2018

Annual Report of

Energy Conservation Accomplishments

April 1, 2019

PSE obtained permission to use all photos and likenesses within this Report.

PUGET SOUND ENERGY

Doc# EES0012019

Table of Contents

Figures

Tables

Supporting Documentation

The Exhibits and Supplements to the 2018 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 2018 Report of Conservation Accomplishments

Exhibit 1: 2018 Conservation Targets and Budgets versus Actual Achievements and Spending.

Exhibit 2: Program Cost Effectiveness.

Exhibit 5: Prescriptive measures offered in 2018.

Exhibit 9: Requirement Compliance Checklist.

Exhibit 10: NEEA 2018 Report of Activities and Initiatives.

Supplements Included

Exhibit 1 *(Table of savings and expenditures)*

- Supplement 1: 2018 Actual Expenditures Compared to Anticipated Spends.
- Supplement 2: 2018 Savings adjustments.
- Supplement 3: 2018 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 2017.

I. EXECUTIVE SUMMARY

A. Puget Sound Energy's Annual Report of 2018 Conservation Accomplishments

Puget Sound Energy's (PSE's or The Company's) Energy Efficiency department presents this 2018 Annual Report of Energy Conservation Accomplishments (Annual Report or Report), satisfying WAC 480-109-120(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 2018 Portfolio-level savings, expenditure results, Total Resource Cost (TRC), and Utility Cost (UC) benefit-to-cost (B/C) ratios for electric and natural gas conservation programs.

Table I-1: Energy Efficiency 2018 Electric Savings and Cost-Effectiveness Results

2018	Savings	Expenditures	Total Resource Cost	Utility Cost
Electric (MWh)	299,918 34.2 aMW	$91,086,596	1.69	2.17
Goal/Budget *Percent*	281,328 32.1 aMW *106.6%*	$99,562,721 *91.5%*		
Gas (Therm)	3,771,307	$15,790,198	1.45	1.76
Goal/Budget *Percent*	3,269,604 *115.3%*	$15,275,735 *103.4%*		

299,918 MWh divided by 8,760 hours = 34.2 aMW
Savings are stated in terms of first-year annual figures, at the customer meter, without line loss.

1) 2018 Results

In 2018, 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 281,328 MegaWatt-hours (MWh) or 32.1 average MegaWatts (aMW) by 6.6 percent, achieving 299,918 MWh, or 34.2 aMW.

Electric expenditures finished the year 8.5 percent lower than planned: $91.09 million, compared to a budget of $99.6 million.

Natural gas programs exceeded savings goals for the year by 15 percent: 3.77 million therms against a goal of 3.27 million therms, while natural gas expenditures were slightly higher than planned spending, finishing the year at $15.79 million, compared to a budget of $15.28 million. PSE provides detailed savings and expenditure information by program in Exhibit 1: *Savings and Expenditures.*

Reported Portfolio results include Pilots With Uncertain Savings and the Northwest Energy Efficiency Alliance (NEEA) savings, which PSE excludes from its EIA Penalty Threshold 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 2018-2019 savings in May 2020. PSE will include those savings in its 2018-2019 Biennial Electric Achievement Report, submitted in compliance with WAC 480-109-120(4) on or before June 1, 2020. PSE includes complete discussions of Pilots with Uncertain Savings in Chapter 7. PSE provides a summary of NEEA's 2018 savings and expense metrics in Chapter 8: *Regional Initiatives.* NEEA provides additional 2018 accomplishment details in Exhibit 10: *NEEA 2018 Report of Activities and Initiatives*.

Energy Efficiency's 2018 Portfolio electric TRC B/C ratio was 1.69, with a UC B/C ratio of 2.17. PSE finished the year with a natural gas TRC of 1.45, and a UC of 1.76. 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]

It is noteworthy that two inadvertent and unintentional 2018-2019 Biennial Conservation Plan (BCP) omissions factored into Energy Efficiency's savings and expenditure results.

[1] In a Docket 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.

1) When the Individual Energy Report pilot, consisting of almost 100,000 customers, was subsumed into the "legacy" Home Energy Reports (HER) program, the corresponding savings and budgets were excluded.
2) The electric and natural gas budgets for Customer Awareness Tools, which provide three electronic customer services, was excluded.

These two programs' actual 2018 savings and budgets are represented in this Report. PSE also ensured that they are included in its 2019 Annual Conservation Plan.

a. Key Results Drivers

Program reviews in Chapters 4 and 6, and 9 through 13 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 2018 electric savings results in both the Residential Energy Management and Business Energy Management (REM and BEM, respectively) Sectors was customers' enthusiastic acceptance of LED lamps, and the ever-changing LED technologies. This is particularly reflected in the sales of LED multipacks in Retail Lighting, and Tubular LED (TLED) engagements in the Lighting to Go and Business Lighting programs: all of which exceeded their electric savings goals.

Program staff proactively utilized data analysis, customer surveys, and marketing intelligence to tailor their offerings, adjust incentives to maximize market demand, and respond to customer service expectations. Energy Efficiency program staff adaptively managed their customer offerings and maximized services in both Residential and Business Sectors.

For example, The Dealer Channel began offering limited Saturday Home Energy Assessment services. Using contractor feedback, the Single Family Space Heat program became aware of product hurdles, and was able to adapt its offerings. Similarly, the Single Family Water Heat program received positive contractor response on its new storage and tankless water heater offerings. In the Small Business Direct Install (SBDI) program, staff combined a wide range of small business types, managed by a specific program staff with a singular suite of measure offerings, applicable to each business type.

PSE successfully engaged manufacturers to partner in rebate offerings, effectively doubling rebate amounts in the Home Appliances and Space Heat programs for limited timeframes. By transitioning TLEDs to no-cost installs, the SBDI program exceeded its electric savings goal. The Residential Showerhead program benefited by working with a major retailer and manufacturer to carry a new residential showerhead line. And, as a result of re-signing a Seattle CAP agency, the Low Income Weatherization (LIW) program exceeded its natural gas goal by 120 percent.

Some programs experienced lower-than-expected electric and natural gas savings in 2018. Drivers included new program ramp-up delays (Commercial Midstream, Single Family New Construction, and Multifamily New Construction for instance), vendor organizational re-alignments, and marketplace and cost variability. For example, although the SBDI program exceeded its electric savings goal, the program fell short of its natural gas savings goal as a result of lower volumes and higher product costs.

Energy Efficiency Staff also pursued several measures and program innovations that are classified as pilot-analogous, including the installation of over 1,400 line voltage web-connected thermostats in the Multifamily Retrofit program, a manufactured home replacement pilot (set to commence in 2019) in the LIW program, and a ductless heat pump installation program for 300 previously-weatherized manufactured homes. Additionally, the Industrial Systems Optimization Program's (ISOP's) I-SEM (Industrial Strategic Energy Management) initiative implemented a "cohort" service, which resulted in four new industrial participants.

The Commercial Kitchen program completed an engineering analysis to set the ground work to offer a new Demand Control Kitchen Ventilation (DCKV) measure as part of the suite of measures. In BEM's Pay for Performance pilot, several key learnings have been applied, and, in spite of only one customer enrolling in 2018, program staff sees value in continuing the pilot into 2019.

Staff's continuous improvement initiatives and proactive program management also included the retirement of some cost-ineffective measures, including Advanced Power Strips (applicable to several Residential programs) and clothes washer replacements in Multifamily Retrofit. Commercial HVAC retired its commercial Rooftop Unit (RTU), and will replace it with a Commercial Midstream offering.

The work performed by Energy Efficiency's support organizations, including Marketing and Energy Efficient Communities, also contributed to conservation savings in 2018. Several successful promotions, energy-efficiency campaigns, and communication engagements included Energy Upgrades, Cross-Sell, community blitzes, and social media initiatives.

PSE sponsored tabling events at food banks, energy fairs, and small business "meet & greets". In the Multifamily Retrofit program, the energy fair tabling resulted in a 50 percent participation rate in direct-install offerings. Field services, including retailer training and in-store events expanded: from 401 in 2017 to 410 in 2018, and 91 in 2017 to 103 in 2018, respectively. PSE tailored its Small Business blitzes to include multiple days in more than one adjoining community. These resulted in greater customer exposure, awareness, engagement, and ultimately, conservation savings.

ii. Expenditures

The majority of REM and BEM 2018 electric and natural gas expenditures finished the year well within expectations. Exhibit 1, Supplement 1: *2018 Actual Expenditures Compared to Anticipated Spends*, provides a program-level comparison of costs incurred by budget category. Readers will recognize figures in the Supplement's tables that PSE discusses in the program detail overviews. It is important to note that although some budget variances appear proportionately significant—as compared to their budgeted amounts—the overall impact was negligible, as PSE finished 2018 under-budget in the electric and very close to the anticipated spend in the natural gas portfolios.

Nearly all savings programs that varied from their anticipated expenditures also realized a commensurate increase (or reduction) in their planned savings. Program staff continuously improved efficiencies and proactively managed expenses, resulting in lower-than-expected ancillary costs, such as the Employee Expenses, Materials, and Miscellaneous categories. The majority of Outside Services costs were below their anticipated spending levels, with the exception of Home Energy Reports and Customer Awareness Tools.

As referenced in the Section I.A.1: *2018 Results*, the inadvertent and unintentional omission of a large portion of Home Energy Reports and Customer Awareness Tools budgets caused sizable variances in the actual-versus-planned expenditure figures.

Other drivers of Energy Efficiency expenditures were associated with new programs' start-ups: including Single Family New Construction, Manufactured Home New Construction, and Commercial Midstream, which weren't completely implemented until the second quarter of 2018. Staffing issues in third-party implementers' businesses (for instance, in the Multifamily Retrofit program) also resulted in budget variances. Additionally, the Dealer Channel implemented several cost-savings processes, including a centralized reference for Contractor Alliance Network (CAN) issues, and brought key Weatherization program responsibilities in-house, which reduced administrative costs.

Program staff achieved additional cost-savings through the continuous improvement of measure offerings and proactive management of incentives. For instance, the Lighting to Go and Business Lighting programs aligned their TLED incentives. Business Lighting also increased their Luminaires Level Lighting Control (LLLC) incentive from $50 to $75 to spur additional savings. Staffing levels throughout the year impacted some Sector organizations, with a small number of groups sustaining vacancies for the majority of 2018 in both the electric and natural gas segments. Streamlined customer-centric processes also led to cost savings, including a revised New Construction Lighting Power Density (LPD) workbook, and a new online training in the Commercial Strategic Energy Management (CSEM) program.

Additionally, programs susceptible to customer planning variables—New Construction, in particular—saw variances in their actual savings (and thus, expenditures) versus planned. For instance, in the Multifamily New Construction program, the Direct Benefit to Customer (DBtC) was lower, as a result of projects being delayed until 2019.

Some supporting organizations also realized variances from their originally-planned expenditures. CAN expenses were lower as a result of a delayed implementation of a planned trade ally portal. The Conservation Supply Curves and Strategic Planning organization had some Outside Services costs for the Conservation Potential Assessment shifted to 2019, and some work performed in December 2018 was not invoiced until 2019.

The Energy-Efficiency Brochures team consolidated the assortment of literature, resulting in significant cost savings. And in the Trade Ally Support function, a regional partner performed new, ad-hoc work for the CSEM program in 2018.

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 2018.

i. Maximizing Customer Awareness

PSE continued to engage customers with new and broader outreach campaigns, reaching customers in their communities, at food banks, energy fairs, trade shows, and in their businesses.

In 2018, PSE and its Outreach partners completed over 100 high-impact and "Pop-up" events in retail locations with high foot traffic. The Energy Efficient Communities team conducted 5 Small Business Direct Install blitzes in 11 communities, engaging with more than 1,200 small business customers. The team also conducted 10 Home Energy Assessment door-to-door blitzes, knocking on almost 11,000 doors, and securing almost 950 program sign-ups. Energy Efficiency's award-winning Energy Upgrades campaign—which included transit ads, social media, emails, direct mail, radio, etc., resulted in over 71 million advertising impressions, 8 months of limited-time-offers on select LED products, and 36 different in-store retail blitz events, with over 17,000 Golden Tickets distributed—16,000 of which were redeemed during the events.

Other Energy Efficiency retail initiatives also resulted in maximized customer awareness. The Direct-to-Consumer staff conducted an extensive and comprehensive effort to ensure retailers provide customers plenty of PSE energy-efficiency information, with over 3,500 field visits to over 400 stores in 2018. Field staff and its four full-time representatives verified that retailers' staff were trained on PSE offerings, including limited-time-offers, and that point-of-purchase signage and eligible product was correctly placed.

The Cross-Sell engagement, which targets both Direct-to-Consumer and Dealer Channel customers, distributed 4.6 million emails with 89 unique messages to customers—an increase of 36 percent from 2017.

In its Residential Business-to-Business Channel, PSE continued its initiatives to encourage multifamily tenant participation by awarding building owner/developer "Strive for Five" plaques, and participating in energy fairs.

PSE also continued its energy-efficiency focused digital media initiatives, including award-winning television advertisements, featuring new characters "JoAnne" and "Rocky", and returning characters "Stan", "Art", and "Sally".[2] The energy-efficiency ads provide a humorous and memorable call to action for customers to participate in Energy Efficiency programs.

PSE's Customer Awareness Tool—delivering energy-efficiency email messaging such as Unusual Usage Alerts, and Seasonal Readiness Alerts—has generated over 600,000 alerts, and up to 250,000 reports twice a year to customers. PSE's "Savings & Energy Center" web presence also provides a strong customer engagement, with over 2 million web page views and almost 400,000 myPSE account Energy Center accesses in 2018.

ii. Enhancing the Customer Ease of Participation

In 2018, Energy Efficiency continued its focus on making participation easier for customers. Residential and Business program staff streamlined a number of incentive application processes, enhanced channel and customer training, and aligned key measure (TLEDs, for instance) offerings across programs. In the Dealer Channel, program staff reorganized assignments to centralize and focus critical expertise: the SBDI program is one example. A significant customer enhancement is the ability to input and monitor the progress of their rebate applications using Energy Efficiency's Public User Interface (PUI), which is a program within the Demand Side Management central (DSMc) system. In 2018, the Data and Systems Services organization developed the options for customers to apply their rebate incentive to their PSE account or receive a rebate check. This new service began its initial roll-out to customers in January 2019.

Energy Efficiency's emphasis on providing easy participation in conservation offerings extends to its channel partners.

[2] A few of the newer energy-efficiency television characters are featured on this Annual Report cover page.

Initiatives included an emphasis on developing an enhanced trade ally network for the Contractor Alliance Network (CAN) program, consisting of 188 members. Program staff also collaborated with NEEA staff to provide midstream training, marketing, and sales incentives. Energy Efficiency also provided direct training for many of its customers. For instance, CSEM customers had the ability to participate in one in-person and five webinar-based sessions. Additionally, CSEM created a new online curriculum for their customers.

The Industrial Systems Optimization Program (ISOP) also applied proven CSEM techniques, creating a "cohort" program for its customers. Cohorts can network with each other, share conservation learnings and tips, and provide useful feedback to PSE on effective energy-efficiency strategies.

PSE also continued its efforts to connect with its potentially Hard-To-Reach (HTR) customers, including those in rural areas, commercial tenants, low- and moderate-income customers, and customers living in manufactured homes. In addition to its expanded small business and community blitzes, PSE also developed several additional initiatives that emphasis its focus on HTR segments.

In 2018, the Low Income Weatherization program, in concert with Washington state agencies, developed a manufactured home replacement pilot, which targets the complete replacement of five units in 2019. Also, in collaboration with The Energy Project, the program will facilitate the installation of up to 300 ductless heat pumps in manufactured homes that had been previously weatherized. PSE also distributed targeted emails and direct mailings, offered Home Energy Assessments, and provides higher heat pump rebates for customers living in manufactured homes. PSE also expended significant effort to reach its English-as-a-second-language customers. These, and other initiatives to target the hard-to-reach and proportionately underserved segments are discussed in Chapters 3, 4, 5, 6, 10, and 11.

c. Adaptation through Continuous Improvement

Energy Efficiency program staff continued their ongoing work to enhance processes and program offerings—especially customer-facing processes—through its consistent application of continuous improvement principles. The men and women of Energy Efficiency focused on removing barriers to effectiveness, improving productivity, optimizing their measure offerings, and creating experiences that enrich customers' lives.

Through its commitment to adaptively managing its business, PSE continued its progression toward operational excellence. The following list highlights some key improvements and adaptation Energy Efficiency implemented. Readers will find details in the chapters that follow. In 2018, Energy Efficiency and support staff:

- Delivered dozens of presentations to chambers, homeowners associations, downtown associations, non-profit organizations, etc. and tabled at hundreds of local events to promote select energy efficiency programs.
- Participated and/or facilitated almost 800 events in which energy-efficiency was promoted.
- Incorporated EM&V 2.0 principles into its core evaluation activities.
- Improved retail in-store customer awareness by broadening retail trainings and engaging customers in shopping aisles as they're making energy-efficiency purchasing decisions.
- Engaged manufacturers in creative rebate offerings that for some programs, effectively doubled customer incentives for limited periods.
- Utilized data collected from Home Energy Assessments (HEA) to develop more targeted energy-efficiency email campaigns. On a limited basis, PSE also offered HEAs on Saturdays.
- The Single Family New Construction program re-launched, with a comprehensive building modeling protocol that integrate design techniques.
- Designed and implemented an improved in-store Commercial Kitchen presence.
- Improved Commercial/Industrial Retrofit forecasting tools that allow Energy Management Engineers to view and update projects more effectively.
- Developed a new incentive structure for ISOP customers, which may provide up to 100 percent of the measure cost.

d. Notable Energy Efficiency Accomplishments

Highlights of notable 2018 accomplishments, detailed in the following program-specific discussions include:

- The Energy Efficient Communities organization engaged over 1,200 small businesses and completed more than 250 upgrades as part of the small business community blitzes.
- Customer Awareness Tools' Unusual Usage Alerts open rates were higher than industry standards: 48 percent.
- DSMc's PUI has greatly streamlined PSE-processed rebate management for customers.

