficient Communities Program.

PSE Response: PSE typically collaborates with these organizations on "sector" outreach and program promotion initiatives while coordinating community blitzes with local agencies such as Chambers of Commerce and government officials. However, PSE will consider opportunities for increased collaboration with these organizations in supporting local community blitz initiatives.

Adapting: Recommendations (Pg. 77)

Recommendation: ***Collect additional data on program participants.*** In the near-term, Navigant has suggestions for how to improve the reliability and predictability of program performance. Table 29 outlines the additional data for PSE's consideration, in order to identify

and capitalize on significant savings opportunities and to identify gaps in current program design.

PSE Response: PSE leverages much of the data listed in Table 29 that is purchased through Dun & Bradstreet, collected from publicly available county property assessor data, and compiled internally from PSE's Customer Information System and CSY energy efficiency program management database. While this data is currently used on a case-by-case and as-needed basis for specific projects, PSE is considering utilizing this data at a greater level. One example of this is the Small-to-Medium Business Energy Reports pilot that has commenced in 2014. PSE is using this, as well as other, data to identify like type businesses and proactively engage with them regarding their energy use and savings opportunities.

Leading: Recommendations (Pg. 79)

Recommendation: ***Implement a portal for real-time customer feedback***. Implementation of a portal for real-time customer feedback can be achieved through social media or online chat assistance on the utility website. It is also important to obtain real-time feedback from customers through ongoing surveys.

PSE Response: Energy efficiency program teams are considering opportunities to obtain more real-time customer feedback. In 2013, the Business Energy Management team mapped out all points of interaction with customers throughout an energy efficiency project cycle and identified feedback information that would be beneficial to program management at points along the way. The team is currently considering opportunities to gather "real-time" data in addition to the current project evaluations given to customers after an incentive is paid.

Recommendation: ***Engage customers through creative measures***. Engaging customers through creative measures, such as online videos, contests, and promotions is an effective strategy to increase participation and awareness. PSE was commended for its "Rock the Bulb" social media contest to promote energy efficiency. PSE was also recognized for posting a short video documentary of its wind power development activities. Another example of success is from Southern California Edison, which developed an award-winning mini-video series to promote energy efficiency.

PSE Response: PSE is considering expansion of its "creative" approaches to engaging customers in the business sector and weighing the costs versus benefits of online videos, etc.

NOT PURSUING

Developing a Sales Culture (Pg. 66)

Recommendation: ***Time sensitivity***: Salt River Project effectively communicates remaining rebate funds to contractors and customers with a "meter" (shown below in Figure 19) on each program's homepage. This simple, transparent communication of remaining incentive budget builds trust with trade allies, and instills potential participants with a sense of urgency.

PSE Response: PSE does not limit program participation to budgeted amounts – if a program is running strong and outperforming its targeted budget and/or savings in a program cycle, PSE will reallocate funds from other programs, etc. to continue meeting customer demand and achieving all cost-effective conservation. Much effort has been invested in dispelling the myth that PSE's conservation programs "run out of money" and may not be available at the time a customer wishes to participate. While a "meter" may drive increased participation by instilling a sense of urgency, it would likely also create confusion about availability of funding, especially near year-end as targeted savings and expenditures are reached, and often exceeded.

Forming Partnerships Internally and Externally: Recommendations (Pg. 72)

Recommendation: ***Educate PSE call center employees on the status of the program***. Organize meetings between call center staff, key account reps, and implementation contractors. Be sure program information is passed to new employees in areas of high turnover. Ultimately, trade allies, account representatives, utility staff, call center staff, and implementation contractors should all be trained to assist the customer (at various levels of detail) with technical or program information. At a minimum, each party should have a clear idea of where to direct a customer if they themselves do not have an immediate answer.

PSE Response: The short-term approach taken to improving the business customer experience has been creation of a unique business call center number which routes callers directly to Business Services staff and Energy Advisors who are familiar with business energy efficiency program offerings.

There are no immediate plans to educate all call center employees on business energy efficiency programs. PSE's long term strategy to enable more broad dissemination of energy efficiency program information is to leverage the Customer Information System (CIS) and potentially a new Customer Relations Management (CRM) platform to provide prompts with scripted content to call center staff to enable general conversations regarding program offerings, but the dedicated business call center number is likely more effective for connecting business customers with information regarding business energy efficiency incentives.

