2016

Annual Report of

Energy Conservation Accomplishments

March 31, 2017

PSE PUGET SOUND ENERGY

Doc# EES0012017

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(Clockwise, from the left)

1. PSE hosted the 2016 West Coast Energy Management Congress in Seattle, May 2016.
2. “Gloria”, Energy Efficiency’s television advocate.
3. A large water-treatment facility, recipient of a large Energy Efficiency grant in 2016.
4. “Stan”, another Energy Efficiency television advocate.
5. A Contractor Alliance Network member, installing insulation in a residential attic.

Table of Contents

Figures

Tables

Supporting Documentation

The Exhibits and Supplements to the 2016 Annual Report of Energy Conservation Accomplishments contain a significant amount of program detail, including savings, financial, measures, UTC filings, and compliance.

Exhibits Included in the 2016 Report of Conservation Accomplishments

Exhibit 1: 2016 Conservation Targets and Budgets versus Actual Achievements and Spending.

Exhibit 2: Program Cost Effectiveness.

Exhibit 5: Prescriptive measures offered in 2016.

Exhibit 9: Requirement Compliance Checklist.

Exhibit 10: NEEA 2016 Report of Activities and Initiatives.

Supplements Included

Exhibit 1 *(Table of savings and expenditures)*

- Supplement 1: Expenditures by Cost Element Group.
- Supplement 2: 2016 Savings adjustments.
- Supplement 3: 2016 Sponsorships and Memberships.
- Supplement 4: Portfolio Measure Category Counts.

Exhibit 6 (The Evaluation Plan is excluded from this Report)

- Supplement 1: Evaluation studies with their associated Evaluation Report Responses (ERRs) performed in 2016.

I. EXECUTIVE SUMMARY

A. Puget Sound Energy's Annual Report of 2016 Conservation Accomplishments

Puget Sound Energy's (PSE's or The Company's) Energy Efficiency department presents this 2016 Annual Report of Energy Conservation Accomplishments (Annual Report or Report), satisfying WAC 480-109-130(3). The Report provides details of initiatives, activities, and adaptive management steps employed to be responsive to the expectations of PSE customers and meet savings goals of Energy Efficiency programs funded by the Electric and Natural Gas Conservation Riders. Table I-1 presents 2016 Portfolio-level savings, expenditure results, Utility Cost (UC), and Total Resource Cost (TRC) benefit-to-cost (B/C) ratios for electric and natural gas conservation programs.

Table I-1: Energy Efficiency 2016 Electric Savings and Cost-Effectiveness Results

2016	Savings	Expenditures	Utility Cost	Total Resource Cost
Electric Actuals (MWh)	314,500 35.9 aMW	$100,934,000	2.46	1.72
Goal/Budget	294,500 (38.1 aMW)	$98,600,000		
Percent	*107%*	*102%*		
Gas Actuals (Therm)	4,480,000	$13,644,000	2.05	1.67
Goal/Budget	3,963,000	$14,714,000		
Percent	*113%*	*93%*		

314,500 MWh divided by 8,760 hours = 35.9 aMW

Savings are stated in terms of first-year annual figures, at the customer meter, without line loss.

1) 2016 Results

In 2016, PSE's Energy Efficiency department continued its exemplary standard of meeting energy savings goals and customer expectations for energy efficiency programs, while effectively and prudently managing costs for its customers.

Overall, electric conservation exceeded the savings goal of 294,500 MegaWatt-hour (MWh) or 33.6 average MegaWatts (aMW) by 7 percent, achieving 314,500 MWh, or 35.9 aMW. Electric expenditures finished the year 2 percent over expected costs: $100.93 million versus a budget of $98.6 million.

Natural gas programs surpassed savings goals for the year by 13 percent: 4.48 million therms against a goal of 3.96 million therms, while natural gas expenditures were 7 percent lower than planned spending, finishing the year at $13.64 million, compared to a budget of $14.7 million. PSE provides detailed savings and expenditure information by program in Exhibit 1: *Savings and Expenditures.*

Portfolio results include savings that are excluded from its EIA Target: Pilots and the Northwest Energy Efficiency Alliance (NEEA), per agreements reached with PSE's Conservation Resource Advisory Group (CRAG) and the Washington Utilities and Transportation Commission (UTC or Commission). NEEA will report its verified savings in May 2018. PSE will include those savings in its 2016-2017 Biennial Electric Achievement Report, submitted in compliance with WAC 480-109-120(4) on or before June 1, 2018. PSE includes complete discussions of Pilots in Chapter 8. NEEA's 2016 performance can be found in Chapter 9: *Regional Initiatives,* and Exhibit 10: *NEEA 2016 Report of Activities and Initiatives*.

Energy Efficiency's 2016 Portfolio UC B/C ratio was 2.46, with a TRC B/C ratio of 1.72. PSE finished the year with a natural gas UC of 2.05 and a TRC of 1.67. Both TRC figures include a 10 percent conservation credit. Although this is not standard for natural gas cost-effectiveness reporting, it is a useful representation in light of the UTC workshops on the considerations of natural gas cost-effectiveness calculations.[1]

[1] In a Docket No UG-121703 April 2013 workshop, participants discussed the merits of applying a conservation credit, similar to the 10 percent value applied for electric cost-effectiveness calculations. For consistency, PSE chose 10 percent for this representational value.

a. Key Results Drivers

Program reviews in Chapters 5 and 7, and 10 through 14 contain extensive discussions on the key drivers of programs' savings and expenditure results. PSE provides high-level summaries here, and in Chapter 2: *Introduction*.

i. Savings

One of the primary contributors to Energy Efficiency's notable 2016 electric savings results was customers' enthusiastic acceptance of LED lamps, including "value LEDs".[2] There was a sizeable decline in CFL sales in 2016, with one major retailer removing them altogether from their inventory. Advancing LED technology and cost reductions similarly impacted commercial projects.

For instance, in 2016, average lighting grant projects size increased by 21 percent over similar projects in 2015, and new construction projects for horticultural and small businesses became more cost-effective. Another substantial contributor was a higher-than-anticipated adoption of heat pump water heater technology in the Residential Sector. These circumstances helped to offset the continued reduction in prescriptive Unit Energy Savings (UES) values. In the Business Sector, several late-2016 projects were delayed until 2017 in order to obtain more accurate verification data, thus lowering the achieved electric savings in the Retrofit program.

Another emerging technology impacting the natural gas business that saw considerable residential customer support in 2016 was web-enabled thermostats. Customers also engaged in an increased number of weatherization measures; insulation, structure sealing, and windows. Some large projects in the Multifamily New Construction and Commercial Retrofit that were originally planned for completion in 2015 resulted in higher-than-expected natural gas savings in 2016.

[2] Value LEDs are those that meet PSE programmatic criteria, but are not certified as Energy Star®. Value LEDs tend to be less expensive that Energy Star-rated lamps.

Some key circumstances that affected lower-than-expected natural gas savings results included extended times to ramp-up new programs' implementation, onboarding of contractors, less-than-favorable market conditions and market saturation, and lower UES values for prescriptive measures. Additionally, the high cost of efficient natural gas equipment, and service provider engagement delays also had an adverse effect on some programs.

ii. Expenditures

The majority of REM and BEM 2016 electric and natural gas expenditures finished the year well within expectations. Savings programs that varied from their anticipated expenditures also realized a commensurate increase (or reduction) in their planned savings. Some newer programs' 2016 implementation processes resulted in reduced spending, commensurate with their saving achievements: Lodging and Agriculture Direct Install programs, for instance.

Staffing levels throughout the year impacted several Portfolio Support and Research & Compliance organizations, with some groups sustaining vacancies for the majority of 2016. Invoice timing and delays led to some variances: Northwest Energy Efficiency Alliance (NEEA) electric and Natural Gas Market Transformation; and Conservation Supply Curves' Outside Services, for instance.

Distinct or startup expenses that also contributed to Rider expenses included Demand Side Management Central (DSMc) program-management system implementation, the extension of the Electric Vehicle Charger Incentive pilot, early start-up of the Biennial Electric Conservation Achievement Review (BECAR) 2016-2017 measure analysis, and expenses associated with the development of PSE's Demand Response program.

b. Enhancing Customer Participation in Conservation Efforts

Building on past years' achievements in encouraging customer participation, Energy Efficiency program staff consistently demonstrated their commitment to exceeding customer expectations of their programs throughout 2016. PSE continued to engage customers with innovative and expanded outreach campaigns, reaching customers in their communities, at sporting events, energy fairs, trade shows, and in their businesses.

Pop-up events increased from 60 in 2015 to 85 in 2016, and they also expanded to include residential customers. Small business blitzes increased from three in 2015 to four in 2016, with 300 businesses touched—up from 190 in 2015. Energy Efficiency's award-winning Energy Upgrades campaign resulted in over 30,000 door knocks in over 13 PSE communities, and almost 1,000 prizes and 2,500 golden tickets distributed in Spanish-speaking community events.

The Cross-Sell campaign, which targets both Direct to Consumer and Dealer Channel customers, distributed 24 unique emails with an average open rate of over 28 percent. PSE continued its initiatives to encourage multifamily tenant participation by awarding building owner/developer "Strive for Five" plaques, and participating in energy fairs.

Energy Efficiency's initiatives resulted in a sizeable increase in customer awareness. Program staff conducted an extensive and comprehensive effort to ensure that retailers provide customers an abundance of PSE energy-efficiency information, with over 3,000 store visits conducted in 2016.

Almost 700,000 energy-efficiency email news "eblasts" were delivered to opt-in customers. PSE also expanded its Energy Efficiency Awareness Tools, which deliver energy-efficiency email messaging to customers when they are most likely to be thinking about their energy use. PSE's enhanced energy efficiency web presence has seen a significant uptick in overall customer engagement, and feedback from PSE's Claymation characters "Stan" and "Gloria" indicated that customers are more likely to use PSE's energy-efficiency information and tools.

Another focus for making engagement in Energy Efficiency's products easier for customers are its enhanced services and programs. These included, but weren't limited to: an expansion of its Contractor Alliance Network (CAN) to 226 members; RCM trainings included four in-person and four webinar-based sessions. ShopPSE, Energy Efficiency's E-commerce website, saw a 600 percent increase in customer participation from the prior, third-party operated website. PSE also continued its efforts to reach its English-as-a-second-language and low-income customers, and expanded its points of engagement with its small agricultural, small-to-medium lodging, and commercial kitchen customers. These, and other initiatives to target the hard-to-reach and proportionately underserved segments are discussed in Chapters 3, 4, and 6.

c. Adaptation and Continuous Improvement through Total Quality Management

Energy Efficiency program staff continued their ongoing work to enhance processes and program offerings—especially those affecting PSE customers through its consistent application of Total Quality Management (TQM). The men and women of Energy Efficiency, regardless of the department or functions, focused on removing barriers to effectiveness, improving productivity, optimizing their measure offerings, and creating experiences that enrich customers' lives. Through its commitment to TQM and adaptively managing its business, PSE continued its progression toward operational excellence in every Energy Efficiency organization.

The following list highlights some key improvements and adaptation Energy Efficiency implemented. In 2016, program staff:

- Provided a significant upgrade for its RCM customers with its Resource Accounting Software,
- Enhanced and simplified the custom lighting grant offerings and application process,
- Created new program guidelines for Energy Management Engineers (EMEs) that clearly document processes, incentive structures, and lessons learned,
- Created an easier-to-use New Construction Lighting Power Density (LPD) worksheet,
- Implemented a new, powerful online Billing Advisor tool that helps Energy Advisors provide customers with an enhanced experience,
- Provided an enhanced Market Research dashboard that standardizes satisfaction and performance indices across Residential programs,
- Employed a new online interconnection tool, PowerClerk®, enhanced customers' net metering application process.

d. Notable Energy Efficiency Accomplishments

Highlights of notable 2016 accomplishments, detailed in the following program-specific discussions include:

- RCM's Urban Smart Bellevue program's first full year saw 60 businesses enrolled, with the successful roll-out of Energy Management Information System (EMIS) software to participants. (page 122)
- Energy Efficiency's DSMc system now houses almost 30 programs, with over 500 files uploaded into the new system. (page 192)

- PSE's Energy Upgrades campaign received the prestigious Chartwell Gold Award for excellence in marketing practices. (page 47)
- Program staff fully implemented the new Agriculture and Lodging Direct Install programs (page 138, 139)
- The average size of projects for business lighting grants increased 21 percent from 2015, to almost 65,000 kWh per project. (page 103)
- As measured at the program level, the electric Direct Benefit to Customer (DBtC) ratio was an impressive 77 percent. The natural gas DBtC ratio was also strong: 71 percent. (page 19)
- PSE fully implemented its Customer Awareness Tools, which proactively provide customers with targeted and seasonal energy-efficiency information. (page 49)

Provided as a courtesy to readers to make referencing more straightforward, page numbers in parentheses indicate the location of the more detailed accomplishment discussion in the specific program overview.

2) Compliance

By the end of 2016, the Company had completed almost 15 percent of all compliance requirements.[3] In each biennium, the majority of requirements are considered completed commensurate with the filing of the following biennium's Conservation Plan. Exhibit 9: *Requirement Compliance Checklist* provides specific condition compliance status, and Chapter 14, *Compliance* includes additional compliance discussions. The below list outlines the primary conservation-related requirement documents that govern Energy Efficiency's operations:

A. RCW 19.285 and WAC 480-109,
B. Exhibit F, the 2002 Stipulation Agreement, Docket No. UG-011571,
C. The 2010 Electric Settlement Agreement, Docket No. UE-100177, and
D. Order 01, Attachment A of Docket No. UE-152058 and UG-158075.

[3] Notable exceptions are only those that have a deliverable date of 2018; particularly those related to the reporting and Commission review of PSE's 2016-2017 conservation achievements.

3) Report Organization

In Chapter 2: *Introduction*, Energy Efficiency provides expanded discussions of overall 2016 accomplishments.

Chapter 3: *Energy Efficiency's Key 2016 Initiatives* delves more deeply into the department's important areas of focus that impact the majority of its operations. Next, Sector-level overviews provide a brief snapshot of each Sector's results.[4] These are Residential, Business, Regional, Portfolio Support, Research & Compliance, and Other Electric Programs. Program detail discussions follow each overview, with business-unit and program-level reviews of adaptive TQM steps implemented, and achievements reached in 2016.

PSE presents Exhibits, listed on page viii of this Report, at the conclusion of the Report. These contain a significant amount of additional Energy Efficiency detail.

[4] The order of these discussions correspond with Sector headings outlined in Exhibit 1: *Savings and Budgets.*

II. INTRODUCTION

The discussions in Chapter 2 provide Portfolio highlights of key performance areas for the Energy Efficiency Sectors: savings and expenditures; 2016-2017 biennial progress; five-year trends; cost-effectiveness ratios; Direct Benefit to Customer (DBtC) results; measure counts by program; memberships and sponsorships; and compliance.

A. Key Portfolio Results

PSE maximized electric and natural gas conservation savings while prudently and effectively putting its customers' Conservation Rider funding to work in 2016. Table II-1 provides Sector-level views of 2016 electric and natural gas savings results.

Table II-1: Energy Efficiency 2016 Savings Results by Sector

2016	Residential	Business	Pilots	Regional	Total
Electric Results (MWh)	141,900	143,200	17,300	12,100	314,500
Goal	133,000	133,600	17,300	10,500	294,400
Percent	107%	107%	100%	115%	107%
Gas Results (Therm)	1,825,000	2,225,000	431,000	na	4,481,000
Goal	1,859,000	1,674,000	430,500		3,963,500
Percent	98%	133%	100%		113%

PSE presents electric and natural gas expenditures figures for each Sector in Table II-2.

Table II-2: Energy Efficiency 2016 Expenditures by Sector

2016	Residential	Business	Pilots	Regional	Portfolio Support	Research & Compliance	Other Electric	Total
Electric Results	$46,327,000	$39,009,000	$934,000	$4,029,000	$6,316,000	$2,500,000	$1,819,300	$100,934,300
Budget	$45,476,000	$35,930,000	$977,000	$5,200,000	$6,097,000	$3,154,000	$1,765,600	$98,599,600
Percent	102%	109%	96%	77%	104%	79%	103%	102%
Gas Results	$7,423,000	$3,924,000	$164,000	$827,000	$935,600	$369,900	na	$13,643,500
Budget	$7,360,000	$4,748,000	$181,000	$1,087,000	$829,600	$508,500		$14,714,100
Percent	101%	83%	91%		113%	73%		93%

Overall total amounts may vary from those presented in Table I-1 and Exhibit 1 due to multiple rounding.

1) Conservation Savings

Each Energy Efficiency Sector achieved strong results, exceeding their savings goals for electric and most natural gas portfolios. Savings achievements reflect PSE's commitment and diligence in delivering quality energy-efficiency programs that provide customers with participation options and are easy for customers to engage in. These efforts yielded notable conservation savings and are illustrative of the forward-thinking adaptive management steps that program staff developed in 2016.

The overall Portfolio achievement of 107 percent of its 2016 electric target and 113 percent of its natural gas target is noteworthy, considering challenges that program staff encounter each year, such as ever-increasing marketplace opportunities, increasing efficiency code standards, regulatory requirements, and the consistent reduction of prescriptive savings value.

a. Key Drivers of Electric Savings

As discussed in the program-specific chapters to follow, one of the key drivers of Energy Efficiency's positive results include the rapid evolution of LED technology and reduced costs, which has resulted in an unprecedented increase in customer demand; both in the Residential and Commercial Sectors.

New technologies, such as web-enabled thermostats, and proven concepts, such as heat pump water heaters also saw increased success in 2016, in spite of a major manufacturer exiting that market. Program staff also saw a market shift from natural gas furnaces to heat pumps in 2016, and multifamily air sealing measures were also successful.

PSE also adaptively managed its suite of measures, recognizing the need to retire the refrigerator replacement program, and incentives for CFLs. Staff expanded their suite of measure offerings to include faucet aerators, low-e storm windows, showerhead flow restrictors, heat pump clothes dryers, T8 shop lights, efficient grocery freezer doors, display case night curtains, refrigerator display case T8 and TLED conversions, a broader suite of commercial kitchen equipment, and whole-building measures.

Several programs worked with their contractor and Contractor Alliance Network (CAN) members, other utilities, and trade allies to maximize savings in key market segments, such as English-as-a-second-language, customers who are tenants rather than property owners, manufactured and mobile-home residents, and low-to-medium income customers. These efforts helped to offset the continuous reduction of UES values, difficult market conditions in some sectors, and stringent new construction codes. These and other circumstances led to some Residential programs finishing the year below their electric goal.

The Business Energy Management Sector continued to see an expansion in new construction projects throughout the region. Lower-cost LEDs contributed to small business grants in both Business Lighting and New Construction increasing in 2016, while street lighting projects continued their robust performance.

b. Key Drivers of Natural Gas Savings

Commensurate with program staff's active management of their suite of electric measures, they exercised great care to ensure that natural gas incentives were proactively managed, that contractors and trade allies remained closely engaged, and that measure offerings were adjusted to compensate for market conditions (for instance, in residential furnaces). Staff's performance resulted in the overall natural gas portfolio exceeding its 2016 goal by 13 percent.

Low natural gas avoided costs continue to impact several programs, including the Multifamily sector, where it difficult to offer comprehensive natural gas measures.

Offsetting these circumstances, though, several projects that were originally slated for completion in 2015—both in the Residential and Business Sectors—wrapped up in 2016, resulting in significant natural gas savings achievements in the Multifamily New Construction and Commercial/Industrial Retrofit programs.

Customer response to natural gas web-enabled thermostats was stronger than planned, and RCM's O&M and behavior-based improvements also resulted in reduced use of natural gas. This result, along with program incentives designed to recognize savings persistence, contributed to a higher-than-expected program therm savings.

2) Expenditures

The majority of Energy Efficiency programs finished the year consistent with anticipated expenditures, achieving an overall Portfolio electric result of 2 percent above anticipated expenditures, while natural gas spending was 7 percent lower than planned for 2016. Expenditures in programs that generate savings in Residential Energy Management and Business Energy Management (REM and BEM, respectively) were, to a large degree, proportionate with their electric and natural gas savings. This reflects the exceptional precision with which Energy Efficiency staff manage their programs to ensure the prudent use of PSE customer funds.

a. Key Drivers of Electric Expenditures

A key contributor to the electric spending level was an additional $4 million in the Portfolio's Direct Benefit to Customer (DBtC) expenditures. The surprisingly enthusiastic customer acceptance of LED lamps resulted in a variety of programs in both the Residential and Business Sectors experiencing a significant uptake of LED measures, and thus, a higher rate of incentives paid. Among those impacted were Retail Lighting, Lighting-to-Go, Commercial Lighting Grants, Commercial New Construction, and Direct Install programs. Other areas in which the DBtC was higher than expected were those in which residential customers also engaged with the newer technologies:

PSE's space and water heating programs, and web-enabled thermostats, for instance. The electric space heat program was also positively impacted by customer preference for heat pumps in lieu of natural gas furnaces.

Project timing, particularly in the residential and commercial new construction marketplace, affected program spending as well, with some large grant projects that were originally slated for completion in 2015 being paid in 2016. These would cause an apparent over-spend.

The costs of new efficient equipment in the Commercial Kitchen program, and contractor engagement issues led to the Commercial HVAC program falling short of its 2016 electric budget.

Programs and functions in which the electric expenditures were lower than expected offset some of the 2016 spending overages, with some of these resulting from the timing of invoice receipt and their payment. For instance, an apparent under-spend in the Northwest Energy Efficiency Alliance (NEEA) electric program was the result of invoice payment timing: PSE received the Q4 2016 invoice in late 2016, and it was paid in Q1 2017.

Comparably, a similar situation occurred when an Outsides Services invoice for Conservation Supply Curves. Some work was performed at the end of 2016, but was not billed by year-end. PSE subsequently paid the invoice in January 2017.

Some Portfolio Support and Research & Compliance organizations experienced staffing shortages at various times in 2016. Market Research, for instance, was short a budgeted FTE for the majority of 2016, while Rebates Processing was also short-staffed for significant periods of the year.

The electric Portfolio also incurred several single-time, distinct expenses, including those related to the Biennial Electric Conservation Achievement Review's (BECAR's) examination of 2016 prescriptive measures, and the extension of the Electric Vehicle Charger Incentive pilot, which was originally scheduled to end in 2016. Higher costs were associated with Energy Efficiency's continued implementation of its new program management system, DSMc, while development costs were also incurred for PSE's new Demand Response program.

b. Key Drivers of Natural Gas Expenditures

While Energy Efficiency completed 2016 13 percent over its natural gas savings goal, it finished the year 7 percent under budget.

Several attributes that impacted Energy Efficiency's electric expenditures, including high costs for new efficient equipment, the switch from natural gas furnaces to heat pumps, staffing challenges, etc., also applied to its natural gas programs. Some programs that offer the same measures for both electric and natural gas fuel types were affected by the ratios of planned electric-vs-natural gas spending. For example, program staff originally estimated that web-enabled thermostats would be installed at a 50/50, electric/natural gas ratio. Instead, the actual installation rates were 15/85, which led to an apparent under-spend of the electric budget, with a corresponding over-spend in the natural gas budget.

Likewise, as noted in the electric key drivers discussion, the customer move to heat pumps in lieu of natural gas furnaces resulted in an approximate 20 percent underspend of the Space Heat program's natural gas budget. A slower-than-expected ramp-up and customer engagement in PSE's Agriculture and Lodging Direct-Install programs also reduced the overall natural gas expenditures.

Similar to the electric NEEA program, invoice and payment cycles led to an expenditure variance in its Natural Gas Market Transformation expenditures as well.

Another noteworthy 2016 natural gas expenditure variance is in the Contractor Alliance Network (CAN) program. Each year, both the electric and natural gas programs are expected to finish the year with revenue balances.[5] In 2016, however, the natural gas program finished the year with an expense balance (the electric side finished with a higher-than-expected revenue balance). This was due primarily to accounting for CAN referrals by product type, an overall reduction of single family natural gas product referrals, and a potential of some unreported referral fees. PSE continues to investigate the latter potential and will report any needed adjustments in 2017.

c. Revenue Balances

It is notable that several programs other than CAN finished 2016 with a revenue balance. This is a result of PSE's continuing focus on adaptively managing program costs to achieve the maximum value for its customers.

[5] Since Exhibit 1 represents Conservation Rider costs, revenue amounts are indicated as parenthetical, "($nn)" or negative dollars.

In some of the electric and natural gas Residential programs: Home Appliances; Retail Showerheads; Multifamily Existing; and Single Family Water Heat, PSE entered into an agreement with Cascade Water Alliance to share incentive costs for water-savings measures where the two utilities' territories overlap. Cascade Water Alliance paid PSE for those applicable measure installations. Another revenue balance resulted from contractors reimbursing PSE for lost inventory used in Home Energy Assessments.

In the Business Sector, a large revenue balance resulted from two customers' repayment of pro-rated custom grants. Per Schedule 183, when a customer switches from a PSE natural gas rate Schedule to a transportation Schedule after receiving a custom grant, they must repay the portion of the grant that corresponds to the remaining measure lives of those noted in the grant.

These revenue balances help to offset conservation expenditures, and are listed in Exhibit 1, Supplement 1: *Actual Expenditures Compared to Anticipated Spends.* PSE discusses key drivers in the applicable program overviews.

3) 2016-2017 Biennial Target Progress

Table I-1 in Chapter 1: *Executive Summary* presents the 2016-specific overall Portfolio electric savings (314,500 MWh) and natural gas savings (4.48 million therms).

Those figures include deemed NEEA electric savings and Pilot electric and natural gas savings, which are excluded from PSE's Energy Independence Act (EIA) Target, per CRAG and Commission agreements.

PSE provides Stakeholders with a status of its biennial performance as a status update. PSE will present the final 2016-2017 electric savings and expenditure figures in its Biennial Electric Conservation Report, which will be filed on or before June 1, 2018, consistent with WAC 480-109-120(4).

Table II-3 provides a Portfolio view of PSE's key savings and expenditure performance mid-way through the current biennium.

Table II-3: 2016-2017 Biennial Progress

2016-2017 Biennial Target and Budget Progress		
Sector	Two-Year Savings	Two-Year Expenditures
Electric, Actual to-date (MWh)	314,526	$100,933,893
Target*	605,194	$ 198,984,817
Percent	52%	51%
Natural Gas, Actual to-date (Therm)	4,480,141	$ 13,643,850
Budget*	7,426,495	$ 29,481,162
Percent	60%	46%

* As indicated in the 2016-2017 BCP, and approved by the Commission in Docket Nos. UE-152058 and UG-152075.

4) Five–Year Trends

As indicated in Figure II-1, the Portfolio's electric savings have decreased an overall 12 percent from 2012 to 2016. The electric expenses for the 5-same period increased an overall 10 percent, with a 2016 increase of 8 percent from 2015 expenditures. This trend reflects the market saturation of several key measures, annual revisions to measure UES values, updated energy codes, increasing data management and reporting requirements, and evolving customer demand. These and other ancillary contributors drive increased costs to acquire savings.

However, 2016 reversed the savings trend of the previous four years, with electric savings increasing 11 percent from 2015.

Figure II-2 shows that natural gas savings have decreased an overall 14 percent from 2012 to 2016. However, 2016 natural gas savings were up over 38 percent from 2015. The natural gas expenses for the 5-year timeframe have declined by less than 1 percent from 2012 to 2016, while natural gas expenses increased 4.2 percent from 2015 to 2016.

These figures reflect the significant impact of lower natural gas avoided costs and consolidation over time of higher-cost measures within Energy Efficiency programs; more high-cost measure make up a larger proportion of the overall Portfolio.

Figure II-1: Energy Efficiency Electric Programs; Savings and Expenditures – Five-Year Trends

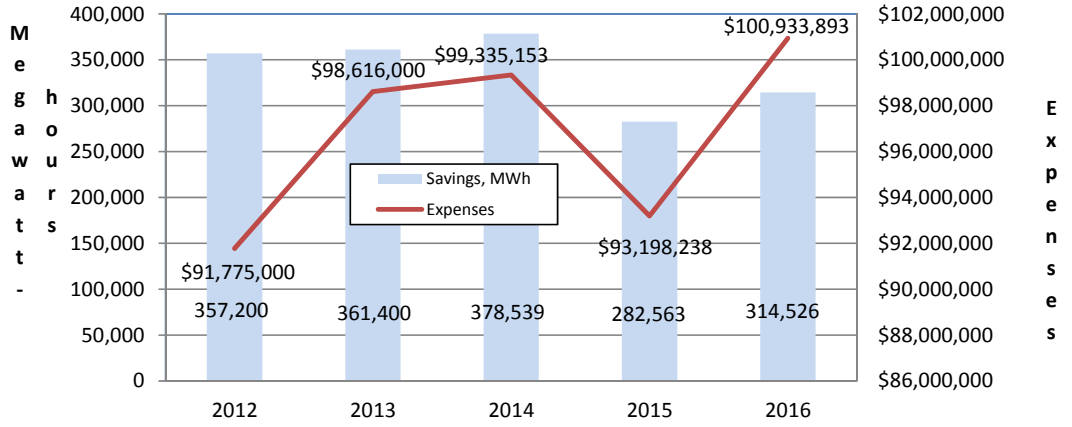
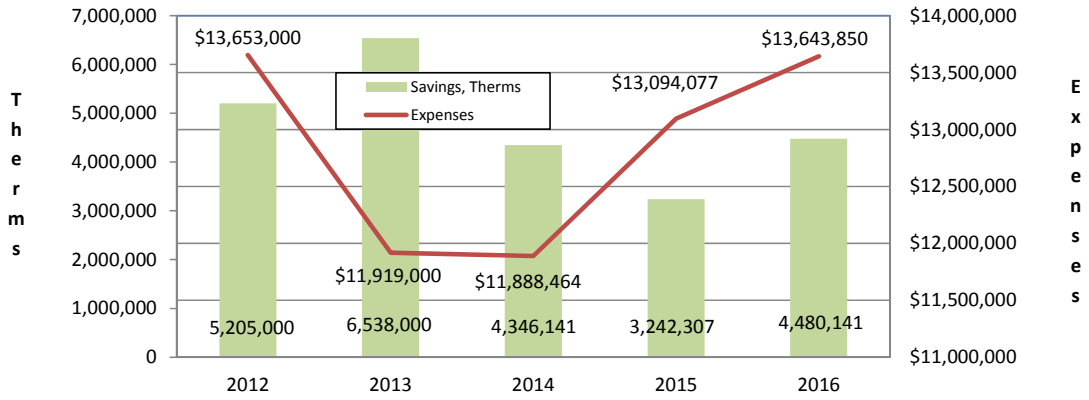


Figure II-2: Energy Efficiency Natural Gas Programs: Savings and Expenditures - Five-Year Trends



5) Cost-Effectiveness Ratios

Table II-4 provides the Portfolio view Utility Cost (UC) and Total Resource Cost (TRC) Benefit to Cost (B/C) results for 2016. Figure II-3 represents PSE's five-year Portfolio Total Resource Cost results. All TRC figures are indicated with a 10 percent conservation credit adder included.

Although such an adder is not a generally-accepted attribute of natural gas cost-effectiveness, some type of a conservation credit or risk adder was discussed between 2012 and 2013,[6] when the UTC conducted workshops to develop their Policy on natural gas programs' cost-effectiveness analyses. Intended merely as a comparison to a TRC value without any conservation credit, PSE has also included this figure in past Conservation Plans and Reports.

a. Portfolio Results

The Energy Efficiency Portfolio finished 2016 with an overall electric UC B/C ratio of 2.46, and a natural gas UC of 2.05. The electric Portfolio's TRC B/C ratio was 1.72, and its natural gas TRC B/C ratio was 1.67.

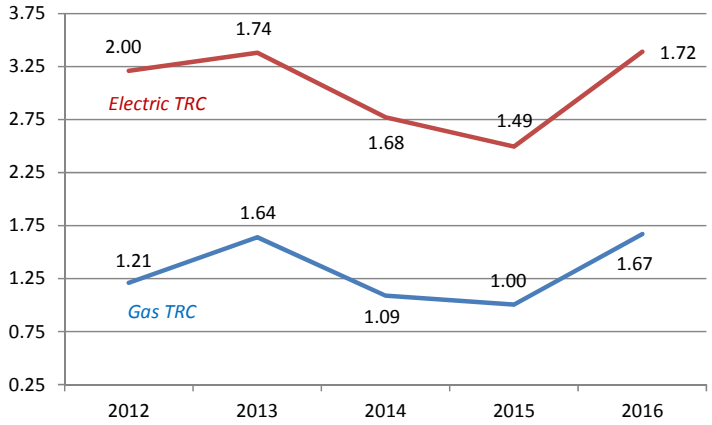
Table II-4: Overall Energy Efficiency Cost-Effectiveness Benefit/Cost Ratios

Benefit to Cost Ratios Portfolio		
	Utility Cost	Total Resource Cost
Electric	2.46	1.72
Gas	2.05	1.67

Indicated TRC includes the application of a 10 percent Conservation credit value.

[6] ¶ 29, page 12 of Docket No. UG-121207, Policy Statement on the Evaluation of the Cost-Effectiveness of Natural Gas Conservation Programs: *"(…) Stakeholders discussed the use of an across-the-board adder to the quantified benefits of conservation activities. (…)"*

Figure II-3: Electric and Natural Gas TRC Ratios – Five-Year Trends



6) Direct Benefit to Customer as a Percent of Energy Efficiency Expenditures

Exhibit 1, Supplement 1: *Actual Expenditures Compared to Budgets*, provides results of incentives paid to customers in addition to detailing program-level budget groupings such as labor, employee expense, materials, etc.

Certain expenditures related to customer benefits that are difficult or administratively onerous to quantify are not specifically classified as "incentives," but clearly also carry a value to the customer, albeit not necessarily monetary. This distinction represents that most customers derive many more benefits than simply remuneration.

PSE denotes these expenditures as "Direct Benefit to Customer" (DBtC). This nomenclature, established by PSE during the 2012-2013 BCP development period, is specific to PSE programs, and is not intended to be used for comparison with other utilities. PSE maintains this metric to track the performance of its programs year-over-year.

a. Intrinsic Customer Value

There are several instances in which Energy Efficiency provides a value to its customers apart from rebates and grants.

For instance, among other benefits:

- Commercial Retrofit customers realize a benefit of engineering evaluations and verifications in addition to any custom grant received.
- Customers derive a value from consulting with an energy advisor before investing in a new heat pump.
- Customers who take advantage of PSE's refrigerator decommissioning program not only receive a rebate check, but they also do not need to be concerned with transporting their old unit to the transfer station.
- Quality Assurance Specialists provide customers with a variety of information to customers when verifying the installation of an energy-efficiency measure.

It would be impractical, artificially precise—and very inefficient—to attempt to track the time a staff member spends on each of these tasks. It is therefore inaccurate to attempt to categorize total Portfolio expenditures as simply "administrative" and "incentives" in order to imply a measure of how effectively a program is using customer funds.

b. DBtC does not Express a Program's Operational Efficiency

The DBtC ratio is affected by a number of factors, including but not limited to:

- One-time expenditures (for instance, the costs associated with upgrading to a new tracking system),
- Regulatory requirements (the BECAR, minimum spending requirements on evaluations, participating in regional collaboratives, evolving reporting and data requirements, analyses of new supplementary services charged to the Rider, for instance),
- Measure cost adjustments (either increased or decreased costs, which are impacted by manufacturing costs, etc.),

- Hard-to-Reach market segments often require significantly more staff time, effort, and cost to have any measurable impact, and
- Marketplace circumstances: saturation of certain measures leave only higher-cost measures availability, increased or decreased customer demand may require less incentives to move the market. Artificially keeping incentive high is not a prudent use of ratepayer funding, nor does it help ensure that customers have a vested interest in investing in energy-efficiency measures, (colloquially termed "some skin in the game"). Market saturation may make some measures no longer desirable, building codes make some measure obsolete, etc.

It is therefore inaccurate to assume that the higher the DBtC ratio is, the better-managed the program.

c. PSE's DBtC Calculation

PSE views its DBtC two ways: first, at the Program level (comparing the DBtC of its Sectors to the expenditures of those same Sectors)—which is a more accurate view of DBtC. In this view, Energy Efficiency's 2016 DBtC was 77 percent; 77 cents out of every dollar collected through the Conservation Rider was returned to customers. Similarly, the natural gas DBtC—using the same calculation methodology—was 71 percent. These figures are impressive, and reflect program staff's substantial efforts to continuously improve business operations and value for PSE customers.

The second method for calculating DBtC is one that is more subjected to single-time charges, regulatory requirements, and outside influences. It also accounts for Energy Advisors, Market Integration, Strategic Planning, Market Research, other Portfolio support costs, and excludes Other Electric Programs. Many of these functions contribute some level of DBtC, however intrinsic the value is.

Using this method reveals DBtC ratios that are, in spite of mitigating factors, noteworthy: the overall electric Portfolio DBtC was 69 percent in 2016, while the overall natural gas Portfolio DBtC was 65 percent.[7]

[7] If PSE discounted the $827,000 expended on the NEEA natural gas collaborative, which resulted in no DBtC, the ratio would have been 69 percent.

Readers will also note that there is a wide range of DBtC among the programs when reviewing the budget-versus-actual expenditures listed in Exhibit 1 Supplement 1; some programs operate with a DBtC ratio of approximately 90 percent, while others operate with a ratio or 30 to 40 percent.

d. Proactive and Consistent Program Management

PSE accomplished this sustained level of DBtC through its continued focus on process maximization, careful attention to continuous improvement and customer satisfaction throughout the organization, as discussed in the program-specific chapters that follow. In order to sustain this consistent level of DBtC year after year, significant effort is required on the part of every Energy Efficiency staff member to balance customer expectations to prudently and effectively use Rider funding.

This is indicative of the attentive, thorough, and proactive management that program staff exercise, the programs' maturity, and the effort required to cost-effectively:

- Manage increasingly complex programs, often consisting of hundreds of measures;
- Develop Conservation Plans one or more years in advance;
- Create and maintain extensive measure research and documentation;
- Respond to third party and evaluation data requests;
- Meet evolving regulatory requirements; and
- Review and validate third-party reporting.

e. Support Organizations also Contribute to DBtC

Support functions noted in the overall-Portfolio calculation method are critical to Energy Efficiency's success. They contribute to the overall Portfolio conservation achievement and expenditures with no DBtC recognition, even though each contributes some level of intrinsic customer direct benefit. PSE is confident that the actual DBtC is greater if one were to account for the significant intangible benefits to customers that the Energy Efficiency department provides.

7) Measures

PSE discusses its Energy Efficiency's Measure Metrics archival system in Chapter 10: *Measurement & Verification*, starting on page 157. Exhibit 5 presents prescriptive measures[8] that Energy Efficiency programs used in 2016.

a. Measure Counts by Program

Exhibit 1, Supplement 4: *Portfolio Measure Category Counts* provides a condensed view of measure counts; typically, only one or two key measures per program.

This Supplement is intended to provide a high-level impression of measures that were key in driving Energy Efficiency savings accomplishments. Program-specific measure overview tables are included in each program discussion, and provide more refined views—albeit general summarizations—of a program's projects or measure installations.

It is important to note that PSE provides these high-level figures to afford a sense of program scale, customer demand, key savings contributors, and interesting measure types in each program. The tables include a limited number of measure types, and aren't intended to be comprehensive lists of all measures installed; only a representative sampling of measure types are provided.

Program measure tables aren't intended to be used as audit tools or to reconcile actual tracking records.

8) Memberships and Sponsorships

Energy Efficiency staff derives value for customers by engaging in memberships and sponsorships. For instance, PSE is a major funder of the Regional Technical Forum (RTF). Exhibit 1, Supplement 3: *Sponsorships and Memberships* lists those paid in 2016.

[8] Only measures that were originally included in the Source of Savings database at the time of the measure's creation, or measures that have a deemed savings value are archived. For instance, LED MR-16 lamps in the Commercial Lighting program. Their 2015 deemed value was a fixed kWh/yr. In commercial applications, though, that value is modified by the number of operating hours within a certain building. This measure is therefore classified as "calculated". Calculated measures archived in the Source of Savings database have an indicated savings value of "0" to avoid the impression that a savings value was inadvertently omitted.

9) Compliance

Chapter 14: *Compliance*, provides a complete discussion of Energy Efficiency regulatory compliance, beginning on page 231. This 2016 PSE Annual Report of Conservation Accomplishments is consistent with WAC 480-109-120(3). The Report will also reflect PSE's compliance with requirements outlined in WAC 480-109-100(1): Process for pursuing all conservation [sic].

It is noteworthy that in the interest of brevity and to avoid repetition, PSE will use the terms "condition (N)(x)" or "Section M(z)" when referencing deliverables outlined in Exhibit F to Stipulation Agreement, Docket No. UG-011571;[9] the 2010 Electric Settlement Terms, Docket No. UE-100177;[10] and Order 01 of Docket No. UE-152058.

In addition to these three requirement documents, PSE also addresses additional deliverables outlined in other pertinent documents in applicable sections of the Report.

[9] Commission Order 05 in Docket UE-100177 vacated specific electric deliverables outlined in Docket No. UE-011570.

[10] Within the 2010 Electric Settlement Terms, "Conditions" apply specifically to Section K. There are also specific PSE deliverables in applicable sections of the Settlement Terms.

III. ENERGY EFFICIENCY'S KEY 2016 INITIATIVES

In addition to achieving its conservation savings targets while prudently managing customer Rider funding, Energy Efficiency developed and managed several initiatives that are critical to its ongoing success.

A. Continuing Customer Focus

PSE customers are the key determinant of the success of Energy Efficiency's conservation programs. Throughout 2016, the dedicated men and women in the department—as well as staff members in departments that support Energy Efficiency—continued their long-standing commitment to maximize customer participation in PSE energy-efficiency programs while surpassing customers' expectations at each point of customer contact. Customers expect PSE to provide pioneering conservation products, flexible avenues of energy efficiency messaging, information and outreach, easier rebate and grant processing, simple applications, and online tools that help them manage their energy use.

1) Maximizing the Ease of Participation for Customers

Energy Efficiency teams focused on creating programs that were easy for customer to participate in, with expanded participation options. Efforts included broad outreach strategies and tactics, including community activities and small business blitzes, which enabled small business owners to immediately register for conservation measures. PSE's award-winning Energy Upgrades campaign (where PSE engaged thousands of customers)[11] was also very successful and provided new participation avenues for customers. Retailer point-of-purchase rebates, and better training for PSE partners and contractors also enhanced customer participation opportunities.

Joint utility programs such as the Advanced Rooftop unit Controls (ARC) incentive process significantly improved consistency between utilities and simplified the customer's incentive application process. PSE also grew the number of Contractor Alliance Network (CAN) members, which also expanded the number of Multifamily and commercial lighting contractors.

[11] PSE provides a detailed discussion of the Energy Upgrades campaign on page 47.

Program staff also simplified Lighting Power Density (LPD) applications, implemented an upgraded resource accounting and the MyDataManager reporting systems, adapted the qualifications for smaller lighting projects, and implemented new direct-install programs—designed to influence two categories of hard-to-reach segments: small to mid-size lodging and small agricultural customers—for their business customers.