- The Energy Efficiency Events team reached out to over half a million customers.
- The Multifamily Retrofit and the Commercial Strategic Energy Management programs were recognized by ACEEE as an exemplary program for the multifamily segment.[3]
- SBDI established several conservation district partnerships across the PSE territory to collaboratively promote PSE services to agricultural customers.
- The ISOP program engaged with 17 customers, 12 of which progressed to full project implementation.

2) Compliance

By the end of 2018, the Company had completed several 2018-2019 compliance requirements.[4] In each biennium, the majority of requirements are considered completed concurrent with the filing of the following biennium's Conservation Plan. Exhibit 9: *Requirement Compliance Checklist* provides specific condition compliance status, and Chapter 13, *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 UG-011571;[5]
C. The 2010 Electric Settlement Agreement, Docket UE-100177; and
D. Order 01, Attachment A of Dockets UE-171087 and UG-171088.

3) Report Organization

In Chapter 2: *Introduction*, Energy Efficiency provides expanded discussions of overall 2018 accomplishments, key drivers, cost-effectiveness, and PSE's progress toward its 2018-2019 goals.

[3] The ACEEE report can be found at this URL: https://aceee.org/research-report/u1901

[4] Notable exceptions are only those that have a deliverable date of 2020; particularly those related to the reporting and Commission review of PSE's 2018-2019 conservation achievements.

[5] The electric Stipulation Agreement, Docket UE-011570, was vacated by Order 05 in Docket UE-100177.

Sector-level overview tables provide a brief snapshot of each Sector's results.[6] The chapter delves into the department's important areas of focus that impact the majority of its operations.

The subsequent chapters provide program-detail discussions. These are Residential Energy Management (REM), Business Energy Management (BEM), Regional, Measurement & Verification, Portfolio Support, Research & Compliance, and Other Electric Programs. Each provides a business-unit and program-level reviews of adaptive steps implemented, and achievements realized in 2018. PSE provides a brief, introductory overview for each. PSE also provides a more in-depth compliance and Stakeholder relations discussion in Chapters 12 and 13.

PSE presents Exhibits 1, 2, 6, 9, and 10, and their associated Supplements—listed on page vi of this Report—at the conclusion of the Report. These contain a significant amount of additional Energy Efficiency detail. Consistent with WAC 480-109-120(3)(v), Exhibit 6, Supplement 1 provides copies of all 2018 evaluation studies conducted in 2018.

[6] The order of these discussions corresponds 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; 2018-2019 biennial progress; five-year trends; cost-effectiveness ratios; Direct Benefit to Customer (DBtC) results; focus on the customer; measure counts overview; 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 2018. Table II-1 provides Sector-level views of 2018 electric and natural gas savings results.

Table II-1: Energy Efficiency 2018 Savings Results by Sector

2018	Residential	Business	Pilots	Regional	Total
Electric (MWh)	134,680	150,681	0	14,557	299,918
Goal	121,208	146,003	840	13,277	281,328
Percent	111.1%	103.2%	0.0%	109.6%	106.6%
Natural Gas (Therm)	2,653,112	1,118,195	0	na	3,771,307
Goal	1,805,370	1,456,734	7,500	na	3,269,604
Percent	147.0%	76.8%	0.0%	na	115.3%

In 2018, Energy Efficiency achieved Portfolio electric savings of 299,918 MegaWatt-hours (MWh), versus a goal of 281,328 MWh, and natural gas savings of 3.77 million therms, as compared to a goal of 3.27 million therms. Portfolio electric expenses were $91.09 million, versus a budget of $99.6 million. Natural gas expenses were $15.79 million, as compared to a budget of $15.28 million.

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

Table II-2: Energy Efficiency 2018 Expenditures by Sector

2018	Residential	Business	Pilots	Regional	Portfolio Support	Research & Compliance	Other Electric	Total
Electric	$35,316,606	$40,064,876	$13,728	$4,033,724	$6,856,030	$3,537,407	$1,264,225	$91,086,596
Budget	$40,044,600	$42,798,226	$84,000	$5,200,000	$6,616,519	$3,755,486	$1,063,890	$99,562,721
Percent	88.2%	93.6%	16.3%	77.6%	103.6%	94.2%	118.8%	91.5%
Natural Gas	$8,333,308	$3,787,770	$0	$2,282,499	$909,293	$477,329	na	$15,790,198
Budget	$7,967,713	$3,792,602	$11,925	$2,006,136	$1,040,727	$456,632		$15,275,735
Percent	104.6%	99.9%	0.0%		87.4%	104.5%		103.4%

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

B. 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 program staff developed in 2018.

The overall Portfolio achievement of 106.6 percent of its 2018 electric target and 115.3 percent of its natural gas target is noteworthy, considering challenges that program staff encounter each year, such as ever-increasing marketplace barriers, increasing efficiency code standards, regulatory requirements, and the consistent reduction of prescriptive savings value.

1) Key Drivers of Electric Savings

Residential Energy Management's (REM's) 2018 electric achievement surpassed its goal by 11 percent. Many programs exceeded, or achieved near-goal electric savings results, with only Water Heat, Home Appliances, and the Multifamily programs falling short.

One notable anomaly was Home Energy Reports (HER), both electric and natural gas. PSE's 2018-2019 Biennial Conservation Plan (BCP) inadvertently and unintentionally omitted a key portion of the HER savings and budgets: those resulting from the Individual Energy Reports (IER) pilot program being subsumed into the "legacy" HER program.[7] As this customer group was approximately three times larger than the legacy group, the impact was substantial, as discussed in the following sections.

Business Energy Management (BEM) exceeded its electric target by 3 percent in 2018. Only Commercial/Industrial (C/I) New Construction—which is heavily dependent on large, developmental projects—and Commercial Kitchens and Laundry finished the year below goal. Although it appears that Commercial Strategic Energy Management did not achieve its electric savings goal, the final savings amount is within reasonable variance tolerances for this program.

In the following sections, Energy Efficiency discusses highlights of several drivers to achieving 299,918 MWh versus a 2018 goal of 281,328 MWh.

a. Contributors to Surpassing Electric Savings Goals

In addition to proactively managing their suite of measure offerings to provide optimal services to customers, staff employed innovative approaches to manage their market presence and influence. For instance, program staff adjusted certain incentives to ensure optimal customer participation. Examples include the retirement of the Advanced Power Strip measure, and the establishment of a partnership with major manufacturers, which effectively doubled equipment rebates in the Space Heat[8] program. The engagement of two additional major manufacturers to the Residential Showerhead program boosted savings considerably, and consumer adaptation of LEDs also contributed to Retail Lighting's savings achievement.

As noted in the preceding section, the complications of combining legacy HER savings with IER savings resulted in reported savings that were 100 percent higher than planned: 24,100 MWh achieved, versus 11,600 MWh planned.

[7] PSE added the IER pilot group to the legacy group as a result of "behavioral" measures being included in the 2017 Conservation Potential Assessment.

[8] Although REM's Home Appliances program fell short of its electric savings goal, it too conducted an incentive partnership with a major manufacturer for a limited time, effectively doubling customer incentives.

The Contractor Alliance Network (CAN) team established a unique, limited-time zero-cost extended financing by leveraging local distributor relationships, and leveraged NEEA support to create Sales Performance Incentive Funds (SPIFs) on Heat Pump Water Heaters. The Small Business Direct Install (SBDI) program established key partnerships with conservation districts across the PSE territory, which collaboratively promoted PSE services to small agricultural businesses.

As part of its outreach efforts, PSE's community "blitzes" focused on combining geographically nearby communities during each event, while also incorporating small business "meet and greets". They also engaged more rural and English-as-a-second-language customers, and created a digital newsletter which resulted in additional savings opportunities. Customer-centric campaigns also made significant contributions to making engaging with Energy Efficiency programs easy for customers. Each targeted different customer constituencies, and included the Energy Upgrades, the Cross-Sell, Energy Efficiency Awareness Tools, and pop-up events. Energy Efficiency also realized value in its digital offerings. In 2018, customers purchased almost 700 measures from Energy Efficiency's ShopPSE online store.

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 customers who are tenants rather than property owners, manufactured and mobile-home residents, and low-to-medium income customers. These engagements resulted in earlier involvement in new construction projects, a higher degree of collaboration, and enhanced expectations for savings delivery.

Strong uptake of TLEDs in commercial applications, along with re-alignment of the TLED incentive structure, led to strong results in the Business Lighting and Lighting-to-Go programs. Also applicable to the TLED measure, SBDI converted this measure to a no-cost installation, contributing to savings that exceeded goal by 87 percent. Another contributor to the electric savings achievement was the CVR measure, included in the Transmission and Distribution program. CVR implemented at three substations resulted in electric savings that were 400 percent over goal, or 3,780 MWh, versus a goal of 750 MWh.

Program staff also pursued initiatives that are innovative and are considered analogous to pilots. These include, but are not limited to, Multifamily Retrofit's expansion of the Strategic Energy Management (SEM) approach and the installation of 1,400 line-voltage thermostats.

The Commercial Midstream pilot kicked off mid-year, with encouraging results. The Industrial Systems Optimization Program's (ISOP's) I-SEM (Industrial Strategic Energy Management) initiative, first implemented by the Commercial Strategic Energy Management [CSEM] program) pilot engaged four customers, which is expected to yield positive savings results.

b. Drivers of Lower-Than Expected Electric Savings Goals

While the majority of Residential programs and key Business programs completed 2018 with electric savings that exceeded goals, there were lower-than-expected savings in a limited number of programs.

This often resulted from the continuous reduction of UES values, retirement of cost-ineffective measures,[9] unanticipated market conditions, or lower customer demand. Notable examples include the C/I New Construction program, where several indoor horticulture projects were not completed as planned in 2018, and lower-than-expected volumes in the Home Appliances program led to below-target savings results. Also, the Commercial Kitchen and Laundry program is subject to fluctuating market conditions and their customers purchase high-cost equipment on a reactionary basis, making forecasting challenging.

Delays in new program implementation, such as the Single Family New Construction and Commercial Midstream programs, also contributed to lower-than-forecasted savings. The Multifamily New Construction program also completely revised its service offerings (to a whole-building approach), which caused a delay in implementation, and the Multifamily Retrofit program experienced a significant staffing turnover in its third-party implementation partner. Also, in mid-2018, NEEA provided PSE with a downward-revision of its 2018-2019 forecast savings, resulting in a 22 percent reduction in reported savings from the original target.

[9] The Advanced Power Strip is one example. The APS retirement impacted several Residential programs.

2) Key Drivers of Natural Gas Savings

Commensurate with program staff's active and adaptive management of their suite of electric measures, they exercised great care to ensure that natural gas incentives were proactively managed, contractors and trade allies remained closely engaged, and measure offerings were adjusted to compensate for market conditions.

Staff's performance resulted in the overall natural gas portfolio exceeding its 2018 goal by 15 percent: 3.77 million therms, as compared to a goal of 3.27 million therms.

a. Contributors to Surpassing Natural Gas Savings Goals

REM's Single Family Existing group finished 2018 55 percent above its natural gas savings goal. Residential Space Heat, Home Appliances, Showerheads, and Weatherization all exceeded their natural gas savings goals. As was the case in the electric portfolio, HER's natural gas reported savings were impacted by the inadvertent and unintentional omission of a large portion of planned energy reporting savings from the 2018-2019 BCP. The complications of combining legacy HER and IER natural gas savings resulted in the program exceeding its 120,000 therms goal indicated in the 2018 Plan, with more than 890,000 therms achieved: a 600 percent difference.

Drivers included, but were not limited to: higher-than-anticipated performance in the Weatherization's Duct Sealing and insulation measures; limited-time manufacturer-matched incentives in the Appliance Decommissioning program, and strong contractor support for PSE's storage and tankless water heater program. The success of the limited time decommissioning offer led to PSE exceeding its gas savings target in 2018; and establishing partnerships with key high-volume retailers led to an increase in Showerhead savings.

The Low Income Weatherization program surpassed its 2018 natural gas savings goal by 120 percent, largely as a result of re-establishing its contract with a Seattle CAP agency. And in the Multifamily New Construction program, the whole-building incentive structure resulted in an increase in savings.

Sometimes, a single custom grant project can cause a program to exceed or miss its savings goal, particularly in the C/I Retrofit, and to a greater extent, C/I New Construction programs. This was the case in C/I New Construction, where one large project represented 93 percent of the total program savings in 2018.

Commercial Kitchens and Laundry and Commercial HVAC also exceed their natural gas savings goals. Marketing, outreach initiatives, and social media campaigns that generated increased customer awareness also contributed to several programs' success, including the Direct-to-Consumer Showerheads program and the LIW program.

b. Influencers of Lower-Than-Planned Natural Gas Savings Goals

In REM's Multifamily Retrofit program, third-party implementer staffing turnover took its toll on the program's natural gas savings achievement. And in the Commercial Strategic Energy Management (CSEM) program, customer analysis timing caused the program to fall short of its savings goal. Another notable contributor to lower natural gas savings was in the Small Business Direct Install (SBDI) program, where 2018's therm savings were significantly more expensive than originally planned.

C. Expenditures

The majority of Energy Efficiency programs finished the year consistent with anticipated spending, achieving an overall Portfolio electric result of 8.5 percent lower than anticipated spending levels, while natural gas spending was 3 percent higher than planned expenditures for 2018.

There were few notable variances in any particular expense category, reflecting the exceptional precision with which Energy Efficiency staff manage their programs to ensure the prudent use of PSE customer funds. Expenditures in savings-generating programs in REM and BEM were, to a large degree, proportionate with their electric and natural gas savings. Actual expenditures in other Sectors finished the year well within expected parameters. PSE discusses notable key expenditure drivers in the following section.

One key variance was that of Customer Awareness Tools. As PSE shared with the CRAG in an October 2018 meeting, PSE inadvertently and unintentionally omitted the Customer Awareness Tools budget from its 2018-2019 BCP. This approximately $1 million variance ($916,000 electric, $137,000 natural gas) resulted in the Portfolio Support Sector finishing 2018 above its electric budget, and higher in natural gas spending than originally planned.

Exhibit 1, Supplement 1: *2018 Actual Expenditures Compared to Anticipated Spends* provides a comprehensive review of program budgets compared to actual expenditures. Readers will note some apparent variances in budget categories, such as Labor, Outside Services, Direct Benefit to Customer (DBtC), etc.

It is important to note that despite these specific apparent variances—PSE discusses highlights of notable instances in the following paragraphs—Energy Efficiency staff effectively managed all programs and support functional costs, completing 2018 at or below the department's electric and natural gas anticipated spending levels.

1) Key Drivers of Expenditure Variances

In considering Energy Efficiency's electric spending of $91.09 million against a budget of $99.56 million, there were very few substantial electric expenditure variances.

In REM, which finished the year at 88 percent of anticipated electric spending and 105 percent of natural gas spending, there were better-than-expected marketing efficiencies in the Retail Lighting program. Commensurate with implementation delays (discussed in the preceding savings section), some programs realized cost savings at the beginning of the year.

The same circumstance applies to the Multifamily programs, which underwent design changes and vendor realignments. The BEM Sector completed 2018 at 94 percent of electric budget and 100 percent of its natural gas budget. Lighting-to-Go and Business Lighting rebate amount reductions resulted in lower costs.

In the Portfolio Support Sector, there were very few budget variances. A membership payment for work that an industry partner performed outside the scope of their normal membership represented a 31 percent increase over the 2018 electric budget. Consolidating the Energy Efficiency brochure inventory resulted in an under-spend in EE Brochures' electric and natural gas budgets. Also, the delayed development of a Trade Ally Portal in the CAN program[10] resulted in significant cost savings.

The Northwest Energy Efficiency Alliance (NEEA) budgets were affected by invoice payment timing. On the electric side, payments at times lag behind the invoices by one month, causing apparent lower-than-expected expenses.

[10] It is important to note that the CAN program receives referral payments from contractors who perform work for PSE customers. Although designed to be revenue-neutral, in many cases, revenues (expressed as negative numbers in SAP) exceed operating expenses. These revenues are applied to the Conservation Rider to benefit ratepayers in the subsequent year.

On the natural gas side, in Q2 2018, NEEA discovered that it hadn't updated the quarterly invoice amount to the 2018 rate, and issued a one-time invoice for the difference. Additionally, similar to the electric NEEA invoicing, the December 2017 invoice was paid in January 2018, resulting in an apparent over-spend.

Other notable variances were in the Program Evaluation and Conservation Supply Curves organizations, where the timing of some Outside Services work for the Conservation Potential Assessment was shifted to 2019, as well as some work that occurred in December 2018 not being invoiced until January 2019. The latter incurred a higher-than-expected Outside Services charge for work performed by the consultant in 2016 that was not invoiced to PSE until 2018.

Another relatively sizeable charge was attributable to the Net Metering program. Distribution system charges (associated with net metered customers' use of PSE's infrastructure, as outlined in the Commission's Accounting Order in Docket UE-990016) are entered as miscellaneous charges.

2) Revenue Balances

It is notable that some programs other than CAN may finish the year with a negative balance in the Revenue column of Exhibit 1, Supplement 1.[11] In 2018, the Single Family Water Heat program, in cooperation with the BPA's Heat Pump Water Heater Demand Response pilot, is providing rebates to customers, and BPA is reimbursing PSE for those rebates. These revenue balances help to offset conservation expenditures, and are listed in Exhibit 1, Supplement 1: *Actual Expenditures Compared to Anticipated Spends.*

D. 2018-2018 Biennial Target Progress

Table I-1 in Chapter 1: *Executive Summary* presents the 2018-specific overall Portfolio electric savings achievement-versus-goal (299,918 MWh vs 281,328 MWh) and natural gas savings (3,771,307 million therms vs 3,269,604 million therms) figures.

[11] A revenue balance is indicated in Exhibit 1, Supplement 1 as a negative value, since all other noted figures indicate expenses.