Adapting: Recommendations (Pg. 77)

Recommendation: ***Plan budgets on a longer term (three year) cycle to develop consistency for businesses that depend on the program***. If ramping or curtailing of program savings must occur, it is beneficial to plan budgets on a long term cycle. With longer term planning, the need to suspend programs that are delivering above savings targets, or spend excess marketing dollars on programs which are below targets, is rare. Infrequent ramping and curtailing of programs adds some consistency to the economic actors dependent on program incentives. Price certainty enables contractors in the CAN to make investments in training their personnel and using the correct equipment—both factors that lead to market transformation.

PSE Response: Shifting from a two-year to a three-year program planning cycle would misalign energy efficiency program operations with biennial requirements of the State of Washington's Energy Independence Act RCW 19.285. Therefore this will not be pursued at this time.

Recommendation: ***Be transparent—do not hesitate to communicate budgetary constraints or program savings goals to trade allies, vendors, and customers***. Salt River Project developed a tool on their program website that clearly shows the remaining rebate funds for the year. Use the relationships that PSE has established with vendors, contractors, and customers to communicate program goals and budgetary constraints. Consistent communication will help to build trustworthy relationships with these program partners, and may result in alliances with PSE staff in order to meet targets to ensure the program continues in subsequent years.

PSE Response: PSE makes great effort to be transparent with its trade allies, third party program implementers, customers and regulatory advisory groups. Energy efficiency program teams are constantly in communication with their constituents and adaptively managing expectations to maintain program performance. The Business Energy Management team believes a website graphic or other communication displaying "remaining rebate funds" for the year would add to the myth that PSE's programs "run out of money" and that funding may not always be available. In recent years PSE program teams have gone to great effort to make customers aware that, while we may occasionally have promotional or bonus offers, our programs are always available to provide funding according to their project's timeline.

NAVIGANT

Commercial Rebates Programs Evaluation

Pre-Rinse Spray Valve Program Faucet Aerator Study

Addendum to Final Report

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1 Introduction

Puget Sound Energy (PSE) has requested Navigant's consideration and proposal of additional scope concerning the 2011-2012 Commercial Rebates Program evaluation. The results of the original evaluation indicated relatively low energy savings realization rates for the Pre-Rinse Spray Valve program. Through the program, a PSE implementation sub-contractor replaces standard-flow pre-rinse spray valves and faucet aerators with low-flow units through direct installation. Faucet aerators comprise nearly 80-percent of the electrical energy savings and 70-percent of the natural gas energy savings in the program. Navigant's initial evaluation resulted in relatively low energy savings realization rates for faucet aerators due to a combination of the following measurement and verification (M&V) findings:

- Inaccurate assumptions in the unit energy savings (UES) calculations
- Discrepancies in reported fuel sources
- Low post-installation persistence (e.g., vandalism, end-user replacement, etc.)

Prior to Navigant's evaluation, PSE revised the UES calculation methodology to better reflect use profiles of commercial faucet aerators. PSE intends to implement the updated UES in 2014 and seeks to optimize the calculation methodology based on additional faucet aerator evaluation. Navigant proposed to conduct additional M&V for faucet aerators to address the following questions:

- Which building types and faucet applications are most commonly included in the program?
- What are the comparative impacts of discrepancies in reported fuel sources and low post-installation persistence?
- What is an appropriate in-service rate for faucet aerators?
    - Do in-service rates differ by building type, fuel source, application, etc.?
- What data should PSE's verification team (V-Team) collect for quality control of faucet aerator installations?
- What installation guidelines can PSE implement to improve the realization rates?

In order to address these questions, Navigant designed a targeted evaluation of faucet aerators. Specifically, Navigant sought an increase in the confidence interval and relative precision of the realization rate and in-service rates as well as providing any additional recommendations for the design of the program uncovered in the targeted evaluation.

1.1 Impact Evaluation Scope

The Impact Evaluation addressed the following research objective to quantify savings across the Pre-Rinse Spray Valve Program, specifically targeting commercial faucet aerators:

- Thoroughly review existing tracking systems, secondary literature, and best practices literature to guide the development of the impact evaluation framework.

- » Develop a 90/10 confidence/precision sampling framework using a stratified ratio estimator approach to estimate program-level, measure-level, and subprogram-level realization rates.[1]
- » Compile impact evaluation findings and recommendations that will continue to improve the energy savings performance of future program cycles.

In addition to addressing the research questions, the team seeks to make recommendations actionable for PSE staff, using the analysis from the data collection efforts as a basis for the recommendations. This data-driven approach will provide PSE with the information needed to enhance program design with confidence that the adjustments will improve overall program performance.

[1] This is consistent with the statistical accuracy of evaluations in other jurisdictions and corresponds with an Enhanced Level of Rigor stipulated in the California Energy Efficiency Evaluation Protocols.