2) Expanding Energy Efficiency Awareness

Another key area of emphasis for program staff was implementing solutions to increase customer awareness of Energy Efficiency programs throughout the year. Utilizing propensity modelling, spatial analyses, customer surveys, promotions, advertising, outreach, and expanding the communication and information available to customers. Program staff adapted existing—and created new—program services and offerings to meet evolving customer expectations in 2016. Highlights of significant Energy Efficiency initiatives that are discussed in the coming chapters include:

- PSE's Customer Awareness Tools provided customers with more targeted and timely seasonal energy-efficiency information and bill alerts, which are generated at times when customers tend to think most about their energy use. Eligible customers received alerts when their equipment was due for a check-up or service, when their e-bill was ready, or if there was a potential for a higher-than-usual bill. Between 60,000 to 435,000 customers received applicable notices.
- Quality Assurance (QA) verification inspectors provide customers with applicable energy-efficiency information when they're in customers' homes performing verifications.
- The Multifamily Existing program distributed more than 50 "Strive for Five" plaques—which are prominently displayed to maximize tenant awareness—to multifamily properties throughout the PSE service territory.
- The Direct to Consumer Channel expanded its "pop-up" events to include English-as-a-second-language locations, including a Mercado pop-up, in partnership with El Centro de la Raza.

- New television commercials, featuring energy-efficiency messaging from "Gloria" and "Stan" resulted in customers who saw the advertisements indicated that they are more likely to use PSE's energy-efficiency information and tools.
- In response to the Energy Upgrades campaign survey question "Are you aware of how PSE can save you money and cut your bill with Energy Efficiency Upgrades?", there was a 4 percent increase (from 72 percent in the 2015 survey to 76 percent in 2016) of customers answering "yes". This substantially exceeded the goal of a 1 percent increase.
- Energy Efficiency staff also provided program information to a variety of PSE staff in other departments that interact with customers to help them discuss Energy Efficiency programs in their own customer interactions.

3) Continuously Improved Customer-Driven Processes

As noted in the program discussions throughout this Report, program staff consistently focused on increasing customer participation and minimizing customer costs in energy-efficiency programs and exploring ways to maximize the value of external, customer-facing opportunities.

A major 2016 initiative in this regard was the new department-wide program management "DSMc" (Demand Side Management central) system. Several PSE organizations, with significant staff effort, participated in its operational ramp-up. By the end of 2016, close to 30 programs managed their measure suites, rebate application processes, and reporting in DSMc.

DSMc will reduce the time required to process customers' grants and rebates, augment program staff's ability to nimbly react to market conditions, and will provide customers with the ability to monitor the progress of their incentive application. PSE expects that these, and other benefits will enhance customer satisfaction with Energy Efficiency, and potentially lead to new participation opportunities.

Throughout 2016, in addition to the effort expended to bring DSMc online, program staff continued to refine and enhance processes that impact customers' experience with Energy Efficiency, while creating the most value of customer funding.

For instance, Business Sector teams revised rebate applications and Lighting Power Density (LPD) worksheets to make them easier for customers and contractors to participate. RCM's Resource Accounting Software is now easier to use, and the team implemented forms of reporting that are less burdensome for customers. The Rebates Processing team continued to exceed rebate processing turnaround time goal, while the Energy Efficiency Communities team enhanced the impact of their energy-efficiency messaging during their door-to-door blitzes.

Program staff consistently examine their processes required to perform due diligence in managing the accurate and timely tracking of rebate and grant payments, as well as vendor and contractor payments. This ensures a more positive customer experience. Program managers collaborated with contractors and vendors to develop improved reporting and inventory reconciliation to ensure that customer Rider funds were being appropriately safeguarded. An updated DSMc data verification process consists of program staff reviewing data files concurrent with the loading of the files into DSMc, rather than on a monthly basis.

4) Focus on Hard-to-Reach and Proportionately Underserved Market Segments

As indicated in the 7th Power Plan's Chapter 4: *Model Conservation Standard (MCS)-1* indicates that low-income customers are often classified as underserved. Other customer segments may include: moderate-income customers, rural customers, small business owners who may or may not lease their offices, multifamily tenants, manufactured home owners or tenants, and industrial customers. The Plan also says:

> "Ideally, the customers in the HTR segment should participate in similar proportion to non-HTR customers, assuming similar savings potential."[12]

PSE also believes that English-as-a-second-language customers may represent a proportionately underserved segment.

PSE's Energy Efficiency organization has maintained attention on hard-to-reach and proportionately underserved customer segments within its service territory for many years.

[12] Chapter 4, page 4-10, Seventh Power Plan: https://www.nwcouncil.org/energy/powerplan/7/home/

Program staff continue to develop programs and strategies to engage all customer segments and encourage their participation. This is also in compliance with WAC 480-109-100(7), which states:

> "A utility must offer a mix of conservation programs to ensure it is serving each customer sector, including program targeted to the low-income subset of residential customers."

Prior to regulatory mandates and regional recommendation, PSE recognized that there was a need to focus on hard-to-reach and underserved customers, and develop solutions that would help them conserve energy, saving on their energy costs. This focus has been contiguous with enabling PSE to meet challenging savings goals each year.

As noted in its earlier customer awareness discussion, PSE utilizes a broad variety of customer survey data, spatial analyses, feedback from trade allies, historical performance, industry studies and evaluations to ensure that Energy Efficiency's messaging reaches all of its customers, and provides them opportunities, services, and measures that enable participation. The following discussions of key customer segments highlight details that PSE provides in the program review chapters to come.

a. Low-Income Customers

One of PSE's predominantly visible programs is its residential Low Income Weatherization (LIW) program, which exclusively targets customers with a defined circumstance. In order to maximize the availability of energy-efficiency measures, there are several strategies that the program employs, including but not limited to:

- PSE works with eight Puget Sound low-income agencies, and does not limit the conservation funding available for cost-effective projects.
- The LIW program is allowed to fund projects that result in a programmatic TRC of 0.667, in accordance with Schedules 83 and 183.
- LIW provides funding for certain repairs needed to facilitate the installation of energy-efficiency measures.
- Additionally, consistent with WAC 480-109-100(10), the LIW program processed electric projects submitted by agencies that passed the Savings-to Investment Ratio (SIR) of 1.0 in 2016.

PSE also offers services for customers that may be income-qualified through other Energy Efficiency programs.

Another residential program that also serves a portion of the low-income segment is the Multifamily Existing program. Although this segment was not reported as a separate classification for 2016, many low-income and working-class customers living in multifamily dwellings obtain energy-efficiency measures through the Multifamily Existing program, rather than the Low Income Weatherization program. Reasons are varied and numerous, including a sometimes onerous income eligibility process needed to qualify multifamily structures, more time-consuming application processes, measure availability differences, and measure installation costs incurred by customers.

Additionally, Energy Efficiency conducts awareness events and energy fairs at multifamily campuses throughout the PSE territory, in concert with the PSE Energy Efficiency Communities organization, and provides brochures and information geared to multifamily tenants.

b. Business Customers

Other customer segments that may be difficult to reach include small to medium agricultural concerns. This customer segment is often in remote, rural locations, and is limited to participating in energy-efficiency programs between planting, growing, and harvest periods. Energy Efficiency designed its Small Agriculture Direct Install program to specifically address this customer segment. The program was fully implemented in 2016. PSE is encouraged by its customer engagements to date, and is enthusiastic about the program's future.

Similarly, small businesses are sometimes limited in their participation in PSE's programs due to their lack of resources or their lack of building ownership; quite often, small business owners lease their offices, and may believe that they are limited to the availability of energy-efficiency measures. PSE's small business and community "blitzes" continue to expand the Energy Efficiency message, with good responses during the events.

Commercial kitchens have their own unique attributes, and have limited opportunities to discuss, apply for, and install efficiency measures. BEM's Commercial Kitchens & Laundry program staff are skilled at recognizing these customers' specific requirements.

On 2016, the Business Energy Management's (BEM's) custom grant programs modified customer qualification standards, in large part as a result of lower-cost measures. This enabled more small-to-medium business to participate.

c. English as a Second Language

English-as-a-second-language customers may also be a proportionately underserved segment of PSE's customers. In 2016, PSE conducted and participated in several events in neighborhoods that have a high English-as-a-second-language population. PSE's Energy Upgrades was featured at the *Fiesta Premio Esmeralda,* and in partnership with El Centro de la Raza, PSE conducted a pop-up event at the *Dia de los Muertos*. Additionally, PSE publishes several energy-efficiency brochures in other languages, while its web pages can also be viewed in other languages such as Russian, Chinese, Spanish and Korean.

5) PSE Extends its Commitment to Customer Satisfaction

PSE's emphasis on customer service is prominent in PSE's expectations of its trade allies, vendors, and contractors. PSE holds each third-party entity that represents PSE Energy Efficiency Programs when installing or servicing energy-efficiency measures to ever-increasing customer service standards. Energy Efficiency staff regularly review a vendor's or contractor's performance to ensure that they also meet customer expectations.

PSE's commitment to exceeding customer expectations also extends to a key set of customers: its Regulatory Stakeholders. This Report is designed to exceed their expectations by providing critical and useful information, based on their previous requests, comments, and ideas.

Specific program discussions in this Report will provide additional examples of PSE's commitment to providing an outstanding energy efficiency experience for its customers.

B. 2016 Continuous Improvement and Adaptation through Total Quality Management

Throughout 2016, Energy Efficiency program staff continued to conduct business operations with a focus on continuous improvement and adaptive management through the application of progressive Total Quality Management (TQM) principles. Doing so not only ensures compliance with WAC 480-109-100(1)(a)(iv), *Adaptive Management*, it is clearly the most sensible and effective way to operate such a complex and customer-centric organization. TQM is an established and engrained method of adaptive program management for Energy Efficiency program staff. Its application ensures the prudent management of customer funds and enables PSE to consistently offer a superior suite of products.

Incorporating TQM, the skilled professionals of Energy Efficiency achieved incremental improvements—in process efficiency, in the way that Energy Efficiency staff interact with customers, in maximized productivity, and in ways that are often obscured from the public view, but critical nonetheless—throughout the organization. Doing so provided for prompt and innovative solutions to challenges and market opportunities, where teams were able to confidently adapt and maximize customer satisfaction and conservation savings.

In each iteration of the TQM cycle, PSE makes management decisions with these requirements uppermost in mind:

1. Meet customer expectations to drive continued program participation,
2. Prudently apply customer funds to cost-effective conservation,
3. Maximize staff productivity, process efficiency and effectiveness,
4. Ensure rigorous program execution and metrics, with a high degree of savings reporting accuracy, financial prudence, compliance, and transparency.

Continuous improvement is a focus not only programs in Residential Energy Management (REM) and Business Energy Management (BEM), but in all supportive organizations. Every support team's focus on adaptively managing its program execution resulted in numerous process improvements, reductions in duplications of efforts, increased management transparency, and optimized data and information access. PSE's focus and continuous improvement efforts yielded optimal savings results while the business expenses were managed with due diligence.

Energy Efficiency's application of TQM principles is not limited to a rigidly-structured process step outline. In the dynamic environment in which Energy Efficiency operates, staff must apply the conceptual TQM steps in rapid succession with critical coordination between functional groups (for instance, IT, Marketing, Purchasing, etc.), and in some cases, in concurrent steps.

In 2016, program staff also employed agile project management principles, which expedites deliverables while maintaining strict program management and focus. In practice, this methodology prevents the potential for waiting for a sub-task to be completed before staff provides a review and sign-off. In a strict "phases and gates" approach, there's potential that staff may realize that the deliverable is sub-optimal, resulting in delays. Agile project management, though, provides a review opportunity as the development is taking place. This allows staff to be more involved in the progress, and make adjustment suggestions along the way.

An illustrative 2016 example of Energy Efficiency's application of agile project management was the development and implementation of Resource Conservation Management's (RCM's) resource management accounting software. Using this project management approach, the software project was completed on time and on budget.

1) Highlights of Adaptive Management Implementation

Through its consistent application of TQM, PSE achieved several of its adaptive management objectives. Highlights of notable customer satisfaction, measure offerings, process, and system enhancements initiated or completed in 2016 include:

- PSE Evaluation staff have reviewed the concepts, potential benefits, and potential increased costs of an "M&V 2.0" pilot. Staff plan to recommend a potential pilot project in 2017.
- Dealer Channel staff added new commercial kitchen measures in order to provide a more comprehensive suite of offerings.
- Retail Lighting staff removed CFLs from its suite of measure offerings at the end of 2016.

- Manufactured/mobile home offerings were expanded to include Home Energy Assessments and ductless heat pumps.
- In order to accommodate the different rate Schedules and meter configurations found on many small farms, PSE bases program eligibility on gross sales, rather than rate Schedule.
- As a result of reduced LED prices in the retail market, the Retail Lighting program made two incentive level reductions. Similarly, the Business Lighting Grants program put plans in place to reduce 2017 incentive levels.
- The refrigerator replacement program ended in 2016 as a result of reduced demand and reduced cost-effectiveness as a standalone measure.
- The RCM program developed the Urban Smart Bellevue program, in which 60 businesses enrolled by year-end.
- Multifamily Existing's Strategic Energy Management initiative, counted 15 large properties participating by year-end.
- Net Metering staff enhanced the customer application process through its implementation of the online interconnection tool, PowerClerk®.

Program discussions in the following chapters provide additional instances and details of adaptive management achieved through the application of TQM principles.

IV. RESIDENTIAL ENERGY MANAGEMENT

Chapter 4 will focus on the results made possible by customers served by Residential Energy Management (REM) staff. PSE will discuss savings and expenditure metrics and their key drivers, efforts to connect with hard-to-reach market segments, and measure savings type profiles.

A. 2016 Residential Energy Management Sector Summary

The following discussions provide brief summaries of the Residential Energy Management (REM) sector. Detailed program discussions are located in Chapter 5: *Residential Program Details*. Table IV-1 and Table IV-2 provide, at a program level, REM 2016 savings and expenditure figures respectively. Details of the Business Energy Management (BEM) Sector results are included in Chapter 6: *Business Energy Management Overview* and Chapter 7: *Business Energy Management Program Details*.

Table IV-1: 2016 Residential Electric and Natural gas Expenditures

	2016 Expenditures			2016 Budget
Schedule	**Programs**	**Total**	**% of Budget**	
Electric	Electric			Electric
Gas	Gas			Gas
E201	Low Income	$ 3,430,753	101.3%	$ 3,386,625
E214	Single Family Existing	$ 29,992,099	97.7%	$ 30,687,840
E216	Single Family Fuel Conversion	$ 714,872	85.8%	$ 833,282
E217	Multi Family Existing	$ 11,493,946	117.6%	$ 9,776,000
E218	Residential New Construction	$ 695,813	87.8%	$ 792,218
	Total Electric Programs	**$ 46,327,483**	101.9%	$ 45,475,966
G201	Low Income	$ 203,059	71.6%	$ 283,478
G214	Single Family Existing	$ 5,941,054	101.2%	$ 5,873,063
G217	Multi Family Existing	$ 810,926	83.2%	$ 974,655
G218	Residential New Construction	$ 468,107	205.0%	$ 228,332
	Total Gas Programs	**$ 7,423,145**	100.9%	$ 7,359,528

Table IV-2: 2016 Residential Electric and Natural Gas Savings

	2016 Savings			2016 Goal
Schedule	Programs	Total	% of Goal	
Electric	Electric			Electric
Gas	Gas			Gas
E201	Low Income	1,667	106.8%	1,560
E214	Single Family Existing	117,585	106.5%	110,402
E216	Single Family Fuel Conversion	1,616	85.2%	1,897
E217	Multi Family Existing	19,587	113.9%	17,190
E218	Residential New Construction	1,441	72.1%	2,000
	Total Electric Programs	**141,896**	106.6%	133,049
G201	Low Income	11,743	63.0%	18,641
G214	Single Family Existing	1,602,652	95.1%	1,684,421
G217	Multi Family Existing	87,184	84.7%	102,946
G218	Residential New Construction	123,122	233.9%	52,630
	Total Gas Programs	**1,824,701**	98.2%	1,858,638

1) Extraordinary Savings Adjustment to LEDs

As 2016 progressed, it became evident that PSE customers were enthusiastically embracing new LEDs; both Energy Star® and "value LEDs".[13] Despite two incentive reductions in 2016, sales of these lamps far exceeded the expectations established in the mid-2015 target-setting process. Additionally, by working in concert with the Regional Technical Forum (RTF), PSE developed updated Unit Energy Savings (UES) values that, in some specific lamp cases, are substantially lower than the 2016 values being reported. These combined impacts affected not only the retail value chain in the Direct to Consumer Channel, but also the Multifamily, Home Energy Assessment, and Low Income Weatherization Programs.

PSE recognized the need to make an exceptional, one-time savings adjustment and took the initiative to effect a substantial reduction to its 2016 electric savings. PSE presented a recommendation that it take an exceptional, one-time savings adjustment to its Conservation Resource Advisory Group (CRAG) in its October 12 CRAG meeting. The adjustment would be exceptional, in that doing so is counter to Energy Efficiency's establish guideline of adjusting applicable savings only at the start of each year.

[13] Value LEDs are LEDs that meet PSE's programmatic criteria, but are not certified as Energy Star. Value LEDs tend to be less expensive than Energy Star.

However, because the magnitude of this impact overwhelms all other savings adjustments, due to the impact on PSE's Resource Planning organization, to maintain savings that are consistent with the evolving Residential Sector, and to ensure the highest degree of reporting accuracy, PSE recommended that this adjustment be effected by the end of 2016. The CRAG generally indicated support for this recommendation.

PSE therefore made a one-time adjustment of -42,000 MegaWatt-hours (MWh) to its overall REM electric savings. REM adjusted each affected program's electric savings proportionally, according to the actual number of affected lamps reported. The electric savings values indicated in all REM tables, including Exhibit 1: Savings and Expenditures, reflects these adjustments.

B. Targeting Hard to Reach and Proportionately Underserved Market Segments

As noted in Chapter 3, section 4, several programs in the Residential Energy Management Sector positively impacted the Hard-to-Reach and Proportionately Underserved customer segment.

Through partnering with its Energy Efficiency Communities and Events organizations, REM made strides in reaching low-and lower-income customers, working-class and moderate-income customers in multifamily dwellings, and PSE's non-english-speaking customers.

PSE hosted or participated in community events such as *Fiesta Premio Esmeralda* and in partnership with El Centro de la Raza, *Dia de los Muertos*. In 2016, the Sector developed a strategy to reach multifamily residents who may not have access to/information about energy-efficiency measures, which program staff plan to fully implement in 2017.

PSE does not limit the amount of funding that it makes available to low-income agencies through its Low Income Weatherization program, and it works closely with those agencies to develop creative solutions to the specific needs of this customer segment. As reviewed in the Low Income Weatherization program discussion, 2016 was the first full year of funding electric projects that use the TREAT (Targeted Retrofit Energy Analysis Tool) model to attain an SIR (Savings to Investment Ratio) of 1.0, consistent with WAC 480-109-100(10).

The program also provides funding for certain repairs needed to effect energy-efficiency measures, and in 2016, partnered with PSE's Assistance Programs to improve low-income customers' experience.

In the manufactured/mobile home market, Energy Efficiency created a mobile home ductless heat pump measure, and expanded its Home Energy Assessment program to include manufactured homes.

PSE provides details of these, and additional initiatives, in the program discussions throughout Chapter 5.

C. REM Cost Effectiveness

Table IV-3 represents the actual calculated Utility Cost and Total Resource Cost benefit-to-cost (B/C) tests for the Residential Sector. PSE presents the complete UC and TRC tables, showing cost-effectiveness calculations by program in Exhibit 2 of this Report.

Table IV-3: 2016 Residential Sector Cost-Effectiveness Tests

Benefit to Cost Ratios Residential Sector		
	Utility Cost	**Total Resource Cost**
Electric	2.74	1.93
Gas	2.25	1.60

Indicated TRC includes the application of a 10 percent Conservation credit value.

1) REM Program Cost-Effectiveness Performance

All REM electric programs finished 2016 with a TRC of over 1.0. Although REM's Single Family Weatherization (TRC of 0.80), and Multifamily Existing (TRC of 0.85) natural gas programs finished 2016 below a TRC of 1.0, the overall sector's natural gas TRC ratio was 1.67 for the year.

D. Five-Year Trends

Figure IV-1 and Figure IV-2 provide views of REM's 5-year electric and natural gas savings and expenditures. In 2016, electric savings were 7 percent lower from 2012 levels, while commensurate expenditures were 15 percent higher. From 2015 to 2016, however, electric savings were up almost 5 percent, while spending was 3 percent lower for the same period. On the natural gas side, there was a 4 percent increase in 2016 from the 2012 therm savings, and a 7 percent increase in natural gas expenditures. From 2015 to 2016, there was a 42 percent increase in savings, with only an 18 percent increase in spending.

Figure IV-1: Residential Electric Five-Year Trends

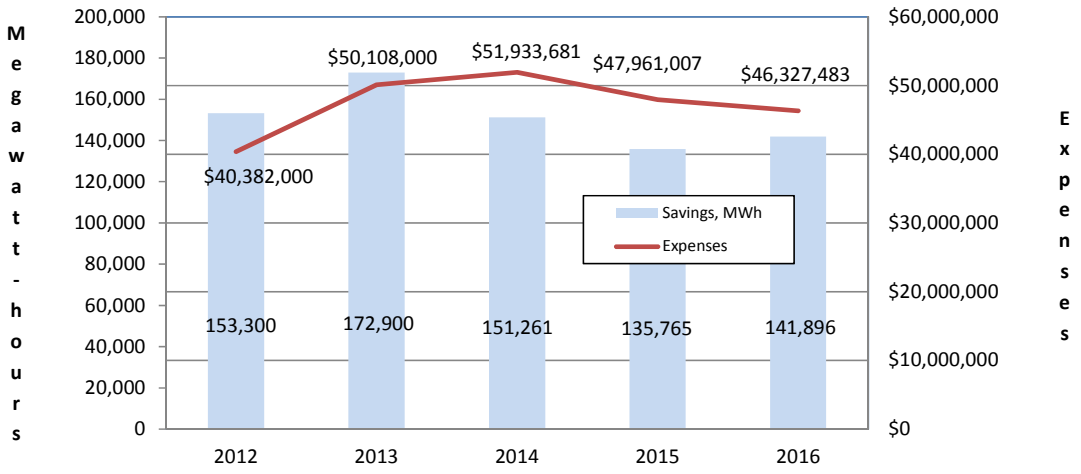
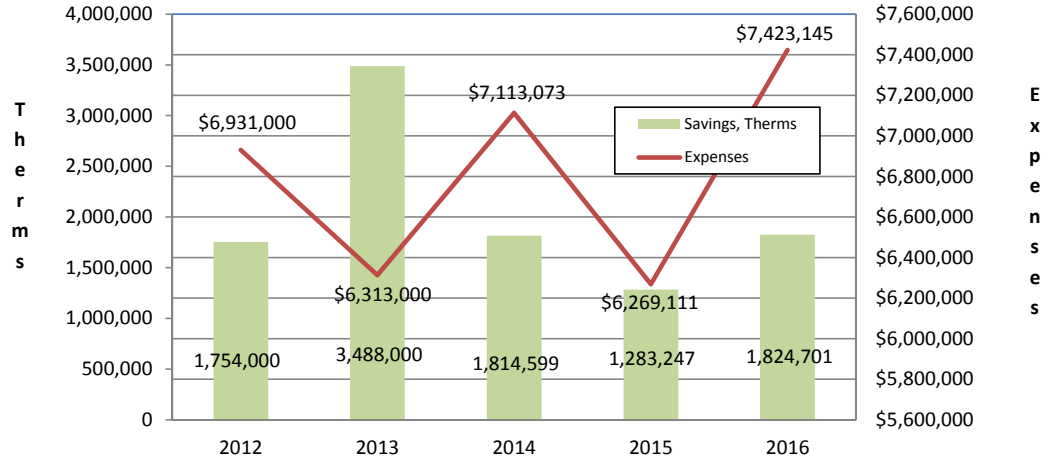


Figure IV-2: Residential Natural Gas Five-Year Trends



E. Program Measure Tables

PSE provides measure tables in each of the program discussions in Chapter 5: *Residential Program Details*. As noted in Chapter 2, PSE provides these high-level figures to afford a sense of program scale, customer demand, key savings contributors, and interesting measure types in each program. The tables include a limited number of measure types, and aren't intended to be a comprehensive list of all measures installed; only a representative sampling of measure types are provided. The listed measures aren't intended to comprise the total amount of 2016 program savings. Program measure tables aren't intended to be used as audit tools or to reconcile actual tracking records.

It is important to note that PSE rounds the overall savings figures indicated in these charts for presentation purposes. The data is extracted from the source tracking systems, categorized, and then summed. The actual overall electric and natural gas savings by program, represented in Exhibit 1: *Savings and Budgets*, may vary by an insignificant amount.

F. Program Discussions

The program discussions In Chapter 5 outline process and tactical improvements that enhance the customer's energy-efficiency experience and prudently utilize Conservation Rider funding, along with program results, key drivers of savings and expenditures, adaptive management, and significant accomplishments.

V. RESIDENTIAL PROGRAM DETAIL DISCUSSIONS

The following program discussions address specific results and accomplishments in the Residential Energy Management Sector. The discussion flow aligns with Energy Efficiency's Exhibit 1: *Savings and Budgets*.

A. Single Family Existing

Schedules E/G 214

1) Description

The Single Family Existing group is comprised of two Channels:

- Direct to Consumer Channel,
- Dealer Channel,

each of which is comprised of several programs. These programs are detailed in the following chapter.

Single Family Existing programs implement cost effective, targeted, residential energy savings using a menu of prescriptive and calculated efficiency measure incentives, including rebates for single family existing structures. Existing single family structures are defined as residential dwellings which include: structures with four or less units that are attached by a contiguous roofline; manufactured or factory built homes permanently affixed to a concrete foundation; and manufactured or factory built homes that are transportable. Single family existing residences exclude structures that are currently under construction. Prescriptive rebates are intended to facilitate participation by customers, contractors, manufacturers, retailers, developers, trade allies, and provide administrative efficiencies for PSE in meeting energy efficiency goals.

Single Family Existing programs are managed in the Direct-to-Consumer and Dealer Channels.

Note: Multifamily campuses which have a mixture of existing residential building types, including buildings with four attached residential units or less, are served under the Multi-Family Retrofit Program; schedules E217 & G217.

Rebates and incentives offered to eligible natural gas and/or electric PSE Single Family Existing customers include a variety of end-use classifications, not limited to:

- Compact Fluorescent Lighting including CFL lamps.
- Light-Emitting Diode (LED) lighting including A-line, BR-30, indoor & outdoor fixtures, MR-16, and candelabra.
- Appliances—including refrigerators, freezers, clothes washers, heat pump dryers, and through PSE's partnership with NEEA.
- Consumer Electronics, including but not limited to advanced power strips, and others through PSE's partnership with NEEA.
- Retail, online, leave-behind, and engagement LEDs and showerheads.
- Refrigerator and Freezer Decommissioning – both secondary and primary units.
- Refrigerator and Clothes Washer Replacement – focus on older inefficient models to encourage early retirement.
- Home Performance activities that may include home energy assessments, audits, and all-inclusive home retrofit services.
- Weatherization, including windows, insulation air and duct sealing, with targeted measures for manufactured home customers.
- Space heating including hydronic systems, high efficiency furnaces, high efficiency boilers, high efficiency fireplaces, heat pumps, and system controls, such as web-enabled thermostats.
- Water heating, including heat pump water heaters, and efficient showerheads.
- Fuel conversion rebates for PSE electric customers switching to energy-efficient gas products such as ranges, space and water heating, and clothes dryers.

Incentive amounts and savings values are regularly reviewed and are based on regionally accepted energy savings estimates and incremental efficiency measure cost. Incentives may be subject to change in response to revisions in savings estimates, average incremental cost, market conditions, or changes in Federal appliance efficiency standards or State codes.

2) Sector Performance

Table V-1 provides program-level details of expenditures for the Single Family Existing group, which consists of multiple single-family programs.

Table V-1: Single Family Existing 2016 Expenditures

2016 Expenditures				2016 Budget
Schedule	Programs	Total	YE % of Budget	
Electric	Electric			Electric
Gas	Gas			Gas
E214	Single Family Existing			
	Residential Lighting	$ 15,273,679	107.4%	$14,215,007
	Space heat	$ 4,404,660	107.2%	$4,107,422
	Water heat	$ 694,345	170.0%	$408,509
	HomePrint	$ 2,359,339	107.6%	$2,192,477
	Home Appliances	$ 5,059,587	87.3%	$5,792,811
	Mobile Home Duct Sealing	$ 65,272	4.5%	$1,456,037
	Web-Enabled Thermostats	$ 94,470		$0
	Showerheads	$ 646,845	99.2%	$652,129
	Weatherization + ARRA	$ 1,229,853	96.2%	$1,278,574
	Home Energy Reports	$ 164,048	71.6%	$229,221
Subtotals		**$ 29,992,099**	**98.9%**	**$30,332,186**
G214	Single Family Existing			
	Residential Lighting	$ -		$0
	Space heat	$ 1,957,102	80.8%	$2,420,721
	Water heat	$ -		$0
	HomePrint	$ -		$0
	Home Appliances	$ -		$16,650
	Mobile Home Duct Sealing	$ -		$0
	Web-Enabled Thermostats	$ 355,227	175.1%	$202,825
	Showerheads	$ 486,058	91.8%	$529,322
	Weatherization + ARRA	$ 3,095,477	117.4%	$2,637,367
	Home Energy Reports	$ 47,190	71.3%	$66,178
Subtotals		**$ 5,941,054**	**101.2%**	**$5,873,063**

Table V-2 provides a 2016 summary of savings for programs within the Single Family Existing group.

Table V-2: Single Family Existing 2016 Savings

2016 Savings				2016 Goal
Schedule	Programs	Total	YE % of Goal	
Electric	Electric			Electric
Gas	Gas			Gas
E214	Single Family Existing			
	Residential Lighting	84,229	118.1%	71,294
	Space heat	7,802	107.1%	7,284
	Water heat	1,021	178.8%	571
	HomePrint	4,128	120.6%	3,423
	Home Appliances	5,493	53.4%	10,291
	Mobile Home Duct Sealing	190	6.4%	2,972
	Web-Enabled Thermostats	165		848
	Showerheads	6,483	135.7%	4,776
	Weatherization + ARRA	2,351	73.0%	3,221
	Home Energy Reports	5,722	100.0%	5,722
Subtotals		**117,585**	**106.5%**	**110,402**
G214	Single Family Existing			
	Residential Lighting	0		0
	Space heat	551,120	85.4%	645,705
	Water heat	0		0
	HomePrint	0		0
	Home Appliances	15,728	33.5%	46,930
	Mobile Home Duct Sealing	0		0
	Web-Enabled Thermostats	65,484	192.6%	34,000
	Showerheads	256,433	78.5%	326,631
	Weatherization + ARRA	473,920	121.1%	391,188
	Home Energy Reports	239,967	100.0%	239,967
Subtotals		**1,602,652**	**95.1%**	**1,684,421**

3) Single Family Existing 2016 Customer Engagements

In 2016 the Direct to Consumer and Dealer Channels collaborated to develop and execute unique customer engagement campaigns focused on driving customer awareness of and participation in PSE's single-family residential energy efficiency programs; the Energy Upgrades campaign, Cross-Sell campaign, and other Energy Efficiency Awareness Tools.

a. The Energy Upgrades Campaign

In the summer of 2016, PSE won the prestigious Chartwell Gold Award[14] for Best Marketing Practices for the successful Energy Upgrades Campaign. 2016 marked the third year of this award-winning campaign. The Energy Upgrades Campaign grew to be bigger and achieved its goal of directly reaching half of PSE's residential electric customers. All of the campaign key metrics are outlined in the list on page 48.

The campaign continued to use the message of "save money and shrink your bill with energy efficiency upgrades". PSE's research has shown that saving money cuts across all segmentations of customers and the word "upgrade" signals to customers that energy efficiency does not mean the customer has to sacrifice anything. Unique to 2016, the campaign included an exciting offer for a free LED, which would be delivered to the home of each customer that specifically requested it. This ambitious task was divided by directly sending the free LED offer to half of PSE's electric customers and the other half will receive this offer in 2017. This free LED offer is a way to surprise and delight customers and encourage them to try an LED bulb in their home. The delivered LED contained a coupon for an additional discount off other LEDs at partner retailers.

The multi-faceted campaign launched in May 2016. PSE partnered with four lighting manufacturers and several retailers in PSE's service territory to offer special limited time offers from May through December on select LED products. The offers rotated throughout the campaign to give equal attention to each partner. In addition to advertising the special limited time offer with the free LED, PSE also used a variety of other marketing and outreach tactics, including but not limited to; paid advertising, bill inserts, social media, in-store events, and door-knocking. .

Throughout the campaign, PSE staffed various retail blitz events that engaged customers to scan their "Golden Ticket" to instantly win a prize, donated or paid for by partners. The prizes included a coupon for a free LED that they could pick up instantly at the retail store, a water saving showerhead & aerator kits, and even energy efficient televisions. Energy efficiency experts staffed the retail blitz events and assisted customers with their energy efficiency questions.

[14] A complete list of recipients of the award can be found at: https://www.chartwellinc.com/sce-comed-pseg-fpl-and-puget-sound-energy-recognized-with-chartwells-2016-best-practices-awards/

PSE also participated in the Spanish-speaking community event *Fiesta Premio Esmeralda*.

The Energy Upgrades Campaign utilized many marketing assets in order to achieve millions of impressions. This included transit ads, social media, a campaign website, email, direct mail, bill inserts, cinema ads, radio, earned media through press releases, and more. PSE also launched a door-to-door campaign to directly reach targeted communities and to hand-deliver the customer's requested LED bulb. The canvassing included informing residents in the door-to-door communities of the other energy efficiency programs that PSE offers.

2016 Upgrades Campaign by the numbers:

- 97,031,632 advertising impressions.
- 288,014 direct mail offers to PSE electric customers for a free LED.
- 459,682 direct email offers to PSE electric customers for a free LED.
- 136,979 LEDs delivered to PSE electric customers.
- 8 months of limited time offers on select LED products.
- 1,394,364 emails to PSE customers marketing these limited time offers.
- 34 different in-store retail blitz events at 5 different retail chains.
- 14,846 Golden Tickets distributed to customers at the retail blitz events.
- 2,500 Golden Tickets distributed to guests at the Spanish-speaking community event *Fiesta Premio Esmeralda*.
- 968 LED prizes awarded at the Spanish-speaking community event *Fiesta Premio Esmeralda.*
- 31,072 door knocks in over 13 PSE communities.
- 3.9 percent increase in customer awareness of PSE's energy efficiency programs.

b. The Cross-Sell Campaign

2016 marked the fourth year of The Direct to Consumer and Dealer Channel's Cross-Sell email Campaign. The goal of this campaign is to encourage customers to participate in PSE's energy efficiency programs, keep them regularly engaged, and to increase their awareness of other PSE energy efficiency offerings.

This was accomplished by leveraging PSE's propensity modeling, which uses predictive analytics to determine customers' likelihood to qualify and participate in a number of energy efficiency programs. This gives a higher probability that customers receive messages that are relevant and wanted. PSE refreshed all propensity scores in 2016.

Overall Results

- PSE distributed 24 unique electronic messages for a total email distribution of 5.1 million emails, an increase of 2.4 million emails from 2015. Across all emails, the open rate averaged 28.6 percent; 7.7 percent above industry average. 2.8 percent of customers clicked-through links provided to learn more about the offer; a 0.7 percent increase over industry average.

c. Energy Efficiency Awareness Tools

In year two of this customer initiative, PSE continued to provide energy efficiency email messaging to customers during moments when they are likely to be thinking about their energy usage (typically, when they receive a PSE bill, at the start of heating season, etc.). Emails were sent to customers in 2016 during three specific instances:

- In both the spring and fall of 2016, as equipment needs to be checked or serviced, PSE customers received an email providing energy efficiency tips and solutions for seasonal concerns. Each email was sent to approximately 435,000 customers.
- For existing e-billing customers, when their bill was ready, customers received an email reminder with a usage breakdown summary and links to energy efficiency programs to help them better understand and manage their energy use. Emails were sent to approximately 370,000 customers monthly in 2016.
- PSE's Unusual Usage Alert launched in May of 2016. This product provides customers an alert in advance of a higher than expected bill, where their usage is projected to increase by a minimum of 20 percent year-over-year. Since launch, PSE sent out over 60,000 of these notices, to a customer pool of 100,000, with unique open rates averaging 50 percent and aggregate open rates near 100 percent; making this the most engaged email communication to customers.

B. Direct to Consumer Channel

The Direct-to-Consumer Channel focuses on services targeted to a wide variety of retail and manufacturer entities, including but not limited to “big box” chains, drugstore/grocery chains, warehouse stores, online retailers, and other local and independent resellers.

The Channel also manages a PSE-branded online store, ShopPSE (http://shop.pse.com).

The Channel manages several programs—most of which are consumer-oriented—including refrigerator decommissioning, showerheads, appliances, electronics, and of course, energy efficient lighting. This Channel also collaborates on consumer electronics and select appliances through PSE’s funding relationship with NEEA. The Direct-to-Consumer Channel operates primarily within the structure of Schedule 214; Single Family Existing.

To best leverage existing market relationships and to drive a consistent customer and contractor engagement strategy, management reporting for the Lighting To Go program that resides under Schedule E 262 was moved into the Direct to Consumer Channel in Q2 of 2014.

1) Direct-to-Consumer Channel Customer Awareness Initiatives

The following discussions highlight some of the Direct to Consumer Channel’s key 2016 customer awareness initiatives.

a. Retail Store Awareness and Field Services

In 2016, Puget Sound Energy successfully implemented field services in 420 retailer locations. From awareness of campaigns to the daily maintenance of the retail programs, the field services team provides a connection between PSE, the retail programs, and the PSE customer. The suite of products that the field team services now ranges from lighting to appliances to thermostats, ensuring that PSE’s customers have an abundance of tools to reduce their energy usage using energy efficiency.

2016 saw a reduction in the total number of stores on the program, from 490 to 420 stores. Two grocery chains, and another variety store, discontinued their lighting program.

However, the reduction in overall store count meant field reps had more time to spend in high maintenance stores and to provide special support to retail locations that participated in PSE's marketing campaigns.

i. Summary of Field Visits, trainings, and events:

PSE's field services team, made up of four full-time representatives, made over 3,400 field visits in 2016. In 2016, the stores were classified in an organized tier system that determined the number of team visits needed to ensure adequate representation:

- A (1-2 visits per month)
- B (1 visit per month)
- C (1 visit every other month, with two levels of communication in the off month)
  - C1 (1 visit every other month, call/email other month)
  - C2 (1 visit every other month)
- D (1 visit every quarter)
- E (1 visit or call every 6 months)

Visits per tier and total visits and average visits per month[15] by tier are:

Store Tier	Number of Stores	Total Number of 2016 Visits	Visits per Store	Avg. Visits per Month
A (1-2 visits per month)	39	502	13	42
B (1 visit per month)	137	1397	10	116
C1 (1 visit (call/email) every other month)	115	725	6	60
C2 (1 visit every other month)	120	674	6	56
D (1 visit every quarter)	66	158	2	13
E (1 visit or call every 6 months)	5	9	2	1

[15] "Visits per Store" and "Avg. Visits per Month" are rounded calculations, based on the actual number of store visits.

The tiered system allows PSE's field service representatives to spend the right amount of time with lower-maintenance stores and more time with high-need stores, such as The Home Depot and new stores.

In 2016, the same 4 field representatives conducted 333 trainings; trainings are defined as either an informal one-on-one or formal group education of retail sales associates. These trainings consisted of both everyday rebate offerings as well as education on limited time offers associated with PSE's marketing campaigns.

Field representatives also completed 89 retail events throughout 2016. These events were educational tabling events within the retail store itself during peak shopping times that engage PSE customers with energy efficient products and program knowledge.

For 2016, the field reps tried out a new format of events that entailed assisting customers in the aisle with their lighting decisions.

As LED technology continues to develop, there is a wide variety of choices and new terms for customers to learn. With the increased choice, however, comes increased confusion from customers about which light bulb to choose. In the past, customers could walk in with their burned-out light and easily find a replacement—find the matching shape, find the matching wattage, and they were done! Now, customers have to decide on shape, lumens, and color temperature. To help with this, reps have restructured their events to spend more time in the aisle with customers and less time behind a table.

ii. Point-of-Purchase Signage

PSE worked to update the look of the in-store Point of Purchase (POP) signage. The design was refreshed with bolder text and a bigger PSE logo to increase PSE rebate recognition in the stores and drive customer awareness. Designs were tested in the store at the end of 2015 and once the color scheme and look were selected, using customer feedback and data, the new POP launched in stores in Q1 of 2016.

A. Summary of Quality Assurance / Quality Control:

Secret shopper visits were conducted in several stores throughout the year to provide QA/QC of field activity.

Representatives are scored on a number of aspects including, but not limited to; routing, organization, price auditing, POP placement, and interaction with store employees.

The representatives are evaluated on these aspects as well as overall for each visit based on this scale:

Field QA/QC Scoring Definitions
5. Rep is outstanding
4. Rep is above average. Minor issues if any.
3. Rep is fine w/ some guidance.
2. Rep is below average. Guidance needed.
1. Rep needs immediate guidance.

Based on the scale, the reps averaged an overall score of 4.35 for the secret shopping visits, meaning they are doing a near outstanding job in the various aspects scored. In all but one of the secret shopping store visits, POP was deemed satisfactorily visible and the average scores for each section of the store were 4.2 out of 5. Additional comments and feedback from the secret shopping was largely positive. The results of retail store employee interviews, conducted during these visits, also indicate that the PSE field services team has built strong relationships with store managers and employees.

iii. Thank You Kits

2016 marked the third full year of PSE's successful "Thank You" kits. PSE sent "Thank You" kits to 26,940 eligible residential electric and combined service customers that either participated in a PSE rebate program or applied for a non-qualifying measure.

The purpose of the “Thank You” kits is to show appreciation to PSE customers for their interest in its energy efficiency programs and to offer a surprise opportunity to adopt energy efficient measures in their home.

In 2016 the “Thank You” kit box and brochure were redesigned. The artwork was revised to match PSE’s in-store point-of-purchase signage. Additionally, two bathroom aerators and Teflon tape were added to the kit along with the existing two Philips® SlimStyle™ LED A-lamp bulbs.

“Thank You” kits include a brochure thanking the customer for their participation and detailing PSE’s various energy efficiency residential programs. By sending these energy efficient products, PSE gave customers the opportunity to trial these measures in their home.

To better serve customers, a “Thank You” kit for eligible residential gas-only customers was launched in early 2016. The kit contains a water-saving fixed showerhead, two bathroom aerators, a kitchen aerator, and Teflon tape. Kits were sent to 8,745 eligible residential gas-only customers that participated in a PSE rebate program or had their application denied. This new “Thank You” kit is a way to surprise and delight PSE customers and to encourage them to install energy efficient measures.

iv. Pop-Up Retail Events

PSE continued its popular “pop-up” retail events at PSE businesses throughout PSE’s service territory. A Pop-Up retail event is a limited-time—often one day—opportunity for customers to learn about and purchase PSE qualified and rebated products. Other PSE conservation programs are often promoted as well.

Events are generally offered to businesses with more than 500 employees in the core PSE electric service territory. In 2016, in collaboration with these businesses, PSE conducted 85 total events; an increase of 15 events from 2015. It is estimated that over 100,000 customers were made aware of the energy efficiency offerings while purchasing over 8,300 PSE branded Energy Efficiency Kits.

v. shopPSE

After nearly two years of market & customer research and development, PSE launched its own E-commerce website. Designed to offer a best in class E-commerce experience, http://shop.pse.com offers customers the ability to take advantage of PSE's energy efficiency rebates online everyday on three select product categories; lighting, showerheads and tier II advanced power strips.

The marketplace launched in May of 2016, and since then, nearly 80,000 customers have visited the site, producing 7,430 orders. This is a 600 percent increase over the previous marketplace that was owned and operated by another third party. The website converts sales at nearly 9.4 percent, which is nearly 4 times the industry average for online retail.