It is important to note that the electric savings figures do not represent: final verified NEEA-reported savings; any Biennial Electric Conservation Achievement Review (BECAR) potential adjustment; or verified and updated Home Energy Report (HER) 2018 savings. Table II-3 provides a preliminary 2018-2019 Portfolio view of PSE's key electric and natural gas savings and expenditure performance.

Table II-3: 2018-2019 Biennial Progress

	Electric			Natural Gas		
PTD	**MWh Savings Actuals:**		**299,918**	**Therms Savings Actuals:**		**3,771,307**
	MWh Savings Target:		*605,194*	*Therms Savings Target:*		*7,426,495*
	% of Savings Target:		*50%*	*% of Savings Target:*		51%
	Actual PTD Spending:	**$**	**91,086,596**	**Actual PTD Spending:**	**$**	**15,790,198**
	EOP Budget:	*$*	*198,984,817*	*EOP Budget:*	$	29,481,162
	% of EOP Budget:		*46%*	*% of EOP Budget:*		54%
EOP	**MWh Savings Forecast:**		**620,294**	**Therms Savings Forecast:**		**8,444,521**
	% of Savings Target:		*102%*	*% of Savings Target:*		*114%*
	Spending Forecast:	**$**	**199,102,957**	**Spending Forecast:**	**$**	**29,507,623**
	% of EOP Budget:		*100%*	*% of EOP Budget:*		*100%*

*Natural Gas Actual Spending excludes Shareholder

PTD = (Biennial) Period-to-Date
EOP = (Biennial) End-of-Period

2018-2019 Targets and Budgets reflect filed Exhibit 1 in UE-171087.

PSE will present the final 2018-2019 electric savings and expenditure figures in its Biennial Electric Conservation Report, which will be filed in Docket UE-171087 on or before June 1, 2020, consistent with WAC 480-109-120(4).

E. Five–Year Trends

As represented in Figure II-1, the Portfolio's electric savings have decreased an overall 21 percent from 2014 to 2018. 2018 savings were 6 percent lower than the previous year. PSE reduced the electric expenses an overall 8 percent from 2014 to 2018, with a 2018 reduction of almost 10 percent from 2017 expenditures. This trend reflects conditions indicated in the Conservation Potential Assessments (CPAs) in PSE's 2017 IRP, including but not limited to: the market saturation of several key measures; annual revisions to measure UES values; updated energy codes; administering costs associated with data management and reporting requirements; and evolving customer demand.

These and other ancillary contributors drive increased costs to acquire savings.

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

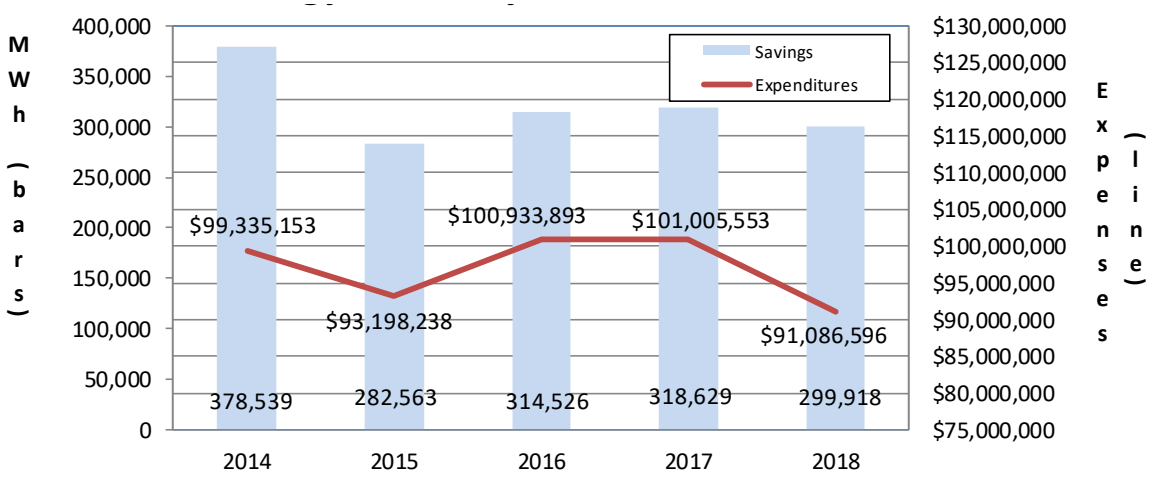
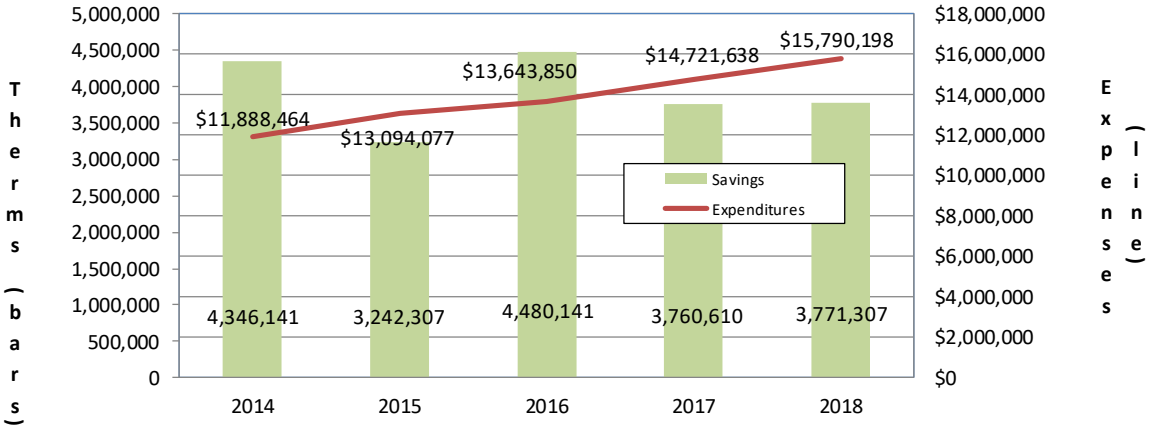


Figure II-2 shows that natural gas savings have decreased an overall 13 percent from 2014 to 2018. 2018 natural gas savings were relatively flat from the 2017 value: an increase of 0.3 percent. The natural gas expenses for the 5-year timeframe have increased 32 percent from 2014 to 2018, while natural gas expenses increased 7 percent from 2017 to 2018.

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



These indicators reflect the significant impact of continued low 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.

F. Cost-Effectiveness Ratios

Table II-4 provides the Portfolio view of the Total Resource Cost (TRC) and Utility Cost (UC) Benefit to Cost (B/C) results for 2018. The electric Portfolio's TRC B/C ratio was 1.69, and its natural gas TRC B/C ratio was 1.45. The Energy Efficiency Portfolio finished 2018 with an overall electric UC B/C ratio of 2.17, and a natural gas UC of 1.76.

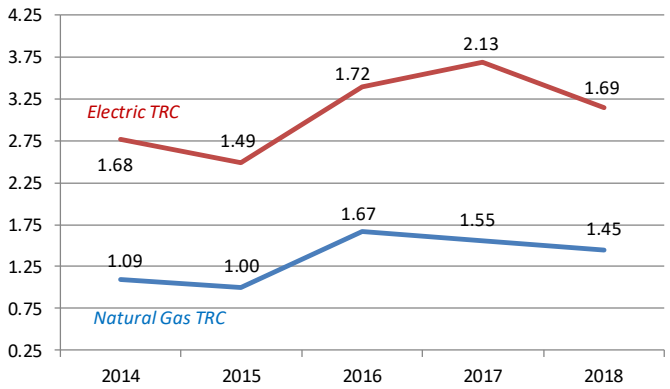
Table II-4: 2018 Energy Efficiency Cost-Effectiveness Ratios

Benefit to Cost Ratios Portfolio		
	Utility Cost	**Total Resource Cost**
Electric	2.17	1.69
Gas	1.76	1.45

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

Figure II-3 represents PSE's five-year Portfolio TRC results. All TRC figures are indicated with a 10 percent conservation credit adder included.

Figure II-3: Energy Efficiency Five-Year TRC Trend



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,[12] 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.

G. Direct Benefit to Customer as a Percent of Energy Efficiency Expenditures

In Exhibit 1, Supplement 1: *Actual Expenditures Compared to Budgets*, PSE indicates incentives paid to customers in the Direct Benefit to Customer (DBtC) category. Customers also directly benefit from a number of services PSE provides in addition to incentive payments. Where it is possible to clearly distinguish these functions and activities, 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 isn't intended to be used for comparison with other utilities. PSE maintains this metric to track the performance of its programs year-over-year.

Certain expenditures related to customer benefits that are difficult or administratively onerous to quantify are not specifically classified as DBtC, but clearly also carry an intrinsic value to the customer, beyond simply remuneration. For instance, if a customer participates in PSE's Refrigerator Decommissioning program, they derive the benefit of avoiding the need to take their old refrigerator to the transfer station—in addition to the rebate they receive.

The DBtC ratio is affected by a number of factors, including one-time expenditures, regulatory requirements, marketplace conditions, and expenses related to influencing hard-to-reach/proportionately underserved market segments. It is therefore inaccurate to conclude that the higher the DBtC ratio, the better-managed the program.

[12] ¶ 29, page 12 of Docket 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. (…)"*

1) PSE's DBtC Calculation

PSE's returned 80 cents out of every dollar collected through the electric Conservation Rider for REM, BEM, Pilots, and Regional Programs to customers in the form of a direct benefit. This Sector-Level DBtC (comparing the DBtC of the savings-generating Sectors that provide customer incentives to the expenditures of those same Sectors) is notable.

Similarly, the Sector-level natural gas DBtC—using the same calculation methodology—was 68 percent.[13] These figures are impressive, and reflect program staff's substantial efforts to continuously improve business operations, maximize value for PSE customers, and drive customer participation.

The Portfolio-Level DBtC is one that is more subjected to single-time charges, regulatory requirements, and outside influences. In addition to savings-generating programs, this ratio accounts for programs and functions in the Portfolio Support and Research & Compliance Sectors. Some of these functions contribute some level of DBtC, however intrinsic their value. Using this method reveals DBtC ratios that are, in spite of mitigating factors, noteworthy: the overall electric Portfolio DBtC was 70 percent in 2018, while the overall natural gas Portfolio DBtC was 62 percent.[14] These ratios excludes Other Electric Programs.

Readers will also note 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 DBtC ratios that range from 90 to slightly below 20 percent.

2) Proactive and Consistent Program Management

PSE accomplished this sustained level of DBtC through its continued focus on process maximization, and careful attention to continuous improvement and customer satisfaction throughout the organization, as discussed in the program-specific following chapters.

[13] If PSE discounted the $2.28 million expended on the NEEA natural gas collaborative, which resulted in no natural gas savings, the *Sector-level* ratio would have been 81 percent.

[14] Energy Efficiency's natural gas *Portfolio-level ratio* would finish 2018 with an overall DBtC of 73 percent by excluding the NEEA natural gas collaborative expenses.

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 with prudently and effectively applying Rider funding. In 2018, program staff cost-effectively:

- Managed increasingly complex programs, often consisting of hundreds of measures;
- Developed Conservation Plans one or more years in advance;
- Created and maintained extensive measure research and documentation;
- Responded to third party and evaluation data requests;
- Met evolving regulatory requirements; and
- Reviewed and validated third-party reporting.

H. Energy Efficiency's Customer Focus

Clearly, Energy Efficiency's ultimate year-end objective was to achieve its 2018 conservation savings targets while prudently managing customer Rider funding. Program staff focused on adaptively managing against plans put in place in 2017, designed to complete PSE's overall 2018-2019 biennial electric and natural gas targets. As the year progressed, staff continuously improved the implementation of those plans, adaptively managing in a dynamic marketplace. PSE discusses specific program initiatives to attain those savings and financial objectives in chapters 4 through 11 of this Report.

This section will highlight several initiatives that are critical in driving Energy Efficiency's 2018 success and are ongoing well into the future. Among those focus areas are a continuous attention to customer needs and expectations, constantly improving and adaptively managing its customer-driven business processes, and sustaining its commitment to exceeding Regulatory Stakeholder engagement expectations.

1) Meeting Customer Expectations

PSE customers' satisfaction is the key determinant of the success of Energy Efficiency's conservation programs, and is a top priority for program staff. Throughout 2018, the dedicated men and women in the department continued their long-standing commitment to maximize customer participation in PSE energy-efficiency programs while surpassing customers' expectations at each point of customer contact.

A key element of meeting customer expectations is the adaptive management of residential and business program offerings, including tailoring specific measures to customer needs, managing the scope of measure offerings, and dynamically adjusting measure incentives to motivate customer participation.

As a part of the specific program activities, customers expect PSE to provide pioneering conservation products and flexible avenues of accessing energy efficiency programs. Today's customers want fun and engaging information and outreach, easier rebate and grant processing with simple applications, and online tools that help them manage their energy use. Customers comprising hard-to-reach or proportionately underserved segments also must have access to Energy Efficiency's program offerings.

2) Maximizing the Ease of Participation for Customers

Energy Efficiency teams focused on creating programs that were easy for customer to participate in, with a broad array of participation options. PSE provided detailed discussions of these initiatives in the program-specific discussions in Chapters 4 through 12. PSE provides some highlights of those efforts here. Key contributors in augmenting the ease with which customers can participate in conservation programs included broad outreach strategies and tactics. These consisted of, but weren't limited to community activities and small business blitzes, which enabled small business owners to immediately register for conservation measures.

Energy Efficiency's extension of the Demand Side Management-central's (DSMc's) Public User Interface (PUI) was a significant factor in making participation easier and more effective for customers. Through the PUI, PSE provides customers the options to "Apply On-Line", "Self-Service", and "Check Status".

PSE's conducted its award-winning Energy Upgrades campaign for the fifth year. Customer participation opportunities were additionally enhanced by retailer point-of-purchase rebates, streamlined rebate applications, and better training for PSE partners and contractors.

Joint utility programs, exemplified by BEM's Commercial Kitchen & Laundry's incentive process, significantly improved consistency between utilities and simplified customers' incentive application process. The program's midstream aspect also provided this customer segments with instant rebates in locations where the customer is actively making a purchasing decision. PSE also maximized the impact of Contractor Alliance Network (CAN) members, which provided new customer participation avenues.

Program staff simplified Lighting Power Density (LPD) applications and the Energy Efficient Communities organization extended their presence in smaller communities, and conducted Home Energy Assessment "blitzes", where customers learned about the no- and low-cost elements of Energy Efficiency services. Many of these customers signed up for Energy Efficiency services during these blitzes.

3) 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. Staff employed propensity modelling, spatial analyses, customer surveys, promotions, advertising, and outreach to expand the communication and information—containing calls to action—available to customers. Program staff incorporated findings into their program services and offerings to meet evolving customer expectations in 2018. Highlights of significant Energy Efficiency awareness initiatives that are discussed in the coming chapters include:

- Now in its fifth year, 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 e-bill was ready, or if there was a potential for a higher-than-usual bill. And, up to 250,000 customers receive reports twice per year during the changing seasons ("Seasonal Readiness" alerts).
- Quality Assurance (QA) verification inspectors provide customers with applicable energy-efficiency information when they're in customers' homes performing verifications.

- The Multifamily Retrofit program distributed 12 "Strive for Five"[15] plaques—which are prominently displayed to maximize tenant awareness—to multifamily properties throughout the PSE service territory. The program also partners with housing authorities, property management companies, and condominium Home Owners Associations (HOAs) to maximize energy-efficiency awareness.
- The Direct-to-Consumer Channel continued its retail events, conduction over 100 high-impact and pop-up events in stores. High-impact events were eight hours, staffed by multiple field representatives, and pop-up events occurred in stores with high foot traffic. These events led to increased customer awareness of energy-efficiency offerings.
- PSE's electronic media presence—online, mobile apps, radio and television advertisements—were effective in maximizing customer awareness—and driving customer participation in Energy Efficiency programs.
- New award-winning television commercials, featuring energy-efficiency messaging from new characters "JoAnne" and "Rocky Raccoon" and returning personalities "Stan", "Art", and "Sally". These humorous segments resulted in customers who saw the advertisements indicating that they are more likely to use PSE's energy-efficiency information and tools.
- Over the course of eight months, the Energy Upgrades campaign sent more than 2.8 million email offers marketing limited-time-offers. There were 36 different in-store retail blitz events, with more than 16,000 Golden Tickets redeemed.
- As a part of its retail store awareness efforts, PSE implemented field services in over 400 retailer locations, with approximately 3,500 store visits. These efforts provide a connection between PSE, the retailer, and the PSE customer. Program staff services now range from lighting to thermostats.
- 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.

[15] *Strive for Five* is a Multifamily Retrofit recognition program that indicates that a property has installed five measure groupings in their building or campus.

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

As indicated in The Regional Power and Conservation Planning Council's (the Council) 7th Power Plan's Chapter 4: *Model Conservation Standard (MCS)-1,* 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 ***[ed.- Hard To Reach]*** segment should participate in similar proportion to non-HTR customers, assuming similar savings potential."[16]

PSE also believes that there may be other potential proportionately underserved segments, including English-as-a-second-language customers, for instance.[17]

PSE will continue to implement successful program strategies that serve potential HTR customers, and consult with the CRAG on the development of plans to address any access gaps. PSE will base future actions and program design on the results of these steps.

It is important to point out that PSE has been serving the majority of these customer segments for several years prior to the Power Plan's publication of the potential HTR segments. In fact, rules and conditions have required that PSE ensure that programs are designed to reach all customer segments since 2002. Even before that, the Low Income Weatherization (LIW), has been successfully serving the low-income and low-income multifamily segments for more than two decades. Energy Efficiency program staff consistently and carefully consider the full range of their constituents when developing their residential and commercial offerings.

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

[17] These, of course, may also be considered as sub-sets of the main eight HTR classifications.