NAVIGANT

2 Impact Evaluation

This section summarizes the Impact Evaluation methods and findings used to develop program-, subprogram-, and measure-level realization rates for the Pre-Rinse Spray Valve Program. Findings from the Impact Evaluation provide PSE staff with the feedback needed to increase program efficacy and to advance the research and policy objectives of PSE staff and the Conservation Resource Advisory Group by providing independent review of program achievements.

More specifically, the Impact Evaluation of PSE's 2011-2012 Pre-Rinse Spray Valve Program aimed to characterize program-specific energy impacts for commercial retrofit measures by doing the following:

- Quantifying the impacts of all measures and activities on annual gross energy consumption.
- Establishing post-implementation performance for installed measures and activities.
- Explaining discrepancies between the results of this study and the ex ante savings estimates.

The results included in this report serve as an addendum to the results previously reported in the broader Impact Evaluation of the Commercial Rebates Program. Additional details concerning the representation of results in this report are addressed in the full Evaluation report.

2.1 Calibrated Program-Level Realization Rates

Table 1 and Table 2 provide an overview of the Commercial Rebates Program realization rates for the as-evaluated energy savings. These results include the increased precision and calibration of the Pre-Rinse Spray Valve Program resulting from this study. The ex-ante savings for the Pre-Rinse Spray Valve Program have been adjusted to align with the adjusted prescriptive energy savings using the updated UES (please refer to full Evaluation report). Note, the realization rates shown in these tables include both faucet aerators and pre-rinse spray valves.

Table 1. Summary of Commercial Rebates Realization Rates with Adjusted Prescriptive Savings (As-evaluated, PY 2011 – 2012)

Program	Ex Ante Savings	Realization Rates	Ex Post Savings
Electric (kWh)	63,839,090	99.7%	63,622,672
Natural Gas (Therms)	1,089,470	91.2%	993,694

Source: Navigant analysis of tracking data

Table 2. Summary of Pre-Rinse Spray Valve Subprogram Realization Rates with Adjusted Prescriptive Savings (As evaluated, PY 2011 – 2012)

Program	Ex Ante Savings	Realization Rates	Ex Post Savings
Electric (kWh)	4,300,120	88.3%	3,796,500
Natural Gas (Therms)	783,412	87.8%	687,636

Source: Navigant analysis of tracking data

2.2 *Impact Evaluation Methodology*

This section presents an overview of Navigant's approach to evaluating *gross* savings attributed to PSE's Pre-Rinse Spray Valve Program, along with discussion of several key issues related to the impact evaluation process. Navigant relied primarily on tracking database and project file data supplemented with site-specific measurement and verification to verify savings for incented measures and systems. Gross energy savings represent the calculated difference between the evaluation findings and the tracking database.

2.2.1 Data Sources

The data for evaluation was gathered through two primary activities. The impact evaluation team reviewed tracking system data and performed onsite verification of a sample of projects.

Table 3. Impact Evaluation Data Collection Sources

Data Collection Type	Targeted Population	Data Source	Sample Design	Sample Size
Tracking Data Analysis	2011-2012 projects	PSE CSY Database	N/A	All
Installation and Operation Verification	Projects in the 2012 Program	PSE CSY Database	Stratified Ratio Estimation	49
Onsite Data Verification	Projects in the 2012 Program	PSE CSY Database	Stratified Ratio Estimation	49

2.2.1.1 Tracking Data

The impact evaluation team was able to extract most key program participation data from the CSY tracking database, which was provided by PSE staff in MS Excel format. The tracking data used for this evaluation were extracted for program years 2011 through 2012. Database tables included a project level dataset with measure type, total savings impacts, grant amount, and project completion date. Project data is linked by a unique proposal number to measure level information.

For pre-rinse spray valves, the CSY database contained only monthly totals of installation metrics. Thus, PSE provided a supplementary database containing project-level details.

2.2.1.2 Program Documentation

The impact evaluation team also reviewed program materials developed by PSE, including: the technical reference spreadsheets documenting prescriptive savings, the program policies and procedures and program application materials.

2.2.2 Measure Prioritization

Navigant reviewed project-level data for the faucet aerator program from the database provided by PSE.[2] As shown in Table 4, the program completed nearly 2,000 projects during the 2011-2012 program years. Most of the projects were reported with natural gas savings. Similarly, natural gas projects averaged approximately twice as many installed aerators per project than electric projects.

Table 4. Faucet Aerator Projects and Installations by Fuel Source (2011-2012)

Fuel Source	Projects	Aerators	Energy Savings
Electric	651	2,995	7,246,885 kWh
Gas	890	8,843	1,202,648 therms
Total	**1,541**	**11,838**	

Source: PSE file "HISTORICAL – PSE PreRinse Program thru 5-31-13.xlsb."