C. Program Reviews

The following discussions provide 2016 recaps for the individual programs that comprise the Direct to Consumer Channel.

1) Retail Lighting

PSE offers incentives to purchase energy efficient lighting measures through instant rebates and limited time offers. The 2016 program year saw several significant changes in the lighting industry. Energy Star® announced their 2.0 specification which reduced the criteria for Energy Star certification. This meant that manufacturers could produce Energy Star certified bulbs less expensively, which reduced retail prices for LEDs.

In 2016, a significant change in the lighting industry was the substantial decline of CFLs. The lower retail cost for LEDs, particularly "value LEDs",[16] offered customers affordable energy efficient lighting options in lieu of CFLs. GE, a major lighting manufacturer, announced that they would cease producing and selling CFLs in the United States by the end of 2016.

Walmart, a major retailer for CFLs in PSE's service territory, phased CFLs out of their product line by the third quarter of 2016. Additionally, the new Energy Star 2.0 specification revealed that CFLs would not be Energy Star certified once the specification goes into effect on January 2, 2017. These factors drove a steep decline in CFL sales and availability, as manufacturers and retailers shifted their focus away from CFLs.

a. 2016 Program Accomplishments

In 2016, the Residential Retail Lighting program exceeded its savings goal. While it also exceeded its budget, it did so at a lower proportion relative to the savings. This accomplishment was aided by changing market conditions in which the overall cost of LED technology declined and the customer adoption rate of residential LEDs increased.

[16] Value LEDs are LEDs that meet PSE's programmatic criteria, but are not certified as Energy Star. Value LEDs tend to be less expensive than Energy Star.

Additionally, effective campaigns such as Energy Upgrades and Cross-sell contributed to the program's successful performance.

LED multi-packs rose in popularity in 2016, contributing to the increase in sales and customer adoption of LEDs. This was influenced by the high sales volume at Costco retail locations and their business model centered on multi-packs. The "value LED" entered the market, offering customers a low-cost option for energy efficient lighting.

b. Adaptive Management

PSE conducted a two-phase survey of its customers that included an in-home product trial in order to determine if value LEDs offered a positive customer experience when compared to Energy Star certified LEDs. From the survey findings, PSE determined that customers were happy with their experience using value LEDs and preferred their low retail price. As a result, PSE created criteria for qualifying value LEDs for rebates on the PSE residential retail lighting program. All of these factors contributed to a record year in which 4.9 million units were rebated by PSE.

In 2016, CFLs accounted for 19 percent of the bulbs rebated in PSE's residential retail lighting program. As a result, PSE decided to end CFL incentives on December 31, 2016.

Lower LED retail prices supported two incentive reductions for PSE's residential retail lighting program in 2016. PSE also added LED T8 shop lights as a new measure rebated on the program and adjusted the energy savings values for all measures. These changes kept the program in line with efficient lighting trends.

2) Residential Appliances

In 2016, the Direct to Consumer Channel offered incentives on a variety of appliance programs for residential customers.

These include:

- Refrigerator & Freezer Decommissioning,
- CEE Tier 1, 2 and 3 Energy Star Clothes Washers,
- CEE Tier 1, 2 and 3 Energy Star Refrigerators,
- Refrigerator & Clothes Washer Replacements.

a. 2016 Adaptive Management

PSE implemented a tiered rebate structure for the retail appliance measures to incentivize customers to purchase energy efficient appliances.

Customers received $25.00 for purchasing CEE Tier 1 appliance, $50.00 for CEE Tier 2, and $75.00 for CEE Tier 3. Although customers enjoyed having more eligible models, customer surveys conducted within 2016 indicated confusion with the tiered rebate system. PSE used this customer data to redesign the program for a 2017 refresh.

Similar to years past, the replacement and decommissioning measures were strategically rolled out throughout PSE's service territory. PSE continued with a community-by-community marketing campaign that would steadily keep customers participating in these measures. Midyear, PSE halted promotion, in large part to customer service issues with the contractor, who has had too rapid of acceleration of its business after the sudden closure of their only other major competitor in 2015. Prior to the marketing halt, PSE has seen a year-over-year decline in its replacement measures.

In light of these decreasing numbers, PSE chose to end the refrigerator replacement measure on December 31, 2016. The measure was only cost-efficient when bundled with a leave behind kit for customers. The refrigerator replacement program began in 2011 and PSE believes, after five years, that the market has captured the majority of early refrigerator replacements.

b. Key Variance Drivers

Although the retail refrigerator measure exceeded budget, the retail clothes washer measure had lower volumes than anticipated.

Combined with the poor performance of both the replacement measures and decommissioning measures, the retail appliance savings and budget result was below its forecast and spending goals for the year.

3) Advanced Power Strips

Reported under PSE's Residential Appliance Program, an Infrared (IR) sensing advanced power strip is installed with a home entertainment system. When this device is installed, it disconnects power to connected devices after a set period with no IR signal. PSE also distributes advanced power strips through pop-up retail events.

a. 2016 Program Accomplishments

In 2016, PSE merged the previous PSE.com/APS standalone site with PSE's new online efficiency marketplace http://shop.pse.com, offering customers the opportunity to purchase the devices online, every day at an incentivized price.

b. Key Variance Drivers

Although customer interest in the product was higher than prior years, the uptake of the measure was below forecast due to no retail locations carrying the product and lack of available delivery methods.

4) Residential Showerheads

PSE continued to look for ways to build and strengthen its showerhead program portfolio in 2016.

a. 2016 Program Accomplishments

Most notably, Costco stores enrolled in the instant rebate showerhead program with the showerhead manufacturer, Waterpik®.

PSE also utilized the newly designed shopPSE to promote the showerhead programs to customers through the Cross Sell campaign; marketing two online showerhead offers to customers, which resulted in almost 4,700 orders. In addition, the program leveraged the Energy Upgrades Campaign to distribute a showerhead kit that contained one showerhead and three aerators.

Customers filled out a business reply card (BRC) at three separate Upgrades event and then received the kit in the mail. 2,200 BRCs were distributed at the events.

b. Hard-to-Reach and/or Proportionately Underserved Segment

In 2016, PSE attempted a new strategy to target some of its hard to reach customers populations.

Water Savings Kits were distributed at the Mercado Pop Up, an event organized by Rebels & Scholars in partnership with El Centro de la Raza, in celebration of the Mexican tradition of the Day of the Dead (*Día de los Muertos*). PSE utilized the event to reach out to the Latino Community and share the message of energy efficiency in a different language. At the event, all of the information that people received from the booth and the staff was in the two languages.

The event lasted 8 hours and during that time the PSE Brand Ambassadors distributed more than 470 water conservation kits.

In a similar style tabling to the Mercado Pop Up event, PSE also distributed the Water Savings kits at 11 local foodbanks to reach out to its low-income population about energy saving opportunities. While customers waited in line at the food bank, the PSE field representatives were able to talk with them about energy efficiency and offer them a water savings kit. More than 1,500 kits were distributed.

c. Key Variance Drivers

Despite the abrupt loss of a major retail's support of its showerhead program, the Retail Showerheads program exceeded its electric goal, thanks in part to PSE's marketing and successful outreach efforts. Sales were also supplanted by the engagement of another national retailer. The program fell short of achieving its forecasted natural gas savings in 2016, though, as a result of historically-high savings goals.

5) Web-Enabled Thermostats

a. 2016 Program Accomplishments

The web-enabled thermostat program had a successful rollout in 2016. The program initially launched with Nest and Honeywell, and added three new manufacturer partners (ecobee, Carrier, and Trane®) during the year, further increasing the options for PSE customers.

b. Adaptive Management

Just after the initial rollout, PSE experienced some issues with customer validation, causing delays for rebate payment to some PSE customers. With the help of its partners, PSE developed a new method to validate thermostats that significantly reduced customer wait times and improved the customer experience.

c. Key Variance Drivers

Overall, the thermostat program was close to forecast for total units. However, the initial forecasting predicted a 50/50 split between natural gas and electric heated homes. The actual split was closer to 85/15 natural gas/electric causing gas thermostats to be higher than forecast and electric thermostats to be lower.

6) Home Energy Reports

2016 was the eighth full year of PSE's Home Energy Report "legacy" program.[17] The program reported 310 kWh electric and 13 therms savings for 2016, due to the results of the 2015 Home Energy Report impact evaluation. Like in years past, the actual 2016 savings will be "trued up" following the next impact evaluation. Due to customer attrition, the overall cost of the Home Energy Report programs was lower than in previous years.

7) Direct to Consumer Channel Measure Highlights

Table V-3 provides an overview of Retail Channel measures reported in 2016 by measure types. It is important to recognize that these figures are rounded and intended to convey the scale and scope of measure types reported in this channel, rather than to provide the precise number of measures installed.

It is interesting to note that many of the water-savings measures (such showerheads, aerators, etc.) are often reported in PSE's electric-only, natural gas-only, or combined territories. Therefore, those figures are presented as a single number that spans the electric and natural gas column.

[17] It is important to note that, consistent with a CRAG agreement established in 2015 target-setting meetings, "legacy" Home Energy Report electric savings apply towards the EIA 2016-2017 conservation penalty target, while the expansion pilot savings (if any) are excluded from the EIA penalty target.

Table V-3: Overview of 2016 Direct-to-Consumer Channel Measure Activity

Direct to Consumer Channel Measure Counts			
Program Measure Type	Measure	Electric	Natural Gas
Retail Lighting			
CFLs	Various types	956,000	
LED Lamps	A-lamps	2,139,000	
	Others: MR-16, reflector, omnidirectional, etc.	1,397,000	
LED Fixtures	Indoor, outdoor, etc.	169,000	
	LED retrofit kits	268,000	
Home Appliances			
Freezers	New, replacements, decommissioning, etc.	1,300	
Refrigerators	New, replacements, decommissioning, etc.	6,400	
Clothes Washers	New, replacements, etc.	7,900	
Clothes Dryers		70	
Advanced power strips		4,900	
Web-Enabled Thermostats		400	3,900
Showerheads			
Showerheads	Various efficiencies, various delivery methods	64,900	
Showerstart	Showerstart & adapters	1,800	
Aerators	Various efficiencies, various delivery methods	62,600	
Home Energy Reports		18,500	

C. Dealer Channel

The Dealer Channel's target market consists of two audiences:

- Resellers and contractors that sell, install, and service energy efficiency appliances for single family residential customers
- Single family residential home owners and renters

Primary measures offered include: HVAC systems, water heating systems, windows and insulation, fuel conversion appliances, comprehensive Home Performance activities such as home energy assessments, audits and all-inclusive home retrofit services.

The Dealer Channel operates primarily within the structure of Schedule 214: Single Family Existing.

1) 2016 Channel Highlights

The Dealer Channel transitioned from the legacy rebate processing system to Energy Efficiency's improved rebate processing system Demand Side Management Central (DSMc). The Dealer Channel staff were highly engaged in the development of system requirements, development, quality assurance testing, user acceptance testing and deployment. All programs that are described in this section are now being processed using the new system.

In 2016 the Single Family Existing programs exceeded savings targets while staying within their budgets.

Dealer Channel programs continue to target hard-to-reach customers such as those renting their home, manufactured and mobile home customers, and customers in rural locations through outreach efforts, program design approaches, and marketing.

Program staff continue to participate on the NEEA-coordinated Consumer Strategy Working Group focused on driving a regional strategy around heat pump water heaters. Staff are also supporting demand-response initiatives to pilot a regional strategy to place demand-response technologies in customer homes.

Several programs introduced new measures, changes to service delivery method, and simplification of processes to improve customer experience and increase cost efficiency of administering Dealer Channel programs. Specific activities are outlined by program in the following sections.

2) Home Energy Assessments

Home Energy Assessment (formerly HomePrint™) provides customers with a no-cost in-home service performed by PSE-qualified Home Energy Assessment Specialists. The program is intended to increase the awareness of customers regarding their home's energy consumption and identify cost-effective ways to use less energy. Participants receive a detailed Home Energy Assessment Report which provides guidance on cost-effective upgrades and associated PSE rebates available. Additionally, eligible customers benefit from instant energy savings from the direct installation or distribution of leave-behind high-efficiency products to include, but not limited to: light bulbs, showerheads, faucet aerators, and Advanced Power Strips.

a. 2016 Program Accomplishments

The Home Energy Assessment program exceeded savings targets, and exceeded its planned Outside Services expenditures. PSE focused on more targeted and efficient delivery of the messaging around the program. Activities included targeted email campaigns by zones, broader communications associated with PSE's Voice of the customer newsletter, and a community canvassing campaign. The community canvassing campaign proved to be more successful, in total volume of engagements and completed projects, than previous years, due to enhancements of scheduling customers through the online platform, improved coordination among partners through the use of data and communications, as well as implementing "next-day" scheduling opportunities for customers.

b. Adaptive Management

PSE rebranded the program, formerly known as HomePrint™, as the PSE Home Energy Assessment. The name change was done to provide a more clarity around the offering and the benefits to the customer.

Contracting with Franklin Energy Services has allowed PSE to introduce some key enhancements to the program, which include developing and creating an online scheduling platform hosted on PSE.com, increasing brand awareness of Specialists through uniforms and branded vehicles, and enhancing an online platform for tracking customer assessment information. These enhancements allow ease of scheduling and verifying eligibility of the program, while also providing a more consistent experience for participating customers.

While primarily delivered through Franklin Energy Services, the program continues to be offered through several Contractor Alliance Network (CAN) contractors. Utilizing both a third-party service provider and a CAN contractor delivery model resulted in higher than anticipated Outside Services expenditures while also exceeding savings targets.

c. Hard-to-Reach and/or Proportionately Underserved Customers

In order to better access hard-to-reach and proportionally underserved customers, PSE developed a Home Energy Assessment offering for customers residing in Manufactured-and Mobile homes.

3) Weatherization

The weatherization program oversees the “shell” of residential structures; installation of windows, insulation, air and duct sealing. There are a wide variety of duct sealing offerings, some directed specifically to mobile homes, while other focus on site-built residences.

a. 2016 Program Accomplishments

Original savings estimates were exceeded in the gas measures during 2016. The primary driver was increased consumer interest and participation in the weatherization program.

b. Adaptive Management

During the first quarter of 2016, PSE added prescriptive RTF measures to support efficiency upgrades in Manufactured and Mobile Home structures. New rebates included: prescriptive duct sealing, and floor insulation.

To facilitate the installation of these measures, PSE trained existing Contractor Alliance Network weatherization contractors on the standard specifications.

PSE added two additional prescriptive measures for site-built homes; prescriptive air sealing for attics and floors, and prescriptive duct sealing only. The duct sealing only measure expands the standard age-of-home eligibility to those built before 2001. Both of the measures provide increasing opportunities to enhance comfort, efficiency and durability in the home.

The 2015 impact and process evaluation for Manufactured Home Duct Sealing and PSE's market evaluation determined it was no longer cost-effective to deliver Manufactured Home weatherization measures through a service provider model. As a result, during the first quarter of 2016, PSE integrated a set of segment-specific prescriptive measures into the Single-family weatherization portfolio to continue to serve this hard-to-reach customer segment.

The high efficiency double-pane window replacement measure was determined to no longer be cost effective, therefore was removed from the portfolio. PSE adopted a Low-e Storm window measure as an option for customers with existing metal-framed double pane windows interested in an efficiency upgrade.

Unfortunately, the market did not adopt the measure as anticipated as limited eligible products are available. Program staff retired the Low-e storm window measure for 2017.

c. Key Variance Drivers

Outside Services expenditures exceeded budget due to the development, training and Quality Assurance activities around the Manufactured Home weatherization measures. The program's electric savings under-achieved its goal by 27 percent as a result of higher-than-anticipated weatherization occurring in heat pump homes, along with achieving only 50 percent of the target for the duct sealing and insulation measures. The target savings for these measures were developed from proposed planned programs for 2016, which ultimately did not occur, or were subsumed into the manufactured home measures.

4) Space and Water Heating

The Space and Water Heating programs deliver incentives and drive installations of heating and water heating systems, including but not limited to: natural gas furnaces and boilers, heat pumps, hydronic systems, and domestic water heaters.

a. 2016 Program Accomplishments

The space heating program exceeded savings goals for electric rebates but did not meet its natural gas targets due to lower furnace rebate numbers.

The Residential Water Heat program exceeded its savings targets and spending forecast in 2016 as a result of a number of 2015 projects rolling into 2016. Furthermore, PSE experienced higher-than-anticipated interest in its water heating rebates.

b. Adaptive Management

In 2016, PSE's space heating programs continued working with larger customer outreach efforts including the Direct-to-Consumer Upgrades campaign and cross-sell email communication efforts. The program continues work with NEEA on both the ductless heat pump and gas fireplace rebate programs.

In 2016, PSE customers experienced a large-scale failure of Air Generate Heat Pump Water Heaters which were highly promoted and incentivized across the region. The product experienced a high failure rate after the manufacturer went out of business, causing customer satisfaction issues. To overcome this obstacle, PSE worked with the Northwest Energy Efficiency Alliance (NEEA) to develop and implement a remediation plan which provided replacement of failed units at no-cost for impacted customers for a specified period of time.

When NEEA funding expired, PSE continued to reimburse customers for a portion of replacement costs through the end of 2016. Overall, customers were satisfied with this approach and the number of failed units declined significantly by the end of the year.

Another major change in 2016 was GE's decision to exit the Heat Pump Water Heater market due to high costs and low uptake. To ensure others don't exit the market, NEEA is leading a revised regional strategy with an emphasis to drive customer demand for these products.

The market is trending towards Heat Pumps over Gas Furnaces. Program staff researched this phenomenon and has determined that this is a result of customer's increasing preferences for air conditioning in the service territory. As customer preference for air conditioning increases contractors are recommending heat pumps with gas backup as a solution, resulting in lowered gas furnace rebate submissions.

c. Pilot-Like Initiatives

PSE started active participation in the NEEA led Regional Consumer Product Strategy focused on Heat Pump Water Heaters. In 2016, most of this work focused on strategic planning.

d. Hard-to-Reach and/or Proportionately Underserved Segments

The Program created a mobile home ductless heat pump rebate to reach the mobile home market. Ductless Heat Pumps (DHP) are excellent options for mobile homes using electric resistance forced air systems. The smaller size and relatively lower cost of the product allows the space heat program to help PSE customers lower their energy bills and increase their comfort with a cost effective option.

The program works with contractors to offer this rebate to qualifying customers.

e. Key Variance Drivers

In the Water Heat program, there was a higher-than-anticipated adoption of the Heat Pump Water Heater technology. Increased interest in promoting regional efforts around this technology has positively impacted the installation rate of this product. The spending variance in the water heat program was impacted by the large scale manufacturer failure.

5) Manufactured Home Duct Sealing

PSE's manufactured home duct sealing program achieves measurable, cost-effective energy savings within PSE's electric service territory for existing single-family manufactured homes by supporting duct sealing upgrades, direct installation of LED lamps, and leave-behind efficient shower heads, at no cost to qualifying customers.

a. Adaptive Management

The impact and process evaluation completed in late 2015 determined that continuing to outsource the Manufactured Home Weatherization program was not cost effective. During the first quarter of 2016, PSE transitioned a number of measures, including duct sealing and floor insulation to its CAN contractors through a prescriptive rebate structure. As a result, a number of duct sealing and floor insulation measures continued to be provided, but were moved to the Single-Family Weatherization program budgets and targets.

6) Dealer Channel Measure Highlights

Measures, grouped by types that were reported in 2016, are presented in Table V-4.

Table V-4: Overview of 2016 Dealer Channel Measure Activity

Dealer Channel Measure Counts			
Program Measure Type	Measure	Electric	Natural Gas
Weatherization	*(Unless otherwise note, the below figures represent square footage)*		
Insulation			
	Floor, various types	245,300	1,046,000
	Wall, various types	48,600	213,300
	Attic, various types	259,100	1,268,000
Air Sealing		32,500	234,600
Windows, various types		135,900	304,700
Duct Sealing	*(Number of units)*	200	1,400
Ventilation	*(Number of units)*	10	
Mobile Home Floor Insulation		43,600	
Leave-Behind Measures	*Showerheads, Aerators, Etc.*		6,900
Space Heat	*(All figures represent number of units, rather than square footage)*		
Heat Pumps			
	Ductless	1,600	
	Air source, geothermal, etc.	1,900	
Heat Pump Sizing & Lockout Controls		700	
Heat Pump Conversions		600	
Boilers			40
Integrated Space and Water Heat			100
Fireplaces			900
Furnaces			4,200
Water Heat	*(All figures represent number of units, rather than square footage)*		
High Efficiency Water Heater	Various efficiencies, various delivery methods	70	
Heat Pump Water Heater		600	
Manufactured Home Duct Sealing	*(All figures represent number of units, rather than square footage)*		
Duct Sealing			
	In-park	50	
	Out-of-park	60	
Direct Install Measures	LEDs	600	
Leave-behind Measures	Showerheads	100	
Home Energy Assessments	*(All figures represent units)*		
Direct-Install LEDs		130,700	
Leave-Behind Showerheads		2,400	
Leave-Behind Aerators		3,000	
Advanced Power Strips		200	

It is important to note that the rounded figures are intended to convey a sense of scale and scope of project activity, rather than to provide comprehensive measure count or an audit tool.

D. Single Family Fuel Conversion

Schedule E216

This program discussion is presented out of Conservation Schedule-number sequence. This is because it is managed within the Dealer Channel. Presenting it in numeric sequence would also interrupt the program sequence of the Residential Business-to-Business (RB2B) Channel, which also includes the Single Family New Construction program, Schedule E/G 215 as part of its Residential New Construction discussion.

1) Description

The Company provides incentives for replacing existing electric forced-air or zonal space heating equipment and/or electric water heating equipment with high efficiency natural gas space heating equipment[18] and/or high efficiency natural gas domestic water heating equipment.

New for 2016, PSE added cook top ranges and clothes dryers to the fuel conversion program. Incentives were provided for replacing existing electric ranges and clothes dryers operating on PSE electric with the equivalent or better natural gas version of that appliance. For the range to qualify, the both the stove top and oven must both be natural gas. Due to a lack of an acceptable energy efficiency standard for ranges PSE decided to discontinue the natural gas cook top range incentive on January 1, 2017.

2) 2016 Accomplishments

Historically the majority of the savings for the program came from electric to natural gas water heater conversions. This is due to the relative ease of converting water heaters when there is already natural gas service to the house.

However, in 2016 the space-heat conversions—especially forced air units—outperformed forecasts and was a major contributor while water heat conversions underperformed forecasts leading to noted variances in Exhibit 1.

[18] As outlined in the Company's Schedule 216, **Section 1, Availability/Eligibility**, the equipment to which the Customer is converting must be "highly efficient natural gas space and/or domestic water heating…"

In 2016, the program was featured in a large-scale communication as part of the Cross-Sell campaign. A message was sent promoting the program incentive, featuring the addition of the natural gas range and dryer incentives. The communication also highlighted the cost benefits of natural gas.

3) Adaptive Management

A program review identified improvement potential for participation, qualification and connection with qualified contractors. This will include a streamlined referral process that will include pre-qualifying the customer for the rebate based on current fuel source and usage as well as confirming that they are in an area where gas is available. The customer will then be connected with a Contractor Alliance Network member who will be able to complete the job from start to finish as well as offer an instant rebate.

4) Key Variance Drivers

In 2016, the Fuel Conversion Program performed slightly under its savings forecast. Historically, this program has been difficult to market as it is geared towards a very specific customer. Overall, the number of units installed exceeded targets but the savings targets fell short. This was due to the implementation of the range and dryer incentives. These measures are an easy conversion but carry a relatively low savings compared to converting space and/or water heat.

5) Fuel Conversion Measure Highlights

A summary of measure categories installed in the 2016 Single Family Fuel Conversion program is provided in Table V-5. Please note that the figures are rounded and are not intended to represent a comprehensive measure listing.

Table V-5: Key Fuel Conversion Measures

Fuel Conversion Measure Counts		
Measure Type	Measure	Electric
Water Heater Only	*Storage & tankless*	100
Space Heat Only	*Baseboard & forced air*	30
Natural Gas Dryer		400
Natural Gas Range		600
Space & Water Heat	*Baseboard & forced air*	40

E. Residential Business to Business (RB2B) Channel

The Residential Business-to-Business (RB2B) Channel develops and implements programs for businesses that provide direct services and benefits to PSE customers, and is comprised of the Multifamily Existing, Low Income Weatherization, Single Family New Construction and Multifamily New Construction, and programs.

The Multifamily Existing program collaborates with variety of stakeholders and provides outreach services to increase customer awareness and maximize the benefits of PSE services to property residents and managers. The Low Income Weatherization program works with social service agencies to satisfy the need of PSE customers that meet low income guidelines. The Single Family and Multifamily New Construction staff relies heavily on their relationships with the building industry and related trade allies like NW Energy Star® Homes, to ensure that measures are incorporated in the design and construction of a wide spectrum of multifamily building types.

The group provides services under electric and natural gas Schedules 215, 217, 218 and collaborates with PSE's Business Energy Management sector when multifamily projects include a combination of residential and commercial custom measures. The Low Income Weatherization program is operated under the terms of electric and natural gas Schedules 201.

1) Low Income Weatherization

Schedules E/G 201

a. Description

The Low Income Weatherization program assists low-income residential customers to improve the energy efficiency of single family residences, multifamily structures and manufactured/mobile homes.

In 2016-2017, the goal of Puget Sound Energy's Low-Income Weatherization Program is to continue to lessen the energy-cost burden of lower-income customers by improving the energy efficiency of their residences and educating these consumers on routine ways to reduce their energy use and costs.

Program efforts build on the existing model and extend the partnerships with assistance agencies as well as leverage other PSE programs for lower-income customers to include safety awareness and bill-payment assistance.

Key stakeholders are: low-income gas and electric customers; county and municipal low-income weatherization agencies in the PSE service area; Washington State Department of Commerce (Department of Commerce or Commerce); and participating weatherization contractors and suppliers.

For those projects receiving PSE funding combined with other State and Federal funding, income eligibility is determined in accordance with Department of Commerce Policies and Procedures.

Residential Low Income Weatherization provides funding of many cost-effective home weatherization Measures for low-income customers receiving gas and/or electric heat from PSE.

Funds are used for single-family, multi-family and mobile home residences. Some Measures that do not meet standard cost-effectiveness tests may also be approved. Measures funded may include conservation measures that are cost effective consistent with the Department of Commerce's *Weatherization Manual* and those measures identified through the priority matrix in the *Weatherization Manual*.

In addition, this program provides funding for energy-related repairs and energy education. An energy-related repair is a repair that is necessary (1) to install a weatherization Measure properly, (2) to protect the health and/or safety of the occupants, (3) to address an existing problem that weatherization could aggravate or (4) to protect the integrity of the installed Measure. Examples include but are not limited to:

- Repair roof leaks
- Electrical inspection and repairs
- Mold/mildew remediation
- Rodent, insect and pest extermination
- Bath and kitchen ventilation upgrades
- Furnace or water heater repairs or replacement.

Sources of Low Income Weatherization funding include, but are not limited to, Electric Rider, Gas Tracker, Company funds, BPA credits or other federal or state government programs.

For those funds that must meet a cost effectiveness standard, up to 30 percent may be applied to energy-related repairs that are necessary to effect the installation of other cost-effective Measures. The final percentage allocated will be determined according to the overall program cost-effectiveness.

b. 2016 Program Review

The 2016 Low Income Weatherization electric savings exceeded goal by 7 percent, and natural gas savings finished the year lower-than-forecasted; 63 percent of goal. Impacts to the natural gas program are discussed in section d. Key Variance Drivers.

c. Adaptive Management

PSE issued policy guidance to Agency partners that clarified application of the Department of Commerce (DOC) cost effectiveness test as it applies to utility funding, and that is consistent with WAC 480-109-100(10). The policy guidance was important to ensure PSE remained compliant with utility cost effectiveness requirements as defined by program tariffs. As a result, the PSE Weatherization Assistance program was able to achieve conservation savings on measures that are considered cost effective by DOC.

d. Pilot-Like Initiatives

PSE collaborated with three agencies, Kitsap Community Resources (KCR) Metropolitan Development Council (MDC) and Opportunity Council, to send a segmented mailing to PSE customers with PSE Assistance Program offerings. Specifically the mailing was a PSE/Agency postcard notifying customers they could be eligible for the program. PSE employed a customer segmentation tool developed for the PSE Weatherization Assistance program to develop the mailing lists.

While this effort did not deliver the intended results, it provided PSE with intelligence on the direct mail implementation method—one traditionally employed by PSE—and its effectiveness to encourage program participation by this customer segment.

e. Hard to Reach and/or Proportionately Underserved Segments

By its design, the Low Income Weatherization program is completely focused on a hard-to-reach segment of PSE customers: those that meet a specific income criteria. In addition to its ongoing work to effect energy-efficiency in this segment, two notable initiatives that program staff acted on in 2016 were:

i. Designed Initial Strategy to Increase Low Income (LI) Units Served

In the fourth quarter of 2016, PSE designed an initial strategy to increase low income (LI) units served whether directly through the Weatherization Assistance program or other complementary PSE programs that also reach the LI sector. This strategy is part of PSE's commitment to serve hard-to-reach and proportionately underserved customers. Once implemented, this strategy will ramp up new program potential in the PSE Multifamily Existing (MFE) program and the PSE Weatherization Assistance Program.

ii. Participated in PSE Assistance Programs Initiative

The PSE Weatherization Assistance program participated in an internal working group to improve the customer experience of low income customers and increase participation in PSE Assistance programs.

f. Key Variance Drivers

PSE offerings are limited due to cost effectiveness limitations. For example, decreased Regional Technical Forum (RTF) savings estimates for single family and manufactured home (MH) units overall have declined, making it difficult to install a broad range of cost effective measures. This also means the Program must serve more units to achieve the same amount of savings in past years.

The natural gas program ended the year at 63 percent of goal. Agencies report that it is not from a decline in applications received by PSE natural gas customers, but it has more to do with limited PSE program offerings and the inability to find structures that qualify for those offerings. For example, a customer may be considered income eligible for the program, but upon conducting an energy audit, agencies find they have limited opportunities to install measures offered by PSE.

g. Measure Summary

Table V-6 provides a high-level summary of Low Income Weatherization measures installed in 2016. The figures represent unique dwelling units (homes, apartments, manufactured homes, etc.), and are rounded to indicate a general sense of program scope, rather than precise totals to be used for auditing. The list is not intended to represent a comprehensive tally of measures installed. A dwelling unit may have one or more measures installed as a part of a project.

It is important to note that the indicated number of units (which represents the measure type) doesn't always correlate to the total number of measures installed.

For instance, for each “LED Lamp” category indicated, there could be substantially more than one LED lamp installed. Indicated values also include measures approved through the agencies’ application of the SIR test in certain instances.

Table V-6: Low Income Weatherization Measure Highlights

Measure	Electric	Natural Gas
Air Sealing	130	
Attic Insulation	150	40
Floor Insulation	190	40
Wall Insulation	30	30
Common Area HVAC	20	
Duct Insulation	10	40
Duct Sealing	110	60
Ductless Heat Pump	220	
Electronic Thermostat		
EnergyStar Whole House Ventilation	220	
Gas Furnace Replacement >95%		10
LED Bulbs	2,700	
LED Fixture	2,000	
TLED	1,800	
Pipe Insulation	250	10
Refrigerator Replacement	30	
Structure Sealing	190	70
Showerheads	90	~5
Windows	20	

2) Multifamily Existing

Schedules E/G 217

a. Description

The objective of the Multifamily Existing program is to increase the installation of cost effective energy efficient Measures into existing multifamily (MF) buildings with PSE natural gas and/or electric service.

The Multifamily Existing program is designed to increase the uptake and installation of selected energy efficient Measures in existing multifamily buildings with five or more attached residential dwelling units located in PSE's electric and natural gas service areas. The team works with property owners, managers, trade ally contractors, and tenants to encourage program participation. The program also serves multifamily campuses which have a mixture of building types including buildings with less than five units. Multifamily structures and campuses typically have opportunities for upgrades in the units, common areas, and building envelope. Measures may include: windows, insulation, and air sealing enhancements; appliance, lighting, and HVAC upgrades; O&M improvements; behavioral modification; and calculated commercial upgrades such as central boilers and solar pool heaters. This program targets installation of energy efficient measures occurring during planned retrofit and replace upon failure. PSE will update current measures list and incentives as needed.

The program continually researches and develops new and innovative means to achieve cost effective energy savings. Examples may include behavioral based programs such as web-enabled thermostats and Strategic Energy Management (SEM). Web-enabled thermostats empower customers with both knowledge and control of their heating costs through a simple user-interface accessed on their smart phone. SEM provides a holistic approach to multifamily property portfolios by engaging managers, maintenance staff, and residents to achieve energy cost savings through behavioral changes, operational improvements, facility maintenance, and attention to utility accounting.

Through effective customer education and implementation, PSE is continually exploring the impacts of how new technologies and energy management plans can contribute to the quantification of behavioral based energy savings.

b. 2016 Program Review

Overall, the program achieved 115 percent of the electric target and 87 percent of the natural gas target. The Multifamily Existing program reached over 500 multifamily properties across almost 4,000 buildings, which ultimately served over 36,000 household units. Contractor-installed measures accounted for approximately 60 percent of the total savings, whereas vendor direct install measures comprised the remaining 40 percent.

i. Air Sealing

Air Sealing projects were conducted across 41 buildings in 2016, resulting in 2,865 households being served. Field staff continues to provide a high level of involvement of quality control and assurance during the installation process. Four additional contractors were also trained in 2016 to perform Air Sealing.

The Air Sealing program continues to be a stand-out measure in Multifamily with growing interest from regional utility stakeholders, especially as insulation opportunities become more saturated. In Q4, PSE completed the latest evaluation phase allowing it to arrive at a prescriptive savings rather than utilizing a calculated approach.

ii. Energy Fairs & Customer Recognition

To increase customer engagement, the program conducted five “energy fairs” in 2016 at apartment and condominium complexes. Most of these were held during or immediately prior to direct-install work being done. This increased customer participation and education, allowing customers to ask questions and touch/see the products that would be installed.

The program also continued the “Strive for Five” recognition campaign. The campaign recognizes multifamily property managers who complete three or more measure categories within a property with a plaque to display.

Given PSE’s long-standing relationships with multifamily property managers and the fact that a comprehensive retrofit on a complex can span multiple years, the plaques serve to further engage and encourage the customer to complete all energy efficiency measure opportunities.

In addition to increasing PSE’s presence at homeowner association meetings and trade-show conferences, PSE published two articles in the newsletter for Rental Housing Association of WA State which outline the value proposition for air sealing as it relates to comfort, energy savings, and ultimately tenant retention.

c. Adaptive Management

PSE added a Portfolio Manager to its program field team. The team's focus is to drive awareness of the program and increase participation with owners and managers of multiple properties.

The program now has a close working relationship with a variety of multifamily customer types including housing authorities, market rate property management companies, condominium Home Owners Associations (HOAs), and workforce housing providers.

As natural gas projects began to fall below forecasted levels, the program team proactively attempted to generate project leads for natural gas projects. The team implemented two successful email campaigns to property managers. The team also fortified new relationships with Capitol Hill Housing and multiple condominium HOAs.

Furthermore, the team reached out to Multifamily contractors and other commercial/industrial contractors to create more awareness of the program. Overall, these adaptive strategies resulted in a significant number of projects that were completed in December.

d. Pilot-Like Initiatives

i. Strategic Energy Management

(SEM) is a pilot-like initiative that provides a holistic approach to energy efficiency by engaging property owners, managers, maintenance staff, and residents to achieve energy cost reductions. SEM is largely untested in multifamily properties and the pilot will apply proven C&I SEM strategies to the multifamily sector to evaluate effectiveness. The program is taking a holistic approach to energy efficiency that combines physical interventions with changes to operations, maintenance, and user activities.

There are now 15 large properties participating in the program that represent approximately 37 million kWh of baseline energy consumption. Education and training activities taking place during the 12-month engagement period are underway and will continue throughout 2017.

ii. Incentive-Sharing for Water-Savings Measures

PSE partnered with the Cascade Water Alliance (CWA), where CWA paid PSE one-half of the measure cost for the installation of water-saving measures in locations that spanned both utilities' service territories. The added revenue helps to offset a portion of the program's overall costs, reflecting staff's commitment to identifying cost reduction strategies and prudently using ratepayer funds.

e. Hard-to-Reach and/or Proportionately Underserved Segments

Low income customers are frequently deemed an underserved segment, but additional residential Hard-to-Reach (HTR) segments also include moderate income customers, and multifamily tenants. The Multifamily Existing program conducted a significant amount of work to develop plans to maximize capacity that ensure that PSE proportionately serve the HTR segment.

Through the use of a GIS (geographical information systems) analysis of census data within the PSE territory, PSE is able to geographically identify regions of that are categorized as "assumed low income".

f. Key Variance Drivers

As noted in the discussion introduction, the Multifamily Existing program ended the year at 115 percent of the electric savings target, while corresponding expenditures were 118 percent of the program budget. Natural gas savings were 87 percent of the target and 83 percent of the natural gas budget.

The program had a difficult time meeting the savings goals in 2016. This is primarily a result of the program's inability to offer comprehensive gas measures due to the low avoided cost of natural gas. Further, the program is increasing challenged with identifying and recruiting properties that are eligible to participate based on their pre-existing building conditions.

There were some electric measures that experienced much higher than anticipated uptake, including attic & floor insulation, common area lighting, Advanced Power Strips (tier 2), and direct-install LED's. Trade allies were most active among insulation and common area lighting, actively seeking out properties with these opportunities.

Attic insulation (R11-R38) was more than 350 percent of the forecasted amount and was driven by two aggressive Contractor Alliance Network (CAN) members, who combined to install over 4 million square feet of insulation (86 percent of all installations). Similarly, two lighting contractors were very active, completing over 70 projects which accounts for 60 percent of the measure savings.

g. Measure Highlights

Table V-7 provides a general overview of measure categories reported in the Multifamily Existing program in 2016. For this discussion, these figures are rounded, and are intended to provide a perspective of the scale and scope of Multifamily Existing activity, rather than a precise count of every measure installed.

Table V-7: Multifamily Existing 2016 Measures

Multifamily Existing Measure Counts			
Measure Type	**Measure**	**Electric**	**Natural Gas**
Insulation	*(Unless otherwise note, the below figures represent square footage)*		
	Attic	3,926,000	229,500
	Floor	152,200	222,900
	Wall	3,100	3,400
Windows		139,800	7,800
Air Sealing		381,600	
LED Lamps	*(Number of lamps)*	131,000	
Various Types			
Common Area Lighting	*(Figure represents total kWh savings)*	4,129,000	
Water Heat			
	Water heaters, boilers, etc.		3,800
Advanced (IR) Power Strips		13,300	
Water fixtures	*(Figure represents units, rather than square footage)*		
Thermostatic Showerhead Restrictors, Direct-installed showerheads, aerators		2,600	4,600
Pipewrap		2,700	
Appliances			
Refrigerators, refrigerator replacement, clothes washers, etc.		1,800	
Ventilation			
With air sealing		500	

3) Residential New Construction

Schedule E215, G215; applicable to single family construction
Schedule E218, G218; applicable to multifamily construction

a. Description

The following discussion applies to new residential construction, both single-and-multifamily structures. Conservation Schedule terms and conditions, as outlined in the above-noted Schedule numbers, govern the applicability, measure types, funding, analyses and general rules and provisions for each structure classification. Where there are specific requirements, service offerings, measures, incentives, marketing, or outreach applicable to the specific structure type, those are so noted in each of the following sections.

PSE does not offer single family new construction incentives due to stringent code updates. While PSE does not offer financial incentives, it work closely with the Northwest Energy Efficiency Alliance (NEEA), the Master Builders Associations and other builder organizations to maintain a presence in the market and provide technical support.

The Residential New Construction program acquires cost-effective energy savings from single-family new construction (single, duplex, and townhomes) and multifamily new construction projects that increase the installation of energy efficient Measures into new electric & gas heated buildings constructed in the PSE service territory.

In addition to newly constructed single-family structures, covered under terms of Schedule 215 (for both gas and electric service) Residential New Construction will include multifamily structures, per Washington State Energy Code 2015 Edition (effective July 1, 2016). Multifamily units are covered under terms of Schedule 218 (for both gas and electric service). These structures typically have both in-unit and common area energy-savings opportunities. These include, but are not limited to, energy efficient upgrades to building shell, appliances, lighting, HVAC and water heating systems.

Eligible customers for multifamily new construction include owners, developers, or agents acting on behalf of a responsible party of service receiving electricity or natural gas through PSE.

This program provides financial incentives to the above audience for both natural gas and electric residential and commercial meters. The incentives offered are both prescriptive and calculated.

In the new construction marketplace, high efficiency measures need to be specified and installed during design and construction. Otherwise, it may be up to 30 years before energy efficient changes to the buildings will take place. For measures and incentives that apply to existing multifamily structures, please refer to the Multifamily, Existing program measures in Exhibit 4: *Measures, Incentives and Eligibility*.

In the new construction marketplace, high-efficiency measures need to be specified and installed during design and construction. Otherwise, it may many years before energy efficient changes to the buildings take place. For measures and incentives that apply to existing multifamily structures, please refer to the Multifamily, Existing program measures in Exhibit 4: *Measures, Incentives and Eligibility*.

Rebates and incentives are offered to eligible natural gas and electric PSE new construction developers, contractors, trade allies and customers (cumulatively, the program refers to these as “partners”) who are constructing new single-family residential structures and multifamily buildings. The program also works with these partners to market energy efficient equipment to their customers. Energy Efficiency encourages the purchase and installation of energy efficient products for their construction projects.

For new residential construction projects, financial incentives are packaged under one grant and are structured to work in accordance with current Business Energy Management programs. PSE provides a single “point of contact” to development teams for all energy efficient measures and/or upgrades. This allows PSE to maximize the energy savings opportunity in each development and reduce multi-program confusion for the customer.

The program includes prescriptive rebates, and/or incentives, and calculated grants. Eligible customers include builders, developers, owners or agents receiving electricity through PSE’s residential schedules 7 (including 17, 27, 37 and 47) and 7A; and commercial schedules 8, 11, 12, 24, 25, 26, and 31; and/or natural gas service through PSE’s residential schedule 23 and commercial schedule 31.

Structures include but are not limited to single-family dwellings, duplexes, apartments, town homes, condominiums, dormitories, affordable housing, low-income housing, workforce housing, and assisted living residences.

There may be any combination of residential and commercial meter mixes in each type of construction. Once the meter type mix is confirmed with the development team, the appropriate PSE programs are identified to serve that development. Incentives include a variety of end-use classifications, not limited to:

- Lighting: Common area,
- Appliances: Clothes washers, refrigerators,
- Ventilation; in-unit whole-home or common area,
- HVAC equipment upgrades.

For all of the conservation Measures installed, Energy Efficiency receives measure installation data directly from builders, developers, showrooms and distributors. It is therefore possible to precisely track measure details.

b. 2016 Program Reviews

i. Single Family New Construction

Although PSE's Single Family New Construction (SFNC) program is in hiatus and maintains an active Conservation Schedule, PSE continues to work closely with the Northwest Energy Efficiency Alliance (NEEA), the Master Builders Associations, and other builder organizations to maintain a presence in the market and provide technical support.

A. 2016 Achievements

In 2016 PSE began to explore the option of implementing a Regional Technical Forum (RTF)-deemed Built Green measure for SFNC and a performance based incentive developed through NEEA and the standard modelling protocol.