Quite often, a specific program addresses more than one HTR segment. For example, PSE designed the Small Business Direct Install (SBDI) program to reach farms and other agricultural customers who operate as small businesses, lodging businesses that may be commercial tenants—and potentially qualify as rural customers—and other small businesses that may be commercial tenants. PSE discusses how its programs served each segment in 2018 through its residential and business programs in the coming section.

There are two important considerations in the hard-to-reach/proportionately underserved segment discussion of data analysis, relative to PSE data accumulation and analyses:

1) Relative to Hard-To-Reach segments, the 7th Power Plan clarifies that analyses should occur ***where data are readily available.***[18]
2) The list of Hard-To-Reach segments may not be comprehensive; MSC-1 states that segments ***may*** include those indicated.

In March, 2018, Energy Efficiency provided the CRAG the results of its HTR segment analyses, which revealed that in many of the potential HTR groups, Energy Efficiency has made good progress in proportionately serving those customers. In the limited segments where there are gaps, PSE re-focused its ongoing service initiatives and provided the CRAG with status updates throughout the year. PSE discusses those initiatives throughout the upcoming program reviews.

[18] Northwest Power and Conservation Council's 7th Power Plan, MCS-1, page 4-10, ¶ 2: "To accomplish this goal, Bonneville and the utilities in their overall data collection should include, **to the extent it is readily available**, demographic and business characteristic data that helps identify the existence of any HTR segments. […]" (emphasis added)

Table II-5 and Table II-6 provide HTR segment participation, relative to the overall PSE customer participation in Energy Efficiency electric and natural gas programs respectively.

Table II-5: Percentage of Attributable Participation by Unique Location for HTR Segments (Electric)

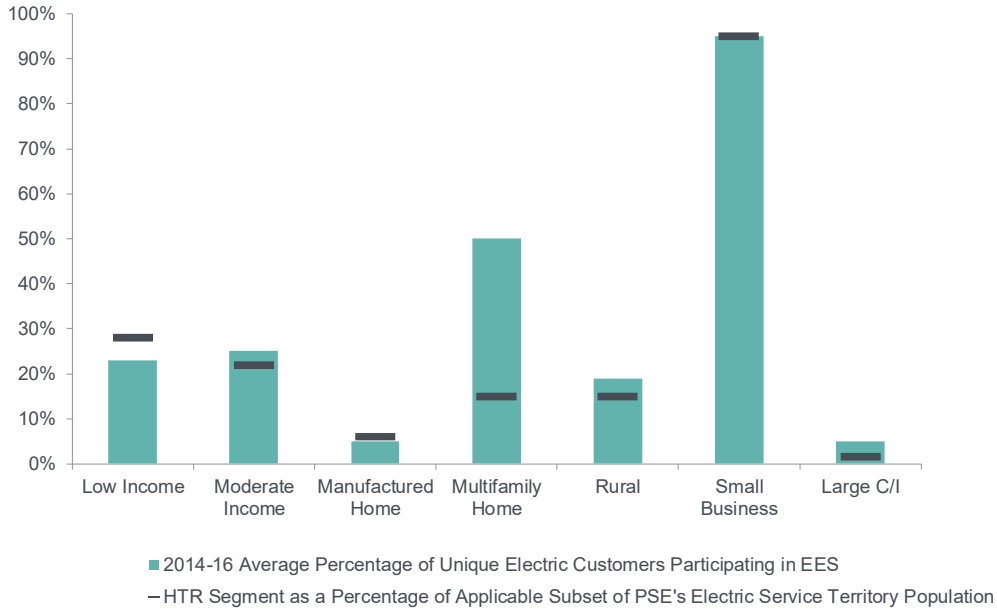
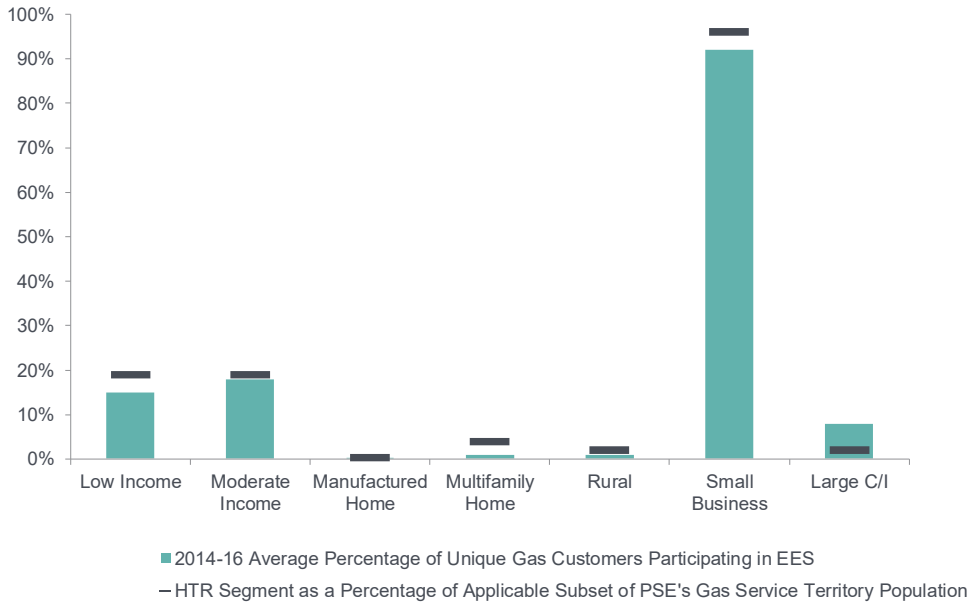


Table II-6: Percentage Participation by Unique Location for HTR Segments (Gas)



a. Energy Efficiency Program Design Currently Address Many HTR Segments

As noted in the previous section, Energy Efficiency program staff continue to manage 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 requirements and regional recommendations, PSE recognized that there was a need to focus on hard-to-reach and potentially underserved customers, and develop solutions that would help them conserve energy, saving on their energy costs. This focus has been integrated with PSE's emphasis on meeting challenging savings goals each year.

To ensure that its messaging reaches all of its customers and provides them opportunities, services, and measures that enable participation, Energy Efficiency utilizes a broad variety of customer survey data, spatial analyses, feedback from trade allies, historical performance, industry studies and evaluations. The following discussions of key customer segments highlight details that PSE provides in the program and organizational review chapters 4 through 12.

It is noteworthy that:

1) PSE designs many of its energy-efficiency programs (Home Appliances, Retail Lighting, Residential Showerheads, Commercial HVAC, for instance) on a range of efficient products that serve a broad constituency. It is safe to surmise that HTR customers also participate in those programs, although acquiring supporting data is a challenge. Others, such as Commercial/Industrial Retrofit, Multifamily New Construction, and Single Family Weatherization, consist of an extensive range of services that—while inclusive of potential HTR segments—are designed around structure classifications.
2) As PSE discusses in the following sections, several Portfolio Support groups play a part in bringing awareness to a range of customer segments. Energy Efficient Communities, Energy Advisors, and the Energy Efficiency Events staff are critical in conveying the availability of Energy Efficiency services across the spectrum of PSE customer segments.

3) The following discussions provide information related to Energy Efficiency's 2018 program implementation. Although program staff considered the HTR-related data as it was assembled, it would be inaccurate for readers to infer that the discussions are in response to HTR data findings. As noted earlier, Energy Efficiency has incorporated potentially hard-to-reach customer segments into its program design considerations for several years, and continually adapts them to evolving marketplace conditions.

i. Low-Income Customers

One of PSE's predominantly visible Hard-to-Reach programs is its residential Low Income Weatherization (LIW) program, which targets customers with a defined circumstance.

In order to maximize the availability of energy-efficiency measures, there are several strategies that the program employed, including but not limited to:

- Working closely with nine Puget Sound low-income agencies throughout the PSE service territory.
- Project funding is not limited to the budgeted conservation funding for cost-effective projects.
- Conducting outreach at food banks, senior and community centers, and tribes.
- Partnering with community organizations, including presentations, workshops, and event presence.
- LIW provides funding for certain repairs needed to facilitate the installation of energy-efficiency measures.
- Identifying ways to increase program participation by privately-owned multifamily properties, as identified through the application of a PSE segmentation tool.
- Consistent with WAC 480-109-100(10), the LIW program processes electric projects submitted by agencies that passed the Savings-to Investment Ratio (SIR) of 1.0 in 2018.

PSE also offers services for customers that may be income-qualified through other Energy Efficiency programs, as discussed in the following sub-sections.

ii. Moderate-Income Customers

Another residential program that also made services available to a portion of the low-income, as well as moderate-income segment was the Multifamily Retrofit program.

Although PSE did not report this customer segment as a separate classification for 2018, many low-income and working-class customers with moderate incomes living in multifamily dwellings obtain energy-efficiency measures through the Multifamily Retrofit program, rather than the Low Income Weatherization program.

Reasons were 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.

Energy Efficiency's Home Energy Assessment program was also effective in identifying and engaging this potentially hard-to-reach segment. The door-to-door approach was especially useful when staff can operate in older-home neighborhoods and military communities.

iii. Rural Customers

Energy Efficiency's Small Business Direct Install program fulfills a need for conservation measure access in many rural communities. Many small-to-medium agricultural operations are often located in remote, rural locations. Unique to the agricultural customer classification is that their access to conservation program services is limited to participating between planting, growing, and harvest periods. Similarly, lodging businesses are also seasonally-driven, with limited windows to consider conservation measures. The Energy Efficient Communities team expanded its reach to several rural cities and towns, often combining small business, agriculture, and small lodging visit "blitzes" in 2018.

The Home Energy Assessment program was another effective method of reaching this segment, and Energy Efficiency considers that its Customer Awareness Tools also communicates the conservation message well.

Additionally, as noted in other HTR segment discussions, PSE's Energy Efficient Communities team coordinated participation in energy fairs, community groups, civic clubs, retirees, colleges, and libraries, etc.

iv. Small Business Customers

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 Direct Install (SBDI) program is specifically designed to address the needs of small lodging, agricultural, and a variety of other small businesses. The Commercial Kitchen and Laundry program also brings their expertise to restaurant owners/operators who may align with the small business category.

PSE's small business and community "blitzes" continued to communicate the Energy Efficiency message, with good responses during the events. The Energy Efficiency Communities organization played a significant role in conveying the conservation message to this customer segment.

As another avenue for small businesses, the Business Energy Management's (BEM's) custom grant programs continued to adjust the customer qualification standards to accommodate lower-cost measures. In 2018, this enabled more small-to-medium business to participate.

v. Multifamily Tenants

In order to reach this potentially underserved customer segment, Energy Efficiency conducted awareness events at multifamily campuses throughout the PSE territory, in concert with the PSE Energy Efficiency Communities organization.

The program provided brochures and information geared to multifamily tenants. The Residential Business-to-Business staff also refined novel methods to communicate directly with tenants of multifamily buildings, including energy fairs, "Strive for Five" plaques, and engaged multifamily contractors and commercial/industrial contractors to increase program awareness.

vi. Manufactured Home Owners or Tenants

Energy Efficiency provided a wide range of weatherization, HVAC, and appliance measures to manufactured home owners and tenants. PSE partnered with its Contractor Alliance Network (CAN) to coordinate focus on this segment and provide weatherization, duct sealing and HVAC services.

Energy Efficiency also provided complementary Home Energy Assessments for this segment, and continued offering ductless heat pump rebates at a higher amount than in its Space Heat program.

PSE also recognizes that this segment may overlap with its LIW program. As discussed in more detail in the Low Income Weatherization review, Energy Efficiency developed a manufactured home replacement pilot, and is working with the low-income agencies to provide ductless heat pump replacement on structures that have been weatherized. PSE also created a targeted email and direct mail campaigns to connect with these customers.

vii. Industrial Customers

Many industrial customers are also eligible for PSE's Large Power User/Self-Directed program, provided under Schedule 258.

As discussed in the program review on page 133, BEM program staff engaged eligible customers in a focused communication effort, coordinated with the implementation of the program's RFP process.[19] Another program that focuses on this potentially underserved segment is Energy Efficiency's Industrial Systems Optimization Program (ISOP). By participating in the program, industrial customers potentially have the benefit of operational and maintenance improvements across each participating site. As discussed in the ISOP review, PSE also conducted "Kaizen Events"[20] for ISOP customers in 2018.

viii. English as a Second Language

English-as-a-second-language customers may also be a proportionately underserved segment of PSE's customers. This PSE-identified segment may also span one or more of the above-noted segments.

[19] In the Large Power User/Self-Directed 4-year cycle, customers are encouraged to develop RFPs in order to utilize the pool of Schedule 258 available conservation funds.

[20] A "Kaizen Event" for the ISOP program is an intense multi-day blitz to walk through a facility and make corrective actions that reduce energy usage, identify actions that can reduce energy usage through operational, behavioral, maintenance, and capital projects. It brings together PSE, Cascade Energy, Plant Maintenance, Plant Operational, and Plant Management staff to work as a team to identify and document the actions identified during the event.

In 2018, PSE conducted and participated in several events in neighborhoods that have a high English-as-a-second-language population. 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) Partners Must Meet PSE's Customer Satisfaction Expectations

PSE's emphasis on customer service is prominent in PSE's expectations of its trade allies, vendors, contractors, and third-party administrators. 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 vendors' and contractors' performance to ensure that they also meet customer expectations.

6) Continuously Improving Customer-Centric 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 engagements.

A key facet in the achievement of program objectives was the refinement of critical internal business processes. Energy Efficiency program staff continued to conduct business operations with a focus on adaptive management through the application of progressive continuous improvement 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. In 2018, Energy Efficiency focused on continuously improving its internal operational processes, and implementing DSMc enhancements.

Continuous improvement is an established and engrained method of adaptive program management for Energy Efficiency program staff. Its application ensures the prudent stewardship of customer funds and enables PSE to consistently offer a superior suite of products, yielding optimal savings results while carefully managing business expenses. Staff efforts 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 addition to conscientiously administering vendor and contractor payments, staff routinely examined processes required to manage the accurate and timely tracking of rebate and grant payments, ensuring a more positive customer experience.

Continuous improvement is a focus of not only programs in REM and BEM, but in all support organizations. Incorporating a wide range of continuous improvement principles, the skilled professionals in each organization achieved incremental progressions throughout the year, often in ways that are obscured from the public view, but critical nonetheless.

In each business consideration, 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.

a. Highlights of 2018 Business Process Enhancements

The below list provides a brief summary of some of the Portfolio-wide business process enhancements. PSE discusses these and others, specific to programs or functional organizations, in chapters 4 through 12.

- Residential program managers developed improved vendor invoice processing methods to improve the accounting accuracy, minimize charges to incorrect order numbers, and reduce the need for journal entries.
- The Market Research team created a dashboard that provides program staff with standardized satisfaction and performance indicators.

- PSE Evaluation staff applied advanced analytics (colloquially, "EM&V 2.0") to model energy consumption data for over 35,000 program participants, enabling staff to determine the predictability of energy consumption.
- As part of its field services, Direct-to-Consumer representatives directly engaged customers in store aisles to assist them in making their purchasing decisions relative to energy-efficiency products.
- The Data and Systems Services team, in concert with the Rebates Processing organization, continued to roll out and expand the availability of the Public User Interface (PUI) service in DSMc. The PUI greatly enhances customers' and contractors' visibility to their rebate application status.
- Data and Systems Services commenced the implementation of a process to allow customers receiving a rebate to either apply the rebate to their account or receive a rebate check.
- CAN program staff developed an enhanced process to track contractor referrals, resulting in a higher level of contractor engagement.

7) Commitment to Surpass Regulatory Stakeholder Expectations

PSE provides a complete discussion of its Regulatory Stakeholder[21] 2018 activities and accomplishments in Chapter 14: *Stakeholder Relations*. Energy Efficiency staff considered sustaining the excellent relationship that PSE has with its Stakeholders as a key 2018 focus area. The Conservation Resource Advisory Group (CRAG) consistently demonstrates the technical, policy, customer focus, and financial expertise required to closely engage with PSE's considerable Energy Efficiency Portfolio. This is a significant achievement, as a few members had not completely experienced the Annual Conservation Planning (ACP) process, and weren't entirely familiar with PSE processes, terminology, or program issues at the start of their tenure.

Energy Efficiency staff expended considerable energy in 2018 to ensure that Stakeholders had a suitable degree of familiarity with its operations, were comfortable communicating with Energy Efficiency staff, and were supportive of PSE's conservation programs.

[21] PSE considers its Regulatory Stakeholders to be the Conservation Resource Advisory Group (CRAG) and members of the UTC staff.

PSE values the collaborative relationship that it has established with its Stakeholders over several years, and expects that its operational processes, guidelines, and regulatory training Energy Efficiency staff have developed will continue to meet the expectations of its Stakeholders.

I. Measures

Energy Efficiency discusses its Measure archival system in Chapter 10: *Measurement & Verification*, starting on page 159. Exhibit 5 presents prescriptive measures that Energy Efficiency programs used in 2018.

1) 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 to driving Energy Efficiency savings accomplishments.

PSE includes more comprehensive, program-specific measure overview tables in each program discussion, that provide more refined views—albeit general summarizations—of Energy Efficiency's programs' projects or measure installations. Program measure tables aren't comprehensive lists of measures installed, and are not intended to be used as audit tools or to reconcile actual tracking records. 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.

J. 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 2018.

K. Compliance

Chapter 13: *Compliance*, provides a complete discussion of Energy Efficiency regulatory compliance, beginning on page 223. This 2018 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 UG-011571,[22] the 2010 Electric Settlement Terms, Docket UE-100177,[23] and Order 01 of Docket UE-171087.

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

[22] Commission Order 05 in Docket UE-100177 vacated specific electric deliverables outlined in Docket UE-011570.

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

PSE intentionally left this page blank.

III. RESIDENTIAL ENERGY MANAGEMENT

Chapter 3 provides a summary of the results made possible by customers served by Residential Energy Management (REM) staff. PSE will discuss savings and expenditure metrics, highlights of programs that drove results, ongoing efforts to connect with potentially hard-to-reach customer segments, and cost-effectiveness results.