[2] Excel workbook "HISTORICAL – PSE PreRinse Program thru 5-31-13.xlsb."

In order to ensure the additional evaluated projects included the most appropriate project types, Navigant performed statistical analyses on the project workbook. Table 5 shows the completed projects categorized by building type. Normalized to MMBTU, "Schools" represent the greatest contribution to energy savings followed by a general "Other" category. However, program contribution can be defined as total savings, number of projects, or a combination of the two. The measure characterization complexity presents itself through project-level statistics. For example, although more projects are completed in the "Other" category, the average number of aerators installed per "Schools" project is significantly greater than that of "Other" projects.

Table 5. Faucet Aerator Projects, Installations, and Savings by Building Type Prioritized by Total MMBTU Savings (2011-2012)

Building Type[a]	Projects		Installed Aerators		Electrical Energy Savings, MWh	Natural Gas Energy Savings, 1000s of therms
	Elect.	Gas	Elect.	Gas		
Schools	33	129	589	5,132	1,427	698
Other	443	101	1,814	508	4,395	69
Full Service Restaurant	24	238	83	868	201	118
Retirement Home/Nursing Facility	0	35	0	462	0	63
Church-Normal Occupancy	15	48	149	428	361	58
Fast Service Restaurant	44	141	96	403	233	55
Grocery	30	109	98	441	237	60
Church-High Occupancy	2	14	47	311	114	42
Taverns/Cafes with food service	19	31	35	111	85	15
Membership Organization	5	15	23	103	56	14
Hospitals	0	2	0	2	0	0.3
Specialty Markets	8	20	14	46	34	0.7
Convenience Stores	27	5	45	7	109	0.5
Hotel	0	2	0	21	0	0.3
Restaurant	1	0	2	0	5	0.02
Total	**651**	**890**	**2,995**	**8,843**	**7,257**	**1,203**

[a] Building types are based on categorization in the PSE tracking workbook.

Source: PSE file "HISTORICAL – PSE PreRinse Program thru 5-31-13.xlsb."

2.2.3 Sampling Framework and Design

Navigant has developed a sampling framework that provides an enhanced level of statistical accuracy (i.e., 90/10 confidence/precision) using the *Stratified Ratio Estimation* approach. This approach to sampling achieves increased precision and reliability by taking advantage of a relatively stable correlation between an auxiliary variable and the variable of interest (i.e., the ratio of actual savings to program reported savings). This approach serves to reduce the overall coefficient of variation within the population. Evaluation experience has demonstrated that a majority of participants will have a ratio of actual savings to program reported savings between 70 – 120%, regardless of the *magnitude* of each individual project's energy savings. This ratio is the ***realization rate*** for gross verified savings and a core objective of this Impact Evaluation. As such, the standard deviation of the realization rate is generally much smaller than that of the magnitude of individual project savings. It follows that the sample sizes required to achieve a specific confidence/precision threshold may be greatly improved by estimating the realization rate instead of total energy savings.

Per the 2004 California Evaluation Framework,[3] sample sizes developed using the Stratified Ratio Estimation approach comply with the following equation:

$$n = \frac{\left(\frac{Z * \varepsilon}{rp}\right)^2}{1 + \left(\frac{Z * \varepsilon}{rp}\right)^2 / N}$$

Where:

n = Sample Size
Z = Z-Score for Desired Confidence Level
ε = Assumed Error Ratio
rp = Desired Relative Precision
N = Population Size

[3]TecMarket Works, *The California Evaluation Framework*, June 2004

Based on the analysis of the reported projects, Navigant defined sampling strata according to building type. PSE tracks fifteen building type categories, but only a few represent significant contributions to number of projects and energy savings. Navigant consolidated the building types into fewer categories based on the average number of aerators installed per project as shown in Table 6. Note the energy savings have been normalized to MMBTU to simultaneously weight electric and natural gas projects. The sample will include both electric and natural gas projects, which will be weighted by the total MMBTU contribution to program energy savings (i.e., approximately four natural gas projects for every one electric project).

Table 6. Strata Definitions for Sampling Design

Stratum	PSE Building Types Included	Average Installed Aerators per Project	Population Size (No. of Projects)	Weighting Dimension (MMBTU saved per project)
Schools	Schools	35	162	461
Restaurants	Full Service Restaurant Fast Service Restaurant Restaurant	3	448	42
Retirement Home/Nursing Facilities	Retirement Home/Nursing Facilities	13	35	180
Churches	Church-Normal Occupancy Church- High Occupancy	12	79	148
All Other	Other Grocery Taverns/Cafes w/Food Service Membership Organizations Hospitals Specialty Markets Convenience Stores Hotel	4	817	41
Total			**1,541**	

Source: PSE file "HISTORICAL – PSE PreRinse Program thru 5-31-13.xlsb."