The standard modelling protocol aims to provide a simplified method for estimating reliable savings with site-specific energy modeling for efficient new homes. The goal is to align all market actors (utilities, realtors, builders, raters, MLS providers, financers, homebuyers) with a metric that differentiates homes on energy efficiency.

The key to this is enabling utilities to determine savings on a house-by-house basis employing integrated design techniques with the same asset metric tool used by the other market actors (for instance, REM/Rate™).[19]

The protocol would validate REM/Rate savings estimates for new construction as an alternative to establishing individual UES measures.

Desired Outcomes:

- Utilities easily claim all incremental savings above code in energy efficient homes,
- Utilities identify and offer programs for new construction customized to their needs,
- Realtors use the rating metric to communicate the energy efficiency of a home and increase sales rates,
- Builders use performance ratings to communicate the value of energy efficiency and sell homes for a premium,
- Raters provide builders with building science expertise to achieve integrated design savings that meet both market demand and utility objectives,
- Homebuyers are able to identify which homes are more efficient and make comparative decisions.

B. Adaptive Management

PSE invested additional resources to better understand the market and which SFNC program strategies would be most effective. To help determine which strategy would be most effective, PSE—with the help of NEEA—organized a focus group with several single-family builders. In addition to the focus group, PSE held discussions with other utilities and Master Builders Association representatives to help PSE gain a better understanding of the barriers. Some of the barriers include increasingly stringent energy codes or limited demand. PSE will continue to work alongside NEEA and the MBAs to reinstate a cost effective SFNC program.

[19] From REM/Rate™'s website, http://www.remrate.com/: REM/**Rate**™ software calculates heating, cooling, hot water, lighting, and appliance energy loads, consumption and costs for new and existing single and multi-family homes.

C. Hard-to-Reach and/or Proportionately Underserved Segments

PSE began analyzing the feasibility of introducing a manufactured home new construction program in 2016. Additional analysis and development are ongoing.

D. Key Variance Drivers

The electric spending was 46 percent of what was budgeted for 2016 while the natural gas spending was 17 percent. PSE underspent on the budget due to the delay of program development efforts. PSE sought to align efforts with the region and leverage NEEA pilots and RTF measure metrics that won't be effectively utilized until 2017.

ii. Multifamily New Construction

A. 2016 Highlights

The New Construction team began an effort to increase collaboration with other PSE departments, such as Customer and System Projects (C&SP), in order to become aware of new construction projects earlier. This awareness gives PSE the ability to work with the customer to leverage the potential incentives to get the most cost-effective energy savings. In addition, PSE began an incentive marketing plan to provide increased industry awareness of new construction programs, and to stimulate earlier contact by customers. Similar to C&SP collaboration, increased awareness of projects gives PSE the opportunity to capture a greater proportion of the industry savings. Earlier contact with prospective projects allows Energy Efficiency to have a greater energy savings influence on the project and provide a better customer experience with a timely, proactive grant process.

In the 4th quarter 2016, PSE participated in joint utility round-tables to Identify trends in how regional and national utilities are approaching the new construction market.

Through the discussions it was found that each utility struggles with similar new construction market challenges. Some of the main regional challenges the utilities identified were market saturation rates, increasingly stringent codes, cost effectiveness of measures, and implementing performance based programs.

B. Adaptive Management

PSE simplified the payment verification process for the showerhead measure. PSE required detailed invoices for all showerheads installed but now PSE only requires a picture of the product installed or nothing if the project will be verified in-person.

As a result of the 2015 Washington State Energy Code changes taking effect on July 1, 2016, PSE began offering prescriptive, custom, and whole building measures. By offering these different paths, PSE can help all builders increase their energy efficiency goals.

PSE realized that some builders may be on the fringe of moving to higher efficient equipment and the simpler prescriptive pathway was easier for them to consider. In other cases a more custom or Whole Building pathway made more sense if the building saved energy in more ways than PSE accounted for in the prescriptive offerings.

In 2016 PSE merged some program resources between the Commercial and Multifamily New Construction programs. Given the similarities between the two programs PSE collaborated on incentive structures and collateral. This sharing of resources resulted in administrative efficiencies.

C. Pilot-Like Initiatives

The first whole-building incentive project successfully closed in 2016. This pilot-like measure allows PSE to recognize other measures that are currently not accounted for through the prescriptive or custom incentives. If Whole Building is chosen by the builder, PSE will use their energy model to calculate the savings above code.

D. Hard-to-Reach and/or Proportionately Underserved Segments

In 4th quarter 2016, PSE designed an initial strategy to increase MFNC units served through increased regional collaborative marketing and streamlined incentive strategies. Once implemented, this strategy will ramp up new program potential in the PSE Multifamily New Construction (MFNC) program.

PSE began creating an ongoing New Construction marketing plan for 2016 and beyond, focusing on raising awareness with key hard-to-reach market actors.

The plan encourages project designers to contact PSE early in design so that the new construction incentives can have the most valuable impact. An important piece of the marketing plan is the future coordination with the local cities, municipalities, and utilities.

E. Key Variance Drivers

The electric MFNC program budget ended the year at 92 percent of what was budgeted for the 2016 year.

PSE did not use 100 percent of its anticipated expenditure because a large project with a $160,000 grant rolled over into 2017.

On the natural gas side, the MFNC program budget ended the year at 255 percent of goal. This increase in expenditures was the result of a large natural gas project—originally slated for completion in 2015 and equaling 90 percent of the 2016 goal—was completed in 2016. PSE also saw an increase in the amount of domestic hot water (DHW) projects beyond what was anticipated.

c. Multifamily New Construction Measures

PSE provides a general overview of measure categories reported in the 2016 Multifamily New Construction program in Table V-8. For this discussion, these figures are intended to provide a perspective of the scale and scope of Multifamily New Construction activity, rather than a precise count of every measure installed.

Table V-8: Multifamily New Construction 2016 Measure Summary

Multifamily New Construction Measure Counts			
Measure Type	**Measure**	**Electric**	**Natural Gas**
	(Represents number of units)		
Lighting Fixtures	Interior, exterior, tenent-controlled, LED, CFL, etc.	800	
Lighting Reductions	*(The below figures represent square footage)*		
	Garage, corridor, etc.	943,000	
Lighting Power Density	*(Approximate kWh)*		
	Garage, corridor	647,000	
Water Fixtures	*(Figure represents units)*		
Showerheads		800	2,800
Water Heat			
Condensing Boilers			10,000
Water Heaters			39,200
Appliances			
Refrigerators, clothes washers		1,500	
Whole Building	*(kWh & Therm)*	351,500	44,200

VI. BUSINESS ENERGY MANAGEMENT

Chapter 6 will focus on the results made possible by customers served by Residential Energy Management staff. PSE will discuss savings and expenditure metrics and their key drivers, efforts to connect with hard-to-reach market segments, and measure savings type profiles.

A. 2016 Business Energy Management Sector Summary

The following discussions provide brief summaries of the Business Energy Management (BEM) sector. Detailed program discussions are provided in Chapter 7: *BEM Program Details*. Table VI-1 and Table VI-2 provide, at a program level, BEM savings and expenditure figures.

Table VI-1: Business Energy Management 2016 Expenditures

2016 Expenditures				2016 Budget
Schedule	**Programs**	**Total**	**% of Budget**	
Electric	Electric			Electric
Gas	Gas			Gas
E250	C/I Retrofit	$ 22,924,071	121.6%	$ 18,857,083
E251	C/I New Construction	$ 4,143,972	156.8%	$ 2,642,725
E253	Resource Conservation Manager - RCM	$ 2,046,444	79.4%	$ 2,578,518
E258	Large Power User - Self Directed 449 + non-449	$ 4,171,117	84.0%	$ 4,968,142
E261	Energy Efficiency Technology Evaluation	$ 16,733		$ -
E262	Commercial Rebates	$ 5,706,256	82.9%	$ 6,883,867
	Total Electric Programs	**$ 39,008,592**	108.6%	$ 35,930,334
G250	C/I Retrofit	$ 2,691,660	144.9%	$ 1,857,369
G251	C/I New Construction	$ 59,645	9.5%	$ 630,984
G253	RCM	$ 703,306	141.0%	$ 498,900
G261	Energy Efficiency Technology Evaluation	$ -		$ -
G262	Commercial Rebates	$ 469,049	26.6%	$ 1,761,061
	Total Gas Programs	**$ 3,923,660**	82.6%	$ 4,748,314

Table VI-2: Business Energy Management 2016 Savings

2016 Savings				2016 Goal
Schedule	**Programs**	**Total**	**% of Goal**	
Electric	Electric			Electric
Gas	Gas			Gas
E250	C/I Retrofit	82,093	121.1%	67,800
E251	C/I New Construction	19,315	191.1%	10,108
E253	Resource Conservation Manager - RCM	13,922	97.7%	14,250
E258	Large Power User - Self Directed 449 + non-449	6,769	51.5%	13,146
E261	Energy Efficiency Technology Evaluation	0		0
E262	Commercial Rebates	21,100	74.7%	28,265
	Total Electric Programs	**143,198**	107.2%	133,569
G250	C/I Retrofit	1,223,490	344.6%	355,000
G251	C/I New Construction	34,552	21.9%	157,500
G253	RCM	861,734	172.3%	500,000
G261	Energy Efficiency Technology Evaluation	0		n/a
G262	Commercial Rebates	105,116	15.9%	661,796
	Total Gas Programs	**2,224,892**	132.9%	**1,674,296**

B. Targeting Hard to Reach and/or Proportionately Underserved Market Segments

One hurdle for businesses interested in pursuing a custom energy-efficiency grant is their size. Smaller businesses often don't meet eligibility requirements for some programs, including potential lighting projects that are less than 25,000 kWh of first-year savings. BEM programs continue to evaluate these potential projects for grant opportunities, and in 2016, the Business Lighting Grants program paid over 400 of these smaller projects. Commercial New Construction's new Lighting Power Density incentive approach also addresses the needs of smaller customers that do not qualify for whole-building incentives.

The RCM program is addressing the needs of small-to-medium businesses with different segment classifications within geographic zone with its Urban Smart Bellevue program, using the "blitz" approach with personalized attention.

Some of the most exciting initiatives that the Business Energy Management Sector developed and implemented in 2016 address hard-to-reach and proportionately underserved small business, lodging, and agricultural customers. Each has its own set of challenges, and the Direct Install programs that program staff designed address those.

Small business customers may not always own their own building, may not be aware of efficiency programs, or may not be trusting of utilities, and so, may be reticent to making efficiency upgrades. Energy Efficiency's community blitzes have proven to be an effective tool to raise this customer segment's program awareness. Small-to-medium lodging customers typically have several types of equipment that could qualify for rebates, but the customers are often unsure of where to start the process. They also often lack the capital needed to make improvements. PSE's Lodging Direct Install program provides many no-cost measures, which frees funds up for larger opportunities.

The lodging program also offers an engineering-grade audit at a 50 percent co-pay. The audit is more comprehensive than a standard, no-cost assessment, which are sometime ill-equipped to evaluate some of the more complex building systems. The customer can work with a single point of contact in the Lodging Direct Install program, rather than various stakeholders.

Agricultural customers tend to be geographically diverse, and thus, hard-to-reach. They also have limited windows to address energy-efficient upgrades; typically, only after the harvest timeframe.

Another distinction of this particular customer segment is that smaller farms may have only a single-meter service on either a farm rate Schedule or a residential rate Schedule. This classification difference sometimes limits the availability of energy-efficiency measures. The Lodging Direct Install program mitigates these restrictions by basing eligibility on gross sales, rather than rate Schedule.

C. BEM Cost Effectiveness

Table VI-3 represents the Utility Cost and Total Resource Cost benefit-to-cost ratios for BEM. A complete listing of cost-effectiveness ratios by program is presented in Exhibit 2: *Program Cost Effectiveness*. All BEM programs finished the year with a UC and TRC B/C ratio of over 1.0.

Table VI-3: Business Sector Cost-Effectiveness Tests

Benefit to Cost Ratios Business Sector		
	Utility Cost	**Total Resource Cost**
Electric	2.85	1.74
Gas	2.78	2.50

Indicated TRC includes the application of a 10 percent Conservation credit value.

1) BEM Program Cost-Effectiveness Performance

With the exception of the Large Power User/Self-Directed (449) program (TRC of 0.67), all BEM electric programs finished 2016 with a TRC of over 1.0. All BEM natural gas programs finished 2016 with a TRC substantially above 1.0.

D. Five-Year Trends

Figure VI-1 and Figure VI-2 provide views of BEM's 5-year electric and natural gas savings and expenditures. BEM's electric savings are 14 percent lower in 2016 than in 2012, while electric expenditures over the same timeframe were 4 percent lower. From 2015 to 2016, electric savings increased 23 percent, and spending increased 25 percent. On the natural gas side, savings have gone down 35 percent from 2012 to 2016, and the commensurate spending went down 38 percent. 2016 natural gas savings saw an increase of 14 percent from 2015 levels, when expenditures were 5 percent lower than in 2015.

Figure VI-1: Business Energy Management Five-Year Trends: Electric

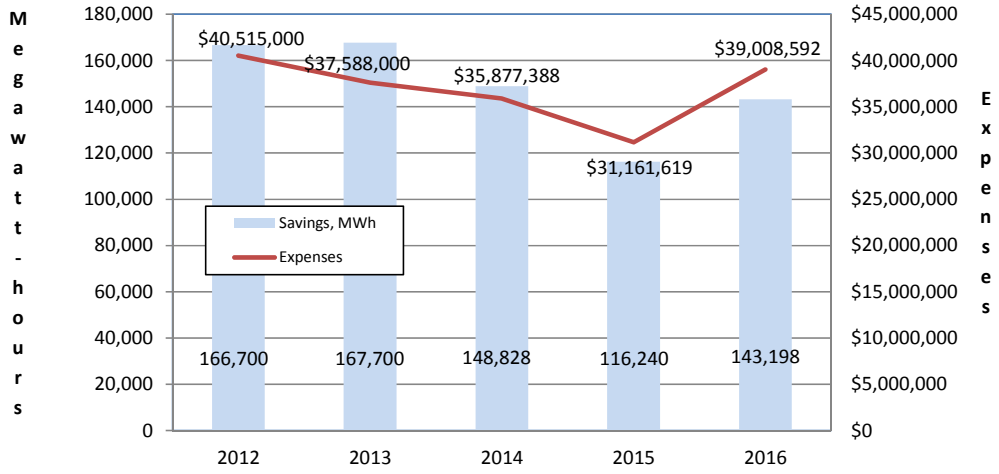
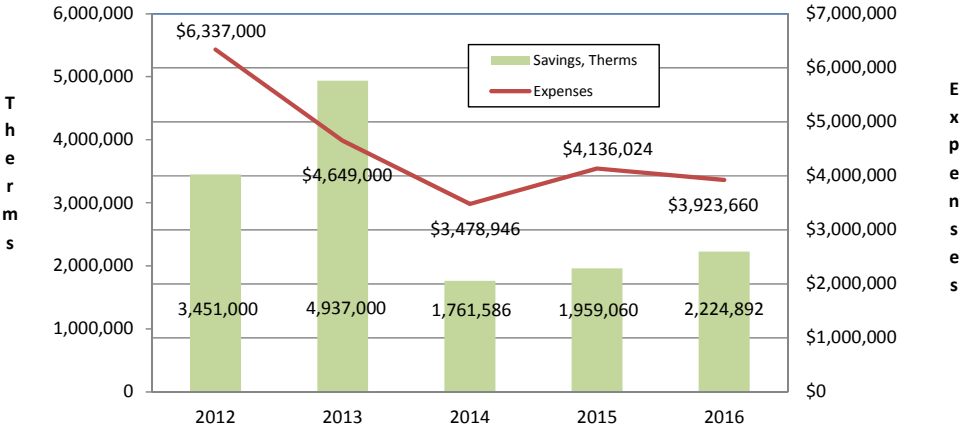


Figure VI-2: Business Energy Management Five-Year Trends: Natural Gas



E. Program Measure Tables

PSE provides project and measure tables in each of the program discussions in Chapter 7: *Business Program Details*. As noted in Chapter 2, PSE provides these high-level figures to afford a sense of program scale, customer demand, key savings contributors, and interesting measure types in each program. The tables include a limited number of measure types, and aren't intended to be a comprehensive list of all measures installed; only a representative sampling of measure types are provided. The listed measures aren't intended to comprise the total amount of 2016 program savings. Program measure tables aren't intended to be used as audit tools or to reconcile actual tracking records.

PSE discusses additional program-specific details in the following chapter.

F. Program Discussions

The program discussions In Chapter 7 outline process and tactical improvements that enhance the customer's energy-efficiency experience and prudently utilize Conservation Rider funding, along with program results, key drivers of savings and expenditures, adaptive management, and significant accomplishments.

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VII. BUSINESS PROGRAM DETAIL DISCUSSIONS

The following discussions provide program-specific reviews of 2016 accomplishments, continuous improvement initiatives, and variance drivers.

A. Commercial/Industrial Retrofit

Schedules E/G 250

1) Description

PSE works with Commercial and Industrial customers to provide incentives for cost-effective energy efficiency upgrades to lighting, equipment, building shell, industrial process, and select O&M improvements. These services are provided on the customer's behalf and, where specified by the customer, will be developed in conjunction with design engineers, contractors, and/or vendors.

PSE conducts site assessments to identify savings opportunities, verify existing equipment and system operations, and makes recommendations to customers. PSE also reviews third-party savings estimates and analyses, and when required performs in-house analyses to validate energy savings. PSE works with financial decision makers at the customer's facility to ensure the customer is aware of cost-savings opportunities, including review of energy saving projections that can help obtain favorable financing rates.

Commercial/industrial retrofit projects commonly include: lighting system upgrades, HVAC equipment upgrades, HVAC controls improvements, commercial refrigeration Measures, and industrial process modifications. Additionally, incentives for existing building commissioning (O&M) improvements are provided through the Comprehensive Building Tune-Up (CBTU) Program.

Upon the customer's decision to proceed with a project, PSE issues a standardized Conservation Grant Agreement and Grant Attachment that establishes terms and conditions for participation in PSE's Custom Grant Program and also explains how the measure will be verified. After the agreement is signed by both parties, the customer is given notice to proceed with the energy efficiency project.

Following completion of the project, PSE verifies the installation and energy savings via an on-site inspection, review of equipment operation and trend log data where necessary, and collection of project invoicing and specifications of installed equipment.

2) Overall C/I Retrofit Accomplishments

Commercial/Industrial Retrofit electric programs, non-lighting custom grants finished the year below target. This was due to several late-year projects that were forecast to close in 2016 but were delayed in order to get more accurate verification information. Program spending was also commensurately below budget.

Commercial/Industrial Retrofit natural gas programs exceeded their 2016 target. The majority of natural gas savings came from one very large project and four larger projects, three of which were contracted in previous years. These projects alone contributed to over 50 percent of the total 2016 savings achievement. Consequently, C/I Retrofit Gas Direct Benefit to Customer (DBtC) also exceeded budget estimates by delivering 135 percent of the target budget.

The overall quantity of gas projects was comparable to the previous year and the presence of several large projects resulted in less labor and overhead amounts were charged to the program. Program accomplishments: PSE paid out 4 HVAC Controls Protocol performance phase grants. In each case actual savings exceeded initial estimated savings.

3) Hard-to-Reach and/or Proportionately Underserved Segments

PSE continues to evaluate projects that do not meet rebate eligibility requirements for custom grant opportunities when necessary. These projects typically involve small businesses that are difficult to categorize into a specific business type.

4) Business Lighting Program

The Business Lighting Grants program serves customers as a part of the Commercial/Industrial Retrofit Conservation Schedule 250. To simplify the customer experience, PSE offers only one Business Lighting grant program. This single program addresses customers' needs by providing custom calculated incentives for lighting and lighting controls measures.

a. Program Accomplishments

The Business Lighting Program paid over 900 projects in 2016. This was an 11 percent increase over the number of planned 2016 projects. The average project size increased by an average of 21 percent in 2016 over projections to almost 64,800 kWh per project. As a result of this increase in project size and number of projects, the Business Lighting program exceeded the 2016 savings goals and its corresponding budget.

b. Adaptive Management

The Business Lighting Team consistently monitors the trends of the lighting market. The trend in 2016 was faster adoption of LED products and reduced LED prices that were predicted at the beginning of the year. In October 2016 the team developed reduced incentive rates and started development of a new application/calculator to take effect Jan 1, 2017.

c. Hard-to-Reach and/or Proportionately Underserved Segments

Small businesses often fall into the hard-to-reach category due to their cost-flow requirements. The Business Lighting program classifies smaller projects as projects with under 25,000 kWh first-year savings. In 2016, the program paid over 400 of these projects. These projects accounted for almost 9 percent of the Business Lighting program savings.

Additionally, 11 Relight Washington (small Washington cities) street lighting projects were completed in 2016.

d. Key Variance Drivers

LED technology is being adopted at a faster rate than expected in part due to LED price reductions throughout 2016. As a result of this faster adoption both the number of projects and the size of projects increased over 2016 projections. The program exceeding its electric savings goal by 44 percent. 2016 expenditures commensurately exceeded the program budget by 37 percent.

5) Contracted Programs

In addition to Commercial/Industrial Retrofit Custom Grant offerings, PSE contracts with industry experts to develop and implement cost effective programs tailored to the unique needs of target markets. Measure-specific incentives are provided through these contracted programs:

a. Industrial System Optimization Program (ISOP)

The Industrial System Optimization Program engaged 18 industrial customers in 2016, the first of a two-year program cycle. Of these customers, nine have progressed towards full implementation.

The ISOP Implementer, Cascade Energy, has been contracted to conduct an Industrial Strategic Energy Management (SEM) Pilot consisting of four customers who have successfully completed ISOP. SEM is a holistic approach to energy efficiency that includes strategic implementation of O&M best practices, behavioral energy reduction programs, and capital projects to achieve maximum energy savings. The SEM Pilot is an 18-month customer engagement. The Strategic Energy Management Pilot participation target of four customers has been met. All four customers are actively participating in the program and identifying savings opportunities.

Expenditures consist of administrative and incentive costs. Administrative costs are slightly below budget for the year, while no customer incentives were paid in 2016. This is due to 2016 being the first year of a 2 year program cycle and none of the customers engaged have completed the program in 2016.

b. Energy Smart Grocer (ESG) Program

Energy Smart Grocer was able to exceed it 2017 natural gas goals through the implementation of a larger than expected number of energy efficient freezer door measures, helping BEM reach its overall annual goals for gas savings.

The Energy Smart Grocer program was scheduled to end in mid-2016. As this period approached, PSE decided to continue the program through the end of 2017 in alignment with other regional utilities offerings.

The primary drivers of the program's variance from the original 2016 are the rate of project closeout and the implementation of measures such as the efficient freezer door measure that may not have been forecasted in the program.

6) 2016 Project and Measure Type Summary

PSE provides the following Commercial/Industrial Retrofit tables to give readers a sense of programs' custom grant activity and scale of custom projects. PSE provides these figures as highlights; they are not intended to be comprehensive lists of all projects, measure categories, or individual measures. It is important to note that an indicated project or measure category may represent 10, 100, or even more single measures installed in a project. A project may consist of a single structure or multiple structures.

Table VII-1 provides a representative number of Commercial/Industrial Retrofit projects completed in 2016.

It should be noted that in this specific table, the column "Both Electric and Natural Gas" isn't indicative of adding the "Electric" and "Natural Gas" columns together.

Rather, these are projects in which both electric and natural gas measures were installed.

Table VII-1: Commercial/Industrial Retrofit Projects

Commercial/Industrial Retrofit Custom Grants		Number of Custom Grant Projects		
Program Project Classification	Order number(s)	Electric	Natural Gas	Both Electric & Natural Gas
Commercial/Industrial Custom Grants	E-18230711 & G-18230731			
Commercial & Industrial Retrofit		60	40	10
Industrial		20	0	20
Controls		6		2
C/I Lighting Grants	E-18230724			
C/I Retrofit (applicable to this order number)		5		
Business Enhanced Lighting		120	0	0
Business Standard Lighting		730	0	0
Street Lighting		60	0	0
Contracted Programs				
Data Center Energy Efficiency	E-18231132	5	0	0
Energy Smart Grocer Program	E-18231135	80	50	9
ISOP	E-18231133	*Year 1 of 2-year cycle: no incentives paid.*		
Total Project Count		**1,100**	**90**	**40**

PSE presents a representative number of electric and natural gas measure categories installed in their respective programs in Table VII-3. These are not comprehensive lists of all projects or measures installed. It is important to note that indicated measures may include substantially more than a single unit. Furthermore, custom grants may consist of a combination of prescriptive measures, calculated measures, and efficient equipment installed following detailed engineering analyses.

Although not “measures” as thought of in the traditional sense, these are also included in the category counts.

Table VII-2: Highlights of Commercial/Industrial Retrofit Measure Categories

Highlights of Measure Categories by Program	Count of Measure Categories		
	Electric	Natural Gas	Total Measure Count
Commercial & Industrial Retrofit			
(All custom grants)			
Building Shell	5	4	9
Lighting (Enhanced, Custom, Prescriptive)	5	0	9
Heat Recovery	3	2	5
HVAC - Commercial and Industrial	30	40	70
Motors - Commercial	6	1	7
Operations & Maintenance	4	9	13
Process, Commercial	10	5	15
Refrigeration - Commercial	8	0	8
Software	4	0	4
Water Heating - Commercial	3	8	11
Controls - HVAC	10	2	12
Industrial			
Energy Recovery	1	0	1
Lighting - Custom	1	0	1
Process - Commercial	10	0	10
C/I Lighting Grants			
Business Enhanced Lighting			
Lighting - Custom	120	0	120
Lighting - Prescriptive	350	0	350
Business Standard Lighting			
Lighting - Custom	710	0	710
Lighting - Prescriptive	240		240
Street Lighting			
Lighting - Custom	50	0	50
Lighting - Prescriptive	20	0	20
Contracted Programs			
Data Center Energy Efficiency			0
Data Center	6	0	6
Energy Smart Grocer Program			
HVAC - Commercial and Industrial	30	60	90
Lighting - Custom	60	0	60
Refrigeration - Commercial	40	3	43
Total Measure Count	**1,700**	**130**	**1,900**

A key contributor to overall Commercial/Industrial Retrofit's achievement is its Business Lighting Grants. Table VII-3 Provides highlights of notable prescriptive lighting measure categories that are referenced in Table VII-2.

Table VII-3: Highlights of Commercial Lighting Grant Prescriptive Measure Categories

Highlights of Prescriptive Lighting Grants Measure Types	Count of Measure Types
Business Standard	
LED: Decorative	4
LED: Directional (Par, BR, R) 20, 30, 38/40	50
LED: MR 16	10
LED: Exit Sign	20
LED: Omni Directional	40
LED: Tubular LED	10
Occupancy Sensor	10
Enhanced Projects	
LED: Decorative	20
LED: Directional (Par, BR, R) 20, 30, 38/40	60
LED: MR 16	10
LED: New Exit Sign	20
LED: Omni Directional	80
LED: Tubular LED	30
Occupancy Sensor	40

In each of the above C/I Retrofit tables, figures above 10 are rounded, and the indicated figures are highlights only; they do not represent total program savings.

B. Commercial/Industrial New Construction

Schedules E/G 251

PSE works with designers and developers of any large or small new Commercial / Industrial facilities, or major remodels, to propose cost-effective energy efficient upgrades that exceed energy codes or standard practice where minimum efficiency requirements are not prescribed by code. Three paths may be followed to qualify for assistance and/or funding for New Construction energy efficiency Measures. New Construction Post-occupancy Commissioning is also offered in addition to the building paths.

1) Building Paths

The first path is similar to the retrofit program where component Measures are evaluated individually and funding is based upon cost-effectiveness. Under this approach, customers may receive up to 100 percent of the incremental cost over a code-compliant baseline. There is a streamlined process for lighting projects that have a lighting power density valued listed in the applicable code.

The second path is a whole-building approach that utilizes building energy simulation to demonstrate improvement over energy code requirements. PSE will work with designers to incorporate Measures that produce at least 10 percent overall savings beyond applicable energy code, including local jurisdiction amendments. Given the time required for planning and construction, these projects typically take several years to complete.

The third path includes Prescriptive Basis incentives for Measures that are eligible for rebates under Schedule E262/G262, Commercial and Industrial Incentive Program. The incentive amount for a Measure is the same as that which is available under Schedule E262/G262, but energy savings may be calculated based on actual Site-Specific conditions and Code Baseline adjustments, if necessary.

A complete listing of available incentives is provided in Exhibit 4 of the 2016-2017 Biennial Conservation Plan.

Customers assume full responsibility for utilizing their design teams and contractors to provide information to PSE for evaluation of grant funding. Projects must be approved for funding prior to installation/implementation to be eligible.

2) 2016 Accomplishments

Through the rigorous application of TQM, the New Construction program team accomplished substantial enhancements in 2016, including:

- The creation of new program guidelines for PSE Energy Management Engineers (EME). These clearly document New Construction (NC) program incentives, process, and lessons learned.
- The revision of the NC Lighting Power Density (LPD) measure worksheet for easier use, based on EME and customer feedback.
- The team updated the LPD worksheet for the recently-adopted 2015 Washington State Energy Code.
- The team continued to align Commercial New Construction and Multifamily New Construction programs by (1) building on the previous alignment of the incentive measures, (2) aligning program marketing, outreach, and (3) collaborating with permitting agencies.
- CI New Construction trained its EMEs on New Construction program incentives, process, and guidelines.
- The team increased its Energy Model review resources, which yielded improved project turnaround by contracting with additional Energy Modeling review subcontractors.
- PSE continued to engage Cannabis Producers as they entered the market, providing incentives for lighting. Additional savings are being calculated in lighting projects due to the lower internal heat load of more efficient lighting.

3) Pilot-Like Initiatives

The Lighting Power Density (LPD) New Construction measure that the C/I New Construction team developed in 2016 was a new approach, and can be considered a pilot-like initiative. The LPD projects performed in 2016 served to vet the approach, provided feedback for continued improvement, and increased industry awareness of PSE's New Construction programs.

4) Adaptive Management

C/I New Construction worked with its customers to streamline the LPD approach, resulting in worksheet improvements and better communication of program requirements.

5) Hard-to-Reach and/or Proportionately Underserved Segments

The new-for-2016 Lighting Power Density incentive approach serves the program's small business customers by allowing PSE to provide grants for smaller projects that are pursuing energy efficiency but do not qualify for whole-building incentives. The continued development of LED and lighting control technology, along with decreasing LED costs are making this a cost-effective measure for more small businesses.

By continuing to collaborate and align with the Multifamily New Construction program, the C/I New Construction team is enabling increased small business awareness and enrollment in all of Energy Efficiency's programs.

6) Key Variance Drivers

The Puget Sound region is in the midst of a new construction boom, leading to an increase in New Construction grant projects.

The maturing LED technology along with lower LED prices is driving adoption of LED at accelerating rate. This is increasing the number of New Construction program lighting grant projects.

The programs natural gas savings variance was the result of one large gas savings project not being completed as expected in 2016. This project accounted for approximately 62 percent of the natural gas savings target and will be completed in spring 2017.

In addition to this one large project's timeline shifting, there were additional drivers for the gas spending variance. For one, the latest energy code, enacted in July 2016, has more stringent requirements for gas water heater efficiency. This increased baseline for gas water heating equipment led to fewer gas grants than program staff had assumed in the 2016-2017 Biennial Conservation Plan.

Also, there was a re-payment of a prior year's grant amount, refunded to PSE because the customer began purchasing gas on the open market and converted to a transport rate schedule. This amount was credited to the New Construction gas program in 2016, decreasing the budget spent by about 21 percent. In addition there were two other grant refund amounts erroneously credited to the new construction program in November and December. These two erroneous credits will be corrected with matching debit transactions in 2017.

7) 2016 Project and Measure Type Summary

The C/I New Construction representative number of projects completed in 2016 are shown in Table VII-4. PSE presents the number of electric and natural gas measures installed in Table VII-5. It is important to note that indicated measures may include substantially more than a single unit. The table is intended to provide a sense of the program's scale, and is not a comprehensive list. Figures greater than 10 are rounded.

Table VII-4: Commercial/Industrial New Construction Projects[20]

PROGRAM	Project Count Per Program			
	Electric	Gas	Both Electric & Gas	All Projects Combined
Commercial New Construction	70	2	4	**76**
Energy Smart Grocer	2	0	0	**2**

[20] Please see the measure table discussion in the BEM Sector Overview, page 77.

Table VII-5: Commercial/Industrial New Construction Measures

MEASURE CATEGORY	Project Count Per Measure			
	Electric Measures	Gas Measures	Total Measure Count	Total Projects per Measure
Heat Recovery	**0**	**1**	1	1
HVAC - Commercial and Industrial	2	2	4	3
Lighting - Commercial	60	0	60	30
Lighting, Prescriptive	1	0	1	1
Motors	2	1	3	2
Operations and Maintenance	1	0	1	1
Process, Commercial	5	1	6	6
Whole Building	5	3	8	5
Total Measure Count	**76**	**8**	**84**	**49**

Custom Grant projects often consist of more than a single measure

C. Resource Conservation Management

Schedules E/G 253

1) Description

PSE offers Resource Conservation Management Services (RCM) to any school district, public-sector government agency, and Commercial or Industrial (C/I) customer with a minimum portfolio baseload to meet cost-effective thresholds. The RCM program targets larger customers with multiple facilities such that the cost of implementation can be recovered through savings achieved. Schedule 448, 449, 458, and 459 customers may utilize their Schedule 258 funding allocation for Resource Conservation Manager Services (RCM).

Customers qualify for the RCM program based on their annual PSE energy purchases. A typical customer baseline for maximum program funding is 20,000,000 kWh for electric only or 2,700,000 therms for gas-only service from PSE. Funding levels are prorated based on the amount of staff a customer would need to allocate in order to achieve cost-effective savings from RCM efforts. At a minimum, the customer needs to use 1,000,000 kWh or 135,000 Therms, or the equivalent to participate in the program.

An RCM customer employs, contracts, or designates existing staff to implement RCM responsibilities, including accounting for resource consumption, assessing facilities, recommending actions, monitoring progress, calculating savings and communicating program information to organization stakeholders.

Monetary grants include a "start-up" grant for completion of deliverables associated with building the program foundation. The start-up deliverables include identifying an RCM, setting up an energy-accounting database, writing a company resource management plan, and completing facility action plans. Once start-up deliverables are complete, the customer may qualify for "performance grants" based on achieving energy savings associated with RCM practices and “target grants” for meeting or exceeding pre-established energy-reduction targets.

The RCM agreement is valid for three years. Over this time, PSE anticipates a 10-12 percent reduction in overall energy use. Savings are calculated using industry standard practices and energy accounting methodologies. Reported annual savings are a variance from a fixed baseline. PSE may elect to renew a customer's RCM agreement in three-year increments to provide continued support and additional performance incentives.

Puget Sound Energy's RCM support program is comprised of a "menu" of services, which can be tailored to meet the specific needs of the customer. Typical RCM services include, but are not limited to, the following assistance and support:

a. Program Start Up

- Designing and implementing an RCM program.
- Hiring or contracting a Resource Conservation Manager.
- Developing baselines, policies and guidelines, and facility action plans.

b. Resource Accounting Software

- Purchase and/or implementation of Resource Accounting Software.
- Audits of existing databases to review for inclusion of all facilities, accounts, meters, etc., sufficient facility details, missing data, and overall data integrity.

c. Technical Assistance

- On-site walk-through audits to train customer staff to identify waste and opportunities for improved efficiency.
- Analysis and reporting of savings relative to established baseline.

d. Education & Training

- Training in fundamental concepts for designated RCM and support personnel such as custodial, maintenance, and facilities staff.
- Educational materials for classroom or building occupant use including checklists, fact-sheets, and calculators.
- Training stipend to support professional development in Building Operation or Energy Management.

e. Energy Data Services

- Historical and on-going monthly PSE billing data and access to Resource Accounting Software.
- Energy Interval Services for internet viewing of facility gas and electric interval meter data.

f. Cash Incentives

- ”Start-up” incentive intended to share the cost of program start-up that is paid upon satisfactory completion of deliverables.
- Performance grants for customers who achieve energy savings after completing their deliverables.
- Target grants for customers who achieve a pre-established targeted amount of energy savings after completing their deliverables.

The RCM program has also assisted customers in establishing Energy Star Benchmarks for their facilities using EPA’s Portfolio Manager. PSE will continue to help customers to identify potential targets, improve energy efficiency to meet award qualifications, coordinate the application and inspection process, and submit material to EPA for Energy Star awards.

Additionally, access to energy accounting software has allowed PSE RCM customers to facilitate greenhouse gas accounting and other climate change and sustainability initiatives. The value of this service routinely exceeds those stated in the RCM program scope of work.

PSE continues to explore ways to make the RCM program cost-effective for smaller customers. PSE efforts will continue to work with RCM consultants, customers, and other support agencies to develop this market.

2) 2016 Accomplishments

In 2016 the RCM program continued to implement the program changes developed in the previous evaluation, contributed to the energy savings target, enrolled six new customers, and provided four webinars and four in-person trainings for participating customers.

Program Savings: The RCM and SRM programs achieved their electric and natural gas savings from 39 projects.

- Electric Savings – The Strategic Resource Management (SRM) program savings are included in the overall Rate Schedule 253 target, and contributed 7.6 percent to the program's 2016 achievement. Together, RCM and SRM achieved 98 percent of the Schedule 253 electric savings target.

- Natural Gas Savings – The RCM program surpassed (172 percent) the total gas savings target for the RCM program for 2016. Many of the O&M and behavior-based improvements implemented by RCM customers resulted in lower heating loads, leading to reductions in the use of natural gas. The higher-than-expected gas savings is also a result of the implementation of the program's plan to reward persistence of savings. The SRM program was an electric-only program, and no gas savings were achieved through that program.

New Customers: The new RCM customers on-boarded in 2016 represent several different customer segments, which exemplifies the expanding reach and importance of energy management to PSE customers. These new customers are:

- Kitsap Bank
- Lake Washington Technical College
- MultiCare Health System
- T-Mobile
- University of Puget Sound
- Washington State Military Department

PSE continues to provide training opportunities to RCM customers, a strategy that provides excellent customer service as well as achieving energy savings for the RCM programs resulting from the new ideas RCMs are able to bring back to their facilities.

Trainings completed in 2016 were:

In-person Customer Trainings:

- Retro-commissioning and Energy Auditing
- Innovations in Occupant Engagement
- Hands-on Building Tools Training (at the Smart Building Center)
- New RCM Cohort[21] Meeting

Customer Webinars:

- Water and Wastewater System O&M Savings
- Smart Irrigation
- Plugload Management
- MyDataManager Software

As customers began using the software after development was completed in 2015, it became clear that there were some gaps between the software's functionality and customer needs. The RCM team worked with PSE's IT department to increase the functionality of the software in a project that began in April and ended in August. This project was also chosen by IT to participate in a pilot of the Agile Project Management methodology. The partnership between the RCM team and the IT team on this project resulted in a much better project that is now rolled out to customers. Additional functionality includes:

- Graph overlays to allow for comparison of different meters and/or time periods for customer sites,
- PDF printing for many of the reports created,
- A sophisticated new method for calculating energy savings that incorporates the impact of weather, operating hours and other variables,
- Storage of energy consumption data to increase the speed of the software.

[21] RCM Cohorts are groups of customers/business owners starting in a program simultaneously. The Cohort structure provides them an environment such that they can go through program start-up together and act as peer support for each other.

3) Adaptive Management

The RCM team is committed to meeting the needs of its customers at the same time that they use best practices to measure and verify program savings. The program's offerings are adjusted accordingly as new information is available.

In addition to the continued implementation of the RCM program, 2016 saw a major upgrade to the Resource Accounting Software developed in-house for RCM customers.

Some additional RCM adaptive management initiatives completed in 2016 include:

- Completed a significant upgrade to the Resource Accounting Software that was built in-house,
- Instituted a new procedure for energy associated with solar installations installed on customer sites after the baseline year,
- Continued to work with customers to develop forms of reporting that are less burdensome for customers, yet meet the requirements of the program,
- Began a cohort group of new customers in the model of standard Strategic Energy Management (SEM) programs to help these new customers learn the best practices that will achieve energy savings, and
- Developed new tools and methods for calculating energy savings that conform to the standards proposed by ASHRAE and IPMVP Option C.

4) Key Variance Drivers

a. Gas Savings and Spending Higher than Expected

In 2016, The RCM program saw higher-than-expected natural gas savings and associated spending. Many of the O&M and behavior-based improvements implemented by RCM customers resulted in lower heating loads, resulting in reductions in the use of natural gas. The higher-than-expected gas savings is also a result of the implementation of the program's plan to reward persistence of savings. The spending increase was due in part to higher incentives correlating to the savings. The remainder of the expenditures were accounted for by the upgrade to the Resource Accounting Software to ensure that it meets the needs of customers.

b. Electric Spending Lower than Expected

In 2016, the RCM program officially launched Urban Smart Bellevue. This program, further discussed below, falls under the 253 Conservation Schedule, and is an offshoot of the current RCM program. The program ramped up more slowly than expected, resulting in lower spending than planned for the 2016 year. This budget will be spent in 2017 as the program continues.

5) Strategic Resource Management (SRM)

Similar to the RCM program, PSE offered Strategic Resource Management (SRM) to any school district, public-sector government agency, and Commercial or Industrial (C/I) customer with a minimum portfolio baseload to meet cost-effective thresholds.

a. Description

The SRM program targeted mid-size customers with multiple facilities such that the cost of implementation can be recovered through savings achieved. Schedule 448, 449, 458, and 459 customers were able to utilize their Schedule 258 funding allocation for SRM services.

Customers qualified for the SRM program based on their annual PSE energy purchases. The minimum customer baseline to participate in the program was 1,000,000 kWh for electric service from PSE.

An SRM customer employed, contracted, or designated existing staff to implement SRM responsibilities, including accounting for resource consumption, assessing facilities, recommending actions, monitoring progress, calculating savings and communicating program information to organization stakeholders. The assigned person was then designated the green champion and served as the main point of contact for the program.

The SRM program then matched a pre-approved contractor with the green champion. The contractor spent time with the customer at the start of the agreement to:

- Benchmark facilities,
- Host an energy management workshop,
- Implement a resource management plan,

- Perform building walkthroughs,
- Create portfolio action plans, and
- Identify behavior, operation and maintenance (O&M), and capital projects.

The contractor then scheduled meetings to confirm progress and spent additional time with the green champion as the program progresses.

PSE established performance targets for the program based on the customer's consumption. Typically, targets were set for a 5 percent reduction each year.

After each milestone, the contractor billed PSE for 70 percent of the pre-determined expenses and the customer for 30 percent of the expenses. PSE provided an incentive to the customer based on energy saving performance, up to the 30 percent of contractor expenses. For savings greater than the target, PSE provided an additional performance incentive to the contractor.

The SRM agreement was valid for one year. A customer could participate in the program for multiple years as long as they continued to meet or exceed the performance targets. For each year, PSE anticipates a 5 percent reduction in overall energy use. Savings are calculated using industry standard practices and energy accounting methodologies. Reported annual savings are a variance from the previous year.

b. Program Summary

2016 was the final year for the SRM program. This program targeted customers with a smaller load than RCM customers, thereby trying to capture a different market segment. Over the two years of the program there was not enough interest to meet the initial enrollment expectations and it was decided to reduce the energy consumption entry point for the RCM program rather than maintain this separate program. For those customers that did enroll in the SRM program, average savings was 8.3 percent of energy use – ranging from 0.5 percent to 19 percent. In 2016, five customers completed their year of participation in SRM. Two of those customers are planning to continue with the RCM program in the future.