A. 2018 Residential Energy Management Sector Summary

Table III-1 and Table III-2 provide, at a program level, REM 2018 savings and expenditure figures, respectively. PSE provides detailed program discussions in Chapter 4: *Residential Program Details*. PSE discusses the Business Energy Management (BEM) Sector results in Chapter 5: *Business Energy Management Overview,* and Chapter 6: *Business Energy Management Program Details*.

The Sector surpassed its electric and natural gas savings goals: 111 percent, and 147 percent, respectively. REM program staff managed the Sector's expenditures quite well. Particularly noteworthy is that electric spending was 12 percent lower than planned. Similarly, natural gas expenditures were commensurate with managing the Sector's savings performance, at 105 percent of budget.

Table III-1: 2018 Residential Electric and Natural Gas Savings

		2018 Savings		2018 Goal
Schedule	**Programs**	**Total**	**% of Goal**	
Electric	Electric			Electric
Gas	Gas			Gas
E201	Low Income	1,901	92.0%	2,066
E214	Single Family Existing	119,545	121.0%	98,820
E216	Single Family Fuel Conversion	499		0
E215	Single Family New Construction	35		254
E217	Multi Family Existing	11,433	65.1%	17,569
E218	Multi Family New Construction	1,267	50.7%	2,499
	Total Electric Programs	**134,680**	111.1%	121,208
G201	Low Income	21,541	220.5%	9,770
G214	Single Family Existing	2,551,448	154.6%	1,650,763
G215	Single Family New Construction	0	0.0%	9,875
G217	Multi Family Existing	19,520	24.3%	80,227
G218	Multi Family New Construction	60,603	110.7%	54,735
	Total Gas Programs	**2,653,112**	147.0%	1,805,370

Table III-2: 2018 Residential Electric and Natural Gas Expenditures

2018 Expenditures				2018 Budget
Schedule	**Programs**	**Total**	**% of Budget**	
Electric	Electric			Electric
Gas	Gas			Gas
E201	Low Income	$ 5,052,281	104.0%	$ 4,856,679
E214	Single Family Existing	$ 21,566,685	92.3%	$ 23,365,857
E216	Single Family Fuel Conversion	$ 204,667		$ -
E215	Single Family New Construction	$ 74,336	35.3%	$ 210,361
E217	Multi Family Existing	$ 7,723,127	74.4%	$ 10,385,755
E218	Multi Family New Construction	$ 695,509	56.7%	$ 1,225,948
	Total Electric Programs	**$ 35,316,606**	88.2%	$ 40,044,600
G201	Low Income	$ 831,130	190.0%	$ 437,426
G214	Single Family Existing	$ 6,873,230	108.5%	$ 6,331,873
G215	Single Family New Construction	$ 23,411	24.5%	$ 95,599
G217	Multi Family Existing	$ 239,830	36.5%	$ 656,719
G218	Multi Family New Construction	$ 365,707	82.0%	$ 446,096
	Total Gas Programs	**$ 8,333,308**	104.6%	$ 7,967,713

B. Notable Accomplishments

Several programs within the REM Sector sustained their innovative and noteworthy efforts to achieve the maximum savings while meeting customer expectations. The Single Family Existing group continued the successful Energy Upgrades campaign, as well as pop-up events, cross-sell engagements, and thank-you kits for selected programs. ACEEE recognized the Multifamily Retrofit program as exemplary for the multifamily segment. The Dealer Channel utilized data garnered from the Home Energy Assessment program to develop targeted email campaigns, and implemented several program process improvements to reduce administrative costs. All programs that used the Advanced Power Strip in their measure suites retired the measure, due to cost-ineffectiveness concerns, and the Single Family New Construction program returned after a 5-year hiatus, with a comprehensive program based on modeling protocols.

C. Key Performance Drivers

PSE provides program-specific discussions on key drivers of REM savings and expenditures in Chapter 4. The following sections provide brief highlights of those; readers may reference the above tables for these highlights.

It should be noted that the Home Energy Report (HER) savings and expenditures figures were impacted by the inadvertent and unintentional omission of a large portion of the program from the 2018-2019 BCP. Beginning in 2018, the Individual Energy Report pilot—consisting of three times the number of customers in the legacy HER program—was subsumed into the legacy HER program. However, the corresponding savings and budgets were not. The indicated savings and expenditure figures in this Report reflect the complications of incorporating the omitted goals and budgets versus the actual figures.

1) Key Savings Contributors

The majority of REM programs met or exceeded their savings goals. Particularly noteworthy are the Showerhead electric and natural gas savings achievement (69 percent and 79 percent above goal, respectively), Retail Lighting—a significant contributor to the overall Energy Efficiency Portfolio—finished the year 15 percent above goal.

REM program staff employed a wide range of continuous improvement and innovation to drive savings results. For instance, in the Multifamily Retrofit program, energy fair tabling events yielded a 50 percent participation rate in direct-install services. The program also made streamlining improvements in the management of condo owner project applications. Two programs: Residential Space Heat and Home Appliances collaborated with manufacturers to effectively double customer rebates for limited periods. Proactive incentive management in Retail Lighting, Showerheads, and Home Appliances also drove maximized savings.

Program implementation start-up delays also had an undesirable impact on some programs: Single Family New Construction, Commercial Midstream, and programs within the Dealer Channel, where the team implemented a restructuring of the Home Energy Assessment team and brought key Weatherization program responsibilities in-house at the beginning of the year. In the electric Water Heat program, staff learned that contractors continue to be wary of heat pump water heater technology, resulting in lower-than-planned electric savings for the program.

On the natural gas side, the Weatherization natural gas program achieved savings 15 percent above goal. The Showerheads program significantly exceeded its natural gas savings goal by 79 percent by collaborating with local utilities and adding units through a high-volume retailer. Low Income Weatherization surpassed its natural gas savings goal by 120 percent, through the return of a Seattle CAP agency.

Only two programs finished the year below their savings goals. The Multifamily Retrofit program experienced a lower number of insulation projects, and significant staffing turnover in the third-party implementer impacted natural gas savings. The program has seen lower potential each year as the multifamily marketplace becomes more saturated. And, as a result of increased marketplace experience, Home Appliances' 2018 forecast was more accurate, leading to savings achievement that—although falling short of 100 percent—was in-line with expectations.

2) Key Expenditure Drivers

The majority of REM programs managed their electric and natural gas expenses exceptionally well. Program staff employed proactive incentive management, innovative marketing techniques, extensive use of data analysis and outreach, and cost-reduction initiatives to finish 2018 significantly below budget. Through achieving better-than-expected marketing efficiencies, the Retail Lighting program was 21 percent under its anticipated spend, while achieving savings that were 15 percent above goal. The Dealer Channel, through several process improvements, was able to reduce administrative costs. Similar to the savings impact that new program start-up had on savings, spending was lower in Multifamily and Single Family New Construction. Other programs' spending was commensurate with the savings achievement.

D. Targeting Hard to Reach and Proportionately Underserved Market Segments

As noted in Chapter 2, section H.4, several programs in the REM Sector positively impacted many of the Hard-to-Reach and Proportionately Underserved customer segments. PSE provides additional detail on its initiatives to connect with potentially hard-to-reach customer segments in the program discussions in Chapter 4. Here, REM provides some highlights of those discussions.

Through partnering with its Energy Efficiency Communities and Events organizations, REM made strides in reaching low-income customers in 2018 by working closely with low-income agencies, community organizations, and numerous other groups to develop creative solutions to the specific needs of this customer segment.[24]

[24] Section II.H.4.a.i outlines several other points of focus for the LIW team.

Consistent with its long-standing policy, PSE does not limit the amount of funding that it makes available to low-income agencies through its Low Income Weatherization program. The program also provides funding for certain repairs needed to effect energy-efficiency measures. LIW also addresses the manufactured home Hard-to-Reach segment.

20 percent of almost 1,200 housing units served by the program in 2018 were manufactured homes. In 2018, LIW initiated projects that are planned to fund the replacement of five manufactured homes. Partnering with The Energy Project, the program will facilitate up to 300 ductless heat pump installations in manufactured homes that were previously weatherized. LIW also created a direct-marketing campaign in the manufactured home sector, consisting of emails, social media, and direct mail. The campaign included Spanish-speaking and multicultural radio and television advertisements.

REM also addressed the need to provide energy-efficiency calls to action for working-class and moderate-income customers in multifamily dwellings. In 2018, the Sector developed a strategy to reach multifamily residents who may not have access to/information about energy-efficiency measures, including energy fairs at apartment and condominium complexes. Staff also used GIS analysis of census data to identify regions categorized as “assumed low income”, which help target awareness efforts. The Multifamily New Construction program targeted specific affordable and rural multifamily building types.

In the manufactured/mobile home market, the Dealer Channel continued to offer the mobile home ductless heat pump measure had a higher incentive level than traditionally-constructed homes. PSE continued to include manufactured homes in its Home Energy Assessment program. In 2018, PSE performed 7,400 assessments for manufactured homes.

PSE provides details of these, and additional initiatives, in the program discussions throughout Chapter 4.

E. REM Cost Effectiveness

PSE presents the complete Total Resource Cost (TRC) and Utility Cost (UC) tables, showing cost-effectiveness calculations by program in Exhibit 2 of this Report.

Table III-3 represents the actual calculated TRC and UC benefit-to-cost (B/C) tests for the Residential Sector.

Table III-3: 2018 Residential Sector Cost-Effectiveness Tests

Benefit to Cost Ratios Residential Energy Management		
	Utility Cost	**Total Resource Cost**
Electric	2.27	1.80
Gas	2.62	1.67

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

1) REM Program Cost-Effectiveness Performance

With the exception of REM's renewed Single Family New Construction—which was impacted by prolonged start-up costs, with a low number of initial incentives paid in the beginning of the year—most of REM electric programs finished 2018 with a TRC of over 1.0. The overall Sector total TRC B/C ratio was 1.69. LIW, which is allowed special cost-effectiveness treatment under WAC 480-109-100(10), and was impacted by implementing agreed-to terms of the 2017 General Rate Case Stipulation Agreement, [25] had an electric TRC of 0.58. The Single Family Water Heat and Space Heat programs also finished the year slightly below a TRC of 1.0. PSE presents REM's overall total cost-effectiveness B/C ratios in Exhibit 2 including and excluding LIW, consistent with the WAC.

REM's overall natural gas TRC was 1.67, excluding LIW. LIW's natural gas cost-effectiveness (TRC of 0.50) is consistent with the Commission's 2012 policy statement on natural gas cost-effectiveness,[26] although the program's compliance with the 2017 General Rate Case Stipulation Agreement also contributed to a lower cost-to-savings ratio.

[25] Dockets UE-170033 and UG-170034.

[26] Docket UG-121207.

The start-up issues that affected the Single Family New Construction program also impacted the Multifamily New Construction natural gas program, which implemented a complete restructuring of its incentive program. The Single Family Water Heat, Weatherization, and Multifamily Retrofit programs also finished the year slightly below a TRC of 1.0.

F. Five-Year Trends

Figure III-1 provides a representation of REM's 5-year electric savings and expenditures performance. In 2018, electric savings were 11 percent lower from 2014 levels, while commensurate expenditures were 32 percent lower. From 2017 to 2018, electric savings were 6 percent higher, while spending was 17 percent lower for the same period.

Figure III-1:Residential Electric Five-Year Trends

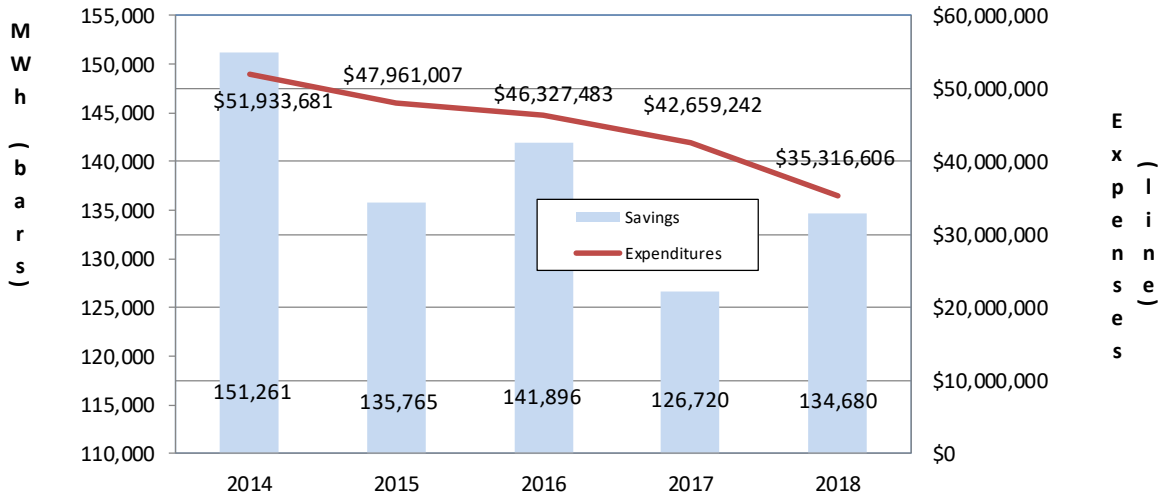
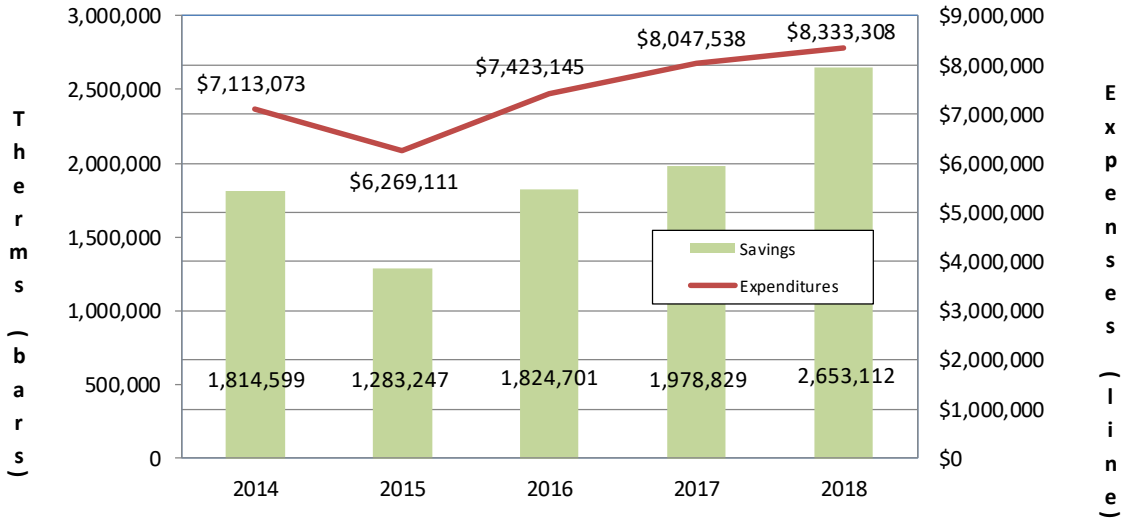


Figure III-2 provides a view of REM's 5-year natural gas savings and expenditures performance. On the natural gas side, there was a 46 percent increase in 2018 from the 2014 therm savings, and a 17 percent increase in natural gas expenditures.

From 2017 to 2018, however, there was a 34 percent increase in savings, with only a 4 percent increase in spending.

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



G. Program Measure Tables

PSE provides measure tables in each of the Channel and/or 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 are extracted from DSMc, include a limited number of measure types, and aren't intended to be a comprehensive list of all measures installed. PSE provides only a representative sampling of measure types. The listed measures aren't intended to comprise the total amount of 2018 program savings, and aren't intended to be used as audit tools or to reconcile actual tracking records.

It is noteworthy that selected measures may have units indicated in the "Dual" savings column in applicable program measure tables. These are measures—water-saving, some insulation, and various HVAC categories, for instance—where it isn't possible to conclusively determine the customer's primary applicable fuel type.

Using algorithms created to calculate electric and natural gas savings in these instances, the "dual" savings type applies specific ratios or existing electric-only and natural gas-only savings values to determine the amount of electric and natural gas savings attributable to those measures.

Showerheads installed in locations where PSE provides both the electric and natural gas service is one example. Another applies to equipment that conserve both electric and natural gas: certain clothes washers and commercial dishwashers, for instance.

H. Program Discussions

The program discussions In Chapter 4 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.

With the exception of this sentence, PSE intentionally left this page blank.

IV. 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, and
- Dealer Channel.

Each Channel is comprised of several programs. PSE details these programs 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, and trade allies. They also provide administrative efficiencies for PSE in meeting energy efficiency goals.

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

- 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 others through PSE's partnership with NEEA.
- Retail, online, leave-behind, and engagement LEDs and water-savings products.
- Refrigerator and Freezer Decommissioning – both secondary and primary units.
- 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 space and water heating and clothes dryers.

Program staff regularly review incentive amounts and savings values and base them 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 IV-1 provides a 2018 summary of savings for programs within the Single Family Existing group.

Table IV-1: Single Family Existing 2018 Savings

2018 Savings				2018 Goal
Schedule	Programs	Total	YE % of Goal	
Electric	Electric			Electric
Gas	Gas			Gas
E214	Single Family Existing			
	Residential Lighting	72,226	115.3%	62,650
	Space heat	8,051	106.7%	7,549
	Water heat	659	67.2%	980
	Home Energy Assessments	4,861	94.4%	5,148
	Home Appliances	4,108	66.6%	6,172
	Single Family Rental Pilot	0		0
	Web-Enabled Thermostats	1,114	95.6%	1,166
	Showerheads	2,493	168.9%	1,476
	Weatherization	1,926	92.6%	2,079
	Home Energy Reports	24,107	207.8%	11,600
Subtotals		**119,545**	**121.0%**	**98,820**
G214	Single Family Existing			
	Residential Lighting	0		0
	Space heat	733,431	116.6%	629,098
	Water heat	52,448	55.7%	94,126
	Home Energy Assessments	0		0
	Home Appliances	24,820	210.5%	11,791
	Single Family Rental Pilot	0		0
	Web-Enabled Thermostats	286,455	83.8%	342,000
	Showerheads	108,684	179.1%	60,700
	Weatherization	452,870	115.2%	393,048
	Home Energy Reports	892,740	744.0%	120,000
Subtotals		**2,551,448**	**154.6%**	**1,650,763**

Table IV-2 provides program-level details of expenditures for the Single Family Existing group, which consists of multiple single-family programs.