Navigant proposes the sampling design and sample sizes as shown in Table 7. Navigant assessed several sample design scenarios and elected to target 80% confidence with 20% precision for each building type. This strategy will enable Navigant to make statistically accurate recommendations for UES inputs specific to building types.

In order to achieve 80% confidence with 20%precision in each strata, Navigant recommended evaluation of 41 faucet aerator projects. The Commercial Rebates evaluation included ten eligible projects, thus 31 additional projects were required to achieve the confidence and precision levels. Twelve Pre-Rinse Spray Valve projects were included in the Commercial Rebates program: two "Schools" and ten "All Other." The results of all twelve projects will be included in this analysis. However, only eight "All Other" projects are needed in this sample, thus 31, not 29, additional projects are required. For the additional projects, Navigant randomly selected projects to meet the quota for each stratum.

Table 7. Sample Sizes for 80% Confidence, 20% Overall Precision

Stratum	No. of Projects in Evaluation	Additional Projects Required in this Study
Schools	10	8
Restaurants	8	8
Retirement Homes/Nursing Facilities	7	7
Churches	8	8
All Other	8	0
Total	**41**	**31**

Source: Navigant analysis.

2.2.4 On-Site Measurement and Verification Analysis

Navigant proposed conducting on-site measurement and verification (M&V) to address the evaluation objectives. M&V activities followed the same protocol as the broader Commercial Rebates evaluation. Specifically for faucet aerators, Navigant verified the following information:

- Primary data
  - Building type
  - Faucet aerators
    - Quantity
    - Fuel source(s)
    - Application (i.e., public restroom, kitchen, laboratory, etc.)
    - Installed flow rate
- Ancillary data
  - Water heater set point
  - Water heater efficiency
  - Daily operation profile of facility

» Explanatory data (i.e., on-site interviews with facility management)
  - Replacement of units after installation
  - Additional issues concerning the measures

2.3 *Summary of Findings*

As noted earlier, Navigant adopted the Stratified Ratio Estimation sampling approach to achieve 80/10 confidence/precision for the evaluation of PSE's program-level realization rates. Under this approach, Navigant divided the sample population into subgroups (i.e., strata) and selected sample units equal to the portion of the population in each strata. This strategy ensured that Navigant evaluated the largest contributors to program performance, while also addressing a sufficient number of smaller projects that, in aggregate, could represent a substantial percentage of ex ante savings.

PSE also expressed an interest in maximizing the confidence and precision of realization rate estimates for key measures of interest identified through the measure prioritization task, recognizing that the expected total sample size would remain the same. The final sampling framework achieved 80/20 confidence/precision across building types. The following subsection presents the findings of the evaluation.

2.3.1 Faucet Aerator Evaluation Results

Table 8. Summary of Electric Aerator Findings

Stratum	Ex Ante Qty in Sample	% Verified	% Fuel Type – Lost	% Unaccounted For
Schools	122	82%	0%	18%
Restaurant	10	80%	0%	20%
Retirement Home/Nursing Facilities	N/A	N/A	N/A	N/A
Church	15	27%	47%	27%
All Other	124	77%	15%	8%
Total	**271**	**76%**	**10%**	**14%**

[a] The tracking database did not include any electric projects in this stratum.
Source: Navigant analysis.

Table 9. Summary of Gas Aerator Findings

Stratum	Ex Ante Qty in Sample	% Verified	% Fuel Type – Lost	% Unaccounted For
Schools	737	60%	11%	29%
Restaurant	52	71%	0%	29%
Retirement Home/Nursing Facilities	403	86%	0%	14%
Church	145	84%	0%	16%
All Other	3	67%	0%	33%
Total	**1,340**	**71%**	**6%**	**23%**

Table 8 and Table 9 show the results of the on-site verification for faucet aerators. For electric aerators, 76% of the expected aerators were verified in the field. Ten percent of the aerators were reported with the incorrect fuel source, while 14% were missing during the site visits. Similarly, 71% of the gas aerators were verified in the field. Generally, gas as a fuel source is reported more accurately than electric, though a larger proportion, 23%, of the expected gas aerators were missing during the site visits.