6) Urban Smart Bellevue Description

The Urban Smart Bellevue program uses an Energy Management Information System (EMIS), Strategic Energy Management (SEM), and community-based social marketing (CBSM) to drive energy savings in the downtown Bellevue urban core. SEM is a holistic approach to energy efficiency that includes strategic implementation of O&M best practices, behavioral energy reduction programs, and capital projects to achieve maximum energy savings.

This program seeks to prove that these combined strategies can produce cost-effective savings, while creating more strategic customer relationships. With this design, PSE is partnering with the City of Bellevue to take proven program elements of the RCM program to a community scale.

Based on Market Characterization work done during the program design, the program targets all businesses in the core downtown Bellevue area with customized outreach to four target markets: (1) office (private & government); (2) hospitality; (3) retail; and (4) healthcare. This concentration does not minimize the importance of other market sectors or businesses outside the geographic area, but focuses program resources on populations with the greatest energy savings opportunities. All other market sectors fall into an “other” category that includes food service, agriculture, construction, non-tech manufacturing, assembly, and education among others.

Specific program goals include saving 16,000,000 kWhs through a combination of low/no cost O&M and behavior changes and increased participation in PSE’s existing EE programs. The program plan runs through the end of 2017.

a. Program Accomplishments

In 2016 program preparation and planning was completed and the Urban Smart Bellevue program officially launched. Since the launch, program staff have focused on recruiting customers and setting these customers up for success with training on the software, energy assessments, and assistance in creating action plans.

Highlights of 2016 accomplishments include:

- Program Launch and media event in June, 2016,
- Enrollment of 60 businesses in Urban Smart,
- Integration with the City of Bellevue to provide outreach materials to potential participants,
- Successful roll-out of Energy Management Information System (EMIS) software to participants.

b. Hard-to-Reach and/or Proportionately Underserved Segments

By focusing on a specific geographic zone, Urban Smart Bellevue encourages participation by several customer segments, including the hard-to-reach Small/Medium Business (SMB) segment. Urban Smart delivery staff are using the blitz approach to reach out directly to SMBs in the target area. This personalized attention has already resulted in good participation numbers which are expected to increase in 2017.

c. Pilot-Like Initiatives

The Urban Smart Bellevue concept is a blend of two of PSE's most successful efficiency programs – Resource Conservation Management and Small Business Direct Install. By blending the customer/tenant engagement of the RCM program with the geography-based engagement of the SBDI program, Urban Smart Bellevue pilots a new method for engaging PSE customers while achieving savings targets. Lessons learned from this first iteration could be applied to similar community programs across PSE's service territory.

d. Adaptive Management

As a pilot-like program, Urban Smart Bellevue seeks to be nimble in its approach to engaging customers. When there was less interest than expected in planned workshops in late summer of 2016, the program team changed the workshop model to include more on-line options and options targeted at specific customers rather than program participants as a whole. This change ensures that the program provides maximum benefit for the customers within the program budget.

7) 2016 Results by Customer Sector

Table VII-6 below shows the number of RCM program projects. Table VII-7 presents a representative summary view of 2016 measures categories installed. It is important to note that an indicated figure can represent more than a single unit of a measure category. Measure totals are rounded for this presentation.

Table VII-6: Number of RCM Projects[22]

PROGRAM	Project Count Per Program			
	Electric	Gas	Both Electric & Gas	All Projects Combined
Resource Conservation Management	10	7	20	**37**

Table VII-7: Representative RCM Measures Installed

CUSTOMER SECTOR	Measures Per Sector			
	Customer Count	Electric Measures	Gas Measures	Measure Count per Sector
School Districts	20	40	40	**80**
Government	7	20	20	**40**
Higher Education	3	2	2	**4**
Property Management	1	3	3	**6**
Hospitals	2	6	6	**12**
Retail/Other	4	10	6	**16**
Non Profit	2	2	5	**7**
Total Measure Count	**39**	**83**	**82**	**165**

Custom Grant projects often consist of more than a single measure

[22] Please see the measure table discussion in the BEM Sector Overview, page 77.

D. Large Power User/Self Directed

Schedule E258

1) Description

This program solicits electric energy efficiency upgrades through a Request for Proposal (RFP) process. C/I customers receiving electric service under Schedule 40, 46, 49, 448, 449, 458, or 459 receive a funding allocation based on their electric usage and are responsible for proposing cost-effective project(s) to utilize their allocation. This is classified as the non-competitive phase.

Proposals are evaluated by PSE Engineering Staff for technical soundness, cost-effectiveness and compliance with energy code and tariff requirements. Customers sign a standard PSE Conservation Grant Agreement, defining project cost, PSE incentive amount, and verification requirements prior to installation of project Measures.

The Large Power User Self-Directed program is implemented in cycles, with the current program cycle spanning January 1, 2015 to December 31, 2018. Customers are given until March 31, 2017 to propose projects that utilize their incentive allocations under the non-competitive phase. Customers not designating projects that fully utilize their allocation forfeit their remaining balance to a competitive phase, in which remaining funds are available to all program participants via competitive bid.

In the Competitive Phase, eligible customers respond to an RFP in order to obtain remaining incentive funding that was not claimed during the non-competitive phase. In this phase, eligible customers may have access to funds beyond their original allocation. The competitive phase RFP will be issued May 15, 2017, with the submittal deadline being July 17, 2017. Received proposals will be ranked based on cost-effectiveness and other criteria specified in the RFP. Competitive funding will be awarded, in order of project ranking, until all funds are allocated to projects.

2) Program Accomplishments

19 distinctive projects were carried out and incentivized in 2016, representing annual electrical savings of approximately 50 percent more savings obtained and 65 percent more incentives paid than in 2015.

The results follow the normal Large Power User program trend of greater participation after the first year of the 4-year program cycle. 2016 was the second year of the current program cycle.

3) Key Variance Drivers

2016 labor and overhead actuals were somewhat different than the anticipated expenditure. This is due to the annual journal entry made from the 258 program to the 250 program (which covers EME labor, as EMEs don't charge labor to the Large Power User program). The journal entry does not break out overhead from labor in this transfer.

DBtC was slightly lower than the anticipated expenditure as fewer projects were closed than were estimated, especially on the retail wheeling customers (449s). Since there are only a few of these customers, it is more apt to fluctuations than the non-449 category.

4) 2016 Project and Measure Type Summary

There were five projects completed in 2016. Table VII-8 shows a representative number of projects.[23] Indicates the number of measure types installed to provide a sense of program scale.

[23] It is important to note that listed "O&M" or "Operations & Maintenance" projects do not indicate that these were funded by PSE O&M. Rather, these are projects that address and improve the customer's operations and maintenance functions within the project's structure(s).

A project may include substantially more than one measure.

Table VII-8: Large Power User/Self-Directed Number of Projects[24]

PROGRAM	Project Count Per Program
	Electric Only
High Voltage Sch 40, 46, 49	20
High Voltage Sch 449	5

Table VII-9: Large Power User/Self-Directed Measure Classifications

PROGRAM MEASURE CATEGORY	Project Count Per Measure	
	Electric Measures	Total Projects per Measure
HVAC - Commercial and Industrial	8	**8**
Motors - Commercial	2	**2**
Process, Commercial	2	**2**
Lighting - Commercial	9	**9**
Total Measure Count	**21**	**21**

[24] Please see the measure table discussion in the BEM Sector Overview, page 77.

E. Energy Efficient Technology Evaluation

Schedules E/G 261

The purpose of Energy Efficiency Technology Evaluation is to identify new, energy efficient technologies and products for PSE program offerings. Ideally, PSE would identify cost effective technologies and measures with significant savings potential, which are commercially available. However, there are many emerging technologies that range from "commercially available, but not used in the Northwest," to "conceptual" or "prototypical" technologies still in the development phase.

It is relatively simple to determine whether new, commercially available technologies are suitable, as long as generally accepted engineering calculations can be used, and manufacturers can provide reliable data. For example, vendors frequently approach PSE with new, improved products, claimed to save more energy than their older models, or their competition. Usually these proposals are evaluated by the Energy Management Engineer who is managing the project, who then shares his/her experience with others in the group.

Some technologies are not so simple to evaluate. Those that are truly new typically have little experiential history, or there is no generally accepted method to calculate the performance. Clearly, it would be risky to broadly offer incentives through PSE's programs - risky with regard to uncertain savings and risky for its customers due to unforeseen product issues. If the potential savings look significant, PSE may try the technology on a limited quantity of projects, especially if it is working with a customer who understands the risks and would like to be an "early adopter." Sometimes the most prudent approach is to monitor the progress of the technology, especially if the savings potential appears limited. PSE's effort is not intended for basic research, or product development, but to identify technologies that are available and suitable for its programs.

The most challenging situations arise when vendors propose products that are "too good to be true." Often their savings claims are supported by testimonials from satisfied customers, with little or no reliable test data. Many technologies, such as transient voltage suppressors, power factor correction devices and paint with high R-Value, have been known for years to save little or no energy, but the vendor may insist their product is different, even though it may only have a different name on the box.

Fortunately, PSE has experience with many of these products, or can readily find others who have had experience. It is important, however, to distinguish between inaccurate claims and those that might truly be the new emerging technology that deserves attention.

1) 2016 Accomplishments and Activities

In 2016, the Energy Management Information System (EMIS) pilot resulted in several engaged commercial customers, who realized relatively small efficiency savings through their respective BEM programs. Although there were more customer with savings potential that expressed interest in the program, less than half engaged an EME in the custom grant process or completed the initiatives in 2016.

The pilot utilized Retroficiency[25] analytics platform to assess building energy savings potentials for customers without the need to go on-site. A summary report for the project was issued in July 2016. PSE's assessment of the pilot was that the tool is useful and the data is relatively straightforward and easy to interpret. However, the difficulty in providing interval data, the very long lead times needed to assess and enroll customers, and difficulty coordinating with large, managed accounts appear to outweigh the benefits of the tool at this time.

[25] In 2015, Retroficiency was acquired by Ecova. For additional information, their website is: https://www.ecova.com/solutions-technologies/utility-solutions/retroficiency-now-ecova/

F. Business Rebates

Schedules E/G 262

1) Description

The following Measure categories are managed in-house by PSE Staff:

- Commercial HVAC (retrofit, demand control ventilation and advanced rooftop controls),
- Commercial Clothes Washers,
- Commercial Laundry Water Heating,
- Commercial Kitchen Equipment,
- Commercial Retail Lighting – Lighting To Go.

PSE contracts with industry experts to implement cost effective Measures tailored to the unique needs of target markets. The following Measure categories are offered through contracted programs:

- Premium HVAC Service,
- Direct Install Measures (Lighting, Refrigeration, Plug Load, Basic HVAC and Water Saving) for Small Businesses, Lodging and Small Agriculture customers.

PSE Program Staff develops program design, monitors program performance, results, and trends. Programs are coordinated closely with the electric and gas Commercial and Industrial Retrofit Program.

Program refinements and cost-effectiveness are reviewed with Engineering Staff, the Evaluation Team, and the Manager of Business Energy Management as necessary on an ongoing and adaptive basis. Incentive Measures, marketing and the fulfillment process may be modified, as needed, to respond to developments in technology, market conditions, customer acceptance and/or changes in supplier/contractor delivery and pricing.

2) 2016 Accomplishments and Activities

Similar to the Residential Sector's Single Family Existing Schedule (E/G 214), the Business Rebates organization is comprised of several separate programs. Therefore, PSE presents a savings and expenditure breakout (Table VII-10 and Table VII-11 respectively) of the overall Schedule 262 programs to facilitate the appropriate level of reporting transparency.

The Commercial Rebates Program continued offering its successful prescriptive rebates in lighting, kitchen, commercial HVAC, hospitality and other programs. It also contracted the delivery of specialty programs such as the Small Business Direct Install Premium HVAC Service and low-flow pre-rinse spray head/aerator installations.

A major accomplishment for the Business Rebates staff in 2016 was the transition from the legacy rebate processing system to DSMc. Program staff were highly engaged in the development of system requirements, development, quality assurance testing, user acceptance testing and deployment. All programs that are described in this section are now being processed using the new system.

Table VII-10: Business Rebate Programs, 2016 Expenditures

2016 Expenditures				2016 Budget
Schedule	Programs	Total	YE % of Budget	
Electric	Electric			Electric
Gas	Gas			Gas
E262	Business Rebates			
	Lighting to Go (AKA Business Lighting Markdowns)	$ 1,538,609	126.6%	$1,215,722
	Commercial Kitchen & Laundry	$ 108,513	47.7%	$227,446
	Commercial HVAC	$ 721,691	99.1%	$728,542
	Business Lighting Express	$ -		
	Small Business Direct Install	$ 2,866,819	89.8%	$3,194,071
	Small Agriculture Direct Install	$ 16,414	4.4%	$371,930
	Lodging Direct Install	$ 353,653	30.9%	$1,146,155
	Business Lighting - Rebates	$ 100,558		$0
Subtotals		**$ 5,706,256**	**82.9%**	**$6,883,866**
G262	Business Rebates			
	Commercial Kitchen & Laundry	$ 184,847	46.3%	$399,585
	Commercial HVAC	$ 107,231	233.7%	$45,883
	Small Business Direct Install	$ 79,000	9.4%	$844,648
	Small Agriculture Direct Install	$ 7,817	17.5%	$44,785
	Lodiging Direct Install	$ 90,154	21.2%	$426,160
Subtotals		**$ 469,049**	**26.6%**	**$1,761,061**

Table VII-11: Business Rebate Programs, 2016 Savings

		2016 Savings		2016 Goal
Schedule	Programs	Total	YE % of Goal	
Electric	Electric			Electric
Gas	Gas			Gas
E262	Business Rebates			
	Lighting to Go (AKA Business Lighting Markdowns)	11,029	121.4%	9,084
	Commercial Kitchen & Laundry	440	43.6%	1,011
	Commercial HVAC	1,145	38.5%	2,975
	Business Lighting Express	0		
	Small Business Direct Install	7,013	63.6%	11,021
	Small Agriculture Direct Install	33	3.1%	1,083
	Lodging Direct Install	893	28.9%	3,091
	Business Lighting - Rebates	546		0
Subtotals		**21,100**	**74.7%**	**28,265**
G262	Business Rebates			
	Commercial Kitchen & Laundry	68,443	32.8%	208,526
	Commercial HVAC	18,001	76.3%	23,600
	Small Business Direct Install	5,140	1.9%	277,585
	Small Agriculture Direct Install	0		
	Lodiging Direct Install	13,532	10.2%	133,170
Subtotals		**105,116**	**15.9%**	**661,796**

Readers will note an entry for savings and expenditures under “Business Lighting – Rebates”. These represent the final rebates paid under the legacy program that were received after the program ended at the end of 2015.

a. Hard-to-Reach and/or Proportionately Underserved Segments

Business Rebates are designed to target hard-to-reach customers who do not traditionally participate in energy efficiency programs. Program design focuses on bringing the opportunity to the customer, whether this is at the place of business, through a trusted community partner, or through a trade ally (for example, contractors and distributors).

b. Pilot-Like Initiatives

In 2016, PSE began conversations with a neighboring utility to seek out opportunities to implement a coordinated program for commercial customers. PSE continues to have these conversations and plans to launch the program in 2017.

The hybrid measure approach described under the Lodging Direct Install program is another pilot-like initiative, which utilizes the commercial rebate program design approach to develop and offer customers deeper, more comprehensive rebates using a custom energy efficiency process.

c. Key Variance Drivers

Overall, the Business Rebates group performed below target in 2016 for savings and spending. This biennium marks some major changes to how several of the rebate programs are offered, and program ramp up was a major driver of this variance.

3) Lighting To Go

PSE's Lighting to Go program provides instant point-of-sale rebate savings to lighting contractors who purchase qualified equipment from approved distributors. The Lighting to Go program covers screw-in LED measures as well as plug-and-play Tubular LED (TLED) measures.

a. Program Accomplishments

The program exceeded savings goals this year due to several program changes implemented to make participation easier for contractors and customers. Simplifying the program requirements has also increased customer and contractor satisfaction and willingness to participate in the program.

b. Key Variance Drivers

The Lighting To Go program had a variance in both savings and budget, exceeding initial forecast. There were 2 main reasons for this:

1. The proliferation and market acceptance of TLED plug and play lamps was much quicker than forecast.

2. The Lighting To Go program made significant changes to increase the ease and acceptance of the program. These included changing the requirements for customer information collected for purchases of 50 lamps or less. PSE also removed the requirement for meter and account numbers on sales of more than 50 lamps.

These changes resulted in higher uptake and satisfaction with the program according to sales data and surveys of distributor partners.

4) Commercial Kitchens & Laundry

PSE continued the historical regional delivery method of this program; offering a joint utility application between six participating utilities, shared qualifying product lists, a single point of contact (PSE), engaging consistent midstream distributors, as well as outreach for the program across all territories, making it easier for customers to navigate more complex measure offerings.

The midstream aspect of the program also continued to award customers cost-effective prescriptive instant rebates in the store, where the customer is actively making a purchasing decision around energy efficient kitchen equipment. The unique regional delivery and midstream option of this program also garnered the attention of the EPA who began drafting a case study focused on PSE's delivery model to include in a "Toolkit" that will be distributed nationwide through Energy Star® in 2017.

The Commercial Laundry program continued to offer a fuel-specific, pro-rated option to laundromat customers for upgrading their washing machine equipment.

a. Program Accomplishments

The Commercial Kitchen program added to its extensive measure mix and expanded the measure portfolio with the addition of seven cost-effective measure categories. To better serve restaurant customers, additional measure categories were added to the portfolio (7 added to the existing 12), increasing the measure portfolio from approximately 50 measure opportunities to over 80. In so doing the program has covered nearly all equipment in a restaurant kitchen that could save energy.

b. Hard-to-Reach, and/or Proportionately Underserved Segments

Most restaurant customers are considered underserved or hard-to-reach due to many factors including lack of upfront capital, renting of their space, uncertainty as to the longevity of their business, and reduced awareness of energy efficiency.

This program continued to reach these customers in unique ways that work for them. This included door-to-door outreach through small business community outreach, attendance and/or tabling at various expos and conferences, presentations to regional and segmental association, as well as the continued midstream rebate delivery through local equipment distributors. A direct mailer was also developed to reach out to customers, mailing lists for which were coordinated with distributors.

c. Pilot-Like Initiatives

In 2016 the Kitchen Program utilized a unique opportunity to engage a trusted local equipment distributor (Dick's Restaurant Supply) as well as a national manufacturer (Pitco) to highlight the commercial fryer rebate, which is very common to the large majority of customers in the PSE service territory. Employing a limited time offer from the national manufacturer and a discount through the dealer, the addition of the rebate for fryers spoke to the customer's bottom line in a way other approaches may not.

An educational and eye-catching direct-mailer was produced and distributed across the service territory, and also communicated by email to the distributor's customer base. The response was overwhelmingly positive, boosting participation in the advertised measure, and awareness and increased participation for that measure continue into 2017.

d. Adaptive Management

Small businesses are particularly sensitive to "high bills". Research was also completed to determine savings potential and regional interest in a deemed Demand Control Kitchen Ventilation (DCKV) measure. Research was also completed in the laundry program to determine savings values which effectively expand that offering to other relevant customer sectors in the future.

e. Key Variance Drivers

Due to fluctuating market conditions and the high cost of new equipment, electric and natural gas savings for the Commercial Kitchen & Laundry sector came in under target. Most restaurant customers make purchasing decisions on a reactive basis, creating uncertainty around program planning. Data is continuously being gathered to better inform future program planning.

5) Small Business Direct Install

a. Program Accomplishments

During 2016, PSE successfully completed four small business blitzes in close coordination with the Community Outreach teams. Small business blitzes bring the Small Business Direct Install (SBDI) program to a community, through partnership with City and Chamber of Commerce staff, offering free and low cost energy efficiency projects to all of the small businesses in the downtown corridor over the course of three days. In 2016, program staff increased the number of Blitzes over 2015 from 3 to 4 and increased the number of businesses touched through blitzes from 190 to 300.

b. Hard-to-Reach and/or Proportionately Underserved Segments

The Small Business Direct Install program serves a unique set of customers who may be in rural areas, have limited access to resources, may be in difficult-to-access areas (for instance, Point Roberts), or be skeptical of efficiency services.

c. Pilot-Like Initiatives

2016 was the first year in which PSE offered customers a co-pay option for advanced lighting projects such as upgrades to Tubular LED's, increased options for refrigeration measures, and more complex outdoor lighting (such as LED canopy lighting) while maintain cost-effectiveness. Customers have reacted positively to these new options.

d. Adaptive Management

Traditionally, the SBDI program relies on "in-house installers" – electricians and journeymen who are employees of the third party provider.

Although the program is competitively solicited, over the past several years, several lighting contractors have expressed interest in participating as a SBDI installer. In 2016, PSE updated program requirements and coordinated with the Contractor Alliance Network (CAN) to give its contractors more opportunities for work through the SBDI program.

The first month of subcontractor participation produced an additional 162,000 kWh savings, which was in addition to the third party service provider's installations.

There has been high demand from customers for LED fixtures since the technology has improved dramatically in recent years. While LED screw-in lamps have been cost effective for this program, fixtures have been too costly to offer them as a free direct install measure. To meet the desires of customers, the co-pay option was developed and coordinated with the Business Lighting incentives to offer the latest technology to customers while keeping the program cost effective.

e. Key Variance Drivers

In the electric sector, the program fell short of savings targets due to significant reductions in savings amounts of some measures after the contract was signed with the service provider, and difficulty acquiring qualified electricians to perform work. This challenge has proved to be regional, as confirmed by the recent emergency rule enacted by the legislature to offer temporary work permits for of state contractors to increase pool of available electricians. PSE collaborated to find solutions and gains were made by the end of the year by sub-contracting with Contractor Alliance Network lighting contractors. This will continue to expand in 2017 along with sub-contracting to specialty contractors for refrigeration measures to meet biennial target.

On the natural gas side of the program, PSE believes that the key drivers of the substantial shortfall were a combination of UES value reductions on aerators, the removal of the employee-only restroom aerator, and the saturation of aerator products in the market. Specifically, the higher-efficiency aerators are already installed, or customers were dissatisfied with previous installations. Program staff began developing a solution to these issues in 2016, and plan to offer a new 1.0 gallon per minute (GPM) aerator in 2017.

6) Agriculture Direct Install

a. Program Accomplishments

The Small Agriculture Direct Install (AGDI) was created to provide a unique outreach approach to small farmers and agriculture customers. The vendor is the same as the SBDI implementer, who has been serving small, hard-to-reach customers for five years.

The purpose of the program is to coordinate with Community Outreach and partner with agencies that support agriculture customers, such as the Farm Bureau and local Conservation districts to bring free energy assessments and low and no cost energy efficiency measures to the farming community. During 2016, PSE successfully developed and is leveraging partnerships with Pierce and King Conservation Districts to perform assessments and complete projects.

The Program has completed seven small farm assessments to date in first six weeks of program launch.

b. Hard-to-Reach and/or Proportionately Underserved Segments

The small-to-medium agriculture customers are, to a larger extent than small business customers, geographically diverse. Farms are typically in outlying areas that are rarely targeted for conservation by other vendors. This customer base is also skeptical about the utility motivations around energy efficiency programs. Additionally customer interest is seasonal- farms aren't able to address energy efficiency upgrades during growing seasons; they typically address upgrades during late fall and winter.

c. Pilot-Like Initiatives

Due to the distinctiveness of this customer segment, it is believed that traditional methods of outreach and engagement would not be the best fit for this customer segment. PSE is trying an approach of coordinating with area Conservation Districts to connect with these customers and deliver the program. To date, the leads for all of the customer assessments completed have come from the conservations districts. An additional benefit to this approach is developing a stronger partnership with the organizations that support many of PSE's hard-to-reach customers.

d. Adaptive Management

Many of the farms have a single meter for home and business, and some customers may not have changed their rate to a commercial rate. PSE bases eligibility on gross sales, rather than on rate schedule, and performing installations within the home that are primarily used for farm-related activities, such as an in-home office, or second kitchen used for value-added products.

e. Key Variance Drivers

The program launch was delayed while the Small Business Direct Install program ramped up for the new biennium. The majority of work for this program will be performed in 2017. There are a very limited number of natural gas measures, as most farms in the PSE service territory are far from natural gas lines.

7) Lodging Direct Install

The Lodging Direct Install is a new program for 2016, which is implemented by the same service provider as the Small Business and Agriculture Direct Install programs. The program targets small and medium hotel and motel customers with no-cost and low-cost prescriptive rebates. The program also includes an option for an engineering-grade audit and engineering services to help customers access more complex custom measures.

a. Program Accomplishments

Successfully launched as a new program in 2016, the Lodging Direct Install program design offers an important customer sector a new and streamlined avenue to interact with relevant energy efficiency offerings. The small-to-medium sized lodging customer receives a free, one-on-one, comprehensive energy assessment for their building as well as installation of free LED lighting and water saving measures where eligible. Customers can also opt-in for installation of “co-pay” measures, as well as take advantage of referrals for additional project opportunities through other PSE programs (for instance, HVAC, Premium Service, Kitchen or Laundry Equipment, etc).

Customers are also now eligible to receive an engineering-grade audit, often termed an “investment-grade audit”, which focuses on more complex energy efficiency opportunities that might require significant capital to put into place.

The audit is offered to the customer with 50 percent co-pay, to ensure that the customer is financially motivated to take action based on the findings.

b. Hard-to-Reach and/or Proportionately Underserved Segments

The small-to-medium sized hotel customer has many barriers to participating in PSE's programs. A primary barrier includes limited access to the capital needed to make improvements. They also have many types of equipment which could qualify for rebates, and are often unsure where to start the process. This program brings the opportunity to these customers in a way that they can understand, providing a starting point on their energy efficiency journey.

With many no-cost installations available to the customer, investments can be spent on larger opportunities with the help of the program's co-pay structure. PSE helps the customer navigate the various measures they have access to and provides a go-to contact that will make that process simpler and more manageable.

Outreach for the program is also coordinated with the Small Business Direct Install Program blitzes, so customers within predetermined underserved communities in PSE's service territory are targeted and educated on their new program opportunity.

c. Pilot-Like Initiatives

An engineering-grade audit is a much deeper dive than the typical assessment offered to customers through the program. Within the program design, a limited number of these audits are available to customers with interested and opportunity, at a 50 percent customer co-pay. This investment-grade audit includes the engineering analysis of more complex building systems and gives the customer a project manager a list of potential measures to inform them of their efficiency opportunities. Where previously this customer would work with various stakeholders at PSE to complete their next steps in its programs, they can now work through the Lodging Program to address all opportunities, including complex custom analysis measures.

This approach is a completely new way to work with a customer, in comparison to historic program offerings, and its comprehensiveness will not only ensure PSE are capturing previously-lost savings opportunities but also providing excellent customer service.

The first customer's energy analysis was completed in late 2016 and the customer has been approved to move forward with all found opportunity in their facility. The customer plans to implement all of their custom measures upgrades in Q1 of 2017.

d. Adaptive Management

This program is the first hybrid rebate approach (deemed measure offerings mixed with custom analysis) that PSE has offered to the business customer, and the program design ensures that all opportunities at a small hotel/motel can be addressed without requiring the customer jumping from program to program.

e. Key Variance Drivers

Savings and spending for this program were below target, as 2016 was a ramp up year for this new program, which focuses on a customer segment not previously targeted. During the first year, the decision-making process for these lodging customers was found to be more lengthy than initially expected. As a result the team is seeing results from its targeted outreach come through later than originally forecasted, and are using this information to change their recruitment and engagement processes.

8) Commercial HVAC

a. Program Accomplishments

In 2016 the Commercial HVAC Program continued working on improving the customer experience and giving PSE's customers more options to improve their energy efficiency. Ductless Heat Pumps (DHPs) were added into the commercial retrofit program as there has been large increase in the number of commercial customers installing this technology. The Premium Service HVAC program brought on a new program implementer in order to remove barriers and increase customer participation.

b. Hard-to-Reach and/or Proportionately Underserved Segments

Small commercial customers were a focus for the program in 2016. The program also participated in multiple Small Business Direct Install Blitzes to get the word out about the importance of HVAC energy costs and ways to reduce them using PSE rebates.

c. Pilot-Like Initiatives

The program added a specific DHP Contractor Referral. PSE found an increased interest in this product and noted that many commercial customers were having trouble locating a contractor to give them bids. Commercial HVAC contractors are often focused on larger projects and residential contractors are hesitant to move into the commercial space. PSE overcame these hurdles by offering the referral product to its existing contractors and provided training to those contractors who chose to offer the commercial DHP referral product. Contractors are now successfully receiving customer referrals for this product.

d. Adaptive Management

Although the Premium Service Program has been in place for several years, 2016 was the first year the program was offered using a service provider model to recruit and facilitate contractor management. The new program design was developed in response to the need for a better delivery mechanism for this HVAC maintenance program as it was determined that many contractors were only using the project for existing customers, and weren't seeking new customer base.

A benefit to this approach includes implementation of an outreach focus that transitioned from focusing on existing contractors to one that is looking for contractors that will see higher value out of the program and spend more time focusing on it. The implementer also gathered market feedback informing PSE that the incentive structure was cumbersome and hard to figure out. PSE spent the 4th quarter of 2016 adjusting its incentive package to better align with measures that will maximize program savings and be easier for contractors to take advantage of.

e. Key Variance Drivers

The Commercial HVAC electric and natural gas savings performed below target. There were two main reasons that savings were less than estimated: (1) The new service provider approach ramp-up period caused a delay to achieving Premium Service HVAC savings; and (2) An overall spike in large construction projects in PSE service territory has also impacted contractors focus on this program. A key driver in natural gas expenditures finishing the year over-budget was that the receipt of RFPs from potential Premium Service vendors were much higher than originally expected, based on the prior program operations.

9) Business Rebates 2016 Measure Highlights

Table VII-12: Number of Business Rebate Projects Managed in 2016 presents a high-level view of the Business Rebates projects managed in 2016.

Table VII-12: Number of Business Rebate Projects Managed in 2016[26]

262 Business Rebates	Number of Projects Completed		
Program	**Electric Only**	**Gas Only**	**All Projects Combined**
Commercial Kitchen Equipment Rebates	80	140	220
Commercial Laundry Rebates	1	1	2
Premium HVAC Service	10	3	10
High Efficiency Heat Pump & Air Conditioner Rebates	70	10	80
Hospitality Rebates	10		10
Small Business Direct Install	1,660	20	1,680
Lodging Direct Install	30	15	45
Small Agriculture Direct Install	3		3
Business Express Lighting	70		70
Commercial CFL Mark Down Program (Lighting To Go)	780		780
Total Project Count	**2,714**	**189**	**2,900**

[26] Please see the measure table discussion in the BEM Sector Overview, page 93.

The number of measures and projects, by category, installed in 2016 is shown in Table VII-13. It is interesting to note that in this organization, more than one measure type may be installed in a single project. Additionally, some measures within this organization are calculated on a per-ton, by building type, (in the case of HVAC Retrofit, many variables factor into each measure) or by individual unit (such as the familiar “per lamp” for most lighting measures). Table VII-13 is clearly illustrative of PSE’s intent to provide a sense of program scale—rather than a comprehensive listing of all measures installed.

Table VII-13: Number of Business Rebate Measures Installed by Type[27]

Business Rebates Measure Counts			
Program Measure Type	Measure *(Unless otherwise noted, all figures represent units)*	Electric	Natural Gas
Small Business Direct Install			
Linear Lamp Conversions	*T12 to T8 or TLED*	10,100	
	T8 to TLED	3,500	
Linear Fixture Conversions	*4-lamp to 2-lamp, HID to LED, 8' to 4', etc.*	5,900	
LED Lamps	*MR-16, Omnidirectional, Par 20/38/40, etc.*		
	All building types: school, retail, warehouse, etc.	31,900	
Spray Heads, aerators, showerheads		400	90
Device, HVAC controllers	*Occupancy Sensors, programmable thermostats*	100	
Signs	*LED open, exit signs*	200	
Commercial HVAC	*(Unless otherwise noted, indicates number of projects)*		
	High Efficiency Retrofit (Projects)	66	9
	Premium HVAC service (Projects)	10	3
	Package Terminal Heat Pump (Units)	200	
	Thermostat Control (units)	1,100	
	Calculated Measures (kWh, Therm)	129,000	13,000
Lodging Direct Install			
Aerators		6	1,000
Linear conversions	*T12 to T8 or TLED, etc.*	1,200	
Showerheads		40	700
LED lamps	*MR-16, omnidirectional, Par 20/30/40, etc.*	5,300	
Small Agriculture Direct Install			
Fixtures	*T12 to T8, etc.*	50	
LED lamps	*MR-16, omnidirectional, Par 20/30/40, etc.*	100	
Lighting to Go			
TLEDs		82,900	
Retrofit kits		22,700	
MR-16, omnidirectional, PAR 20/30/30, decorative, etc.		66,900	
Commercial Kitchen & Laundry			
Cooking equipment			
	Ovens	30	40
	Fryers, steamers, holding cabinets	10	60
Dishwashers		10	20
Boilers, Water Heaters			10
Ice Makers		20	

[27] Please see the measure table discussion in the BEM Sector Overview, page 93.

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VIII. PILOTS

Schedule E249

A. Description

Pilot programs and demonstration projects may be undertaken to determine whether certain strategies and Measures are cost-effective in the long run. Pilots are employed to test cost-effective ways to demonstrate market opportunities for energy efficiency.

Pilots may include tests of Measure cost and performance, customer acceptance and delivery methods. In compliance with condition (7)(d), pilots will only claim energy savings that achieve energy savings sufficient to demonstrate cost-effectiveness by passing the TRC test.

Although Pilots appears in Exhibit 1 after REM and BEM Sectors, it is presented in the Report at this point because both REM and BEM share similar Pilot measures. Table VIII-1 presents 2016 pilot program expenditures and Table VIII-2 presents 2016 pilot program savings.

Table VIII-1: 2016 Residential and Business Pilot Program Expenditures

2016 Expenditures				2016 Budget
Schedule	**Programs**	**Total**	**% of Budget**	
Electric	Electric			Electric
E249	Residential Pilot: HER Expansion	$ 923,921	94.6%	$ 976,899
E249	Business Pilot: Business Energy Reports	$ 10,028		$ -
Subtotal		**$ 933,949**	95.6%	$ 976,899
G249	Residential Pilot: HER Expansion	$ 164,269	90.7%	$ 181,029
G249	Business Pilot: Business Energy Reports	$ -		$ -
Subtotal		**$ 164,269**	90.7%	$ 181,029

Table VIII-2: 2016 Residential and Business Pilot Program Savings

2016 Savings				2016 Goal
Schedule	**Programs**	**Total**	**% of Goal**	
Electric	Electric			Electric
E249	Residential Pilot: HER Expansion	17,348	100.0%	17,347
E249	Business Pilot: Business Energy Reports	0		0
Subtotal		**17,348**	100.0%	17,347
G249	Residential Pilot: HER Expansion	430,548		0
G249	Business Pilot: Business Energy Reports	0		0
Subtotal		**430,548**		0

B. Residential Individual Energy Report Pilot

In March 2014, the Residential Energy Management Sector launched a pilot based on its successful Home Energy Reports. The pilot is testing an expansion of individual energy reports in four classifications as listed below:

- Non-Urban Customers,
- High Relative User, Low Frequency,
- Electric-Only,
- Refill.

PSE's second independent evaluation of this program showed strong savings growth year over year. Savings per household continue to trend upwards as expected, and are following a similar year over year growth path as the original legacy group. PSE will continue to conduct annual independent evaluations of the Residential Individual Energy report pilot, and will "true up" savings between forecasted savings and actuals.

Residential Individual Energy Report Pilot expenditures were 9 percent less than forecasted on the gas side, and 5 percent less on the electric side.

1) Report Marketing

Continuing the effort to market PSE energy efficiency programs across multiple mediums, PSE deployed marketing modules in the Home Energy Report program about other energy efficiency offerings. Programs include, but not limited to; Home Energy Assessment, Appliance Recycling, and Residential Lighting.

2) Report Engagement & Opt-Out vs Attrition

All segments of the expansion group saw some attrition due to customer accounts becoming inactive due to a move or cancellation of service. Attrition rates are in line with expectations established by previous program years, but were the reason behind adding a refill classification. Opt out rates remain well below 1 percent.

C. Small to Midsize Business Pilot

The Small-to-Midsize (SMB) Pilot program, in partnership with OPower, concluded in 2016. The last physical report was mailed to the remaining customer in May 2016. PSE does not currently intend to continue the SMB pilot.

Reports were well-received by some of the targeted customers who reached out to PSE to inquire about what they can do to participate in PSE's energy efficiency programs. However, one of the key challenges was reaching customers whose mailing addresses were different than their service address.

IX. REGIONAL EFFICIENCY PROGRAMS AND RELATIONSHIPS

A. Overview

Table IX-1 and Table IX-2 provide savings and expenditure results for two programs that PSE classifies as Regional; the Northwest Energy Efficiency Alliance (NEEA) and Production and Distribution expenditures & savings. These programs are outside of the REM and BEM Sectors.

Table IX-1: NEEA and Production & Distribution 2016 Expenditures

2016 Expenditures				2016 Budget
Schedule	**Programs**	**Total**	**% of Budget**	
Electric	Electric			Electric
E254	Northwest Energy Efficiency Alliance	$ 4,028,530	77.5%	$ 5,200,000
E292	Production & Distribution Facilities	$0		$ -
Subtotal		**$ 4,028,530**	77.5%	$ 5,200,000
	NEEA Natural Gas Market Transformation Initiative	$ 827,253	76.1%	$ 1,086,677
Subtotal		**$ 827,253**	76.1%	$ 1,086,677

Table IX-2: NEEA and Production & Distribution 2016 Savings

2016 Savings				2016 Goal
Schedule	**Programs**	**Total**	**% of Goal**	
Electric	Electric			Electric
E254	Northwest Energy Efficiency Alliance	8,760	100.0%	8,760
E292	Production & Distribution Facilities	3,323	186.6%	1,781
Subtotal		**12,083**	114.6%	10,541
	NEEA Natural Gas Market Transformation Initiative	0		0
Subtotal		**0**		0

B. Northwest Energy Efficiency Alliance

(PSE uses the NEEA trademark with permission.)

Schedule E254

1) Description

NEEA is a non-profit organization working to maximize energy efficiency to meet the future energy needs of the Northwest. NEEA is supported by, and works in collaboration with, the Bonneville Power Administration, PSE and more than 100 Northwest utilities on behalf of 12 million electric customers.

PSE and its customers benefits from NEEA's market transformation work to accelerate the market adoption of energy-efficient products, services and practices, and to fill the Energy Efficiency "pipeline" with emerging technologies. NEEA works "upstream" to expand the market for energy efficiency and complements utility programs without duplicating efforts. NEEA's regional advantage allows PSE and other Northwest utilities to leverage the market power of the entire region to realize economies of scale.

PSE staff represent its ratepayers and Energy Efficiency programs on several NEEA committees, including the:

- Regional Portfolio Advisory Committee,
- Residential Advisory Committee,
- Commercial Advisory Committee,
- Regional Emerging Technology Advisory Committee,
- The cost-effectiveness committee, and
- The Natural Gas Advisory Committee.

Exhibit 10 of this Report summarizes NEEA's 2016 value delivery to PSE for both its electric transformation efforts, as well as the new Natural Gas Advisory Committee. PSE extends its sincere appreciation to the NEEA staff for their extensive work to provide this level of detailed information outside of its normal reporting cycle.

For additional information about NEEA's unique value to the region, history, structure and recent initiatives, please visit www.neea.org.

2) 2016 NEEA Savings

NEEA provided its savings forecasts during PSE's 2016-2017 Biennial Conservation Plan (BCP) development in the latter part of 2015. In consultation with the CRAG, PSE adapted the source figures provided by NEEA. NEEA's final 2016 electric savings results will include NEEA initiatives started in 2016 as well as codes and standards; the results from those initiatives aren't available at the time of this Report's publication, but will be finalized by NEEA by May 2018.

a. NEEA Expenses

The electric budget of $5.2 million was underspent by $1.17 million as a result of (1) Matching actual expenses incurred versus invoiced amounts. In the quarterly 2016 billing cycle, there was an unbudgeted true-up of $800,000 (one NEEA invoiced were reduced by this amount), and (2) timing of 2016 invoices. NEEA's quarterly invoices represent payments for work already performed (for instance, the first 2016 invoice is received in March, rather than January), and are therefore behind one quarter.

b. NEEA's Natural Gas Market Transformation Collaborative

NEEA provides a more comprehensive discussion of its 2016 natural gas market transformation activities in Exhibit 10. PSE ratepayers are major funders of NEEA's collaborative, with a 41.25 percent share of the overall 5-year budget of $18.3 million.

The NEEA Natural Gas Market Transformation budget of $1.086 million was underspent by approximately $260,000. This amount represents one of the 2015 quarterly NEEA invoices, which was paid in December 2015, due to the invoice timing noted in the NEEA electric discussion.

Similar to the NEEA electric initiatives, Energy Efficiency staff who worked on NEEA's Natural Gas Market Transformation efforts charged their time to this order number in 2016.

NEEA works in concert with Energy Trust of Oregon, Avista Utilities, NW Natural, and Cascade Natural Gas Corporation. It coordinates the evaluation, testing, codes and standards initiatives, contacts with manufacturers, scanning for alternative measures, and developmental status of five pilot natural gas measures.

The measures included in NEEA's 2015-2019 plan are:

- Natural gas-fired heat pump water heaters,
- Efficient hearth products,
- Rooftop HVAC,
- Natural gas dryers, and
- Water/space heat combination systems.

c. Exhibit 10: NEEA 2016 Report of Activities and Initiatives

Exhibit 10 of this Report summarizes 2016 activities, regional initiatives, and outcomes in the areas of emerging technologies, residential, industrial, commercial, codes and standards, partner services and evaluation by the Northwest Energy Efficiency Alliance in PSE's service area.

C. Production and Distribution Efficiency

Schedule E292

1) Description

The Production and Distribution Efficiency program involves implementing energy conservation Measures within PSE's own production and distribution facilities that prove cost-effective, reliable and feasible.

Within production facilities, conservation Measures reduce ancillary loads at the site and exclude efficiency improvements made to the generating equipment itself. These Measures may include, but are not limited to, lighting upgrades, variable speed drives and compressor upgrades.

For transmission and distribution (T&D) efficiency, improvements are implemented at PSE's electric substations. These improvements can involve reducing the energy use within the substation itself and the distribution of energy from it. They can range from on-site Measures like lighting and heat pumps to system Measures like phase balancing and conservation voltage reduction (CVR) (also referred to as voltage optimization [VO]).

2) Adaptive Management

This program requires coordination between the Energy Efficiency program manager and staff in other PSE departments to collect project-specific details for program tracking and reporting. Maintaining a regular flow of communication has reinforced the energy-efficiency culture within PSE. These efforts included doing lighting quality and energy efficiency assessment at six power generation plants.

3) 2016 Accomplishments

Even without conservation funding available, the Production and Distribution Efficiency program was able to implement multiple energy efficiency activities. Of the five projects completed, three were about implementing CVR at three electric substations. The remaining two projects were about retrofitting outdoor lights at two generation stations.

The CVR projects yielded a combined 3.31 million kWh/year in energy savings. The lighting retrofit projects yielded a combined 3,730 kWh in energy savings.