Table IV-2: Single Family Existing 2018 Expenditures

2018 Expenditures				2018 Budget
Schedule	Programs	Total	YE % of Budget	
Electric	Electric			Electric
Gas	Gas			Gas
E214	Single Family Existing			
	Residential Lighting	$ 9,895,423	78.5%	$12,605,450
	Space heat	$ 3,639,184	110.1%	$3,304,298
	Water heat	$ 333,008	82.8%	$402,152
	Home Energy Assessments	$ 2,284,047	86.4%	$2,644,880
	Home Appliances	$ 2,755,325	116.0%	$2,374,444
	Single Family Rental Pilot	$ 13,883	12.6%	$109,928
	Web-Enabled Thermostats	$ 154,439	103.6%	$149,025
	Showerheads	$ 506,733	121.5%	$417,202
	Weatherization	$ 862,096	88.9%	$969,270
	Home Energy Reports	$ 1,122,547	288.4%	$389,208
Subtotals		**$ 21,566,685**	**92.3%**	**$23,365,857**
G214	Single Family Existing			
	Residential Lighting	$ -		$0
	Space heat	$ 2,530,417	112.9%	$2,242,207
	Water heat	$ 292,911	102.0%	$287,116
	Home Energy Assessments	$ -		$0
	Home Appliances	$ -		$0
	Single Family Rental Pilot	$ 13,989	14.0%	$99,928
	Web-Enabled Thermostats	$ 707,599	117.0%	$604,925
	Showerheads	$ 283,289	96.5%	$293,465
	Weatherization	$ 2,831,531	104.7%	$2,703,547
	Home Energy Reports	$ 213,494	212.0%	$100,685
Subtotals		**$ 6,873,230**	**108.5%**	**$6,331,873**

3) Single Family Existing 2018 Customer Engagements

In 2018 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 engagement, and other Energy Efficiency Awareness Tools.

a. The Energy Upgrades Campaign

2018 marked the fifth year of this award-winning campaign. PSE discusses all of the campaign key metrics in the below list.

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.

The multi-faceted campaign launched in April 2018. PSE partnered with four lighting manufacturers, an appliance manufacturer, a smart thermostat manufacturer, and several retailers in PSE's service territory to offer special limited time offers from April through November on select products. The offers rotated throughout the campaign to give attention to each partner. PSE used a variety of other marketing and outreach tactics, including but not limited to; paid advertising, bill inserts, social media, and in-store events.

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.

<u>2018 Upgrades Campaign by the numbers:</u>

- 71,900,829 advertising impressions.
- 8 months of limited time offers on select LED products.
- 2,845,457 emails to PSE customers marketing limited time offers.
- 36 different in-store retail blitz events at 3 different retail chains.

- 869,796 impressions from news stories about limited time offers
- 17,524 Golden Tickets distributed to customers at the retail blitz events.
  - 16,262 Golden Tickets redeemed by customers at the retail blitz events
- 84,451,384 total impressions for 2018.

b. Cross-Sell Engagements

2018 marked the sixth year of the Direct-to-Consumer and Dealer Channel's Cross-Sell email communication engagement. The goal of this initiative is to encourage customers to participate in PSE's energy efficiency programs, to keep them regularly engaged, and to increase their awareness of other PSE energy efficiency offerings.

Program staff accomplished this 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.

To this end, PSE distributed 4.6 million emails with 89 unique electronic messages, an increase of 65 unique messages from 2017. In 2018, PSE updated its email delivery system to enable more customized, targeted messages that are even more relevant to customers and contributed to meeting targets across the portfolio of residential programs.

This communications tool has evolved over the last two years: from a one-time initiative involving a few large email deliveries per year that reference several Single Family programs, to discrete email sends that can be nimbly managed for specific purposes and program goals throughout the year.

c. Energy Efficiency Customer Awareness Tools

In 2018, 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 2018 during three specific instances:

- Unusual Usage Alerts: When a customer was on track to use more than 30 percent of gas or electricity from the previous year, PSE sent an Unusual Usage Alert via email to help them find ways to reduce usage.

- Seasonal Readiness Emails: Twice a year, PSE sent emails to up to 250,000 customers with information about how to save energy during summer and winter months.
- E-Bill Notifications: Customers received electronic bill ready notifications with an informational graph estimating their usage across major appliances during that bill cycle with a link to their current bill.

i. Variance Driver

In 2018, there was a budget variance of nearly $940,000 dollars (combined electric and natural gas) due to an inadvertent forecasting error in the beginning of 2018 that was corrected and reported as soon as it was discovered in July 2018.

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 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.

1) Direct-to-Consumer Channel Customer Awareness Initiatives

The following discussions highlight some of the Direct-to-Consumer Channel’s key 2018 customer awareness initiatives.

a. Retail Store Awareness and Field Services

In 2018, Puget Sound Energy successfully implemented field services in 410 retailer locations, a slight increase from 401 locations in 2017. This allowed PSE to increase access to efficient products while maintaining appropriate support for diverse retailers. 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.

PSE provides metrics for the PSE-branded online store, ShopPSE (http://shop.pse.com) in the Customer Digital Experience section of the Program Support chapter.

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

PSE's field services team of four full-time representatives, made over 3,500 field visits in 2018. In 2018, the stores were classified in a 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 by tier are:

Store Tier	Number of Stores	Total Number of 2018 Visits	Visits per Store	Avg. Visits per Month
A (1-2 visits per month)	37	617	16.7	51.4
B (1 visit per month)	117	1407	12	117.3
C1 (1 visit [call/email] every other month)	80	549	6.8	45.8
C2 (1 visit every other month)	83	510	6.1	42.5
D (1 visit every quarter)	88	371	4.2	30.9
E (1 visit or call every 6 months)	5	19	3.8	1.6

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 2018, the same 4 field representatives conducted almost 1,400 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 103 retail events throughout 2018. These events were a combination of high-impact events and pop-up events. High impact events were 8-hour events staffed by multiple field reps and scheduled with store management in advance. Pop-up events were on-the-spot events that took advantage of high foot traffic in the store. Both types of events aimed to engage store associates and PSE customers with energy-efficient products and program knowledge. For 2018, the field reps continued the innovative 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.

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 4.3 for the secret shopping visits, meaning they are doing a near outstanding job in the various aspects scored. In 80 percent of the secret shopping store visits, POP was deemed satisfactorily visible and the average scores for each section of the store were 3.9 or above out of 5. In light of how much product turnover exists at stores these numbers are encouraging, though there is some room for improvement. 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.

ii. Thank You Kits

2018 marked the fifth year of PSE's successful "Thank You" kits. PSE offers two types of kits based on the residential customer's fuel type. Customers receive a kit if they applied for a PSE rebate or participated in a PSE renewable energy program. The electric and combined service kit contains two A-Lamp LEDs and two faucet aerators. PSE sent electric "Thank You" kits to more than 14,600 eligible residential electric and combined service customers. The gas-only customer kit contains two bathroom faucet aerators, one kitchen aerator, and one showerhead.

PSE sent gas-only "Thank You" kits to over 5,700 eligible residential customers.

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.

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

iii. 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 150 employees in the core PSE electric service territory. In 2018, in collaboration with these businesses, PSE conducted 91 total events; approximately the same number as 2017. It is estimated that over 20,000 customers were made aware of the energy efficiency offerings while purchasing over 11,800 PSE branded Energy Efficiency Kits.

C. Program Reviews

The following discussions provide 2018 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 2018 program year was less volatile as the previous years' industry changes stabilized. PSE continued worked to educate customers and sales associates on the variety of LEDs available in the market as well as the benefits of selecting a LED bulb over an incandescent or halogen bulb. PSE developed and deployed in-store signage designed for this purpose, in participating retail locations in 2018.

a. 2018 Program Accomplishments

In 2018, the Residential Retail Lighting program exceeded its savings goal while staying under budget. Effective campaigns such as Energy Upgrades contributed to the program's successful performance. LED multi-packs continued to be popular in 2018 and the average retail price of LEDs was low enough to encourage customer adoption. PSE offers LED rebates at a variety of geographically-diverse retailers, including big box stores, grocery stores, and independent hardware stores, making it easy for customers to take advantage of rebates.

b. Adaptive Management

PSE decided not to pursue some budgeted marketing activities as staff worked on ways to improve the analysis of the program's marketing efforts. Absent the improved analysis, staff suspended some marketing expenses until they could be more confident that the spending would help meet program goals.

c. Key Variance Drivers

The Retail Lighting program completed 2018 under budget, primarily due to better-than-expected efficiencies in marketing and retail field service as the organization continued successful, established strategies.

2) Residential Appliances

In 2018, the Direct-to-Consumer Channel offered incentives on a variety of appliance programs for residential customers.

These include:

- Refrigerator & Freezer Decommissioning;
- Energy Star® Clothes Washers;
- Energy Star Refrigerators;
- Heat Pump Dryers; and
- Energy Star Dryers.

a. 2018 Program Accomplishments

PSE's retail appliance program partnered with manufacturer Whirlpool in 2018 as part of the Upgrades campaign. PSE promoted double incentives on energy efficiency appliances and saw a significant lift in rebate applications during the campaign. Based on the success PSE experienced in 2017 with a limited time appliance decommissioning offer, PSE offered an increased decommissioning incentive in conjunction with the Whirlpool double incentive. Customers had the opportunity to receive double rebates if they purchased a new refrigerator and had their old one recycled.

PSE's goal with the combined rebate opportunity was to inspire more customers to upgrade their inefficient appliances and recycle them in an environmentally responsible manner. The Appliance Decommissioning program experienced even greater success in 2018, with a 248 percent increase in refrigerator and freezer recycling rebates (based on pick-ups) during the Upgrades campaign period, as compared to the eight weeks prior to the campaign.

b. 2018 Adaptive Management

To maintain a cost effective program in 2018, PSE lowered incentives from $75 to $25 for ENERGY STAR® refrigerators, clothes washers and electric dryers. PSE also reduced Heat Pump dryer incentives from $100 to $50. The freezer rebate was also discontinued as PSE continued to see a decrease in customer participation from 2017. Additionally, PSE contracted with a new rebate processing vendor in 2018 in an effort to lower administrative and operating costs for the downstream rebate program, improving cost effectiveness.

c. Key Variance Drivers

Although PSE lowered incentives in 2018, 2017 rebate applications processed in 2018 with the higher rebate value caused spending to exceed the budget in 2018. The retail refrigerator measure performed well in 2018, but the retail clothes washer and dryer measures had lower volumes than anticipated. Lower than expected volumes led to the program's electric savings shortfall.

PSE, however, exceeded its gas savings target for the Retail Appliance program.

PSE's Appliance Decommissioning program provides a leave-behind kit as a thank you to customers for participating in the program. The water efficiency products result in gas savings for customers that live in PSE's dual-fuel service territory. The success of the limited time offer led to increased distribution of the leave behind kits, resulting in PSE exceeding its gas savings target in 2018.

3) Residential Showerheads

PSE offers instant incentives on WaterSense® labeled showerheads to customers through retail stores, targeted emails, engagement and through shopPSE. PSE continued to look for ways to build and strengthen its showerhead program portfolio in 2018.

a. 2018 Program Accomplishments

Most notably, Costco stores re-enrolled in the instant rebate showerhead program with the showerhead manufacturer, Waterpik® and added the showerhead manufacturer, Kohler® to the program in 2018.

In addition, the program leveraged partnerships through WaterSense® and the Energy Upgrades Campaign to promote the program to customers. In January, PSE collaborated with the City of Bellevue Utilities (water, sewer, storm water, solid waste) to promote the PSE showerhead rebate program, as well as shopPSE in Bellevue Utilities' monthly newsletter. The newsletter is translated into Chinese, Korean, Russian, Spanish, and Vietnamese. The collaboration provided PSE the opportunity to target a new segment of its customer base.

b. Adaptive management

The retail showerheads program had no significant changes in 2018. As it became apparent the program would exceed budget, PSE reduced its spending on marketing and will revisit strategies in 2019.

c. Key Variance Drivers

The Retail Showerheads program exceeded its electric and natural gas savings goals, as well as budget for expenditures, largely due to additional showerheads being offered through a high-volume retailer.

4) Web-Enabled Thermostats

PSE has made adjustments to the measure life, measure cost, and energy savings to reflect new research on savings and market prices for these units. PSE continues to add new Energy Star®-qualified manufacturers who meet its product functionality requirements and have the ability to verify customer connectivity.

a. 2018 Program Accomplishments

The web-enabled thermostat program had a successful 2018. Though PSE transitioned to a new rebate processing vendor, the program was able to continue offering instant incentives and was well-received by customers. PSE partnered with Nest in November of 2018 to specifically target electric heating customers. An email blast promoting PSE's smart thermostat rebate, as well as Nest's Black Friday discounts was sent to PSE electric customers. PSE's partnerships and strategic marketing led the smart thermostat program achieving both its savings and spending goals in 2018.

b. Adaptive Management

PSE noted a decline in electric heat smart thermostat rebate redemptions midway through the year in 2018 and focused marketing efforts on reaching electric heating customers. Smart Thermostat rebates were promoted via social media, email, and other programs' cross promotions in efforts to raise customer participation in the program.

c. Key Variance Drivers

The Smart Thermostat program performed close to savings and budget targets as a result of PSE's strategic marketing and 2018 anticipated volumes being based on lessons learned from the program's 2017 performance.

5) Home Energy Reports

The Home Energy Reports program successfully delivered 498,474 print Reports and 357,369 email Reports. PSE's 2018 Customer Engagement Tracker survey revealed that 93 percent of customers in the 2008 deployment program (the first HER pilot) are still reading reports.

Twenty-six percent of customers self-report being more satisfied with PSE in response to the Reports program. As it has done in years past, the actual 2018 savings will be "trued up" following the next impact evaluation.

a. Key Variance Drivers

The originally-filed 2018-2019 Biennial Conservation Plan inadvertently and unintentionally omitted the Home Energy Report budget and savings forecasts. Program staff revised its forecasts mid-year 2018, and the 2018 actuals reported here are in-line those revised forecasts.

The complications of combining legacy HER savings with IER savings resulted in the reporting discrepancy between the planned and achieved 2018 electric and natural gas savings. On the electric side, savings were 100 percent higher than indicated in the 2018 Plan: 24,100 MWh achieved, versus 11,600 MWh planned. On the natural gas side, the program exceeded its 120,000 therms goal indicated in the 2018 Plan, with more than 890,000 therms achieved—a 600 percent difference.

6) Direct-to-Consumer Channel Measure Highlights

It is interesting to note that many of the water-savings measures indicated in the following table (such showerheads, aerators, etc.) are often reported in PSE's electric-only, natural gas-only, or combined territories. The latter figures are presented in the "Dual" column.

PSE provides an overview of Direct-to-Consumer Channel measures by measure types reported in 2018 in Table IV-3.

Table IV-3: Overview of 2018 Direct-to-Consumer Channel Measure Activity

Direct to Consumer Channel Measure Counts				
Program Measure Type	Measure	Electric	Dual	Natural Gas
Retail Lighting				
	LED Fixture	486,000		
	CFL Lamp	-		
	LED Lamp	3,570,000		
	String Lighting	32,900		
Home Appliances				-
Appliances	Clothes Dryer	3,200		
	Clothes Washer Replacement	300		-
	Clothes Washer	3,680	4,660	
	Freezer Decommissioning	1,150		-
	Freezer	110		
	Refrigerator Decommissioning	4,060	-	-
	Refrigerator Replacement	-		-
	Refrigerator	4,900		
Plug Load	Advanced Power Strip	400		
Lamp	LED Lamp	-		
Water	Residential Faucet Aerator		-	
	Residential Showerhead	-	-	
		-	-	
Web-Enabled Thermostats			-	
	Web-Enabled Thermostat	1,200	7,500	-
Showerheads				
	Residential Aerator	12,150	31,760	13,100
	Faucet		900	
	Showerstart Adaptor	6	40	2
	Showerhead	11,500	31,000	4,600
Home Energy Reports		100,000		81,200

D. Dealer Channel

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

- Distributors and contractors that sell, install, and service energy efficiency appliances for single family residential customers, and
- 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, and home retrofit services. The Dealer Channel operates primarily within the structure of Schedule 214: Single Family Existing.

1) 2018 Channel Highlights

The Dealer Channel made some significant changes to its programmatic approach in 2018, improving program uptake by encouraging the customer to continue moving through an expected energy efficiency journey. PSE altered marketing messages to begin customers with the free Home Energy Assessment, which is a gateway to personalized recommendations and custom contractor referrals. PSE also utilized the data collected through Home Energy Assessments to better target email campaigns related to limited time offers for the space and water heating programs.

PSE also implemented several process improvements to reduce administrative costs related to program management. This included restructuring the Home Energy Assessment implementation team, bringing key responsibilities related to the Weatherization program in-house, and improving customer experience based on the satisfaction surveys received.

PSE also retired the Fuel Conversion program, but captured a small amount of savings from projects completed in 2017, and applied for in 2018.

2) Home Energy Assessments

Home Energy Assessments provide 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, and faucet aerators.

a. 2018 Program Accomplishments

In 2018, the HEA program served 10,044 residential customers, providing an average 13 products and 475 kWh in savings per customer. Overall customer satisfaction for the program exceeded an 8.5 of 10. PSE also implemented several process improvements to reduce costs and improve customer experience, as described below.

b. Adaptive Management

In 2018, the Home Energy Assessment program transitioned from multiple vendors implementing HEA's, to one vendor implementing the HEA, result in a number of program improvements, including: a more consistent customer experience, increased ability to enact program improvements, and a singular marketing message.