Figure 1 and Figure 2 provide a combined visual representation of the tables above. Overall, the electric energy savings is greater than the ex ante energy savings in the tracking database. This is due to the misreporting of electric aerators as gas aerators. In the figure, the "Fuel Source Gain" segment depicts this increase. Conversely, the gas energy savings is less than the ex ante energy savings in the tracking database, because of the misreporting as well as missing aerators. In other words, the electric category saw a net gain of 6.3% more savings than reported in the tracking database, while the gas category saw a net loss of 27%. This finding suggests additional post-installation inspection may be necessary for gas aerator installations.

Figure 1. Visual Representation of Faucet Aerator Field Verification Findings (Electric)

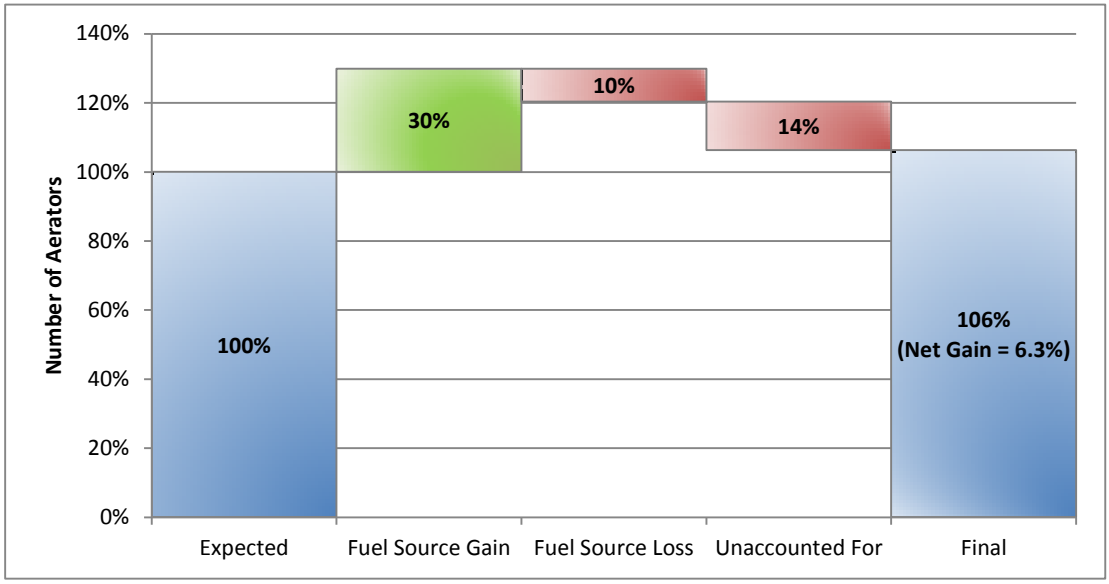

Figure 2. Visual Representation of Faucet Aerator Field Verification Findings (Gas)