X. MEASUREMENT & VERIFICATION

The Energy Efficiency department provides a discussion of Measurement & Verification (M&V) at this point in the 2016 Annual Report because M&V relates directly to the REM, BEM, Pilots and Regional savings programs just reviewed. It is important that readers understand the rigor with which PSE manages its two fundamental conservation metrics—savings achievement and financial prudence—by applying stringent M&V principles. Energy Efficiency and its supporting organizations devote staffing, processes, training, and systems with an eye toward applying these observations, metrics, data, and process verification. Staff focus on consistently improving efficiencies, productivity and transparency, and ensuring the highest degree of savings and financial accuracy.[28]

Supporting organizations that are also responsible for executing elements of these functions include Program Evaluation, Rebate Processing, Data and Systems Services, and the Verification Team. They are key contributors to Energy Efficiency's success.[29] The Report discusses Rebate Processing and Data & Systems Services activities in Chapter 11: *Portfolio Support*. Verification Team and Evaluation activities and accomplishments are reviewed in Chapter 12: *Research & Compliance*. The remaining departments: Energy Advisors, Energy Efficient Communities, Strategic Planning, Marketing Research, etc., also apply a variety of M&V tenets to their work for Energy Efficiency.

This discussion provides general highlights of measurement and verification activities that Energy Efficiency staff regularly perform, including review, analyses, and vetting of:

- Data provided by vendors, contractors, customer rebate and grant applications, and reseller invoices,
- Program staff input, telephone surveys, and evaluations.
- Savings values indicated by evaluation studies, engineering analyses, or the RTF are correctly applied,
- Savings values are properly archived,

[28] PSE routinely balances the requirements of functions considered to be "administrative" against the need to maintain an appropriate level of Direct Benefit to Customer.

[29] The Budget, Evaluation, Administration & Regulatory Team makes significant contributions to Measurement and Verification practices. That team's costs (primarily labor) assess to the overall Energy Efficiency organization, and are not separately budgeted.

- That all tracking systems are accurately counting the number of measures installed, are applying the correct savings values, and
- When corrections are required, they are recorded using generally-accepted accounting procedures.

Apart from activities specifically performed by the Verification Team, Energy Efficiency verifies electric and natural gas conservation savings and expenditures using a wide range of metrics, processes, tools, systems, and reports. Several groups within Energy Efficiency perform a wide range of measurement and verification processes, including program staff, who review and verify measure installations, grant status, and sales reports[30] for measure type and measure count accuracy. Data and Systems Services staff, rebate analysts, Budget, Evaluation, Administration & Regulatory staff, and third-party reviewers also perform critical verification tasks.

Some of the activities are unique to one particular team or function; the Verification Team is an example. Some departments, though, perform more than one measurement and/or verification activity throughout the course of managing Energy Efficiency operations.

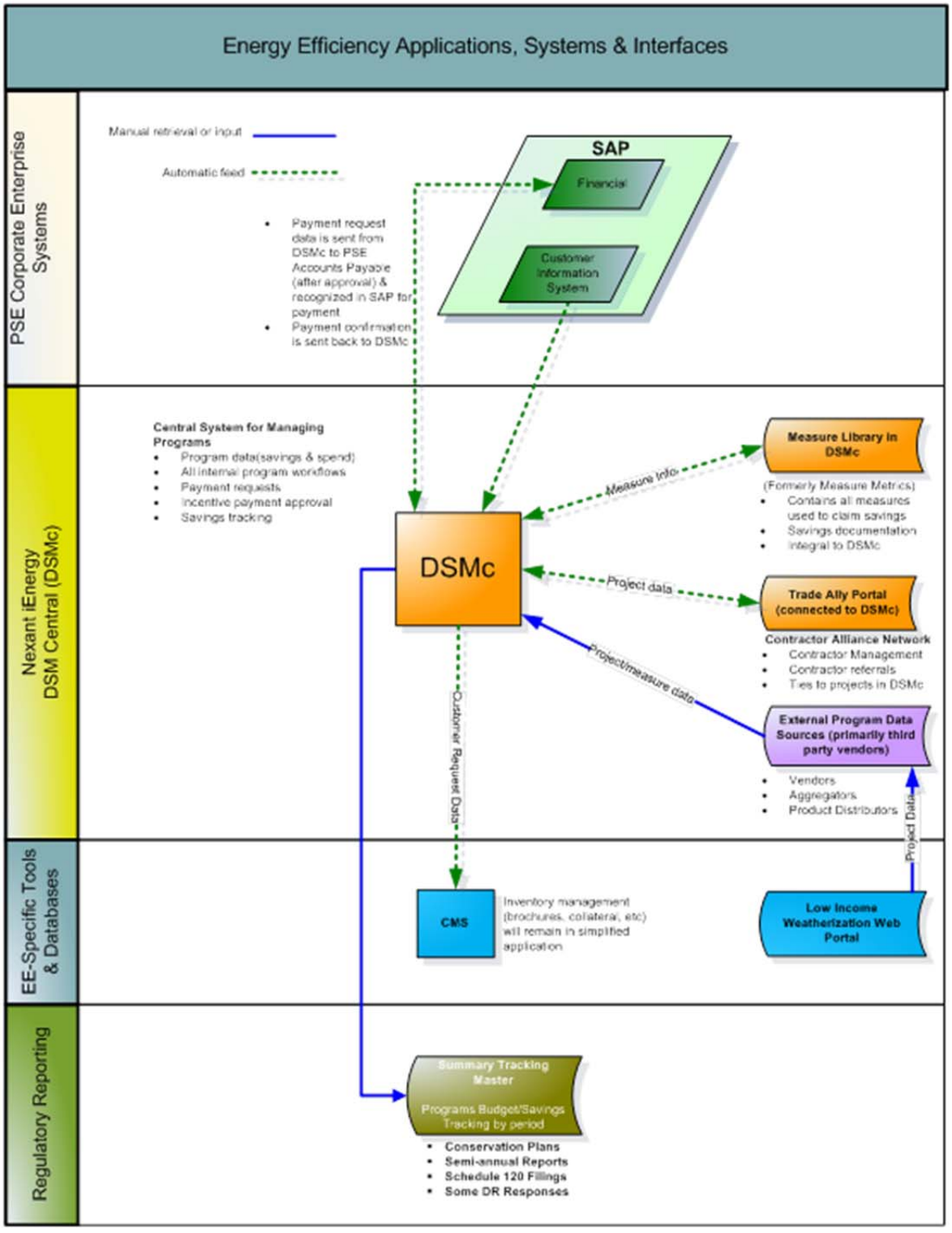
This chapter discusses: savings accounting, tracking and verification; financial accounting and tracking of Conservation Rider expenditures; compiling and; reporting of Energy Efficiency information. This chapter will also discuss the implementation of its new system "DSMc", and the organization that that manages that system: Data and Systems Services.

When the Demand Side Management (DSM) project is complete, DSM Central (DSMc) will replace the EES Tracking and Forecasting Database and most of its functionality. All of the Measure Metrics databases: CSY; EES Tracking; and Source of Savings, along with the program and EES Tracking Workbook will maintain all legacy information (through 2016 at a minimum) for audit purposes.

[30] It is difficult to verify the installation of consumer lamps sold through retailers, for instance.

Updated system interfaces are provided in Figure X-1.

Figure X-1: Energy Efficiency Management Tracking and Reporting Interface, Post-DSMc



A. Savings Accounting, Tracking, and Verification

Energy Efficiency's measurement and verification processes—most of which are long-standing embedded elements of its programs—are consistent with and often exceed the requirements outlined in condition (6)(c):

> "Puget Sound Energy must spend a reasonable amount of its conservation budget on EM&V, including a reasonable proportion on independent, third-party EM&V. Puget Sound Energy must perform EM&V annually on a four-year schedule of selected programs such that, over the EM&V cycle, all major programs are covered. (…)"

The following discussions highlight key areas of measurement and verification resources, tools, and processes implemented by Energy Efficiency staff to accurately measure and track electric and natural gas measure savings, along with their corresponding expenditures.

Systems illustrated in Figure X-1 include enterprise-level and proprietary systems, including tracking databases that the Energy Efficiency department developed. Where applicable and possible,[31] many conservation programs track the number of rebates processed, measures installed, grants paid, contracts or Memos Of Understanding (MOUs) executed, and invoices paid using tools built specifically for those programs. Energy Efficiency made a significant steps in implementing its new system, "DSM Central" (DSMc), throughout 2016. PSE provides a more thorough discussion of DSM Central in Section X.D: *DSM Central Implementation,* on page 171.

PSE intends that the following discussions provide general overviews, rather than comprehensive process reviews.

1) Accounting for and Tracking Conservation Savings

A key outcome of the Measurement & Verification function is the accurate representation of measures installed, and accounting for conservation savings as they are determined by:

- Prescriptively setting the savings value,
- Determining savings values using standard engineering calculations applied for a class of measures,

[31] Retail lighting is an example in which PSE received data feeds from certain retail establishments. The data consists of the number of particular units sold, rather than any specific customer information. Therefore, it isn't possible to indicate the number of lamps per household installed in all Residential programs.

- Formally evaluating the actual savings realization rates or,
- Measuring savings at the customer meter or equipment locations (primarily associated with custom grants).

Two of the most critical verification elements necessary to ensure savings accuracy are the verification of the savings associated with those measures, and the verification of measure installation.

a. Measure Savings Values

Exhibit 5 of this Report lists the savings values for all prescriptive measures, by program (most often associated with a Schedule number) and fuel type. Prescriptive measure values fall into two categories: RTF Unit Energy Savings (UES) and PSE Deemed.

As applied by Energy Efficiency, both are consistent with WAC 480-109-100(5):

> (5) Energy savings. A utility must use unit energy savings values and standard protocols approved by the regional technical forum, unless a unit energy savings value or standard protocol is:
>
> (a) Based on generally accepted methods, impact evaluation data, or other reliable and relevant data that includes verified savings levels; and
>
> (b) Presented to its advisory group for review. The commission retains discretion to determine an appropriate value or protocol.

All deemed measure source of savings documentation is archived and is available for query in the Source of Savings database, which comprises one element of Energy Efficiency's Measure Metrics system.

When an impact evaluation is performed and a prescriptive measure savings value is verified, Program staff will apply pertinent revisions in the following year, consistent with Energy Efficiency's *Measure Revision Guidelines*.

Calculated measures are similar to deemed measures, in that their savings value can be determined on a per-unit basis. The step that differentiates them from Deemed (or UES) values is that there are one or more additional calculations that must be completed before an accurate representation of their savings value can be determined. These calculations, based on engineering analyses, samples, and industry standards, etc., can range from hours of operation, tonnage (in the case of an HVAC measure), building type (for instance, school, retail, restaurant), etc.

Due to their complexity and variability, these types of measures aren't archived in the Source of Savings database.[32]

Measures installed as a part of Commercial/Industrial custom grants are unique, in that every grant project is evaluated by a PSE Energy Management Engineer (EME). EMEs use data loggers, meter data, engineering computations and other measuring tools to evaluate predicted savings. A senior EME verifies every project's calculations for savings prior to grant payment.

b. Measure Savings Verification

A key reference in the assurance of measure savings verification is PSE's reliance on the information archived in the Measure Metrics system, including the Source of Savings database, the EES Tracking & Forecasting Database and CSY. The savings figures archived in the Source of Savings database are routinely compared against the savings data residing in the EES Tracking & Forecasting Database, which is used to accumulate and record year-to-date aggregate savings. Similarly, those Deemed savings values that are archived in these databases are also compared to measure savings values in CSY to verify accurate reporting of savings values. When necessary, PSE follows a rigorous savings adjustment process if it is discovered that certain savings values disagree between the databases.

Rebate application processing and analysis is another vital measure verification component. A complete discussion of the Rebates Processing organization's activities and accomplishments is included in Chapter 11: *Portfolio Support*, starting on page 175.

c. Savings Tracking

After vetting a prescriptive measure's savings value and obtaining the director of Energy Efficiency's approval, the measure value and source of savings data is archived in the Measure Metrics databases.[33]

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[32] For instance, certain Commercial HVAC measures in the past had more than 300 permutations, causing database management to become unwieldy.

[33] Primary Measure Metrics databases are CSY, EES Tracking and Forecasting System, and the Source of Savings database. While the department's ongoing efforts to subsume these systems into DSMc continued throughout 2016, PSE does not anticipate that DSMc will be the ongoing sole repository of savings tracking. Additionally, all financial data originates with SAP, which will continue to be the sole repository.

Program staff then follow a meticulous process to verify and report their measures' monthly installations. Program data is systematically uploaded to the EES Tracking and Forecasting Database, where the archived savings value is linked to the applicable measure quantity. Program staff check vendor/contractor invoices and reports prior to payment to ensure entry accuracy, prevention of double-counting, etc.

To ensure accurate savings reporting,[34] program staff confirm the monthly savings and expenditure figures in the Database. After this check, the data is locked for entry, and is available for department-wide reporting (discussed in the Savings Reporting section). Calculated and custom measure data is aggregated within the applicable tracking system—typically CSY—and logged into the database as a single number.

All measure counts processed by Data and Systems Services and by the Rebates Processing Team are reconciled against CSY and the EES Tracking and Forecasting Database through a careful review of monthly data prior to its reporting. Program staff regularly review the measure count data, providing a double-check and corroboration with projections.

d. Business Energy Management Custom Project Verification

The full range of verification activities is conducted when an energy management engineer (EME) manages a custom grant; either in the Commercial/Industrial (C/I) Retrofit, C/I New Construction, Resource Conservation Management, or Large Power/Self-Directed programs. There are also custom grant projects in REM's Multifamily programs as well. EMEs verify project elements such as measure quantity, baseline energy consumption, potential savings, projected and actual equipment performance, and actual conservation results.

Every custom grant project includes a peer review by a more senior EME. A large number of Business Lighting Rebate projects are selected for EME review, and the Verification Team inspects a calculated number of projects and commercial prescriptive rebates.

[34] Measure data originates from a variety of sources, including contracted vendors, third-party administrators, Low-Income Agencies, direct install reports, rebate applications, etc. Entities outside of Energy Efficiency only report measure counts. Savings values are only archived and reported from within the Measure Metrics database systems.

Before a customer grant is authorized for payment, it must meet verification requirements.

Business Energy Management staff use several functions within the CSY system to manage the processing steps for custom grants, from the initial customer discussion, through the grant creation, work progress and savings measurement, final verification, and grant payment.

2) Savings Adjustments

Although Energy Efficiency's programs maintain robust processes and systems that undergo continuous improvements to ensure accurate savings and financial tracking, there are infrequent instances when an adjustment is necessary.

Exhibit 1, Supplement 2: *Savings Adjustments,* lists and describes each electric and natural gas savings adjustment, along with its respective adjustment value, and an aggregate total of all adjustments that were performed throughout 2016. Adjustments apply to all measure types. The savings adjustment process is outlined in the Energy Efficiency document *Guidelines for Ensuring the Accuracy of Electric and Natural gas Savings Claims*.

A key principle of proper savings accounting is that savings are not adjusted retroactively in a past month. Therefore, all adjustments, once approved, are made in the current reporting month, even if making the adjustment results in a negative value in the current month. Although very rare, there may be multiple adjustments for a single program or multiple programs in a single month.

Adjustments may apply to either electric or natural gas values and may be positive (indicating that the originally-reported value was understated) or negative (indicating that the originally-reported value was overstated).

Savings adjustments are approved by a senior manager only after the applicable program manager has addressed five questions:

1. What is the reporting discrepancy?
2. How was the discrepancy discovered?
3. What was the effect of the discrepancy?
4. How is it corrected?
5. How will program staff ensure that the discrepancy is not repeated?

Once approved, an adjustment entry is made to all applicable tracking and reporting systems.

Archived savings values are revised only:

1. In the case of errors. If it is discovered that an archived savings value is incorrect (for instance, it is entered into a database as "43" kWh, when the actual savings is "34" kWh), the savings value is adjusted and all savings reported to that point—back to the beginning of the current year—are corrected.

   To maintain historical perspective, measures are never deleted from a Measure Metrics database; they are retired.

2. In the case of an evaluation, industry study or RTF revision updating the savings value of a current measure. In this case, the value is adjusted at the beginning of the following year, consistent with Energy Efficiency's *Measure Revision Guidelines*.[35]

Since 2008, PSE has implemented several processes and guidelines to ensure that its savings reporting—both electric and natural gas—maintain the highest accuracy standards. One of these outlines the methods of vetting, justifying, counting and reporting measure savings: *Guidelines for Ensuring the Accuracy of Electric and Natural gas Savings Claims*.

This comprehensive document ensures consistency across programs and Sectors, outlines rounding rules for savings values and measure counts, discusses applicable reporting periods, and how retired measures are tracked, reported and archived.

3) Savings Reporting

Subsequent to the data acquisition and reconciliation in the EES Tracking and Forecasting System and CSY, all aggregated program figures are copied to the Summary Tracking Master workbook. This step provides an extra opportunity for staff examination before the data are archived.

[35] As discussed in the REM Overview, Section IV.A.1, page 36, PSE made an exceptional, one-time savings adjustment of -42,000 MWh in 2016.

After the Summary Tracking Master (noted in Figure X-1 on page 159) is populated with the monthly savings and financial information, it is forwarded to program staff for a last double-check and vetting. The aggregated monthly data is then compiled, and logged in the Energy Efficiency Exhibit 1: *Savings and Expenditures* spreadsheet, which also populates the various savings and financial tables within this Report.

A range of Energy Efficiency staff routinely reviews the department's key recording systems. The systems are regularly upgraded, improved, and double-checked by program staff and the Data and Systems Services Team to validate their accuracy throughout the year.

B. Financial Accounting and Tracking of Conservation Rider Expenditures

Energy Efficiency staff are responsible for ensuring the accuracy of invoices and financial charges applied to their programs. These can include charges from other PSE departments: marketing department labor charges for Direct-to-Consumer Channel collateral development, for instance. Program staff are required to reconcile their program's SAP[36] records on a monthly basis to ensure accuracy.

Energy Efficiency staff also attend regular accounting training, including introductory sessions for newer employees, as well as refresher training made available throughout the year.

Additionally, staff members who are authorized to approve invoices are required to attend annual training and sign a due diligence affirmation, consistent with PSE corporate accounting policies.

PSE employs SAP as its enterprise-level accounting system. PSE uses financial information collected and reported in SAP on conservation expenses in its annual Schedule 120 filing—PSE's funding mechanism for conservation programs. When PSE hosts UTC Staff and CRAG members to review Energy Efficiency Schedule 120 expenses in preparation for its annual Commission open meeting, Compliance staff use SAP to satisfy reviewers' queries. These reviews typically occur in the late March-early April timeframe; subsequent to PSE's Schedule 120 filing, and prior to the updated Schedule 120 rates going into effect on May 1.

As noted in the Conservation Savings discussion in the previous section, Energy Efficiency intends that the below-referenced process discussions only provide an overview, rather than a comprehensive process review. Financial accounting applies to PSE-internal expenses incurred as a part of executing conservation programs (labor, customer incentives, employee expense, etc.), and expenses incurred paying third-party evaluators, vendors, printers, etc.

[36] PSE discusses SAP in more detail on page 169.

1) Expense Tracking

SAP accumulates charges and credits them to Energy Efficiency order numbers.[37] Within each order number, there are cost elements (sometimes referred to as account numbers), that are used to log the specific type of account to which the expense is recognized.[38] SAP provides functionality that allows authorized users to "drill down" into expenses; accessing specific invoices, charges from supporting departments, etc.

2) Financial Adjustments

Similar to measure savings adjustments, expenses that have already been logged into SAP erroneously must be adjusted to reflect the correct accounting.[39] The process used to effect those infrequent adjustments is similar to that discussed in the measure savings adjustment section above.

Moving expenses from an incorrect account to the correct account is accomplished by the use of a journal entry (JE). This process is strictly controlled by the Company, and has rigid segregation of duties requirements. For instance, in the two-step JE process, a staff member who "parks" a journal entry may not also "post" it in SAP.

3) Expenditure Data Assimilation

Each month, SAP financial records for all Energy Efficiency order numbers are downloaded and entered into the EES Summary Master Tracking Workbook. The EES Tracking and Forecasting Database also archives expense data, using a feed from SAP.[40]

The Workbook and Database are intentionally separate to ensure segregation of duties, thus providing an additional point of reconciliation.

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[37] The order numbers used by Energy Efficiency programs are listed in the "Sector Views" of the 2016-2017 Biennial Conservation Plan's Exhibit 1: *Savings and Budgets* workbook. Order numbers, formatted according to FERC accounting requirements, are used to account for program costs in SAP.

[38] Cost elements can include, but are not limited to categories such as labor, overhead, outside services, employee expenses, etc.

[39] An example may be where a natural gas rebate was entered into CSY as an electric rebate. In this case, a savings adjustment (reclassify therm savings as kWh savings) and a financial adjustment are required.

[40] Figure X-1 on page 159 illustrates these systems.

C. Final Assembly of Energy Efficiency Information

As referenced in the previous discussions, Energy Efficiency employs a combination of proprietary and enterprise software applications and tools to accumulate, validate, report, and where necessary, adjust financial and energy savings figures with a high degree of integrity and accuracy. These systems are referenced in Figure X-1 on page 159. Readers will note that DSMc—often referenced in this Report—is central to Energy Efficiency data and information reporting.

SAP (originally named "Systeme, Anwendungen, Produkte", German for "Systems Applications and Products") is an enterprise system and is used throughout PSE. SAP provides all financial information, including vendor contracts, material orders,[41] staff pay and expense reporting, and overhead allocations. SAP will continue to operate as it does today with respect to program operations, program spending, and incentive check distribution when DSM central (discussed in the following section) is fully implemented.

CSY (referenced in previous discussions, but will be fully replaced by DSMc in 2017) tracks projects—custom, calculated, and those using prescriptive measures—with the associated customer incentives paid and the electric and/or therm savings. Energy Efficiency policies strictly limit access to CSY to authorized staff only. The type of access ("reporting only", "data entry only", "approval only", etc.) is also limited according to PSE strict segregation of duties rules. CSY will become a read-only application after the DSM project, so that the data will be available as needed, but the functionality it provides today will be located in DSMc. The same access controls apply for DSMc.

The EES[42] Tracking & Forecasting Database tracks measures installed and expenses incurred, primarily for Residential programs. It also, though, accumulates BEM savings and financial information, used for internal forecasting and monitoring, along with expenditure data from supporting functions. PSE plans that the EES Tracking & Forecasting Database will continue to be used for forecasting and aggregating reporting of project data after DSMc is fully implemented.

[41] Material orders sometimes include lamps used in Energy Efficiency events, carbon monoxide detectors used in weatherization projects, etc.

[42] Prior to 2012, the Energy Efficiency department was named Energy Efficiency Services. In some databases, this name carried throughout system updates, avoiding complicated table/query/report revisions and re-programming.

CMS (Customer Management System) is a proprietary system used to inform PSE customers as to the status of a rebate application, energy-efficiency measure installation history (as determined by rebates paid) and other useful, customer-centric information. CMS currently interfaces with the EES Tracking & Forecasting Database, CSY, and SAP.

CMS will continue to be used for referrals, and may continue to be used for brochure disbursement and collateral inventory management, following the full implementation of DSMc.

The Source of Savings database serves both a Measurement and Verification role in Energy Efficiency and is a key database in Energy Efficiency's Measure Metrics archival system. It is important to note that the Source of Savings database does not track savings throughout the year; it only serves as a repository of savings values and their justification documentation. This database will also become a read-only reference following the complete implementation of DSM central.

Measure tables included in Exhibit 5 are generated from the EES Tracking and Forecasting Database. The database works in conjunction with the Source of Savings database, which archives all prescriptive measures. Calculated measures (Those that may have prescriptive value, which is modified by operational factors. For instance, hours of operation, tonnage [some HVAC systems], system controls, business type [retail, school, office], etc.) and custom measures are not archived due to their variability and complexity. Those savings values are archived in individual program files.

D. DSM Central Implementation

As the DSM project moves through the different waves of functionality (programs, measures, reporting, etc.) that are currently provided by largely custom in-house applications, the systems model will change. The goal of the project is to migrate programs and data into a single system for tracking and reporting purposes. An additional goal is to enable customers and contractors to submit applications online rather than using email or standard mail.

The DSM project began in the first quarter of 2015, with heavy design/build activities happening in DSMc with the product provider, Nexant, in the spring and summer. To focus the team and others, in July, a change was made to only focus on similar program groups simultaneously. As a result of this change in tactics, program types including data-focused programs, residential rebates, commercial rebates, the verification team, and the energy advisors are all live in the production environment at the completion of 2016. The remaining areas are the custom grant programs and the complete deployment of the Trade Ally tool and online applications.

In 2017, the system relationships will transition as Energy Efficiency brings the DSM project to a close, centralizing its programs systems into the single DSMc system.

E. Data and Systems Services

Data and Systems Services plays an integral support role for all of Energy Efficiency, and is a key component of measurement and verification functions for the entire department. The group provides the department with the tools, data, reporting and analyses necessary for rigorous measurement and verification processes. This team will oversee system administration, technical support, and system enhancements for the new DSMc application.

PSE provides a complete discussion of the team's 2016 activities and accomplishments in Chapter 11: *Portfolio Support*, in the Programs Support section.

F. Accomplishments, Continuous Improvement and Adaptive Management

The following points are illustrative of PSE's commitment to continuous improvement and adaptive management to all facets of its Energy Efficiency business—not just to program that generate conservation savings. Throughout 2016, Energy Efficiency organizations, while maintaining their focus on maximizing the accuracy of reporting savings and financial data, also met their customers' expectations, increased M&V efficiencies, prudently used ratepayer funds, and minimized the impact of increasing regulatory requirements. Highlights of key M&V accomplishments include:

- Data and Systems Services' monthly data reconciliation process captured and reconciled the majority of reporting errors before the errors made their way into the tracking systems.[43] PSE streamlined the process to reconcile measure database reference numbers, providing for easier and more accurate measure savings cross-references used in reporting Exhibits.
- As a result of the continuous improvement efforts and focus of the Data and Systems Services Team, program staff, and the Budget & Administration Team, the number of savings adjustments continued the declines of the last several years; from the 2015 total of 14 to 11 savings adjustments in 2016; 9 electric, and 2 natural gas. Many were the result of vendor or contractor training issues, and were addressed as a part of adjustment reporting process.

  The Budget and Administration team collaborated with program staff to streamline the adjustment request process, enabling adjustments to be made in the same month that they're requested. PSE provide the details of these adjustments in Exhibit 1, Supplement 2: *Savings Adjustments*.

  This 21 percent improvement in overall savings adjustments continues PSE's positive trend of continuous improvement, reflecting customer-facing process and rebate application refinements, with continued emphasis on thorough data review prior to reporting.

  The overall savings reported in Exhibit 1 are reflective of those adjustments.

[43] PSE discusses additional Data and Systems Services accomplishments in Chapter 11, *Portfolio Support*.

- The Budget and Administration team refined several steps and worksheet lookups in the EES Summary Tracking Master so that any data inconsistency is identified within the reporting month, eliminating the need for manual reconciliation and time-consuming review at year's-end.

- Energy Efficiency executed an unprecedented one-time savings adjustment of approximately 42,000 MWh in four REM programs. The adjustment was made with the engagement of the CRAG beforehand, and was entered into DSMc in December, with a coordinated effort of Direct-to-Consumer, Residential B2B program staff, Data and Systems Services staff, and the Budget and Administration team. All of the original data remained intact to ensure a historical reference, with the adjustment measures clearly identified for any review purposes. The specifics of the adjustment are outlined in Chapter 4: *REM Overview, Section IV.A.1* on page 36.

XI. EFFICIENCY PORTFOLIO SUPPORT

A. Overview

The organizations that comprise the Portfolio Support group play a critical role in Energy Efficiency's success of consistently achieving conservation targets within expected cost parameters. Much of what Residential Energy Management and Business Energy Management (who make up key elements of the Energy Efficiency department) implements and offers to customers depends on the work performed by these teams.

The teams' activities do not directly result in electric or natural gas savings, although the Portfolio Support activities expenses are spread over the portfolio for purposes of calculating cost effectiveness. The groups collaborate with program staff to ensure that (1) they engage and represent all customer classes, (2) that incentives are properly set, and (3) that program staff are targeting their efficiency communication effectively. Through market research and planning, the establishment of compelling messaging, easy-to-navigate and intuitive web content, and visible conservation presence within the communities that PSE serves, and with its trade allies, the teams' contributions cannot be overstated.

1) Functional Group Performance

Table XI-1 provides a 2016 year-to-date summary of expenditures for the Portfolio Support organizations.

Table XI-1: Portfolio Support, 2016 Expenditures

2016 Expenditures				2016 Budget
Schedule	Programs	Total	% of Budget	
Electric	Electric			Electric
Gas	Gas			Gas
	Customer Engagement and Education	**$ 1,321,554**	***69.8%***	**$ 1,893,684**
	Energy Advisors	*$ 829,907*	*73.6%*	*$ 1,127,545*
	Events	*$ 459,838*	*68.7%*	*$ 668,909*
	Brochures	*$ 31,808*	*36.0%*	*$ 88,430*
	Education	*$ -*	*0.0%*	*$ 8,800*
	Electronic Medial Tools & Awareness	**$ 1,516,145**	***146.2%***	**$ 1,036,967**
	Customer Online Experience	*$ 526,766*	*89.4%*	*$ 588,990*
	Customer Awareness Tools	*$ 641,336*		
	Automated Benchmarking System	*$ 158,151*	*126.9%*	*$ 124,630*
	Market Integration	*$ 229,463*	*71.0%*	*$ 323,347*
	ShopPSE	*$ (39,571)*		
	Rebates Processing	*$ 606,770*	91.9%	*$ 660,029*
	Programs Support	*$ 296,845*	95.4%	*$ 311,175*
	Data and Systems Services	*$ 1,754,081*	146.7%	*$ 1,196,032*
	Energy Efficient Communities	$ 710,306	79.0%	$ 899,299
	Trade Ally Support	$ 150,605	128.0%	$ 117,661
	Contractor Alliance Network	$ (40,569)	223.9%	$ (18,116)
	Total Electric	**$ 6,315,736**	**103.6%**	**$ 6,096,731**
	Customer Engagement and Education	**$ 158,433**	**73.8%**	**$ 214,543**
	Energy Advisors	*$ 66,499*	*79.2%*	*$ 83,937*
	Events	*$ 89,882*	*77.9%*	*$ 115,416*
	Brochures	*$ 2,051*	*14.4%*	*$ 14,215*
	Education	*$ -*	*0.0%*	*$ 975*
	Electronic Medial Tools & Awareness	**$ 232,167**	**146.1%**	**$ 158,916**
	Customer Online Experience	*$ 81,304*	*70.5%*	*$ 115,349*
	Customer Awareness Tools	*$ 112,127*		
	Automated Benchmarking System	*$ 21,285*	*108.1%*	*$ 19,683*
	Market Integration	*$ 35,500*	*148.6%*	*$ 23,884*
	ShopPSE	*$ (18,049)*		
	Rebates Processing	*$ 67,120*	68.1%	*$ 98,625*
	Programs Support	*$ 35,771*	79.1%	*$ 45,210*
	Data and Systems Services	*$ 250,142*	139.8%	*$ 178,924*
	Energy Efficient Communities	$ 105,981	81.2%	$ 130,495
	Trade Ally Support	$ 14,482	68.9%	$ 21,015
	Contractor Alliance Network	$ 71,504	-395.1%	$ (18,096)
	Total Gas	**$ 935,600**	**112.8%**	**$ 829,632**

B. Customer Engagement and Education

This Energy Efficiency Sector performs functions and activities that are customer-facing; via telephone, PSE's web portal, literature, or various forms of media. For a large part, the organizations and the staff initiatives discussed in the following sections are the first exposure that customers have to PSE's energy-efficiency programs.

1) Energy Advisors

The Energy Advisor Department is a unique, customer solution operation. This expert group brings efficiency into PSE's customer homes by guiding them in changing behaviors, understanding their energy use, and assisting them in using PSE's programs that are best for the customer's individual circumstances. Energy Advisors also promote and explain PSE's renewable energy programs, community challengers, available promotions and tax incentives. The Energy Advisors assist customers with these services over the phone, email, and in person.

Unlike transaction-based customer care departments, the Energy Advisors provide expertise and deliver solutions tailor-made for customers' homes. The Energy Advisors perform research, conduct analyses, provide resolution, and respond to customer inquiries. They follow-up on requests related to energy efficiency and conservation that inform customers, make suggestions on how customers can reduce their energy use. They represent PSE in an effort to promote and cross-market energy-efficiency products and services by presenting and providing educational materials to employees, organizations and community groups.

Energy Advisors receive training and instruction in departmental procedures, current programs, building science, and customer service. They are expected to use good judgment in independently responding to recurring customer issues and/or complaints. Unique, difficult or unusual customer service issues are referred to Senior Energy Advisors**.**

Individual Energy Advisors are also located in several PSE Business Offices throughout PSE's service territory to provide direct support for energy-efficiency questions.

Customers have access to speak directly to an Energy Advisor through a toll-free number, **1-800-562-1482**, Monday through Friday, 8am to 5pm.

a. 2016 Accomplishments

As noted in Table XI-2, the number of customer phone calls into the Energy Advisor directory remained fairly consistent from 2015 levels. The organization, though, substantially increased the number of email contact—up over 20 percent from their 2015 levels—and community/tradeshow events that energy advisors staffed: almost 80 percent more than 2015 events. Four energy advisors that staff PSE's regional offices managed over 700 personal customer interactions in 2016. These indices reflect customers' requirements for an increased level of self-service and in-person interactions with PSE. Table XI-2 presents highlights of key 2016 Energy Advisor metrics.

Energy advisor staffing at events is particularly useful for customers, as energy advisors have the opportunity to review PSE's digital engagement experience directly with customers, alleviating any potential concerns and illustrating the simplicity of managing their energy use through PSE.com's Energy Center page.

b. 2016 Adaptation and Continuous Improvement

New for 2016, Energy Advisors are utilizing a powerful online Billing Advisor tool to deliver an enhanced experience for customers. This internal-only interface offers a comprehensive view of each customer's unique energy situation. This includes deep insights and data exploration that makes energy usage diagnosis easier and faster. It is based upon the customer's actual energy coupled with external data, such as weather.

PSE continues to improve its information distribution to customers based on their evolving requirements. For example, PSE makes use of emails with PDF attachments via its energy advisors, as well as mailed hardcopy brochures through its brochure fulfillment process.

Table XI-2: Key Energy Advisor Metrics

2016 Energy Advisors	
Calls Answered	81,300
Emails	6,800
Events Staffed	100
Walk-in Customers Served	700

The metrics noted in Table XI-2 denote:

- Calls Answered are both Residential Sector, and a portion of Business Sector incoming activity.
- Events staffed are those home shows, municipal gatherings, etc., where energy advisors are on-hand during all or a portion of the event to share a wide range of Energy Efficiency information directly with PSE customers. Event metrics are presented in the following section.
- Emails include a wide variety of actions taken by energy advisors in response to emails sent to the general energy advisor email link.

2) Events

The Energy Efficiency department participates in community, local, and regional events throughout the year, including home shows, trade shows, seminars, corporate events and community events. The event audience consists of general public, businesses, builder/contractors, multifamily property owners, city leaders, home owner associations, and students/teachers. PSE maintains a presence at these venues to promote its residential and commercial energy efficiency programs in addition to the other communication methods PSE uses to educate customers about its offerings. This provides unique opportunities for Energy Efficiency Staff to interact directly with customers and discuss a variety of products, programs and services that the department offers. Energy Efficiency Staff will also match customer interests and needs with Energy Efficiency programs, as well as bring back customer feedback.

The event strategy team provides specific criteria for event participation that matches overall business and strategy of the programs supporting Energy Efficiency programs with emphasis on presence, affiliation, and relevance. Each event holds a particular value to stakeholders and relates to objectives of PSE Energy Efficiency programs.

The Events team organizes events using an event management data system to improve communication and customer experience. The team assesses event requests and reviews event opportunities in advance with a focus on tactical planning for and vetting events. PSE proactively seeks new audiences to deliver energy efficiency services, using available demographic data to identify harder to reach communities.

PSE employs a third-party vendor to augment its dedicated events staffing to ensure the maximum energy-efficiency exposure. The goal of this is to increase awareness and uptake of PSE EE programs, drive energy savings and reach a broad and diverse audience base through door-to-door, open houses, and community events.

a. 2016 Accomplishments

In 2016, the Customer Outreach Events team partnered with the Energy Efficiency team throughout PSE's service territory to have a presence at a substantial number of diverse community event opportunities. Through this internal partnership, PSE was able to reach out to nearly half a million people to share the message of Energy Efficiency programs.

b. Highlights of Residential Events

With broader resources provided by contract staffing, the team was able to reach into a great variety of community events in all of the PSE-served counties. Community events into which PSE expanded its participation include:

- Island County festivals,
- Whatcom, Skagit, Kitsap, Kittitas Counties - Home Shows,
- Snohomish County YMCA Series,
- Kittitas County Fair, Wild Horse REC events, Farmer Markets,
- King County festivals, Home Fair, low income community events,

- Kitsap community safety fairs,
- Thurston Multi-family energy fair,
- Pierce Multi-family energy fair.

c. Highlights of Business Events

PSE hosted the 34th West Coast Energy Management Congress event on May 25 and 26, 2016. Sponsoring this event was a joint effort with PSE's neighboring utilities: Seattle City Light, Snohomish County PUD, Tacoma Power, as well as the Northwest Energy Efficiency Council (NEEC) and Pacific Northwest Green.

WCEMC featured an exposition of energy efficiency, power, building systems, sustainable, and green facilities products and services. Attendees were offered the opportunity to visit 200 booth displays and attend complimentary exhibit hall workshops. This provided an interactive experience between expo attendees and expert presenters. PSE provided 10 presenters ranging in topics from Women in Energy Leadership to LED Street Lighting for municipalities. The WCEMC is the largest west coast energy conference for business, industrial and institutional energy users where PSE was able to reach and educate over 1,800 customers.

d. Reaching into PSE Businesses

The Events team, in concert with the Energy Efficiency Communities team, continued Energy Efficiency's ongoing practice of engaging PSE employees, its vendor partners, and key clients in extolling the customer benefits of energy efficiency. These efforts included events at:

- TechniArt Corporate Fairs (also termed "Pop-up events" in the Single Family Existing and Direct-to-Consumer program discussions) in PSE business campuses and offices,
- Customer Employee events: Boeing plants, Darigold, and City Halls,
- Open house community tabling at Energy Efficiency's Small Business Direct Install blitz events.

e. Hard-to-Reach and/or Proportionately Underserved Segments

The Events team was instrumental in targeting an increase of participation in Multi-Family energy fairs. The goal was to reach more rental residents with direct-install information and tips for continued energy savings through on-hand education.

Table XI-3 provides a summary of 2016 events in which PSE presented energy-efficiency information.

Table XI-3: Total Events

2016 Events	Count
REM	140
BEM	10
Residential Door-to-Door	10
Customer Outreach	150
Contractors, Partners in Community	30
Total	**340**

3) Energy Efficiency Brochures

PSE provides brochures and how-to guides on numerous energy efficiency opportunities, including low-cost equipment, weatherization measures, major weatherization improvements, and equipment upgrades. This information includes investment and savings estimates where appropriate.

The brochures provided as part of this program are general energy efficiency in nature, whereas program-specific (for example, business programs, residential heat pumps, or mobile home duct sealing), are budgeted within those specific programs. These brochures are available to customers in paper form and online at the PSE website. Where required by tariff, brochures are included as bill inserts.

a. 2016 Accomplishments

The brochures staff in collaboration with PSE's Communications Marketing group worked toward improving the customer experience by reducing the overall variety of available brochures. This reduction of over a dozen titles helps bring focus to those that are used most frequently.

b. Adaptive Management

A significant change in customer behavior was noted as EE brochure downloads from PSE.com increased to over 6,000 from almost 2,000 items in 2015.

Conversely, mailed brochures declined to approximately 2,800 from 8,000 in 2015. PSE is maintaining more brochure information for online access, but remain sensitive and responsive to customer need for hardcopies to distribute to those who don't have easy access to the internet.

Table XI-4 provides a view of 2016 brochure distribution.

Table XI-4: Brochures and Mailings Distributed

Energy Efficiency Brochures	Number
Brochures mailed	2,850
Brochures downloaded from PSE.com	6,500
2016 Energy Efficiency Brochures & Customer Referral Letters	
Sampling of EE Items Mailed via USPS	**Qty**
Post CAN *Thank You* completion letters	3,500
HomePrint & Home Energy Assessment letters:	2,400
Electric heating letters:	100
Natural gas heating letters: *(natural gas furnace)*	1,100
Gas & electric insulation letters:	1,200
Customer referral letters:	8,300
Energy efficiency brochures:	2,800
Customer natural gas & electric Thank You kits:	90

4) Energy Education

Schedules E/G 202

a. Description

The Energy Efficiency Education program provides opportunities to broaden knowledge of conservation and renewable energy, and increase participation in efficiency programs.

PSE's energy education provides a forum for positive customer and community interaction and involvement that will inform, inspire, and empower with the understanding that individual choices do make a difference.

b. Adaptive Management

With limited staffing to bring education into the community, PSE focused on its successful relationship with the Independent Colleges of Washington (ICW). The ICW underwent an administrative leadership change in 2016. Working with their new Director, PSE advised ICW that PSE preferred school projects moving forward to reach larger audiences with its $10,000 grant dollars – both in number of students participating and in potential impact..

The Director brought this message to the schools and returned with a proposed project from University of Puget Sound that PSE will engage with in 2017. A component of the project will entail tracking campus housing energy usage to measure effectiveness of implementation of behavioral change through education.

C. Electronic Media Tools & Marketing

The Electronic Media and Tools group implements services and activities that focus on PSE customer access to Energy Efficiency programs, via the internet or other forms of electronic media. This Electronic Media and Tools team is made up of Customer Digital Experience and Market Integration, which are detailed in the following paragraphs. The Automated Benchmarking System is discussed in the following section.

1) Description

Customer Digital Experience and Market Integration are designed to significantly improve Energy Efficiency's ability to communicate the "how and why" of energy efficiency, using new technologies and engaging interactive methods.

Customer Digital Experience consists of the initiative to make PSE's energy-efficiency web tools effective in delivering electricity and gas savings. Research has shown that PSE customers are more web-savvy than average and have high expectations when doing business on the web.

Customer Digital Experience also supports interactive content development, e-newsletters and other miscellaneous software applications, including online form, database and web hosting services.

These newly-enhanced tools, implemented in 2014 and regularly improved and updated, help customers understand the specifics behind their energy usage, show neighbor comparisons (residential customers),[44] notify customers of higher than usual usage, and provide new ways to encourage efficient behaviors, by suggesting personalized tips, tools, ideas and checklists, based on a customer's automated energy usage profile and self-assessment information.

Customer Digital Experience also supports interactive content development, e-newsletters and the fees for other miscellaneous software applications, such as online form, database and web hosting services.

[44] Specific customer details; addresses, names, account information, etc. is rigorously protected. Instead, only general, non-specific comparisons will be provided.

It includes purchases made through ShopPSE, funded by the Residential Energy Management Direct-to-Consumer Channel (http://PSE.com/shoppse).

2) Customer Online Experience: Investment in New Online Tools

Since the pse.com re-launch in 2011, the "Savings & Energy Center" has seen a significant uptick in page traffic and overall engagement with customers. Several highlight of PSE's 2016 online metrics are provided in Table XI-5.

3) Market Integration

Market Integration consists of salary costs of employees and contractors working on energy-efficiency marketing and promotional support activities. This is to make marketing efforts more transparent: tasks include the enhancement of online energy-efficiency tools and features, as well as traditional marketing executions that center on promotional channels used across all programs, such as advertising, events, collateral and websites.