PSE continued to improve upon its HEA marketing efforts by leveraging the data gathered during HEA's to send customers emails that were more customized to their needs. In a similar vein, PSE began incorporating a call to action for the HEA in the unusual usage alerts that are sent to residential customers. PSE also began offering limited Saturday appointments for HEA's for customers that are not available during the week.

Customer survey data was analyzed and feedback was provided to program staff to enact program improvements. In addition to improvements in how HEA is implemented, much work was put into analyzing lead sources for HEA and identifying which of those lead sources was most cost effective.

Historically, email campaigns have been the most effective means for enrolling customers in HEA, but as that market becomes more saturated there is an increased need to find alternative means to educating customers about the HEA program.

PSE also retired the "Advanced Power Strip" measure in early 2018, due to evaluation findings that suggested that customers were removing the devices at an unacceptable rate. PSE continues to explore different ways to educate customers and improve the persistence of this measure.

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

In order to better access hard-to-reach and proportionally underserved customers, PSE continues to offer a Home Energy Assessment for customers residing in Manufactured and Mobile Homes. This year PSE performed HEA's at over 400 mobile homes.

d. Key Variance Drivers

The HEA program fell slightly short of savings and spending targets. Savings targets were impacted by the program restructuring at the beginning of the year. That change had positive impacts on overall program spending, significantly reducing overall administrative costs.

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. 2018 Program Accomplishments

The program continued to provide top quality weatherization services, delivered through PSE's Contractor Alliance Network. In 2018, PSE identified ways to build expertise internally to seamlessly transition quality assurance and control from a third party implementer to PSE's in-house verification team.

b. Adaptive Management

In 2018, PSE transitioned project verifications from a third-party to PSE's internal verification team, resulting in better tracking of contactor issues. Additionally, PSE also prepared for the transition of contractor account management from a third-party to PSE. Efforts were undertaken to communicate these changes to contractors in 2018 and build on the relationships that had been developed by the third-party.

c. Key Variance Drivers

Single Family Weatherization under-performed on electric savings, but managed its budget well. On the natural gas side, savings exceeded goal, while expenses were only slightly over the anticipated spend. Key contributors for gas accomplishments were higher than anticipated performance in duct sealing/insulation, attic insulation, and floor insulation measures. Marketing efforts—which are not fuel-specific—for weatherization did not yield expected results in all cases.

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. 2018 Program Accomplishments

Electric Space heating continued to see an increase in customer heat pump installations (including ductless heat pumps). The program worked with market partners to provide qualifying customers a limited-time offer on ductless heat pumps that combined PSE rebates with manufacturer financing incentives.

PSE continued to see strong performance from the Energy Star® natural gas furnace measure for the third year in a row. In 2018, 71 percent of incentives processed came from contractors that are part of PSE's Contractor Alliance Network, who can offer instant rebates to PSE's customers.

The Residential Electric Water Heat program management team gained valuable insight through marketing efforts. PSE planned to work with contractors to promote the Heat Pump Water Heater (HPWH) through a contractor-based limited-time offer. The offer was based around providing the contractor with a salesperson incentive for every HPWH sold. This "Sales Performance Incentive Fund (SPIF)" was combined with in-person training in partnership with the Northwest Energy Efficiency Alliance (NEEA).

In spite of all this work, PSE saw no increase in the amount of incentives processed. PSE analyzed the results of this effort and became aware of some key hurdles that need to be overcome in order for contractors to fully embrace the product, such as increased installation time and contractor anxiety related to warranty callbacks on a new technology.

Natural Gas Water Heating is a new program PSE launched in 2018. Contractor response was very positive. Both a storage and tankless water heater rebate were included in the program. Redemptions of tankless water heaters exceed PSE targets but the storage tank rebate was slower to start off. PSE continues to monitor the success of these new measures.

b. Adaptive Management

In 2018, PSE implemented a process to analyze customer satisfaction survey results and follow up with customers who responded with low satisfaction scores. The most common complaint was related to a lack of knowledge about an instant discount which had been provided through the Contractor Alliance Network. Deeper analysis demonstrated that Contractors were following PSE's guidelines regarding attribution, and customers may not see the rebate in their bill or forget that it was included.

As a result PSE implemented an email reminder campaign to contractors to make sure they ensure customers are aware of the rebate, designing a rebate thank you card that contractors can include in the sales packet that they leave with customers.

c. Pilot-Like Initiatives

In 2018, PSE introduced a separate ductless heat pump measure to encourage customers to install a DHP instead of a less efficient code-qualified unit. PSE quickly realized that this incentive was not being used as anticipated, as customers were using it to supplement an existing gas system for only a portion of their homes (versus the entire home).

As this was not the intent of the incentive, it was retired at the end of the year and the whole home air source heat pump rebate was adjusted to include mini-split technology.

PSE also participated in the Bonneville Power Agency (BPA) Heat Pump Water Heater Demand Response Pilot to test advanced water heater demand response communication technology. PSE recruited customers, provided monitoring equipment, coordinated communications and customer surveys, and attended working meetings with the BPA. PSE also facilitated the pass through of rebates to the customers. The pilot was successful, with PSE contributing the highest number of customer participants.

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

The program maintained a higher 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 continues to work with contractors to offer this rebate to qualifying customers.

e. Key Variance Drivers

PSE's Electric and Natural Gas Heating programs exceeded savings and budget expectations. The increased demand for Ductless Heat Pumps and Gas Furnaces outpaced PSE's initial plan, even with reduced gas marketing efforts at the end of the biennium. This signals that there is a higher-than-normal demand for more efficient technologies in this area. This demand was factored into 2019 plans.

Conversely, the Electric and Natural Gas Water Heat did not meet planned targets. Electric Water Heat performance tracked according to targets, coming under budget, while Gas Water heat did not and slightly exceeded its anticipated spend. On the electric side, there is a regional focus on driving market transformation in Heat Pump Water Heaters, but as PSE learned in its contractor-targeted Limited Time Offer of SPIFs, contractors continue to be wary of the technology and are deterred by the overall time it takes to install the equipment. PSE continues to work with regional partners to drive education and customer demand around the technology.

As for Natural Gas Water Heat, 2018 marked the additional of the storage and tankless water heater measures. PSE anticipated a faster ramp up than was experienced. PSE also under-estimated the x costs of the program. It is likely that the retirement of the Fuel Conversion rebate also contributed to the underperformance, since PSE no longer covers a portion of the costs related to home improvement needs that may be needed to accommodate these technologies.

5) Fuel Conversion

PSE closed out the Fuel Conversion program at the end of 2017. However, as part of the close-out process, PSE managed a list of pre-approved customers who had expressed interest in the fuel conversion rebates and may have experienced delays in either receiving a meter or equipment installation. As a result, PSE processed rebate applications for these pre-approved customers through the first part of 2018 and stopped tracking labor to the program in June. This program tracks electric-only conservation.

Fuel Conversion measures consisted of Baseboard-to-Furnace, Water Heater-to-Water Heater, and Combination Water and Space Heat Conversions. Fuel Conversion Appliances consisted of Gas Range Conversion and Clothes Dryer Conversion. Table V-4 illustrates the Fuel Conversion projects that PSE processed in 2018.

Table IV-4: 2017 Fuel Conversion Projects Processed in 2018

Fuel Conversion 2018 Project Close-Outs												
	January	February	March	April	May	June	July	August	September	October	November	December
kWh Savings	296,288	105,338	63,536	11,183	0	9,720	0	12,774	0	0	0	0
Projects												
Fuel Conversion Appliances	123	22	14	7								
Natural Gas Fuel Conversion	41	13	10	2		1		2				
Projects Grand Total	164	35	24	9		1		2				

6) Dealer Channel Measure Highlights

On the following page, most insulation measures indicated are reported in units of square feet.

Measures, grouped by types that were reported in 2018, are presented in Table IV-5.

Table IV-5: Overview of 2018 Dealer Channel Measure Activity

Dealer Channel Measure Counts				
Program Measure Type	Measure	Electric	Dual	Natural Gas
Home Energy Assessments				
Energy Assessment	Home Assessment	10,500		2,700
Lamp	LED Lamp	150,000		
Water	Residential Showerhead	10,500		8,500
	Residential Aerator	4,600		7,100
				-
Commercial Midstream				
HVAC	Heat Pump	5		-
	Air Conditioner	60		
Water Heat	Boiler			10
	Water Heater - Storage			90
	Water Heater - Tankless			2
Space Heat				
Heat Pump	Heat Pump Sizing and Lockout Control	-		-
	Ductless Heat Pump	2,300		
	Ground Source Heat Pump	2		-
	Heat Pump	800		-
	Heat Pump Conversion	600	-	-
Boiler	HVAC Boiler			60
Combined	Integrated Space and Water Heat	-		100
Fireplace	Gas Fireplace			900
Furnace	Gas Furnace			5,600
Thank You Kits	Aerators	4,500	6,100	7,500
	LED Lamp	10,600		
	Residential Use Showerhead			2,500
Water Heat				
Water	Heat Pump Water Heater	400	-	
	Storage Water Heater			100
	Tankless Water Heater			900
Thank You Kits	Aerators	500	1,100	1,500
	LED Lamp	1,500		
	Residential Use Showerhead			500
Weatherization				
Sealing	Insulation and Duct Sealing	200		1,300
	Air Sealing	405,600		2,033,000
	Duct Sealing	30		160
Energy Assessment	Home Performance Assessment	-		
Insulation	Attic Insulation	274,000		1,130,000
	Floor Insulation	258,000		1,010,000
	Wall Insulation	48,600		183,000
Safety	CO Detector			900
Thank You Kits	Aerators	1,100	2,900	3,400
	LED Lamp	4,000		
	Residential Use Showerhead			1,100
Ventilation	Whole House Ventilation	20		
Window	Single Pane to U30	75,250		179,300

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 Retrofit, Low Income Weatherization, Single Family New Construction and Multifamily New Construction, and programs.

The Multifamily Retrofit 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 2018, the goal of Puget Sound Energy's Low-Income Weatherization program was 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 built on the existing model and continues to focus on partnerships with assistance agencies and leveraged PSE programs such as bill-payment assistance.

Key stakeholders include: 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 (Shareholder), BPA credits or other federal or state government programs.

Other ad-hoc funding may include, but is not limited to:

i. 2017 General Rate Case Settlement Stipulation

In the 2017 General Rate Case, PSE agreed to additional funding for the LIW Program:

> Beginning January 1, 2018, PSE will provide an additional amount of $2 million to facilitate project support activities. The funding is consistent with terms outlined in PSE's 2017 General Rate Case (GRC) Settlement Stipulation Agreement.[27]

This funding will be in effect until June 30, 2019. PSE will provide reimbursement to partnering agencies of up to 30 percent of project that agencies enter in PSE's LIW online portal for project support. This amount is incremental to the funding that PSE already provides as a part of its standard services (install measures, protect health and safety, and protect the integrity of the installed measure), and will continue to provide through the 2018-2019 biennium.

There is no cap on low-income funding; if agencies provide cost-effective projects beyond PSE's forecasted biennial total, PSE will continue funding the standard activities.

ii. Special Contract Funding

Per stipulations outlined in the special contract between Microsoft and PSE and approved by the Commission, established as a part of the Settlement Agreement in Docket UE-161123, PSE estimates that the LIW program will manage up to approximately $145,000 annually for energy efficiency projects, emerging technology, distributed generation, or repairs necessary to install energy-efficiency measures.

iii. Green Power Community Support Grants

In 2018, the Community Energy Efficiency Program (CEEP) issues a grant to PSE for $250,000. In collaboration with the PSE Green Power programs, which matched the CEEP funds, PSE has facilitate funds for low-income solar installations.

[27] Dockets UE-170033 and UG-170034.

The PSE Green Power funds are taken from Program Reserve funds (funding collected from PSE Green Power customers that is not used for Green Power REC purchases) dollars. Projects will be completed by June 15, 2019. The projects will be Net Metered through PSE's Customer Connected Solar group.

b. 2018 Program Review

The 2018 Low Income Weatherization program electric savings met 92 percent of goal and natural gas savings finished the year at 220 percent of goal. The natural gas program significantly exceeded expectations which is discussed further under "Key Variance Drivers". The Program served 1,180 housing units. Of those, 17 percent were single family, 63 percent were multi-family, and 20 percent were manufactured home residences.

c. Adaptive Management

The PSE Low Income Weatherization program continued to achieve conservation savings on measures that are considered cost effective by the Department of Commerce (DOC) in addition to prescriptive measures typically offered by the Program. For measures considered cost-effective by DOC, the program was able to leverage Savings to Investment Ratio (SIR) values on custom measures while capturing TREAT energy modeled savings values.

General Rate Case Dollars

Beginning January 1, 2018, PSE started to distribute 2017 general rate case dollars through reimbursements to partnering agencies, which will continue through the 2018-2019 biennium until June 30, 2019 or until funds are exhausted, whichever comes first.

PSE began 2018 by implementing a higher reimbursement rate for project support per the agreement with stakeholders. After the State Capital budget passed and dollars distributed to the agencies, the reimbursement rate reverted to a decreased project support reimbursement rate.

Green Power/CEEP Dollars

In November 2018, PSE awarded King County Housing Authority, HopeSource, and Opportunity Council nearly $465,000 to pilot 5 multi-family solar installations with the intent to identify how best to leverage multiple funding sources in advance of the Microsoft Contract dollars. The projects are funded based on a one-to-one match with WSU's Community Energy Efficiency Program.

Special Contract Dollars

PSE is awaiting Microsoft's metering readiness to collect special contract dollars. The Green Power/CEEP partnership will help provide lessons learned toward implementing renewable projects with the special contract dollars and other funding sources, if applicable.

d. Pilot-Like Initiatives

Manufactured Home Replacement Pilot (MHRP)

Upon receiving a $300,000 CEEP grant, PSE launched a MHRP pilot in late summer 2018, in partnership with Department of Commerce, the Energy Project (TEP), and Washington State University (WSU). The pilot is aiming to fund five demonstration projects across the service territory by June 30, 2019, with the ultimate goal of creating a replicable and scalable program.

The Energy Project Ductless Heat Pump (DHP) Collaborative

This effort was led by The Energy Project in coordination with Department of Commerce and PSE. The TEP goal is to target and install 300 DHPs in previously weatherized manufactured-home units by June 30, 2019. The list of potential candidates was made accessible to agencies for targeting purposes. Per Commerce guidance, households identified as part of this initiative could be verified as low-income either through energy assistance participation, PSE HELP participation or by having received Weatherization in the last 12 months. Agencies have been following individual procurement policies by soliciting a third party installation contractor. PSE committed to tailor and complement marketing tactics to support TEP DHP goals.

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. The program also reached other Hard-To-Reach Segments including, Rural, Manufactured Home, Multi-family, and Renters.

In addition to its ongoing work to effect energy efficiency in this segment, LIW program staff prioritized direct marketing campaigns to the Manufactured Home (MH) sector. Campaigns targeting the MH Sector ranged from email, to social media, to direct mail (post card) campaigns. The campaigns reached the general MH customer population and specific segments, such as PSE HELP customers who previously declined weatherization and those PSE MH customers with digital propensity. PSE also completed a Spanish speaking multicultural campaign in May 2018, which included radio and television ads/interviews and featured a MH Weatherization video with English subtitles.

f. Key Variance Drivers

In 2018, the LIW natural gas program savings were 220 percent of goal. The primary reason for this variance was the reinstatement of the Seattle HomeWise contract in the first half of the year. The 2018 original program forecast did not include production from Seattle HomeWise because the contract had not been negotiated when the forecast was developed in 2017. Much of the increased program activity was directly related to additional production as a result of the contract reinstatement.

g. Measure Summary

Table IV-6 provides a high-level summary of Low Income Weatherization measures installed in 2018. The figures represent unique dwelling units (homes, apartments, manufactured homes, etc.), and don'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 IV-6: Low Income Weatherization Measure Highlights

Low Income Weatherization Measure Counts			
Measure Type	**Measure**	**Electric**	**Natural Gas**
Barrier	Vapor Barrier	70	3
Combined	Integrated Space and Water Heat	-	2
Door	Door: weather strip, sweep	10	2
Insulation	Attic Insulation	200	50
	Duct Insulation	10	40
	Floor Insulation	200	40
	Pipe Insulation	300	20
	Slab On Grade Insulation	-	
	Wall Insulation	30	30
Lighting	LED Lamp	3,400	
Refrigerator	Refrigerator Replacement	30	
Sealing	Air Sealing	100	
	Duct Sealing	100	30
	Shell Sealing	200	50
Space Heat	Programmable Thermostat	100	-
	Furnace Replacement	-	30
	Ductless Heat Pump	300	
	Air Source Heat Pump	10	
	HVAC Boiler		40
Ventilation	Mechanical Ventilation	20	4
	Whole House Ventilation	300	-
Water	Heat Pump Water Heater	1	
	Water Heater Insulation	1	
	Water Heater Replacement		3
	Residential Use Aerator	300	-
	Residential Use Showerhead	150	-
Window	Double Pane to Double Pane	6	
	Single Pane to Double Pane	30	

2) Residential New Construction

Schedule E215, G215; applicable to single family construction

a. Description

The following discussion applies to new residential construction, both stick-built single family homes and manufactured homes. 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, they are noted in each of the following sections.

The Residential New Construction program acquires cost-effective energy savings from single-family new construction (single, duplex, and townhomes) and manufactured home new construction. The goal of each program is to increase the installation of energy efficient measures into new electric and natural gas-heated buildings constructed in the PSE service territory.

In the new construction marketplace, high-efficiency measures need to be specified and installed during design and construction. Otherwise, it may be many years before energy efficient changes to the buildings take place. 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”). The program also works with these partners to market energy efficient equipment to their customers. The programs encourage the purchase and installation of energy efficient products for their construction projects.