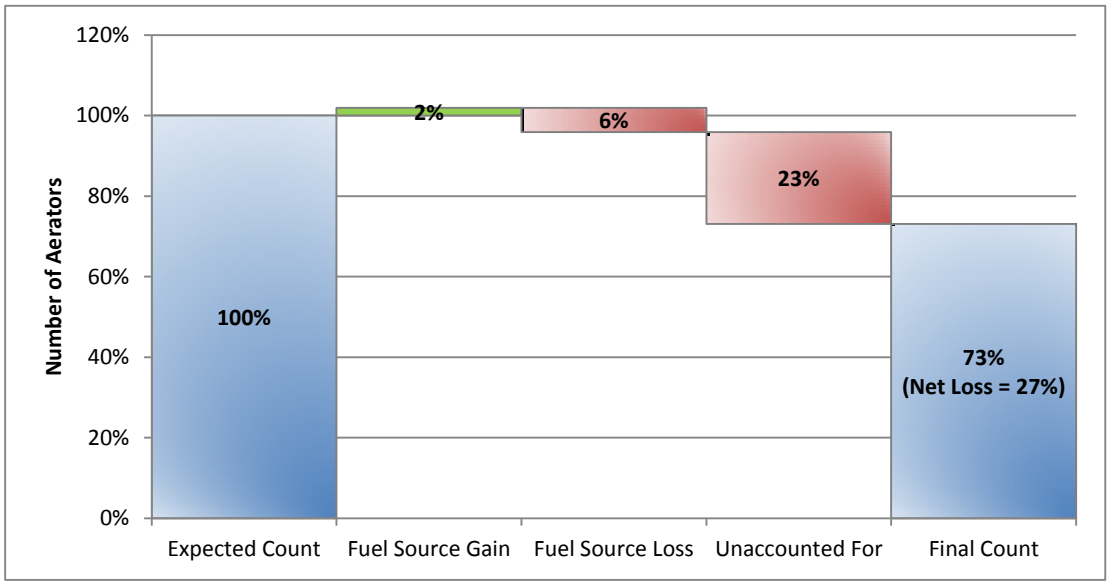

Table 10 and Table 11 show the aggregate results of the evaluation. The dependent nature of the electric and gas scenarios increases the difficulty of determining a realization rate by fuel source. At a fundamental level, the realization rate should reflect only the field verified savings compared to the ex ante savings reported in the tracking database. Thus, the realization rates do not include misreported aerators, because inclusion would bias the results toward higher realization rates than the field verification dictates. On the other hand, in-service rates for the aerators were combined across the fuel sources and do include misreported aerators. In-service rates are discussed later in this report.

Table 10. Impact of Findings on Program-Level Faucet Aerators (Electric).

Stratum	Average Ex Ante Savings per Project (kWh)	Total Ex Ante Savings (kWh)	Realization Rate	Total Ex Post Savings (kWh)
Schools	18,512	1,117,658	82.0%	916,113
Restaurants	2,057	281,149	80.0%	224,920
Retirement Home/Nursing Facilities	N/A	N/A	N/A	N/A
Churches	5,340	174,704	26.7%	46,588
All Other	4,250	503,392	76.6%	385,663
Total		**2,076,904**	**75.8%%**	**1,573,284**

Source: Navigant analysis.

Table 11. Impact of Findings on Program-Level Faucet Aerators (Gas).

Stratum	Average Ex Ante Savings per Project (therms)	Total Ex Ante Savings (therms)	Realization Rate	Total Ex Post Savings (therms)
Schools	1,424	146,183	60.4%	88,265
Restaurants	113	36,773	71.2%	26,165
Retirement Home/Nursing Facilities	563	12,301	86.4%	10,623
Churches	384	22,850	84.1%	19,226
All Other	133	65,841	66.7%	43,894
Total		**283,949**	**66.3%**	**188,173**

Source: Navigant analysis.

2.4 *Factors Influencing M&V Results*

Navigant's evaluation of the faucet aerator projects confirmed the key factors influencing the M&V results. This supplementary evaluation provided additional detail into the relationship of fuel source, building type, and influencing factors.

» **Measure Quantity Discrepancies:** In aggregate, Navigant could not account for 21% of all faucet aerators in the sampled projects. The ratio of total ex post aerator quantity to total ex ante aerator quantity defines the in-service rate for aerators. The fuel sources have been combined to normalize for the fuel source discrepancies encountered during the evaluation. Notably, evaluation of School and Restaurant projects resulted in in-service rates outside of the 20% precision of the sampling plan suggesting a statistically significant discrepancy. Interviews with facility staff indicated aerators are often broken or removed, often due to patron and staff dissatisfaction with the lower flows. Overall, the 79% in-service rate also falls outside of the 10% precision level of the sampling plan. Thus, Navigant is confident the in-service rate discrepancies lead to program savings discrepancies.

Table 12. In-Service Rates for Faucet Aerators by Building Type.

Stratum	Total Ex Ante Qty	Total Ex Post Qty	In-Service Rate
Schools	859	545	73%
Restaurants	62	45	73%
Retirement Home/Nursing Facilities	403	348	86%
Churches	160	126	83%
All Other	127	97	91%
Total	**1,611**	**1,161**	**79%**

Source: Navigant analysis.

» **Fuel Source Discrepancies:** The project files and tracking database allows the contractor to input one fuel source type. Navigant's on-site M&V found cases of multiple fuel sources. For example,

a school may have a central gas system providing hot water for most of the school, but may also have individual electric systems providing hot water for smaller applications. Thus, the energy savings for such a project still exist, but savings were reported in the incorrect units. The higher electric realization rate indicates the discrepancy happened most often for gas fuel sources. Ten percent of aerators reported as electric fuel source and 6% as gas were found to be misreported in the tracking database.

» **Aerator Application Discrepancies:** The program allows for the reporting of hospitality and non-hospitality applications. The former relates to hotel guest rooms and retirement home rooms. These applications have a lower prescriptive energy savings, because of the different usage profile than for a non-hospitality use. The non-hospitality energy savings are based on the usage profile for a public restroom. During the evaluation, Navigant reported the specific application of each verified aerator. Table 13 shows the results of the study. Nearly half of the verified aerators were found in public restroom settings, aligning well with the prescriptive savings estimates. However, the remaining verified aerators were found in other locations, such as private restrooms, school laboratories, and commercial and domestic kitchens. Although not factored into the realization rates and in-service rates, these applications likely have less usage, and less energy savings. than a public restroom setting.