To reinforce and broaden the impact of energy efficiency programmatic marketing, an energy efficiency awareness advertising campaign comprised of a series of clay animation shorts launched in February 2016.

The two television and digital video commercials developed to promote PSE's online energy center tools and general energy efficiency tips can be viewed here:

- Incredible Bill-shrinking Lightbulb, featuring "Stan": https://www.youtube.com/watch?v=yFvih_2XlLU
- Cold Hard Cash, featuring "Gloria": https://www.youtube.com/watch?v=ovOpxPTPlQI

Research conducted in October 2016 shows that PSE customers are more likely to associate PSE with "helping them to save money" since the advertising campaign launched, while those that saw ads are more likely to use PSE's energy efficiency information and tools. The two ads received more than 40 million impressions in PSE's service area over a four-month period.

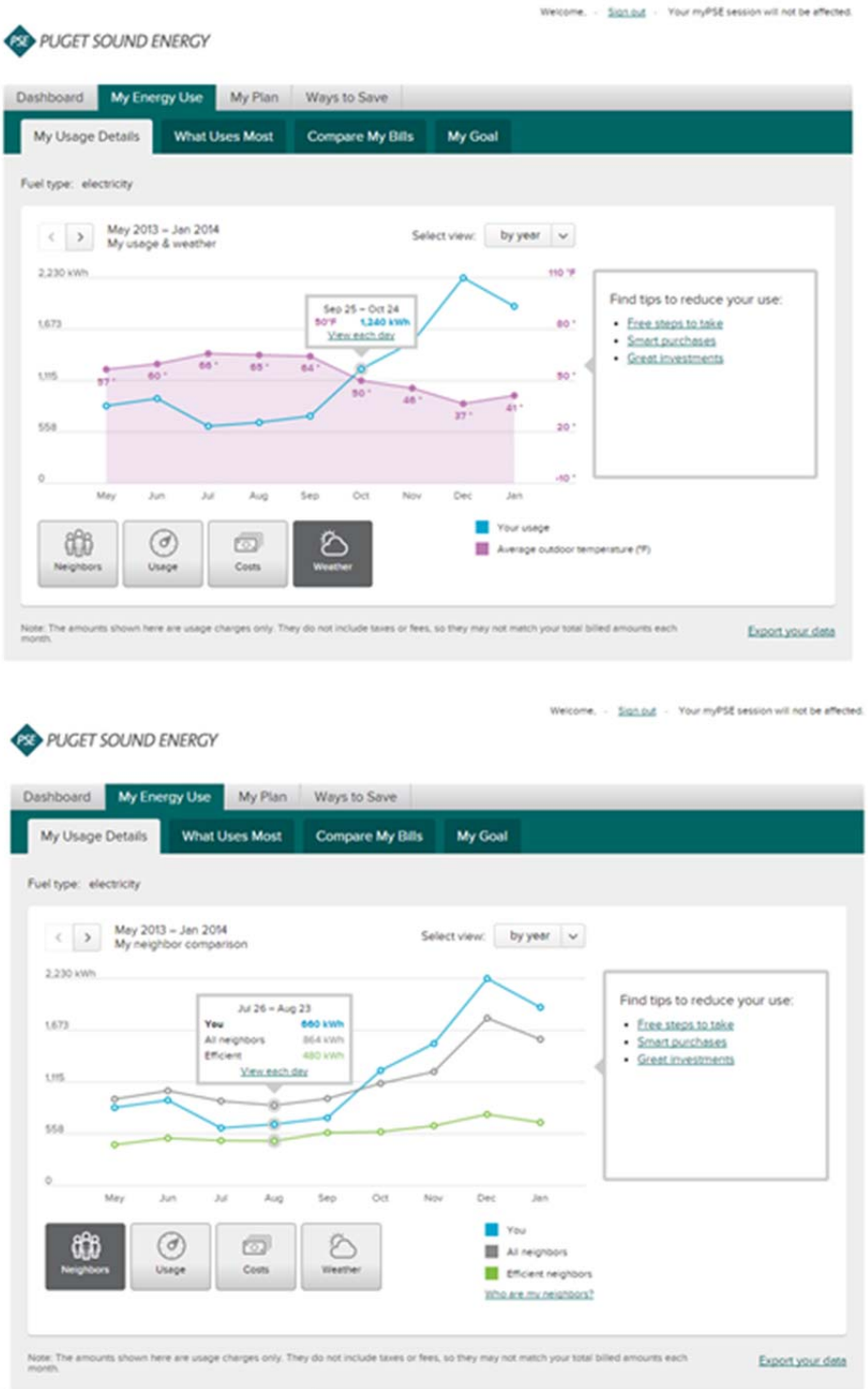
In the fall of 2016, two additional energy efficiency awareness commercials were developed to further promote the energy center online tools and the Home Energy Assessment program. These two commercials will premier to the public in 2017.

Table XI-5: Energy Efficiency On-Line Metrics

2016 Customer Online Experience Metrics
• The Savings & Energy Center received more than 2.5 million page views. • There were 320,000 views of the myPSE account Energy Center tools. • There were more than 22,000 views of the Ask an Energy Advisor inquiry form page. • There were almost 50,000 views of the Contractor Referral Service referral page, an increase of more than 10% over 2014. • Almost 700,000 energy-efficiency email news blasts were delivered to opt-in subscribers.

Figure XI-1 presents a screen image of PSE's new myPSE Account Energy Center Tools web page.

Figure XI-1: Screen Images of Updated myPSE Account Energy Center Tools



4) Automated Benchmarking System: MyData

This website, called *MyData* and launched in the autumn of 2013, provides building owners an easy to use, self-service portal that will allows users to set up automated monthly reporting of their building's usage.

MyData is a free web-based tool offered by PSE that allows building owners, managers and operators to track and assess energy consumption of their buildings. By registering your property, you will be a part of what is becoming an industry standard and will receive quick and accurate data on a monthly basis for your entire building. This tool will enable you to track energy usage for a portfolio of buildings, track the results of energy efficiency projects, develop Energy Star ratings and comply with state regulations including required reporting in the City of Seattle via Energy Star Portfolio Manager.

Approximately 75 percent of the whole-building energy usage requests PSE receives come from building owners (or their contractors) that are tracking their energy usage or tracking the results of energy efficiency projects.

a. Program Accomplishments

In 2016, an additional option to view energy use by billing cycle or by calendar month was added. This provides more flexibility to customers for reporting energy consumption and cost. The program was also used more heavily than in past years. The intended audience was originally customers benchmarking their energy use, but now includes any customers wishing to track consumption of multiple sites or energy use at multiple sites as an aggregate unit.

By the end of 2016, there were:

- Almost 1,000 customers using the MyData program to track their consumption and cost information,
- More than 1,200 customers using the program to report and automatically upload their building's data into the Energy Star® Portfolio Manager utility.

It is important to clarify that each customer may be responsible for more than one building or facility.

b. Hard-to-Reach and/or Proportionately Underserved Segments

The Automated Benchmarking Service software platform is available to all PSE customers. It is used extensively by SMB customers in Seattle to assist with compliance with the benchmarking regulations.

c. Adaptive Management

The addition of the option to receive data either according to the billing cycle timeline or the calendar month timeline is an example of how PSE continue to adapt this software tool to the needs of its customers. Program staff continue to use customer feedback to plan for future improvements.

5) Customer Awareness Tools

Please see the discussion on Energy Efficiency Awareness Tools in the Single Family Existing overview discussion on page 49.

D. Programs Support

Programs Support functions include data management, tracking and reporting services provided by Data and Systems Services staff, as well as research, planning, and development work by Program Development staff, all supporting implementation of Residential and Business Energy Management customer programs.

In addition to mainstream *energy* management development work, customer load (or *capacity*) management assessment, planning, and development interests are included in the Programs Support budget.

The Programs Support budget is predominantly labor and includes training, planning and development costs projected by Programs Support staff.

Data and Systems Services roles include:

- Planning, development, support, and enhancement of EE systems and tools,
- Management of reporting, forecasting, and business performance metrics,
- Conducting analytics by understanding and presenting program data as meaningful knowledge and insights,
- Oversight and administration of Energy Efficiency's DSMc system.

Program Development roles include:

- Internal and external research, planning and development;
- Biennial and strategic program planning support;
- Customer experience – EE program participation surveys;
- Customer load control / ancillary services assessment;
- Coordination with regional organizations including NEEA and RTF;
- Holistic assessment of Measurement & Verification protocols;
- Developing and managing IRP and related DSR bidding activities;
- Programs Cost-Effectiveness;
- Trade ally support; and
- Best practices and continuous improvement.

1) Data and Systems Support

The Data and Systems Services (DSS) group plays an important support role for all of Energy Efficiency. As noted in Chapter 10: *Measurement & Verification*, the Team plays a vital role in the department's measurement & verification functions.

This group provides the department with the right tools, resources, and people to assist in pro-actively managing their respective businesses, allowing Program staff to make management decisions that optimize their business. Program data management, savings reporting, system development and ad-hoc analyses are some of the critical services this team provides.

a. 2016 Accomplishments and Activities

In 2016, the DSS group was squarely focused on the implementation and administration of PSE's new DSMc system. Over the course of the year, the team successfully onboarded close to 30 programs into this new system. This onboarding process involves building program data forms and workflows, program measure building, and data migration. After program implementation was completed in DSMc, the DSS managed much of the data upload process for many Energy Efficiency programs, uploading over 500 files of program data over the course of the year.

The team progressed significantly in its understanding of the new DSMc system throughout this process and is now providing technical and administrative support to the Energy Efficiency users of this application.

The DSS team had several additional accomplishments outside the work they did relative to the transition to DSMc:

- Over 2016, the team continued to support Bellingham, Bellevue, and Port Angeles with their community energy usage feeds related to the Georgetown Energy Prize competition (Final data sets will be uploaded in early 2017).
- Additionally the team provided data and analytical support for many projects and initiatives throughout the year (Annual BECAR Audit, Evaluation Studies, Propensity Modeling, and program participant surveys).

b. Adaptive Management

As Program data management transitioned to PSE's new DSMc system for many Energy Efficiency Programs in 2016, the DSS team instituted a more rigorous level of data review. In this new system, Vendors provide data files coincident and supporting their payment invoicing to PSE. As these data files are loaded into DSMc, they are reviewed and approved in the system by program managers to insure measure counts and incentive payments match vendor invoicing as expected.

Previous to DSS' new system, the tracking data review occurred once each month and focused mainly on measure counts. The migration of measure management, rebate processing and other program data-tracking activities into this system are adding a new level of standardization and control to Energy Efficiency's data tracking activities.

1) Programs Support

This organization provided ongoing research, planning, and development work. Their functions support management planning and implementation needs of Residential and Business Energy Management customer programs. Programs Support costs are predominantly labor and include training, planning, and development contract costs.

a. 2016 Accomplishments and Activities

Staff roles included performing internal and external research relative to planning and development; biennial and strategic program planning support; participation in regional organizations including NEEA and RTF; assessment, development and implementation of Measurement & Verification protocols and methodologies; developing and managing IRP, and related Energy Efficiency new program RFP bidding processes; and staying abreast of and conveying best practices and continuous improvement methodologies.

PSE actively participates at all levels in the Regional Technical Forum (RTF) and related regional efforts. Participation includes, but is not limited to Energy Efficiency leadership's RTF Policy Advisory Committee (PAC) membership through active participation in RTF subcommittees by PSE program and planning personnel.

A significant portion of staff's efforts focused on providing assistance to and support of the Data and Systems Services team on DSMc implementation.

Staff provided key coverage in the program data migration efforts throughout the latter half of 2016.

2) Cost-Effectiveness

Cost-effectiveness modeling and calculations are also conducted within the Programs Support Team. PSE's program-level detailed view of electric and natural gas cost-effectiveness results for 2016 are attached to this report as Exhibit 2.

E. Rebate Processing

Rebates Processing functions include intake, qualification, payment and customer service, as well as process improvement in the customer experience. improvements include, but are not limited to, redesigning rebate forms for clear instructions and qualifying criteria, analyzing rejection reasons for the root cause of non-qualified rebates, and simplifying the application process for customers.

The Rebates Processing budget is predominantly labor and includes training, planning and development costs projected by Rebate Processing staff.

Rebates Processing roles include:

- Intake, qualifying, data entry, and incentive payment processing;
- Communicating with customers regarding the rebate submittal, including status and payment;
- Collaborating with the Energy Advisors to provide a seamless and efficient customer experience;
- Demonstrating best practices and continuous improvement;
- Coordinating timely customer payment with PSE Accounts Payable.

As noted in Chapter 10: *Measurement & Verification*, the Rebates Processing Team perform a critical verification step in Energy Efficiency. While a selected sample of applications are directed for onsite inspection by the Verification Team, all must go through several verification steps prior to payment authorization.

Key attributes include:

- Is the applicant a PSE customer?
- Is this the correct fuel type?
- Is the customer receiving service under the applicable Rate and Conservation Schedule?
- Did the customer submit a valid receipt (rather than one that's been used before)?
- Is the equipment eligible?
- Etc.

Table XI-6 provides a summary of rebates processed by Energy Efficiency Rebate Processing staff. The totals are not inclusive of all rebates, instant point of purchase markdowns, etc. paid within the REM sector.

As with program measure counts, the totals are rounded and are intended only to provide a sense of the scale of activity within the Rebates Processing group.

Table XI-6¨ 2016 In-House Residential Rebates Paid

Program	Fuel Type	Count	Incentives Paid
Fuel Conversion Rebate	Electric	200	$248,000
Space Heat	Electric	4,800	$4,090,000
Water Heat	Electric	700	$612,000
Space Heat	Gas	5,300	$1,680,000
Windows	Electric	1,000	$463,000
Windows	Gas	1,800	$700,000
Weatherization	Electric	800	$293,000
Weatherization	Gas	4,500	$1,450,000
TOTALS		**19,100**	**$9,536,000**

1) 2016 Continuous Improvements and Accomplishments

The Rebate Processing Team successfully managed over 19,000 customer rebates in 2016, all with a consistently low average turnaround time. In most cases, the team exceeded processing expectations.

The number of applications is a reduction of 42 percent from the team's 2015 figures. This is a result of Home Energy Assessment (HEA) applications (approximately 8,300 in 2015) now being processed by PSE's HEA vendor. In spite of the reduction in applications processed, this was a significant achievement, as the team was faced with unique challenges, including several individuals leaving the group and the implementation of the new DSMc database.

The organization was a key contributor to the successful launch of DSMc as the primary rebates processing system in October 2016.

The team was also instrumental in mapping out processes, testing and overall input on critical “must-haves”: rebate qualification guidelines; overall individual program guidelines; processing turnaround expectations; qualification look-up tools; and other critical, day-to-day business information for DSMc.

This substantial amount of effort occurred concurrently with the ramp up of the heating season, when the team receives the vast majority of rebate applications. The team rose to the challenge and met its processing targets for the year.

F. Energy Efficient Communities

Energy Efficient Communities (EEC) is a program-support channel to deliver Energy Efficiency program information directly to residential and commercial customers and through partnerships with community organizations and municipalities.

1) Description

The program works to leverage community resources to connect with, educate and move customers to Energy Efficiency program participation. The team works to discover locally-appropriate ways of engaging with customers by leveraging PSE's resources, community knowledge and partner support.

The EEC team works closely with the Energy Efficiency programs to determine whether a broader partnership with a community organization or a more targeted, direct-to-customer approach is needed, such as a door-to-door initiative.

The key benefit that the organization provides is performing customer outreach for both residential and commercial programs. The team supports cross-program promotion, where appropriate. Many of the organization's initiatives involve a high degree of focus on hard-to-reach and proportionately underserved segments of PSE customers. The Energy Efficiency Communities engages with stakeholders of these groups and program staff to ensure that the Energy Efficiency message is made available, and that customers are aware of their energy-efficiency participation opportunities. Most of the key initiatives discussed in the following sections contain some element of this focus.

The following discussions provide reviews of key 2016 customer outreach areas of focus.

b. Program Accomplishments

In 2016, the EE Communities team accomplished a variety of customer outreach initiatives in support of various EE programs, including the following:

- The team delivered over 10 multi-family energy fairs, resulting in almost 3,000 customer impressions and more than 200 more in-depth conversations with customers. For these fairs, the EEC team works with the program contractors and property managers to find appropriate times to set up an information table to discuss the upgrades happening as part of the multifamily retrofit program, and to share information about other energy-saving behaviors and applicable programs. It is a valuable way to connect with customers in ensuring they are fully aware of the value of energy efficiency efforts in their residences.

- EEC implemented door-to-door Home Energy Assessment (HEA) blitzes in 10 communities including knocking on more than 8,800 doors with a sign up rate[45] of over 55 percent. The HEA blitzes include working with local community organizations to promote the program to their audiences and engaging with the city council, home owners associations, or other community entities to find the appropriate time to deliver the initiative, including tying into other community initiatives happening at the same time., such as community fairs, neighborhood gatherings, etc.

- The team partnered with program teams to serve more than 300 small business customers through 5 small business direct install blitzes. These blitzes are similar to the HEA blitzes, but include integration with organizations that represent the business community. They include a preliminary door-to-door canvass to ensure that the customers are aware that PSE will be coming to conduct the assessments, if they are interested. Having this initial discussion allows for the owner, who many times is not on site, time to make the decision to participate when the contractor is working in the community. The team incorporates local business initiatives and partners, like downtown associations and chambers of commerce, into the blitzes to help ensure more collaboration and exposure.

[45] If a customer indicates that they would be interested in a home energy assessment at the time of the door-to-door visit, the customer outreach team classifies that as a "sign-up".

- The team provided customer outreach with over 100 organizations that serve customers in need to promote the appliance replacement program through social media, flyers, posters, tabling at their events, and presentations. Having these organizations promote the program on behalf of PSE allows for increased awareness of the program and adds additional validity to the program. Since this initiative supports the goals of these organizations as well, they are more open to partnering with PSE in the future in promoting other initiatives to help increase participation in programs. A perfect example is working with a local food bank to distribute flyers in weekly food allocations to their clients.

- EEC delivered more than 50 presentations to a variety of organizations and community groups about PSE Energy Efficiency programs. Organizations include City Councils, libraries, civic clubs, Home Owners Associations, PSE retirees, colleges, corporate offices, and others.

c. Continuous Improvement and Adaptation

The EE Communities team worked with its third-party contractor to better align the door-knocking timing for the Home Energy Assessment door-to-door blitzes to reach more customers when they are home. In addition, this contractor also continued to refine their presentation to best pique the customers' interest on the benefits of the program right when the customer answers the door.

d. Pilot-Like Initiatives

In partnership with the Dealer Channel team, the EE Communities team piloted the implementation of the door-to-door blitzes in gas-only areas and in testing new approaches to getting customers to act sooner on their signups for the program by having day-of or next-day appointments. More details on these piloted approaches can be found in the Dealer Channel section.

In mid-2016 the EE Communities team launched the pilot of a new Powerful Partnerships program to strategically leverage PSE's corporate giving dollars to reach more customers with information about Energy Efficiency programs and services. As part of this partnership, the team engaged with a few outside organizations to bring forward program information to their employees, clients, donors, volunteers and other audiences through social media, newsletters, tabling at events, conducting volunteer efforts and other applicable avenues.

The team partnered with five local organizations throughout the service area to test the concept in order to design the program for 2017. This stronger partnership with the local organization allowed for a more targeted message to reach their audiences and increased the other voices talking about PSE's programs to customers.

In order to more directly target the hospitality industry with the applicable programs, the team assisted in a door-to-door outreach initiative to bring information on these programs to customers in Skagit County. The team connected with more than 50 customers to directly promote these programs.

e. Key Variance Drivers

The EE Communities team underspent its budget in 2016 due mostly to staffing vacancies. A key team member was away on Jury Duty for three months, during which time she was only charging a few hours per week to the EEC order numbers. The team also had several staffing changes throughout the year, including three team members leaving the department or the company which resulted in the corresponding vacancy time while the supervisor worked to fill the roles.

G. Trade Ally Support

Trade Ally Support manages PSE membership costs in Energy Efficiency (EE) trade associations. These organizations stand apart from other trade memberships managed in individual Energy Efficiency programs in that they provide comparatively broad-based EE research, training and/or implementation support services.

1) Description

Trade Ally Support organizations provide education, information and related services for:

- The adoption or expansion of energy-efficiency products, services, and practices; and
- Conducting research toward the development of new, or improved validation or delivery of existing conservation measures, programs and services.

The Trade Ally Support line item budgets and tracks only annual membership dues or Energy Efficiency services subscriptions PSE pays to broad-based industry trade and research organizations who perform and support ongoing development and implementation of Residential and Business Energy Management programs. PSE participates in and utilizes the services of many such organizations to support delivery, management, and promotion of energy efficiency services. Utility, customer, and service provider benefits primarily include education and information exchange on end-use technologies, energy legislation, efficiency services, and related industry trends.

Other Trade Ally expenses not related to dues, for example conference attendance by PSE Energy Efficiency staff, are budgeted and tracked with the pertinent efficiency program(s) receiving the benefit.

2) Memberships and Subscriptions

As discussed in Chapter 10: *Measurement & Verification*, PSE applies a great deal of rigor to ensure that Conservation Rider customer funds are used appropriately to add value to Energy Efficiency conservation offerings when considering memberships.

Memberships paid from the Trade Ally Support account in 2016 focused mainly on local or regional conservation efforts. 2016 memberships included:[46]

- Association of Energy Services Professionals – AESP,
- Building Owners and Managers Association of Seattle & King County – BOMA,
- China-U.S. Energy Efficiency Alliance,
- Consortium for Energy Efficiency – CEE,
- Electric League of the Pacific Northwest,
- Energy Solutions Center – ESC,
- Northwest Energy Efficiency Council – NEEC,
- Washington Association of Maintenance and Operation Administrators – WAMOA.

PSE also enhanced its resources by subscribing to eSource in 2016. This extensive industry database provides an additional insight for program staff to ensure that they maintain awareness in utility and efficiency developments. 2016's subscription included additional tools for technology assessment and eliminated access to customer journey mapping tools (essentially, a process flow diagram of the customer experience with a utility).

[46] These are included in Exhibit 1, Supplement 3 of this report, which provides a high-level view of 2015 expenditures for memberships and sponsorships.

H. Contractor Alliance Network

The Contractor Alliance Network (CAN) connects PSE customers with pre-screened, independent contractors committed to helping customers make safe, dependable and efficient energy choices. This ensures their business and home energy improvement projects are successful and handled with a high level of customer service.

1) 2016 Program Review

In 2016, the Contractor Alliance Network (CAN) had 226 member contractors enrolled in the network. These contractors were responsible for closing almost 6,500 customer referrals which generated over $7.4 million in project costs for contractors installing energy efficiency equipment.

Another key focus of 2016 was the development of a trade ally network and associated strategy. This strategy is aimed to reach a broader range of trade allies who participate in, or are associated with the delivery of energy efficiency measures. These allies will include contractors, manufacturers, retailers, distributers, builders, and others. The goal of broadening the program's reach is to communicate, train, and educate all entities involved with Energy Efficiency programs and provide greater accessibility and communication paths to and from PSE.

a. Program Accomplishments

In 2016, the program team focused on development and implementation of a new trade ally portal. The new portal will allow the program to reach a larger number of contractors with regular communications, training opportunities, and program resources. For current CAN members, this portal will also provide improved visibility into customer referrals, rebates, and network performance.

The program team also focused on hosting contractor roundtables with each sector of contractors enrolled to participate in the program. Through these roundtables PSE was able to gain a better understanding of concerns or struggles that its contractors may have so program staff can better design the program to increase ease of participation.

b. Hard-to-Reach and/or Proportionately Underserved Segments

In 2016, the Contractor Alliance Network team, in collaboration with program staff, supported the addition of Manufactured Home Weatherization measures as a referred product in the portfolio. The inclusion of these measures for CAN members provides greater accessibility and market rate options for customers in Manufactured and Mobile homes who need solutions to improve the efficiency and comfort of their homes.

c. Key Variance Drivers

The CAN natural gas revenue variance is primarily a result of three separate issues. (1) Accounting for CAN Referrals is aligned with product type according to set electric-versus-natural gas ratios, resulting in some natural gas revenues being assigned to electric order numbers. (2) Overall, the Single Family sector experienced a reduction in natural gas products referred and projects closed—especially in single family natural gas heating. (3) Program staff are researching the potential that there may have been some unreported referral fees in Q4 2016. Associated projects will be vetted and reported in the 2017 program year.

It is important to note that all CAN revenue reported is accurate, and integrated into the annual Conservation Rider (Schedule 120) filing—decrementing the expenses paid by PSE ratepayers.

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XII. EFFICIENCY RESEARCH & COMPLIANCE

A. Overview

Functions of this group include:

- Conservation Supply Curves,
- Strategic Planning,
- Market Research,
- Verification Team,
- Program Evaluations.

In addition to playing a critical role in Energy Efficiency's overall measurement and verification functions, the work of these teams assists Energy Efficiency Program staff in designing innovative conservation offerings, evaluating processes and savings calculations, verifying cost-effectiveness, and building the Company's biennial IRP. They ensure that there is a regular schedule of program performance review, consistent with applicable conditions. It is notable that the Program Support organization's name evolved in 2016 from Program Development & Support to its current name. Table XII-1 provides a 2016 summary of expenditures for the Research & Compliance group.

Table XII-1: Research & Compliance 2016 Expenditures

2016 Expenditures				2016 Budget
Schedule	Programs	Total	% of Budget	
Electric	Electric			Electric
Gas	Gas			Gas
	Conservation Supply Curves	$ 338,001	76.7%	$ 440,752
	Strategic Planning	$ 108,174	76.8%	$ 140,934
	Market Research	$ 152,013	54.0%	$ 281,703
	Program Evaluation	$ 1,409,561	77.8%	$ 1,810,699
	Verification Team	$ 376,344	91.7%	$ 410,403
	BECAR	$ 116,220	166.0%	$ 70,000
	Total Electric	**$ 2,500,313**	**79.3%**	**$ 3,154,491**
	Conservation Supply Curves	$ 49,434	75.1%	$ 65,860
	Strategic Planning	$ 15,452	73.4%	$ 21,059
	Market Research	$ 22,298	53.0%	$ 42,094
	Program Evaluation	$ 208,469	77.0%	$ 270,564
	Verification Team	$ 74,272	68.2%	$ 108,960
	Total Gas	**$ 369,924**	72.7%	$ 508,537

B. Conservation Supply Curves and Strategic Planning

The purpose of the Conservation Supply Curve function is to complete a Conservation Potential Assessment for the company's Integrated Resource Plan (IRP). The

1) Description

The purpose of the Conservation Supply Curve function is to complete a Conservation Potential Assessment for the company's Integrated Resource Plan (IRP). The Conservation Potential Assessment identifies the amount of energy savings potential that is technically and economically achievable over the 20-year planning horizon of PSE's IRP. The IRP, which is filed every two years, is the basis for PSE's electric and natural gas energy resource acquisition strategy, as well as the targets for its energy efficiency programs. The IRP analysis is also used to derive the ten-year conservation potential and two year electric conservation target required to comply with the Washington Energy Independence Act.

PSE's next IRP and Conservation Potential Assessment are due in 2017. The Company will conduct an assessment of the long-term market potential for electric and natural gas energy savings from energy efficiency and other demand-side resources, covering the twenty year period 2018-2037. PSE anticipates continued use of a consultant to perform the analysis. The budget includes costs to complete the conservation potential assessment and incorporate the results of that assessment in the resource portfolio analysis. This analysis will be a key component for establishing program savings targets for 2018-2019.

The Strategic Planning function conducts a variety of research studies and analyses to support regulatory compliance proceedings and other strategic initiatives.

The Strategic Planning function is responsible for providing support and guidance to a variety of regulatory and other strategic initiatives. Responsibilities include regulatory compliance filings, federal and state legislative review, policy analysis, or other strategic efforts related to energy efficiency.

2) 2016 Accomplishments and Activities

Navigant Consulting was selected to conduct the Conservation Potential Assessment for the 2017 Integrated Resource Plan (IRP), through a competitive bidding process. Navigant completed a draft assessment of achievable technical potential in 2016, which, when finalized, will be used to determine the amount of economic potential in the company's IRP.

The Strategic Planning function provided management and oversight activities, supply curves, end use data and research needs, and legislative review. In October, Strategic Planning also assumed responsibility for supervising the program evaluation and cost effectiveness functions.

Spending for Conservation Supply Curves was 24 percent less than the budget due to lower expenses in Outside Services. This is a result of timing, where some consultant work performed in 2016 was not billed by year-end. The underrun due to unbilled 2016 work was partially offset by additional expenses for consultant work performed in 2015, but paid in 2016.

Strategic Planning expenditures were also below budget by 24 percent, due to lower than planned expenses for labor and associated overheads.

C. Market Research

Market Research conducts a variety of research studies and analyses to support program design, marketing strategies, and development of effective program promotion and customer communications for energy efficiency.

1) Description

The focus of the Market Research function is on acquiring information about customers that is relevant for the development of energy-efficiency programs, educational materials, and promotional campaigns that will be effective in encouraging program participation.

Through various techniques such as surveys, focus groups, and analysis of existing databases, Market Research provides understanding of customer perceptions, motivations and barriers to adoption of energy-efficient applications and behavior, as well as tracking customer awareness of program offerings and satisfaction with non-program specific education and information services. Market Research is also called upon for analysis of localized characteristics, attitudes, behavior, and energy usage trends, necessitating more geographically targeted research. Market Research expenses are driven by the customized nature of the work and the large sample sizes required in quantitative studies for results to be valid for multiple market segments and geographic areas.

The Market Research staff works closely with program evaluation, marketing communications, and program implementation staff to identify research needs that support the effective development, delivery, and evaluation of energy efficiency programs. These research needs are then coordinated and leveraged to result in a slate of research projects that are responsive to internal client needs, eliminate duplication of effort, and are cost-efficient.

PSE's conservation market research activities are divided into two basic components:

Baseline Research with Broad Applications: This type of research provides foundational information about PSE customers that will be a common source of knowledge for the general planning and design of all energy efficiency programs and promotional campaigns.

Application-Specific Research: This research is focused on specific programs or promotional initiatives. It includes research that supports specific energy efficiency program promotion and communications campaigns, such as message testing, target markets, and campaign effectiveness studies. Other research efforts will be focused on tracking customer satisfaction with information services, such as the Energy Advisors. Finally, research may be conducted to provide customer input on the design and implementation of specific programs, primarily using qualitative methods such as focus groups.

2) 2016 Results

In 2016, PSE Energy Efficiency Market Research efforts focused on: customer awareness of PSE energy efficiency offerings; preferred communication channels regarding energy efficiency products & services; and Customer satisfaction with PSE energy efficiency program details such as rebate submission and payment mechanisms. Energy Efficiency Market Research also participated in a number of spatial analyses to support energy efficiency programs.[47]

a. Program Accomplishments

In 2016, the organization:

- Provided a dashboard standardizing satisfaction and performance across EES residential programs to guide program management throughout year. Comprehensive surveying of residential customers that either called for a referral of products and services offered, or participated and received a rebate.
- BEM Program Surveys – Designed and forwarded surveys to participants of Commercial/Business programs. Completed surveys continue to be returned at a slow pace at the beginning of 2017.

[47] Spatial Analysis is researching the distribution of conditions across PSE's service area. The variables could be: income level, education level, housing type, or age of housing. This past year, PSE examined questions for EES program staff through spatial analysis looking at the questions:

- Where are the low income/hard to reach customers located within the service area?
- What proportion of program delivery occurred in these areas?
- Where can EES market effectively to these customers?

- (DSMc) Web Rebate Improvement – User Testing research to improve the online formatting and presentation of rebate information, clarity in the steps completed, and confirmation when process is completed.
- Conducted survey and provided baseline and monitoring metrics for the Energy Efficiency Services "Upgrades" campaign to gauge whether it raised awareness of PSE Energy Efficiency offerings.
- Provided support to the Energy Efficient Communities campaign through GIS[48] analysis of appropriate scale of door to door and mailing campaigns for specified residential areas within PSE's service area.
- Value LED Bulb Survey – Determine whether there's a preference for less-expensive "value" LEDs and what LED features are desired relative to price
- A number of smaller ad-hoc projects supporting specific inquiries into energy efficiency program attributes, technical support for survey design and data dashboards.

b. Hard-to-Reach and/or Proportionately Underserved Segments

- Provided technical support to EES Evaluation and Low-Income programs using a GIS tool to target low-income energy efficiency opportunities in Whatcom and Island Counties.
- Conducted low-income customer interviews to learn pain points in assistance application and potential qualification for low-income weatherization assistance.
- Provided analysis of dispersion of multi-family retrofit programs across lower income census block groups as a proportion of PSE's greater service area.

c. Adaptive Management

Several of the organization's accomplishments listed in the previous section were the result of staff's continuous improvement adaptive management efforts. In addition to those listed, the team provided a suggestion that low-income weatherization consider a train the trainer approach with social service/community of faith organizations within targeted low-income geographies for possible program uptake improvement over postcard mailers.

[48] Geographical Information System; used to perform spatial analysis.

d. Key Variance Drivers

Market Research was planning to hire an additional staff member in 2016, and held a portion of its budget accordingly. After several interviews, management was unable to identify a candidate with the desirable skills to fill the position from the pool of applicants. This resulted in the function's 2016 budget variance. A portion of the budget for outside services was reserved for the purchase of third party market data, which was not spent in 2016.

D. Program Evaluation

This organization is a key element of PSE's overall Evaluation, Measurement & Verification (EM&V) initiative. PSE Evaluation staff are committed to the evaluation of energy savings and the continual improvement of energy-efficiency service delivery to customers.

1) Description

PSE program implementation teams work together with the Evaluation Team to inform the development of evaluation scopes of work. The Evaluation Team then develops and maintains a strategic evaluation plan, in accordance with the guiding Evaluation Framework, ensuring that all programs receive review on a four-year cyclic basis. PSE also considers the level of energy savings, significant program changes, and whether a program is new or never been evaluated before in prioritizing programs for evaluation. Adjustments to the evaluation plan may be made during the biennium, with CRAG review and advice.

PSE frequently shares the results of its evaluations with the RTF to ensure continuous improvement of measure energy savings values that are widely used in the region. In addition, PSE monitors the Regional Technical Forum (RTF), NEEA, and the Northwest Research Group (NWRG), as well as directly reaching out to neighboring utilities, for opportunities to collaborate on common evaluation needs.

Along with UTC Staff, the Evaluation Staff managed the 2014-2015 Biennial Electricity Conservation Achievement Review. The cost of the independent third party consultant was lower than anticipated to complete the planned scope of work in 2015.

2) Evaluation Studies

The Evaluation Team completed the following evaluations in 2016:

Residential

- Home Energy Reports
- Multifamily Retrofit

Commercial//Industrial

- Commercial HVAC
- Data Centers
- Commercial Lighting
- Large Power Users

Additional evaluation activities under way in 2016 were:

- Urban Smart Bellevue Evaluability Study
- Small and Medium Business Design
- Multifamily Air Seal Pilot Evaluation

The Evaluation team also developed and released requests for proposal for evaluations of the following energy efficiency programs to be completed in 2017:

- New Construction
  - Residential New Construction
  - C&I New Construction
- Resource Conservation Manager
- Commercial Rebates

3) 2016 Activities and Accomplishments

In addition to the evaluation studies listed above, work began on the 2016-2017 Biennial Electric Conservation Achievement Review (BECAR). SBW Consulting was selected through a competitive bidding process to conduct the 2016-17 BECAR. Review of PSE-deemed unit energy savings used in 2016 was completed and a memo summarizing the results was shared with Commission staff.

4) Pilot-Like Initiatives

Findings from the MFAS Pilot Study enabled PSE to establish uniform savings values and contractor performance metrics, while significantly driving down the cost of program delivery. These improvements in program delivery and cost will enable PSE to expand energy efficiency service to customers in the hard-to-reach Multifamily sector.

The group also conducted a year-one evaluation of a pilot test of a new approach to recruiting HER participants. The recruiting focused recruiting based on specific customer characteristics – High Energy Users, Electric-only customers, and Non-Rural. Results to date show that the HER accelerated behavior-based savings by those in the High Energy User category, and drove non-Urban customers to increase participation in other PSE energy efficiency programs.

5) Adaptive Management

In late 2015, the company implementing PSE's Business Energy Reports discontinued implementation services. In response, the Evaluation group, with program staff, sponsored research to identify new approaches to serve the Small and Medium Business sector.

The Evaluation group is also working with Business Energy Management to ensure that evaluability (the capability for evaluating savings from an energy efficiency program) is being built in to the Urban Smart Bellevue Program during its pilot phase. This will enable the Urban Smart Bellevue to collect performance and savings data to support timely and actionable evaluation results.

The Evaluation group initiated a review of the energy efficiency program portfolio to assess applicability and feasibility of implementing M&V 2.0 and real-time M&V principles in 2017 evaluations. The expected outcome of the review is an evaluation pilot designed to investigate the efficacy of M&V 2.0 principles compared to traditional M&V principles.

6) Key Variance Drivers

Evaluation spending was 22 percent below budget primarily because of timing issues with Outside Services. The budget for 2016 assumed that all evaluation studies started in 2016 and were completed by year-end, when actually most studies will carry into 2017. The underrun from 2016 evaluation studies was partially offset by consultant expenses for evaluation studies that continued from 2015, as well as sponsorship payment for the Regional Technical Forum.

BECAR expenses were higher than expected as a result of consultant review of PSE-Deemed unit energy savings being moved up. In prior reviews, the review of PSE Deemed measures occurred in the year following the Annual Report. This however, shortened the timeframe for PSE to make any necessary adjustments if there were any findings. In this biennium, the consultant reviewed 2016 PSE Deemed measure *in* 2016, rather than 2017.

E. Verification Team

Energy Efficiency's Verification Team serves as another key element of its EM&V efforts. The Verification Team provides PSE program staff with an overarching process to improve the quality of program implementation and validate energy savings with a high degree of rigor by incorporating higher levels of measurement and verification activities.

As the "V" in EM&V, PSE's Verification Team performs on-site inspections and confirmations of randomly-selected participating homes and businesses to assure energy efficiency measures are properly installed. Combined with other Evaluation and Measurement functions, the Verification Team seeks to secure both confidence in claimed energy savings and improvements in program quality.

The "Measurement & Verification: Policies, Guidelines, Protocols & Processes" document introduces M&V protocols to be used across the Energy Efficiency functions.

1) Composition

The Verification Team consists of three quality assurance specialists and one business analyst. The QA verification inspectors are responsible for conducting on-site inspections and related activities to verify installation of Energy Efficiency measures for rebated equipment. This team confirms installed measure quantities, model numbers, site qualifications, equipment settings, and other related installation parameters through review of primary documentation, phone surveys, and onsite inspections.

Energy Efficiency measures include those installed and reported by trade allies, PSE contractors, and other third parties. The team's Business Analyst is responsible for data and systems, forecasting and working closely with Energy Efficiency program staff on a regular basis. The Business Analyst is also responsible for preparing the reporting, tracking, and communicating program findings and other related information from the field verifications to the program staff.

2) Objective

The team strives to positively contribute to program quality implementation and validate energy savings by combining detailed and documented statistical methods of analysis and sampling[49] with individualized field inspection protocols and documentation requirements tailored to each specific program.

Additionally, the Verification Team assists with other quality assurance interests in residential and business efficiency programs; including non-random visits and reviewing retail stores' advertisements and inventory in the stores. Non-random visits, typically performed at the request of program managers for case-specific interests, are considered quality assurance reviews, and may also result in documented findings for program management follow-up.

When performing onsite inspections, QA verification inspectors routinely engage customers in several Energy Efficiency elements about which the customer may not have been aware. For instance, the QA verification inspector may provide a referral to a CAN contractor, alert the customer that they may be eligible for a weatherization rebate, etc. These efforts lead to increased customer satisfaction and raise customer awareness.

3) 2016 Team Accomplishments

The Verification Team completed over 1,700 site and phone verifications for over 23 unique energy efficiency programs; both residential and commercial. In addition, the team began to take on site verifications for PSE's single-family weatherization program, which had previously been the responsibility of a third-party contractor. All of this was accomplished while the team's usual three- person field staff was down to two individuals for three months of the year.

Table XII-2 represents on-site project inspections completed by the Verification Team through 2016. It is important to note that verification by a home, project, business or dwelling can involve a significant number of individual measures.

[49] Sampling methods for randomly identifying measures or projects for verification, and a sampling tool to determine sample size for verification of each program was developed in collaboration with DNV KEMA and deployed throughout 2015.

Please note that PSE rounds the indicated figures to provide a sense of scale and scope. The figures are not comprehensive; only key highlights are indicated. They are not intended to be comprehensive or used for audit purposes.

4) Adaptive Management

With such a vast service territory, often times it was challenging to schedule jobs within the same geographic location on the same day. The Verification Team worked with its third-party scheduling contractor (based in Portland, Oregon) to help the contractor better understand PSE's service territory. This helped to plan appointments according to realistic travel times, and continue to meet customer and program needs.

5) Pilot-Like initiatives

In 2016 the Verification Team began discussions on the possibility of implementing a "virtual verifications" pilot. The details of the pilot proposal will be finalized in 2017. The goal of the pilot program is to provide PSE customers with a "virtual" option to complete program verifications by using a "smart" device (phone or tablet) that is capable of using virtual software applications (for instance, FaceTime or Skype) that will allow the team's Quality Assurance Specialists to walk a customer through the verification process. A similar program is currently being implemented by Tacoma Power.

Table XII-2: Summary of Verifications by Measure Type

Measure Category	Count
Business Lighting Program	60
Commercial Cooking Equipment	20
Ductless Heat Pump	120
Ductless Heat Pump- Manufactured Homes	10
Forced Air Furnace to Heat Pump Conversion	60
Fuel Conversion	30
Gas Boiler	20
Gas Furnace	180
Gas Fireplace	80
Heat Pump Water Heater	120
Heat Pumps	200
Heat Pump-Lockout Control	80
High Efficiency Heat Pump & Air Conditioner	10
Hospitality Rebates	3
Integrated Space & Water Heat	20
Multifamily Retrofit	4
Refrigerator- New	4
Refrigerator- Replacement	30
Recycling Program	140
Single Family Weatherization- Windows	160
Single Family Weatherization- Insulation	370
Small Business Direct Install	60
TOTAL VERIFICATIONS	1,800

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XIII. OTHER ELECTRIC PROGRAMS

A. Overview

There are four electric Energy Efficiency programs for which conservation savings are not claimed: Net Metering, Energy Renewable Energy Education and the Electric Vehicle Charger Incentive programs. Net Metering and Renewable Energy Education primarily focus on customer-side generation, including solar, wind, anaerobic digesters (bionatural gas, etc.) and small-scale hydro. These systems are smaller than five megawatts (MW).[50] Only Other Electric Programs are excluded from Energy Efficiency's cost-effectiveness calculations.

1) Sector Performance

Table XIII-1 provides a 2016 summary of expenditures and energy savings for Other Electric Programs.

Table XIII-1: Other Electric Program 2016 Expenditures

		2016 Expenditures		2016 Budget
Schedule	Electric			Electric
E150	Net Metering	$ 997,663	109.4%	$ 911,904
E195	Electric Vehicle Charger Incentive	$ 650,724	76.2%	$ 853,682
	Demand Response	$ 170,905		
	Total Electric	**$ 1,819,291**	103.0%	$ 1,765,586

[50] Larger systems fall under the considerations of PSE's Schedule 91: Cogeneration and Small Power Production.

B. Net Metering

Schedule E150

PSE's Net Energy Metering (NEM) program provides interconnection services for qualifying customer-generators in accordance with State legislation enacted into law in February 11, 1999 and amended June 8, 2000 (see RCW 80.60).