Table 13. Evaluation Findings for Various Aerator Applications.

Application	% of Total Verified Aerators
Restroom	47%
Other	30%
Laboratory	20%
Kitchen	3%
Total	**100%**

Source: Navigant analysis.

3 Recommendations and Conclusions

3.1 Recommendations

Navigant staff thoroughly documented the Impact Evaluation process in an effort to capture and assess program feedback based on discussions with participants, program data, and evaluation observations. This information has been used to develop recommendations that will improve future program and impact evaluation cycles. Based on the study of the impacts, Navigant offers the following recommendations in addition to those presented in the main Evaluation Report.

Navigant understands the recommendations are often dependent on each other. That is, certain changes made by PSE will effectively neutralize other consequent recommendations. For example, the in service rate and overall realization rate would likely improve if the implementer restricts installations to certain space types. Or, for example, the recommendation to implement more detailed data collection by the V-Team should lead to increased in-service rates and greater confidence in accurate program-level savings estimates.

3.1.1 Energy Savings Calculations and Documentation

- PSE can diversify the energy savings calculations to include applications other than hospitality and non-hospitality. Navigant observed a high proportion of aerators were installed in non-restroom applications, which most likely do not generate energy savings consistent with current UES assumptions. For example, a laboratory faucet in a school may only be used once or twice a day, while a public restroom in the same school sees much more usage.
    - Conversely, PSE could limit the installation of aerators in non-restroom spaces. That is, the program rules could be revised such that certain application types are ineligible.
- PSE can increase the reliability or accuracy of energy savings forecasts of commercial faucet aerators by implementing an in-service rate factor in the prescriptive savings methodology. In-service rates are the percentage of units rebated that actually get used over the effective lifetime of the measure. In-service rates are typical for such measures with high ease of installation (and removal) and variable customer acceptance. Navigant verified 79% of the aerators in the field, thus a conservative in-service rate could be set as 80%. This in-service rate could be included in the business case for faucet aerators. Typical in-service rates are between 90%-98% for measures of this type.
    - Furthermore, PSE could also set in-service rates based on the building type. Specifically, Schools and Restaurants exhibited the greatest discrepancies in the field observations, thus those building types could have an in-service rate applied to the savings after the project is completed.

- Alternatively, as part of the standard installation procedures, PSE can require the contractor to leave a specified number of aerators with the project sponsor at the site. This could be as high as 20% extra faucet aerators. Such a strategy could mitigate the losses observed from missing aerators.

» PSE should consider augmenting the V-Team's post-installation inspection procedures for faucet aerator projects. In addition to data already collected by contractors, the V-team could gather the following information:

- Primary data:
  - Fuel sources
  - Aerator applications
  - Verified aerator counts
- Ancillary data:
  - Water heater set point
  - Water heater efficiency
  - Water heater type (i.e., central boiler, small domestic, instantaneous, etc.)
- Supplementary data:
  - Reasons for missing aerators
  - Any additional concerns of the site

The collection of such data could facilitate improvement of faucet aerator business cases and program procedures. At the same time, the V-Team could provide additional aerators as needed for the sites should any discrepancies arise during the post-installation verification.

3.1.2 Program Data Requirements

» PSE can require contractors to provide additional detail for the reporting of faucet aerators. Currently, the contractors report fuel source and aerator count (non-hospitality and hospitality). Based on Navigant's observations, PSE could revise program procedures so that contractors can report multiple fuel sources and more specific aerator application types. Additionally, PSE can require contractors to provide more specificity concerning the location of the installed aerators. Such detail correlates with providing aerator application information, but the inclusion of space type will not only provide another layer of data to analyze, it will also make post-installation verifications more efficient and accurate.

3.2 Future Research

Throughout the Impact Evaluation, Navigant captured ideas for future research and investigation. These findings may be of interest to PSE as more detailed investigations into the Impact Evaluation findings. Based on the results of the Impact Evaluation, Navigant suggests the following as future research objectives:

» PSE can oversee an in-depth Process Evaluation to complement this Impact Evaluation. Because of the discrepancies observed in the tracking database and in the field, Navigant suggests performing ride-alongs with the installation contractors so that PSE can better understand the process by which aerators are installed and reported. Additionally, a critical review of program documentation processes (e.g., project application procedures) will provide insight into the feasibility of implementing project reporting improvements. Customer feedback could also be sought in a process evaluation regarding appropriate and inappropriate installation contexts. Anecdotally, we heard about concerns of faucet flow rates for hand washing for restaurant employees. We also heard from science teachers about aerators in faucets used for filling vessels which slows things down, but does not lead to savings.