1) Description

PSE provides interconnection services to qualifying Customer-generators who operate fuel cells, hydroelectric, solar, wind, or bionatural gas generators of no more than 100 kilowatts (kW). PSE must offer at least 22.4 Megawatts (MW) of cumulative nameplate generating capacity under this Schedule, of which no less than 11.2 MW of cumulative nameplate generating capacity shall be attributable to renewable energy net metering systems that use as a fuel either solar, wind, hydroelectric power, or biogas from animal waste. In 2014, capacity moved from 11.2 to 22.4 MW. Customer generation can be used to offset part or all of the Customer-generator's electricity use under Schedules 7 through 49 of Electric Tariff G.

At the time a customer enrolls in the Net Energy Metering program, they are also provided the necessary information to receive annual benefits from the Production Metering, or Renewable Energy Advantage Program (REAP) , which is the state's performance based incentive described in Schedule 151.

While the schedule applies to customers who operate fuel cells or hydroelectric, solar or wind generators of no more than 100 kW, in 2015, over 99 percent of net metering systems were solar PV with a median size of 6.7 kW.

No direct customer incentives are provided by PSE as a part of these programs. As described in the following section, the Conservation Rider only funds administrative expenses, as provided by the indicated requirements.

Energy produced by customer-generator systems directly reduces energy used in the home or business from the grid. When energy generated exceeds home or business electrical loads, the excess energy flowing to PSE is separately metered and credited to the customer at the retail rate.

The Net Metering Program's year runs May 1 to April 30. Any excess credit each month is rolled forward to the following month. When the new program year ends on April 30, the credit is reset to zero.

2) Net Energy Metering Expenses

The 2002 Stipulation Agreement, Exhibit F, UE-011570 and UG-011571, Section H.25 provides the authority for PSE to charge reasonable Net Metering administrative costs to its Conservation Rider:

> "Tariff-rider funds shall only be used on programs and their associated administrative costs that result in energy savings through Energy Efficiency investments or fuel switching. This may include reasonable administration costs for PSE's net metering program."

Further, in January 1999 the UTC issued an accounting order under docket No. UE-990016 which requires the collection of unbilled distribution costs from all customers through Schedule 120.

3) Program accomplishments

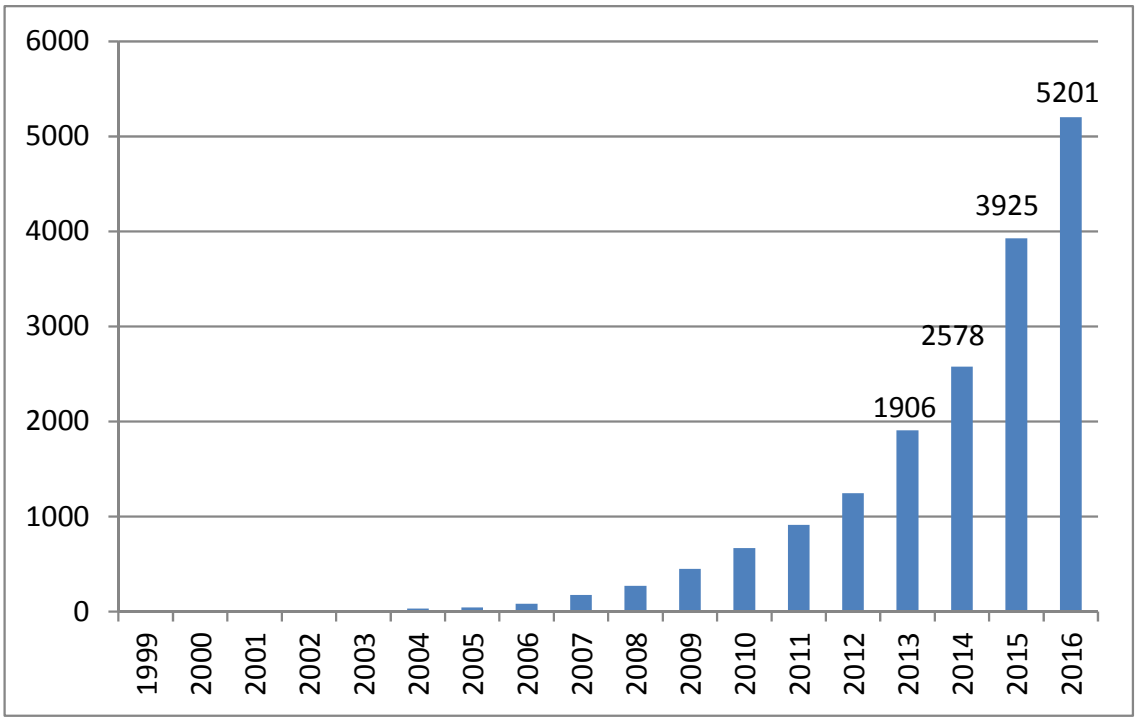
The program grew at a rate of nearly 36 percent in 2016, with the addition of over 1,300 new customers, which is equal to growth in 2015. Even with a consistently high level of growth, PSE has been able to maintain service levels – interconnecting customers in under 10 days from receipt of the completed application. This is in large part due to the implementation of an online interconnection software tool known as PowerClerk. PSE began rolling out the new tool with a small group of installers in late August, and completed the roll out with installers by early October. Between the launch and the end of January, over 600 applications had been processed through the tool – resulting in greater customer transparency & process efficiencies.

Figure XIII-1 provides a look at the historical growth of the program.

4) Adaptive Management

In the third quarter of 2016, PSE launched a new online interconnection tool, known as PowerClerk®, for customer-owned net metered systems. The tool streamlines the interconnection application process, and provides greater visibility into the status of an application for installers and customers. In the last two quarters, installers submitted, and PSE processed over 600 applications through the new tool. Program staff have already seen fewer errors, a reduction in paper, and a decrease in the time required to process each application.

Figure XIII-1: Net Energy Metering Customer-Generators, 1999-2016



C. Production Metering

Schedule 151

PSE's Renewable Energy Advantage Program provides qualifying Customer-generators with production payments in accordance with State legislation WAC 458-20-273. PSE receives tax credits for renewable production payments, as outlined in RCW 82.16.

Production Metering is operated in conjunction with, and in addition to, the Net Metering program. At the time a customer enrolls in the Net Metering program, they are also provided the necessary information to receive annual benefits from Production Metering when enrolling with a qualifying renewable energy technology. Rapidly accelerating solar installation numbers, the adoption of Washington-made solar equipment, and higher production, have led to PSE exceeding its payment cap for the 2015-2016 payment year.

Following the rules of the state law governing the program, PSE had to reduce payments by 7 percent in order to come in under the $10 million cap for production payments in the 2015-2016 production year. Given no change to that law, PSE will continue to adjust the fiscal year 2017 payments to all customers in order to remain under the $10 million annual limit as prescribed by state law.

D. Electric Vehicle Charger Incentive

Schedule E195

PSE's Electric Vehicle Charger Incentive program (EVCI) is a pilot program to study charging use in PSE's electric service territory. The program collects data on charging behavior and patterns for PSE electric customer charging their electric vehicles at home, and compares this information against PSE's other load shapes and resources. Customers driving electric vehicles are provided a $500 incentive towards the purchase of a Level 2 charger for their home as an incentive to participate in the program and use Level 2 charging, which is more energy efficient than Level 1 charging.

1) 2016 Accomplishments and Activities

As of the end of 2016, there are an estimated 20,000 electric vehicles registered in Washington State, with approximately half of those in PSE's electric service territory. Most of which have been registered in the past four years. Some customers are known to be using Level 1 charging, which is a wall outlet, while others are using Level 2 charging at home, which uses specific charging equipment that can use between 3 and 19 kW of power.

EVCI monitors the electric use of customers with electric vehicles to determine the amount of load and load shape that electric vehicles place on PSE's system, compare these loads to PSE's other loads and resources, and identify impacts to peak load on the system. Data collection is occurring using multiple sources including PSE's existing meter system and data loggers. PSE has started whole-house interval data collection for over 1000 customers. In 2016, PSE completed data logger installations at 46 homes to specifically monitor just the EV chargers to compare that with whole home usage. PSE also issued an RFI for electric vehicle chargers in 2016 and received 18 responses.

In 2016, the UTC issued Docket UE-160799, which discusses the role of utilities in providing electric vehicle charging services. In Docket UE-160799, the UTC has issued a draft policy statement, with comments due on March 31, 2017. In order to provide continuity for customers until then, PSE and UTC Staff agreed to extend customer enrollments until April 1, 2017.

E. Demand Response

Schedule E271, E249a

PSE's 2015 IRP identifies a capacity shortfall. Before any additional demand-side resources, peak capacity need in the base case is almost 900 MW by 2021 and over 2,700 MW by the end of the planning period. The 2015 IRP forecasts acquiring 121 MW of demand-response by 2021. Cost-effective levels of demand-response were found to be consistent across nearly all tested scenarios.

In the Action Plan for the 2015 IRP, PSE committed to developing and executing an acquisition process focused on demand-response separate from other resources.

The solicitation/acquisition process may reveal costs or attributes different from those assumed in the IRP, and this could lead to adjusting the amount of demand-response acquired up or down. Changes to resource need are driven by updates to the long-term load forecast and revisions to the regional resource adequacy analysis may also affect the quantity of demand-response.

PSE released two RFPs in September 2016 after approval from WUTC. The RFPs targeted technology and implementation services for Direct Load Control (DLC) for residential and small/medium business customers and Commercial/Industrial Demand Response. The primary objective stated in the RFPs was to achieve PSE's winter load reduction target of at least total 121 MW by 2021, including roughly 70 MW of load curtailment from residential and small/medium business customers and 51 MW of load curtailment from C&I customers.

PSE received 10 proposals for technology and implementation services for Direct Load Control, and 8 proposals for Commercial/Industrial demand response. A broad internal stakeholder group scored all proposals. Analysis and final vendor selections will take place in 2017.

For pagination consistency, PSE purposely left this page blank.

XIV. 2016 COMPLIANCE

By the end of 2016, PSE achieved significant progress in meeting its regulatory requirements, including laws, rules, Commission Orders, CRAG requests, and conditions. This chapter presents an overview of PSE's compliance with conservation-specific requirement deliverables provided in 2016.

A. RCW 19.285

In 2016, consistent with RCW 19.285.070(1), the Company filed its 2014-2015 Biennial Conservation Report with the Commission and provided a copy to the Washington State Department of Commerce on May 31, 2016. PSE collaborated with CRAG members and Commission staff to adjust the Department's EIA report, so that it represented the full breadth of biennial conservation achievements more uniformly, providing for easier reconciliation between figures reported to the Department and the Commission.

B. WAC 480-109

PSE complied with all applicable WAC 480-109 requirements in 2016. Key among these are the requirement to provide the CRAG with drafts of all conservation filings 30 days in advance, CRAG meeting frequency, and the annual reporting and annual planning filings timeframes.

C. Commission Orders

PSE seamlessly incorporated the updated 2016-2017 conditions, outlined in Attachment A of Order 01 in Docket No. UE-152058. These are the first set of conditions that reflect the updated WAC 480-109 requirements by removing duplicate deliverables (for instance, reporting and CRAG terms).

D. 2016 Compliance Results

PSE tracks and reports compliance with Commission requirements outlined in the documents listed in Table XIV-1. In addition to notations and references in PSE's reporting and planning compliance filings, Energy Efficiency's key compliance reporting vehicle is Exhibit 9: *Requirement Compliance Checklist*.

Each requirement type (according to Docket No.) is highlighted in a different color in Exhibit for easier reference.

Several key deliverables that were satisfied in 2016 are highlighted in Table XIV-2. Please note that PSE only listed key or significant deliverables satisfied. Exhibit 9 contains the comprehensive list of satisfied requirements.

Table XIV-1: Tracking Compliance Requirements

Requirement Documents Tracked in Exhibit 9: Condition Compliance Checklist			
Docket Number	Name	Pertains To	Exhibit 9 Color Code
UG-011571	2001 General Rate Cast, Exhbit F to Settlement Stipulation	Original set of conservation conditions; only natural gas requirements now apply.	Lime
U-072375	Multiparty Settlement Stipulation	2008 Merger Agreement: two low-income requirements pertaining to conservation.	Lilac
UE-100177	Conditions for Approval of PSE's 2010-2011 Conservation Targets and Settlement Terms	2010 electric settlement agreement: Sections A - J and L still apply.	Green
UG-121207	Commission Policy Statement on the Treatment of Natural Gas Cost-Effectiveness	Three recommendations for IOUs.	Blue
UE-121697 and UG-121705 (consolidated) and UE-130137 and UG-130138 (consolidated)	Order Granting Decoupling Petition	Two conservation-specific requirements.	Orange
UE-131723	WAC 480-109 revisions	2015 requirements updates.	White
UE-152058	Order 01 Appendix A	2016-2017 conditions.	Yellow

Table XIV-2: Highlights of Key 2016 Completed Requirements

Section	Requirement, UG-011571	Applicable Compliance Vehicle
H.21	Completed -- Annual budgets will be built up from the bottom.	2017 Exhibit 1: Savings and Budgets
H.25	Completed -- (Rider) funds may include reasonable administration costs for PSE's net metering program.	2017 Exhibit 1: Savings and Budgets
Section	**Requirement, UE-100177**	**Applicable Compliance Vehicle**
C.6	Completed -- In general each individual energy efficiency program shall be designed to be cost-effective.	2017 Exhibit 2: Cost-Effectiveness Estimates
F.11	Completed -- The annual budget of the program will be built up from the bottom.	2017 Exhibit 1
G.14	Completed -- PSE will continue to honor Commitments 22 and 23 from U-072375 with regard to future funding levels.	2017 Exhibit 1
Section	**Requirement, UE-130137 & UG-130138**	**Applicable Compliance Vehicle**
pgs. 76, 77, ¶178	Completed -- PSE will add $500,000 in Rider funding and $100,000 shareholder funding annually to its Low Income Weatherization program	2017 Exhibit 1, LIW program detail pages
Section	**Requirement, UE-121697 & UG-121705**	
pg. 17, G.31	In progress -- PSE will agree to achieve electric conservation 5 percent above the Commission-approved biennial target.	Exhibit 1, "Building the Electric Target"
Section	**Requirement, UE-152058**	**Applicable Compliance Vehicle**
(4)(a)	Completed -- PSE must submit annual budgets that include program-level detail	2017 Exhibit 1
(5)	Completed -- PSE must maintain its program descriptions on file with the Commission.	2017 Exhibit 3: Program Details
(6)(c)	Completed -- PSE must spend a reasonable amount of its conservation budget on EM&V.	2017 Exhibit 1, line bl indicates EM&V budget amount
(7)(c)	Completed -- Puget Sound Energy may spend up to 10 percent of its conservation budget on programs whose savings impact has not yet been measured	2017 Exhibit 1, line bi indicates non savings-specific anticipated spending
Section	**Requirement, WAC 480-109**	**Applicable Compliance Vehicle**
100(5)	Completed -- A utility must use unit energy savings values and protocols approved by the regional technical forum [sic], unless it is based on reasonable analyses and evaluations.	2017 Exhibit 5: Prescriptive Measure Savings Values
100(10)	Completed -- A utility may fund low-income measures based on TREAT models that achieve an Savings to Investment Ratio of 1.0.	2017 ACP Overview, page 61
110(2)	Completed -- A utility must meetin with its advisory group at least four times per year.	2016 CRAG meeting summary notes.
120(2)	Completed -- On or before November 15th every even-numbered year, a utility must file with the Commission an annual conservation plan, containing any changes to program details and annual budget.	2017 ACP: Volumes 1 and 2

E. Exhibit 9: Requirement Compliance Checklist

Exhibit 9: Requirement Compliance Checklist demonstrates PSE's adaptive management through the application of TQM principles by providing Stakeholders with a single representation of compliance deliverables status. Exhibit 9 includes all electric and natural gas portfolio requirements, sorted by classification. PSE updated the Checklist in 2016 to reflect inclusion of the updated 2016-2017 conditions. The Exhibit is a "living" document. It is periodically updated and reconciled throughout its applicable biennium.

It is interesting to note that PSE classifies some requirements as "Standard Business Practice" in Exhibit 9. These requirements include obligations such as describing the need for line extension policies, requiring PSE to continue to honor Commitments 22 and 23 from U-072375,[51] describe the makeup of the Conservation Resource Advisory Group (CRAG), etc. They describe no set deliverable date, or have no specific CRAG role. Energy Efficiency routinely reviews these to ensure that there are no updates or revisions. Where there are none, the conditions are notated as "completed". In the attached Exhibit 9, these are noted in the "Deliverable Provided Date" column as "ongoing," or "No specific deliverable—ongoing business practice."

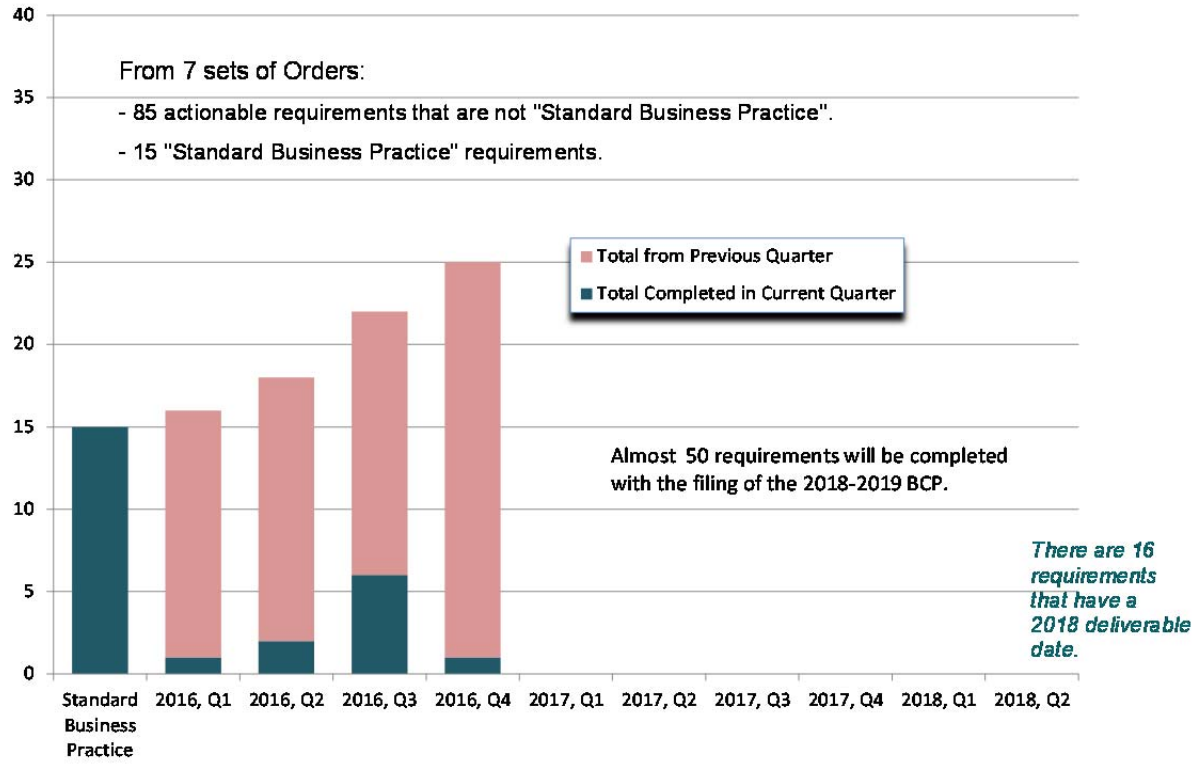
Readers may quickly ascertain the status of any deliverable through the use of these icons:

[51] This requirement is regarding funding levels for Low Income Weatherization programs in the 2008 PSE Merger Agreement.

Although it may appear that several deliverables are lagging at this stage of the biennium, it is noteworthy that, due to the nature of some deliverables, there are many requirements that aren't completed until the final quarter of the biennium.

Readers should not infer from this that PSE delays requirement completion until the end of the biennium; rather, many of these are "In Progress" (noted by the hourglass symbol in the iterative Exhibit 9 publications) throughout a portion of the biennium. One example is the requirement that PSE maintains its program details on file with the Commission in the same docket as the current BCP. Since PSE updates the "living" Exhibit 3 document regularly throughout the biennium, it doesn't classify the requirement as "completed" until the end of the biennium. Figure XIV-1 illustrates PSE's completion status of its biennial requirements mid-way through 2016-2017.

Figure XIV-1: 2016-2017 Requirement Completion Status



F. Compliance Controls

Energy Efficiency's application of compliance controls reflects its use of adaptive management through TQM. PSE sustains its emphasis on regulatory compliance throughout the biennium. Energy Efficiency management and staff regularly review and discuss regulatory requirements, whether RCW, WAC or Commission Orders.

Energy Efficiency staff consider compliance elements during CRAG meeting planning, staff meetings, and especially throughout the year-long biennial planning process. Energy Efficiency's regulatory compliance staff actively participate in planning functions, and ensure that program staff are familiar with tariffs and rules that pertain to their programs.

Regulatory compliance staff also monitor the compliance progress throughout the biennium and alert management of upcoming key deliverables to ensure that the deliverables are met in a timely fashion. In addition to the publication of Exhibit 9 throughout the year, the regulatory compliance staff also provides an annual calendar, with key regulatory deliverables highlighted for quick reference.

It is also important to consider that Energy Efficiency staff must also operate their programs within Company guidelines and policies; SoX reporting requirements, safety processes, cyber-security, and Purchasing department requisites, for instance.

The successful follow-through on several significant 2016 filings (the 2015 Annual Report, Schedule 120, Biennial Conservation Report, Petition for treatment of excess savings, the 2017 ACP, for example) is a reflection on Energy Efficiency's strict attention to regulatory requirements.

XV. 2016 STAKEHOLDER RELATIONS

PSE, along with its primary constituents, the Commission Staff and the Conservation Resource Advisory Group (CRAG) sustained the momentum that this Collaborative established in 2010. In keeping with PSE's emphasis on meeting customer expectations, Energy Efficiency staff continuously maximized the clarity, timeliness, and transparency of information provided to Commission Staff and the CRAG throughout 2016.

A key accomplishment was tailoring PSE's required filing documentation to the needs of its constituents. PSE received feedback, both directly and through casual reference, that its efforts were recognized and appreciated. Similarly, PSE recognizes that Commission Staff and the CRAG expended significant effort to understand, become involved with, and help resolve strategic and policy issues in 2016.

A. Washington Utilities and Transportation Commission

Energy Efficiency values its working relationship with Commission Staff and appreciates their level of thoroughness, thoughtfulness, and adaptability. PSE was able to complete its 2016 initiatives as a result of the cooperation between its Energy Efficiency staff and Commission Staff.

The following discussion outlines the key conservation-related UTC filings that PSE made in 2016. In the list, PSE presents the date and description of each filing the UTC Docket Number for straightforward reference.

All conservation-specific filings complied with WAC 480-109-110(3); CRAG members received draft copies of each of the filings[52] indicated in XIII.A.1 below.

[52] Schedule 120, PSE's cost-recover adjustment filing, is the exception, as also noted in WAC 480-109-110(3).

1) Energy Efficiency-Specific Filings

- February 26, 2016: Filed 2015 Annual Report of Conservation Accomplishments, UE-132043. Consistent with requirements in WAC 480-109-120(3), this report represented the evolution and continuous improvement in providing Energy Efficiency program accomplishments, activities, and value-add information for PSE's Stakeholders.

- March 1, 2016: Filed electric Schedule 120, UE-160265. Effective May 1, 2016, the updated Schedule 120 represents an average decrease of affected customer bills by 0.49%.

- March 1, 2016: Filed natural gas Schedule 120, UE-160267. Effective May 1, 2016, the updated Schedule 120 represents an average increase of natural gas affected customer bills by 0.3%.

- April 29, 2016: Filed an updated Exhibit 4-Measures, Incentives & Eligibility, UE-152058. This revision updated several measure offerings and eligibility criteria.

- May 31, 2016: Filed the 2014-2015 Biennial Conservation Report, UE-132043. Consistent with WAC 480-109-120(4). The BCR was also provided to the WA Department of Commerce, consistent with RCW 19.285.070(1). The Commission's Order 05 on August 15 in this docket confirmed PSE's 2014-2015 electric conservation achievement.

- August 15, 2016: Filed the second quarter update to Exhibit 4 and Exhibit 3-Program Details, UE-152058. These are the final revisions to these documents for 2016. The next update was the 2017 Annual Conservation Plan versions.

- October 24, 2016: Filed a petition to allow excess savings to be applies to potential future shortfall, UE-152058. The Commission approved PSE's petition in Order 02 on December 8.

- November 14, 2016: Filed 2017 Annual Conservation Plan, UE-152058. The 2017 ACP updates the originally-stated 2017 savings targets and budgets.

2) Additional Filings and Presentations

In addition to these rule-and condition-specific requirements, PSE made four other noteworthy filings that may have an ancillary impact on Energy Efficiency or the Conservation Rider in the future.

- June 15, 2016: Draft Request For Proposals, direct load control (residential) offerings, UE-160808. This filing is consistent with WAC 480-107.
- June 15, 2016: Draft Request For Proposals, commercial demand response offerings, UE-160809. This filing is consistent with WAC 480-107.
- September 16, 2016: Motion for ministerial amendment, UE-121697 and UG-121705. Provides a means for the petition to allow excess savings to be applied to potential decoupling shortfalls
- October 21, 2016: Filed request to extend Schedule 120. UE-161156. There is ongoing consideration of policy issues related to the implementation of RCW 80.28.360. The filing requests that Schedule 195 be extended to April 2017.

3) Tariff Schedule Revisions

Other than the Schedule 120 revisions noted in section XIII.A.1, PSE made no conservation-specific tariff revision filings in 2016.

B. Conservation Resource Advisory Group

PSE acknowledges and is very appreciative for the amount of work and committed engagement demonstrated by the Conservation Resource Advisory Group (CRAG) throughout 2015. Through PSE's collaborative process, it achieved significant milestones during the past year, as discussed throughout the Report and in the following sections.

1) Background

PSE formed the Conservation Resource Advisory Group (CRAG) in response to Section D of Exhibit F in the 2001 General Rate Case Stipulation Agreement, Docket No UE-011570 and UG-011571. The CRAG consists of approximately 12 Stakeholders and represents a wide variety of interests, including consumers, industry, and regional concerns. It also includes a member of the UTC staff. The CRAG works closely with Energy Efficiency on a variety of conservation initiatives, most notably conservation tariff filings, savings goal setting and long-term conservation strategies.

2) CRAG Vision

Throughout 2016, CRAG members consistently demonstrated qualities of the CRAG vision, established in May 2010:

> Members actively participate in CRAG processes and advise on PSE decisions so that ratepayer funds are being used to achieve all cost-effective energy conservation in the most prudent, beneficial manner.

In order to ensure its applicability and value, PSE and the CRAG reviewed the Vision Statement at the first CRAG meeting of the year, March 16, 2016. PSE also provides laminated copies of the Statement at each CRAG meeting. PSE and CRAG members conducted all CRAG interactions with the utmost respect for potentially alternative views, and participants were engaged, with the clear vision of customer benefit and continuous improvement uppermost in mind.

3) 2016 Adaptation through TQM

Consistently building on efficiencies that PSE initiated in 2010, Energy Efficiency continued to execute a number of steps to maximize transparency and improve efficiencies for CRAG members including:

- Emails formatted to immediately call attention to the desired level of action,
- Updated CRAG Newsletters, providing members with updated apart from formal CRAG meetings,
- Incorporated CRAG member suggestions for Annual Report and Conservation Plan documents, including section outline references,
- Adapting project management database sites to accommodate reference needs,
- All electronic filing and large files are now posted on PSE's secure FTP site for convenient access.

4) CRAG Activities

In 2016, PSE welcomed three new permanent CRAG members. PSE also welcomed a number of guests to CRAG meetings at various meetings during the year. Apart from CRAG meetings and various sub-committee meetings, PSE provided filings background and workpapers, data, opinions, references, comments, and data request responses to CRAG members throughout the year. There was an ad-hoc meeting involving CRAG members in May to discuss the potential and design of a third-year decoupling evaluation, and another ad-hoc meeting in December to review the 3rd-year decoupling evaluation report.

In addition to facilitating decoupling discussions for interested CRAG members throughout the year, PSE also facilitated discussions for CRAG members on other ancillary topics such as Electric Vehicle Charger Incentives and Leasing.

5) Publication Updates

PSE provides the CRAG with several document drafts prior to filings. For instance, the *List of Measures, Incentives & Eligibility* (Exhibit 4) and the draft 2017 Annual Conservation Plan, as required by WAC 480-109-110(3).

It has been a long-standing practice to provide the CRAG with a mark-up version and clean version of the documents, which enhances the ability to quickly view the applicable modifications. PSE also provides a summary of the changes in the notifying email.

As required by WAC 480-109-130(6), PSE updates these documents on the PSE.com website following Commission acknowledgement or issuance of an approval order.

6) CRAG Meetings

In 2016, PSE met the requirements of WAC 480-109-110(2) by convening four CRAG meetings during the year. PSE places emphasis on ensuring that it maintains an accurate meeting record, where meeting attendees can reference agreements, action items, and issue resolutions. PSE also provides a very long lead time for meeting schedules to avoid potential scheduling conflicts. Every CRAG meeting includes several standing agenda items, including:

- Activities that have occurred since the previous meeting,
- CRAG meeting action item status, and
- PSE emails meeting materials to attendees participating via conference call prior to the meeting call to order.

The last two meetings of the year coincided with the development of the 2017 Annual Conservation Plan. PSE provides detailed meeting summaries to CRAG members following the meeting conclusion.

All 2016 CRAG meetings were hosted by the Smart Buildings Center. PSE is most appreciative of their gracious hospitality and assistance with any technical difficulties that presented themselves.

The following discussions are very high-level “snapshots” of the four 2016 CRAG meetings. They are intended only to provide a general sense of the meeting topics. All CRAG members received a full meeting summary document shortly after each CRAG meeting.

a. March 16 Meeting Highlights:

With an eye toward new CRAG members, the attendees reviewed the CRAG Vision Statement, Meeting Guidelines and Measures of Success. Everyone agreed that each were still valid and had merit to be carried forward.

The key topics of this meeting were the Schedule 120 filing, an Annual Report highlight review, general program updates, and the demand response RFP process. There was also a brief discussion on the impact of solar PV generation.

Key Outcomes

1) The attendees agreed that a more extensive discussion on demand response was merited.
2) The attendees agreed that it would be appropriate to invite a guest speaker, expert in demand response programs, attend and present at an upcoming CRAG meeting.
3) The attendees agreed that a more extensive discussion on solar PV generation and its impacts on conservation was merited.
4) The attendees agreed that CRAG membership does not need to be adjusted and that Invitations to CRAG meetings (a) will be extended to entities that have expertise in a specific CRAG-related topic and (b) will be extended only after being vetted by the CRAG.
5) It was agreed that a review of 2016 PSE Deemed measures would be best performed before the end of 2016, so as to have a reduced negative impact on 2017 efforts, should any values be challenged.

b. May 18 Meeting Highlights:

The July 16 meeting's primary focus was on demand response, and PSE invited a guest speaker. The attendees also bade adieu to two long-standing and valued CRAG members. There was also a brief discussion on the progress of the decoupling evaluation, and the idea of starting an evaluation including the third year of decoupling was raised. PSE facilitated an extensive discussion of performance-based programs, and there was also an extended discussion on solar PV/renewables' relation to conservation. Lastly, PSE provided an update on the EV Charger Incentive pilot.

Key Outcomes

1) The attendees agreed that PSE should remove solar generation from RCM whole-building calculations.
2) The attendees agreed that an ad-hoc meeting was necessary to resolve the treatment of NEEA savings, and that the Energy Reports pilots should continue to be excluded from the EIA penalty target.
3) It was agreed that PSE should adjust its EIA report to the Department of Commerce, so that it reflected all conservation achieved, rather than only savings specifically assigned to the EIA Target.

c. August 24 Meeting Highlights:

This meeting was the first of two planned to discuss the development of the 2017 Annual Conservation Plan. PSE provided overview of key revisions to the originally-indicated 2017 savings and budgets, an updated corporate financial tracking initiative, and the potential for significant LED lamp UES value revisions. PSE presented the year-to-date (semi-annual) savings and expenditure results, and the attendees also discussed a request to add a regional end-use load study to the 2017 Rider funding. There was also a discussion about PSE's recently-approved 2014-2015 Biennial Conservation Report, and the then-outstanding issues of the treatment of excess savings.

Key Outcomes

1) The attendees agreed that PSE's adaptive management discussions (in its Plans and Reports) is exemplary.
2) The attendees generally agreed that PSE should continue to run the Home Energy Reports expansion program, as long as the program is cost-effective. The attendees also agreed that it was appropriate for PSE to cancel the Small-to-Medium Energy Reporting pilot, due to inconclusive evaluation results. The attendees agreed that PSE's adaptive management discussions (in its Plans and Reports) is exemplary.
3) At this stage of the ACP development, it was generally agreed that PSE should include the potential cost of the Demand Response program in the 2017 ACP, with the understanding that the amount was provisional and still under PSE management review.
4) The CRAG generally agreed that an end-use load study is sensible and that PSE should provide a budget estimate for this study to the CRAG for consideration of inclusion in its 2017 ACP.

5) Rather than provide a specific estimate of single large facilities in its planning documents, PSE will report on the actual savings of this customer classification in its Annual Reports of Energy Conservation Accomplishments.

6) PSE will include a hard-to-reach market segment discussion in the 2017 ACP.

d. October 12 Meeting Highlights:

This CRAG meeting was the second of two 2017 ACP development reviews, and focused on primarily providing CRAG members with 2017 program details, and comparing the originally-indicated 2017 savings and budgets to the updated 2017 values. PSE also provided the CRAG with details of its plans to make a one-time extraordinary adjustment to its LED savings reporting by approximately -42,000 MWh. PSE provided a summary overview of its historical and current Lastly, PSE presented a discussion on advanced “M&V 2.0” concepts being considered by PSE Evaluation staff, along with potential implementation recommendations.

Key Outcomes

1) The attendees generally agreed that PSE’s LED UES value adjustment was appropriate.

2) The attendees agreed that PSE is doing a good job of maximizing agency participation and working within the confines of State requirements in its LIW program.

3) The CRAG agreed that PSE should continue its EV Charger Incentive pilot until June, 2017.

4) Based on meeting feedback, several enhancements were made to the draft 2017 ACP.

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XVI. GLOSSARY OF COMMONLY-USED TERMS

Unless otherwise noted in a specific Conservation Schedule, the following commonly-used terms, used throughout and applicable only to this document[53] have the below noted meanings. Definitions or glossaries contained in other Energy Efficiency documents, policies or guidelines referring to specific processes or unique functions shall have the meanings noted in those documents, policies or guidelines.

A. Definitions

A-line or A-Lamp	A bulb with a rounded cover that has the same basic appearance as a standard incandescent bulb. A-line/A-Lamp bulbs are a good option if you have a light fixture that doesn't conceal the bulb or a lamp with a shade that attaches directly to the bulb. A-Line bulbs disperse light at a wide angle and are ideal for fixtures used to spread light throughout the room. LED A-line bulbs are a good choice for: • Room area lighting • Reading lamps • Hallways The "A" itself stands for arbitrary.
Calculated Savings	This savings type is different than deemed or UES values (described below). This term indicates that there is a pre-approved, stipulated input savings value (or cost) per measure. This value (or cost) is then multiplied by site-specific input values to arrive at the overall savings value (or cost). This term is used in the Savings Type field in Appendix B, List of Measures.
Channel	Within an Energy Efficiency Residential or Business sector, an organization that is established to focus on the value chain—consisting of manufacturer distributor, dealer, contractor to the end-use customer—with the most similar market, delivery methods and ultimate purchasers or product users.

[53] Some acronyms, such as "ECM" have a different connotation outside the purview of PSE or conservation activities. For instance, beyond Energy Efficiency, "ECM" may mean "Electric Conservation Measure". In context of PSE conservation programs, though, it means "Electronically Commutated Motor".

Definitions, continued

Conditions	Also "2010 Electric conservation Settlement Agreement Terms conditions", "Energy Independence Act conditions" or "Order 01, Docket No. UE-152058 conditions". Specific deliverables and stipulations by which the Company must operate or produce through the course of operating and managing Energy Efficiency programs during a specified biennium. In addition to compliance requirements outlined in Sections A through J and L, of the 2010 Settlement Agreement, the conditions are listed under Attachment A of Order 01 in Docket No UE-152058.
Custom Savings	This savings type applies to conservation projects where a PSE EME performs specific evaluation and review of a unique customer site to determine savings values—therms or kWh—that apply only for that site. For this type of measure, there is insufficient information, the occurrence is too infrequent or it cannot be specifically defined to justify development of a Calculated or Deemed protocol.
Deemed Measure	As in a measure's deemed value; A savings (or cost) value that applies to a unit of specific measure, regardless of where or how the measure is installed. Measures for which it is possible to "deem" per unit energy savings, cost and load shape based on program evaluation data and engineering estimates. (For instance, one residential interior CFL lamp has a hypothetical deemed value of 23 kWh per year.) This classification applies to both RTF and PSE deemed.
Direct Benefit to Customer (DBtC)	A PSE-specific term, indicating rebates, grants, credits or services that are of value to customers. Services can include, but aren't limited to, credits on a monthly bill, upstream incentive provided to channel partners or trade allies—either within PSE's service territory or regionally—and free energy efficient devices available by mail.
Direct-Install Measure	A conservation measure that is installed by a PSE representative; either a PSE staff member, a PSE contractor or PSE contractor—rather than a PSE customer—into a qualifying structure.
Electric Savings	Savings are defined and reported as those recognized in the first year of a measure's total expected life. PSE reports the total savings for the year that the measure was implemented, regardless of when it is installed. Savings are counted at the customer meter, not the busbar.
Energy Efficiency	A department of Puget Sound Energy that implements energy conservation programs. Formerly referred to as Energy Efficiency Services or Customer Solutions.
Hydronic	A system of heating using fluid (usually water) as the conductive material to transfer heat to the desired area. This type of system is usually applied in a radiant floor system.

Definitions, continued

Measure	A product, device, piece of equipment, system or building design or operational practice used to achieve greater Energy Efficiency or to promote Fuel Conversion and Fuel Switching. Unless specifically enumerated in a specific Energy Efficiency Program, all Measures, proposed by Customers or otherwise, shall meet or exceed the efficiency standards set forth in the applicable energy codes, or, where none exists, "standard industry practice" as determined by the Company. Measures will meet common construction practices, and meet industry standards for quality and Energy Efficiency.[54] Measures must also meet cost-effectiveness standards.
Program	Programs may consist of a single measure, an assortment of related measures or a suite of measures that are related strictly by delivery type or customer segment.
PSE Deemed	Relative to measure savings types (Custom, Calculated, PSE Deemed or RTF Deemed), these measures are supported by PSE engineering calculations or evaluation studies, in compliance with condition (6)(c). This term is used in the Savings Type field in Appendix B, List of Measures.
RTF Deemed	Former reference to the RTF's UES (Unit Energy Savings).
System	In this document, System may have the following meanings: 1) Any software program—supported by PSE's IT department or otherwise—or physical apparatus used to record, track, compile, report, archive, audit energy savings claims or financial data. 2) Electrical, and/or natural gas equipment that is either attached together or works in concert to provide space conditioning, plumbing functions or other end-uses associated with structures, such as HVAC systems, pumping systems, etc.

[54] Schedule 83, section 4, Definitions, #m. Schedule 183, section 4, #l.

B. Acronyms

The below-listed acronyms are found throughout program discussions in this report. Where possible, PSE has defined these acronyms within the discussion. As a courtesy, PSE also provides them in the below list for easy reference.

AESP	Association of Energy Service Professionals
aMW	Average MegaWatt. An expression of energy (versus "power"). It is used to express very large amounts of energy. The term represents an average of power (Megawatts [MW]) used over time (the standard term being one year or 8,760 hours). Thus, 1 aMW = 8,760 MWh.
ASHRAE	American Society of Heating, Refrigerating, and Air-Conditioning Engineers
BOMA	Building Owners and Managers Association
BPA	Bonneville Power Administration
CEE	Consortium for Energy Efficiency
CMS	Customer Management System. A PSE proprietary software application that tracks customer activities, inventory and rebate processing.
CRAG	Conservation Resource Advisory Group
CVR	Conservation Voltage Reduction
DSM	Demand-Side Management. Typically used as an acronym for energy conservation.
EC Motor (ECM)	Electronically Commutated Motor
EME	Energy Management Engineer
EM&V	Evaluation, Measurement and Verification
ERR	Evaluation Report Response. A form used to complete an evaluation study's resultant actions.
GPM	Gallons Per Minute
HVAC	Heating, Ventilation and Air Conditioning
IR	InfraRed. A technology typically used in remote-control devices.
kWh	Kilowatt Hour. 1,000 watt-hours = 1 kWh, which is equivalent to 10 100-watt incandescent lamps being turned on for one hour.
LED	Light Emitting Diode (lamp type)
MWh	Megawatt-hour. 1,000 kWh = 1 MWh
NEEA	Northwest Energy Efficiency Alliance
NEEC	Northwest Energy Efficiency Council

Acronyms, continued

O&M	Operations & Maintenance
PV	PhotoVoltaic. Primarily applies to solar renewable energy generation systems. PV converts solar energy into Direct Current (DC) electricity.
RCW	Revised Code of Washington
RTF	Regional Technical Forum, an advisory committee and a part of the Northwest Power and Conservation Council. The RTF develops standardized protocols for verifying and evaluating conservation.
SAP	Systems, Applications, Products in data Products. A very large, enterprise-wide financial, HR, workflow-tracking accounting system.
TRC	Total Resource Cost: The cost to the customer and/or other party costs to install or have installed approved Measures plus Utility Costs and minus Quantifiable Benefits (or Costs).[55]
UC	Utility Cost: The Company's costs of administering programs included, but not limited to, costs associated with incentives, audited, analysis, technical review and funding specific to the Measure or program and evaluation.[56]
VO	Voltage Optimization
WAC	Washington Administrative Code
WAMOA	Washington Association of Maintenance and Operations Administrators
WSEC	Washington State Energy Code
WUTC	Washington Utilities and Transportation Commission. Also referred to as UTC.

[55] Schedule 83, section 4, Definitions, #z. Schedule 183, section 4, #x.

[56] Schedule 83, section 4, Definitions, #bb. Schedule 183, section 4, #z.

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XVII. CONCLUSION

This concludes the Energy Efficiency 2016 Annual Report of Energy Conservation Accomplishments.

Please refer to the Report's Exhibits and Supplements for additional Energy Efficiency details:

A. Exhibits Included in the 2016 Report of Conservation Accomplishments

Exhibit 1: Conservation Targets and Budgets versus Actual Achievements and Spending
Exhibit 2: Program Cost Effectiveness
Exhibit 5: Prescriptive Measures
Exhibit 9: Requirement Compliance Checklist
Exhibit 10: NEEA 2015 Report of Activities and Initiatives

B. Supplements

Exhibit 1 *(Table of savings and expenditures)*
- Supplement 1: Expenditures by Cost Element Group
- Supplement 2: 2016 Savings adjustments
- Supplement 3: 2016 Sponsorships and Memberships
- Supplement 4: Portfolio Measure Category Counts

Exhibit 6 *(The Evaluation Plan is excluded from this report)*
- Supplement 1: Evaluation studies with their associated Evaluation Report Responses (ERRs) performed in 2016

Energy Efficiency looks forward to a productive and successful 2017.

Respectfully submitted,

The Men and Women of Energy Efficiency