This program provides financial incentives to the above audience for both natural gas and electric residential and commercial meters. 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.

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. 2018 Program Review

In 2018, PSE re-entered the market with the launch of Single Family New Construction (SFNC) and Manufactured Home New Construction (MHNC) programs. PSE continued to work closely with the Northwest Energy Efficiency Alliance (NEEA), the Master Builders Associations (MBAs), other builder organizations, and Manufactured Home Retailers to maintain a presence in the market and provide technical support.

PSE's MHNC program is based on two tiers of RTF-approved measures. The first tier is Energy Star® certified and the second is Energy Star with Northwest Energy Efficiency Manufactured (NEEM) homes plus (Energy Star w/ NEEM+). Each home must be certified by NEEM. To receive a MHNC rebate, the customer or sales person fills out the application at the point of sale and returns to PSE along with the proof of sale and NEEM certification.

PSE based its SFNC program on a Regional Technical Forum (RTF)-derived Built Green measure. Utilizing the RTF approved standard modelling protocol, PSE implemented a performance-based incentive developed with the help of NEEA.

The standard modelling protocol provides 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. By relying on certified home raters to market the program, PSE is able to keep program costs down and increase the influence of energy efficiency by requiring builders collaborate with raters.

The benefits of offering a comprehensive single-family program based on modeling protocols is that it enables PSE 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™).[28]

[28] 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.

The protocol validates REM/Rate savings estimates for new construction as an alternative to establishing individual UES measures allowing for greater program agility.

Some of the outcomes realized by this program design include:

- Ability for PSE to easily report all incremental savings above code in energy efficient homes.
- Customizable program for new construction customized to the market's needs.
- Realtors can 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.

c. 2018 Achievements

After being out of the market for over five years, in 2018 PSE launched both SFNC and MHNC programs. PSE, with the help of NEEA, organized regional MHNC retailer outreach to impact the most MHNC customers. PSE identified market barriers to the program to bring adaptive management strategies crucial to the program's performance in 2019. Given that PSE has not offered MHNC incentives for many years, awareness of the program is the greatest barrier. The program did not officially get off the ground until mid-year and the program's first MHNC rebates were paid in October of 2018.

The SFNC program also did not officially launch until Q2. PSE enrolled seven certified home raters into the Contractor Alliance Network. These raters were trained and PSE-verified so that they meet certain quality control criteria. The home raters work directly with the builders to promote the program and leverage PSE incentives to drive more qualifying homes.

d. Adaptive Management

PSE worked alongside NEEA and the MBAs to reinstate a cost-effective SFNC and MHNC program. Based on feedback from home builders, raters, and NEEA, one of the major barriers to the SFNC program home enrollment is the increasingly stringent energy codes or limited financial benefit for installing energy efficiency measures due to low housing inventory and high demand in the Puget Sound region. Homes are often only built to code and there is little need for builders to differentiate given that homes are selling quickly in the current market.

In order to qualify for the program a builder must achieve 20-30 percent better than energy code energy use, which can be challenging in the current code climate. In response to the market feedback, PSE worked with NEEA to include smart thermostats and 100 percent LED lighting into the percent better than code improvements within the AXIS database. Previously, only CFLs and programmable thermostats were included in the calculations. This allows the builders to receive 2.4 percent above code savings and help them to reach the program incentive levels.

With respect to the MHNC program, sales performance incentive funds (SPIFs) are used to encourage manufactured home retailers to promote qualified homes to buyers. For qualifying homes that are sold to PSE customers, the sales person is eligible for $200-$300, depending on the model.

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

Given that manufactured home customers are listed as a potentially hard-to-reach customer segment in the 7th Power Plan, the new MHNC program helps increase service to this sector and prevent a lost opportunity.

f. Key Variance Drivers

The electric spending was 37 percent of what was budgeted for 2018, while the natural gas spending was at 25 percent. PSE underspent in the electric and natural gas programs due to the SFNC and MHNC programs being so new to the market (limited awareness) and not officially launching until mid-year. This is also the cause of the Direct Benefit to Customer (DBtC) being so low at 6 percent.

g. Measure Overviews

PSE provides a general overview of prescriptive measure categories reported in the 2018 Single Family and Manufactured Home New Construction programs in Table IV-10 and Table IV-8.

Table IV-7: Single Family New Construction 2018 Prescriptive Measure Summary

Single Family New Construction Measure Counts			
Measure Type	**Measure**	**Electric**	**Natural Gas**
Combined	Built Gree - 5 Star or Equiv. - 30% above WSEC	3	

Table IV-8: Manufactured Home New Construction 2018 Prescriptive Measure Summary

Manufactured Home New Construction Measure Counts			
Measure Type	**Measure**	**Electric**	**Natural Gas**
Manufactured Home	NEEM 1.1 Rated - Energy Start	10	

3) Multifamily Retrofit

Schedules E/G 217

a. Description

The objective of the Multifamily Retrofit 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 Retrofit 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, tenants, and condominium Home Owners Associations (HOAs) 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; appliances, interior and exterior lighting, and HVAC upgrades; O&M improvements; behavioral modification; and calculated commercial upgrades such as central boilers, HVAC controls, and solar pool heaters. This program targets installation of energy efficient measures occurring during planned retrofit and replace upon failure. PSE updates 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. 2018 Program Review

Overall, the program achieved 65 percent of the electric target and 24 percent of the natural gas target, while expending 74 percent and 37 percent of budget respectively.

Over the course of 2018, the Multifamily Retrofit program reached over 300 multifamily properties across almost 3,250 buildings, and ultimately served over 29,000 household units. Contractor-installed measures accounted for approximately 40 percent of the total savings, while vendor direct-install measures comprised 20 percent, and 3 percent from the Strategic Energy Management pilot.

Despite lower-than-desired savings, the program was recently recognized by the American Council for an Energy-Efficient Economy (ACEEE) as an Exemplary Program for the Multifamily segment. ACEEE reviews applications from utilities nationwide to highlight and recognize leading programs for overall direct energy savings, cost effectiveness, market impacts, customer service, innovative program design, and transferability/expansion potential. PSE is excited by this recognition and looks forward to building upon its success.

i. Air Sealing

Air Sealing continues to be an important measure for the deep retrofit of multifamily buildings. The savings reported for 2018 were lower than previous years; however, projects comprised of large properties with multiple buildings can take up to 12 months to complete. The program's field team works very closely with its certified air sealing contractors to offer refresher training and coordinates third-party infiltration reduction blower door tests to ensure a high degree of performance and quality control. PSE continues to market air sealing to its portfolio owner group[29] as a deep retrofit that can significantly lower energy bills for PSE customers and increase their comfort and air quality.

ii. Energy Fairs & Customer Recognition

To increase customer engagement, the program conducted seven "energy fairs" in 2018 at apartment and condominium complexes. Most of these were held during or immediately prior to direct-install work being done.

[29] "Portfolio Owner Groups" is a PSE-specific term to denote owners of typically between 4 and 20 multifamily sites. The groups may be local or out-of-state, but maintain 1 or 2 local representatives, who are responsible for weatherization and capital site improvements.

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 and delivered 12 plagues to new recipients.

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.

c. Adaptive Management

The multifamily team continues to focus on driving awareness of the program and increase participation with owners and managers of multiple properties. The program 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, including the low income agencies in the region.

The Multifamily team hosts “energy fair” table events and attends HOA board meeting in an ongoing effort to make their participation easier and raise awareness of the program. These strategies help achieve 50 percent participation in direct install.

The Multifamily program also made process improvements for handling applications from condo owners in an effort to streamline their participation. PSE also developed specified brochures to outline their process given that energy upgrades for one townhome or condo follows a different process than upgrades for an entire property.

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. Line Voltage Connected Thermostats

The multifamily market has been interested in Line Voltage Connected Thermostats (LVCTs), and PSE received a grant from Washington State University through their Community Energy Efficiency Program (CEEP) to pilot the installation of nearly 1,400 LVCTs. Honeywell and Sinope thermostats were directly installed in 25 buildings across 5 different sites. Product functionality, ease of use, product warranty, web/portal features, cost, and customer support all played a role in selection of the two products.

Twelve months of post-install billing data will be collected and an impact evaluation will compare results against a control group with like buildings at each site. Customers have shown initial satisfaction and will also be surveyed at the completion of the evaluation period to help better understand the technology and help establish a regional savings value and products offered by manufactures.

ii. Strategic Energy Management

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 goals were to explore whether applying Commercial & Industrial (C&I) SEM strategies to the multifamily segment would result in cost effective savings, while also developing sustainable and energy-management awareness with residents, site staff and property owners. The program took a holistic approach to energy efficiency that combined physical interventions with changes to operations, maintenance, and user activities.

The third-party measurement and verification conducted a thorough billing analysis and the measured savings were reported in 2018. The adjusted baseline consumption of the 15 properties in the SEM pilot was approximately 34.8 million kWh and just over 60,000 therms. The evaluation reported 6.4 percent electric savings from commercial/common area meters and 1 percent from residential units. There was not any residential gas in the pilot but the results found 3.2 percent commercial savings at the nine sites with gas service.

While the initial goal to generate 5 percent aggregate savings from the baseline was not achieved, the pilot strategies can be reshaped to overcome barriers, lower the cost of implementation, and yield higher savings. A few of the notable lessons learned include:

- Interest in sustainability is necessary among leadership but it's equally important they encourage, support, and empower site staff in these initiatives.
- Property staff are a key component to encourage residents to utilize action lists and material resources, attend events, and participate in friendly community challenges.
- Communication roadblocks can stymie participation and staff turn-over poses real challenges.
- Data visualization is difficult to generate, and was not necessarily as motivating to staff as lists of activities to check off.

Incorporating these takeaways and recommendations is an excellent starting point for continuing the SEM program, in addition to utilizing the tools and program materials that were created in the process.

iii. Incentive-Sharing for Water-Savings Measures

PSE has continued its partnership with the Cascade Water Alliance (CWA) in a joint effort to help the region save water. CWA and PSE split the installed cost of water-saving aerators and showerheads in locations that span 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 Retrofit program conducted a significant amount of work to develop plans to maximize capacity that ensures 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”. Preliminary results have served as a benchmark of past participation among this customer segment and program staff continue to drive its marketing and awareness campaign in these areas.

f. Key Variance Drivers

As noted in the discussion introduction, the Multifamily Retrofit program ended the year at 65 percent of the electric savings target and 24 percent of natural gas savings target.

The reduced savings are a culmination of barriers and influences on the program. Participation in terms of the number of properties tapered downward, but the average size of both lighting and insulation projects have also decreased. The data leaves no question there are fewer opportunities in the multifamily segment with the existing measure mix, and program staff have consistently lowered savings forecasts as a result. Due to cost-effectiveness constraints and recent evaluation report findings, program staff discontinued two key measures in 2018—clothes washer replacements and advanced power strips—that initially accounted for significant savings within the 2018-2019 BCP. This resulted in adjusted forecasts requiring the savings to be compensated for across the portfolio.

The program experienced significant staffing turnover among the implementation vendor which played a role in the ability to actively drive production. More robust key performance indicators (KPIs) and performance-based contractual obligations were therefore developed with a financial incentive to keep the team on track.

The 2018 savings results for the program also illustrate the importance of a comprehensive marketing and targeted outreach package. The team is utilizing more aggressive data mining and analysis to pin-point opportunities among the measure mix, portfolio accounts, and geographic region for targeted outreach. Strategic ad placement and awareness is also essential going forward.

While the program was able to add web-enabled thermostats as a new incentive in line with the single family and retail programs, there are limited multifamily homes with compatible central heating equipment.

The line voltage smart thermostat pilot is important for identifying savings opportunities with resistant heat (baseboard) capable devices. PSE issued a RFI in Q4 of 2018 which will help further explore and identify new measures for the upcoming Biennial planning period.

g. Measure Highlights

Table IV-9 provides a general overview of measure categories reported in the Multifamily Retrofit program in 2018.

Some measures, indicated by asterisks, are indicated in terms of square feet installed (for instance, insulation), dwelling units treated, or number of buildings.

Table IV-9: Multifamily Retrofit 2018 Measures

Multifamily New Construction Measure Counts			
Measure Type	**Measure**	**Electric**	**Natural Gas**
Advanced Power Strip	Advanced Power Strip	700	
Air Sealing	Air Sealing	90 **	
Appliances	Clothes Washer Replacement	500	
	Residential Use Clothes Washer	2	
	Residential Use Clothes Dryer	-	
	Refrigerator Decommissioning	110	
	Refrigerator - Energy Star	10	
Fireplace	Gas Fireplace		1
Lighting	Common Area Lighting	1,100 ***	
	LED Fixture	-	
	LED Lamp	168,500	
HVAC	Central Heating & Controls		370 **
	Gas Furnace		4
	Integrated Space and Water Heating		5
	Ductless Heat Pump	10	
Insulation	Attic Insulation	2,330,000 *	61,000 *
	Floor Insulation	7,900 *	500 *
	Wall Insulation	160 *	1,700 *
Behavior	Strategic Energy Management	470 **	
Thermostat	Elect. Line Voltage Thermostat	10,000	
	Web-Enabled Thermostat	1	
Ventilation	Mechanical Ventilation	280	
Water	Water Heater Pipe Insulation	1,100	
	Residential Use Showerhead Restrictor	6,900	230
	Residential Use Aerator	2,600	100
	Residential Use Adapter	-	-
	Heat Pump Water Heater	2	
	Tankless Water Heater		1
Window	Double Pane	141,000 *	1,900 *
	Triple Pane	14,100 *	

** Units are square feet*
*** Units are dwelling units treated*
**** Units are buildings treated*

4) Multifamily New Construction

Schedule E218, G218; applicable to multifamily construction

a. Description

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 many years before energy efficient changes to the buildings take place.

PSE offers rebates and incentives 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 multifamily construction projects, PSE packages financial incentives 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 with four or more attached units.

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: Exterior, Common area, and in-unit.
- Appliances: Clothes washers, refrigerators, dishwashers, dryers.
- 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, which allows for the tracking of specific measure details.

b. 2018 Program Review

In collaboration with PSE's third party vendor, CLEAResult, PSE began an incentive marketing plan to provide increased industry awareness of new construction programs, and to stimulate earlier contact by customers in the project design process. Earlier contact with prospective projects allowed Energy Efficiency to have a greater energy savings influence on the projects and provide a better customer experience with a timely, proactive grant process. This new approach provides customers with a simple, understandable path to achieving holistic energy savings.

The new construction market is a complex, interdependent system of varied market actors, technical requirements and decision factors. In Washington, stringent state and city energy codes mandate measures that would otherwise be high-value targets for utility energy efficiency programs. PSE is challenged to reach all parts of this diverse and expanding new construction market, achieve savings goals over "stretch" code thresholds, and maintain high customer satisfaction.

The Multifamily New Construction (MFNC) program design addresses this complex scenario by focusing on building design and target markets. PSE brings customers to the design table as a partner, early enough to optimize efficiency opportunities and with tools to ensure results through meaningful market engagement strategies, early design incentives, and a whole-building, whole process approach.

Before new construction projects even begin, PSE's Account Managers develop relationships with architects and engineers to influence building and system design. The New Construction team scaled its outreach efforts with specific consideration for challenging market segments, including hard-to-reach customers in rural areas, and important market segments such as affordable multifamily.

To effectively influence the fast-moving, cost-conscious multifamily market, PSE created tiered measure packages specifically for its service territory that are simple and engaging for customers. The third party engineering team brings extensive new construction experience to support custom measures and energy models for customers, maximizing energy savings for PSE from each project. This emphasis on people and their motivations and challenges enables PSE to help developers achieve a high level of gas and electric savings more cost-effectively than other firms, and with improved customer satisfaction results.

c. 2018 Achievements

In 2018, PSE implemented a redesign of the MFNC program, turning the program from reactive to proactive engagement with its customers. The team held its first Early Design Assistance (EDA) meeting, where they invited all of the Mechanical, Electrical, and Plumbing (MEP) companies to discuss the roles in the overall energy savings of the project. The primary purpose of developing the EDA was to shift focus on energy use targets, rather than a percent savings over code metric. This approach resulted in one building owner in particular to commit to energy performance targets from an early stage and focus on the overall integrated design process. PSE facilitated charrette-style work sessions and provided shoebox models to help customers optimize solutions to meeting the energy targets.

PSE's current proactive presence in the market is unparalleled to what it was able to achieve in previous years in the MFNC program, dating back to 2007. Industry professionals and MEPs are beginning to recognize PSE's presence and count on the team to help them achieve their energy efficiency goals and financial targets.

d. Adaptive Management

PSE continues to focus on creating a culture of collaboration and transparency with its customers participating in the MFNC program and actively seeks feedback on the grant project process. The MFNC team also continue to seek Energy Management Engineer (EME) feedback to update program guidelines, especially EME training and increased project experience.

In 2018, PSE not only redesigned the program to fit the market's needs but also obtained valuable feedback from over 20 different meetings with the building community. This feedback has informed the team of multiple opportunities for improvement such as adding an EDA incentive, including new measures, and customer website experience improvements.

In response to this valuable feedback PSE has done the following:

- Developed a program manual with process work flows and M&V guidelines, reporting templates, and KPI tracking.
- Developed new program offerings: Multifamily My Solutions offering with online customer interface and an early design incentive offering.
- Developed/updated initial market materials, such as web copies, program presentations, and the program brochure.
- Began an effort to create new construction early design incentives and services. Services may include providing experienced leadership for project energy charrettes, providing incentives for the design team to attend charrette, providing early design "shoebox" modeling for evaluation of energy alternatives, and others.
- Updated MFNC program guidelines based on the feedback of PSE EMEs that have had the opportunity to work through one or more NC projects.

The team consistently and regularly monitors and addresses Key Performance Indicators (KPIs). Based on program metrics, feedback from participants and stakeholders, and evaluation recommendations, PSE regularly updates program materials, presentations, and talking points to address any points of confusion and streamline the participant experience.

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

In 2018, PSE continued to use targeted outreach strategies and/or increased Affordable New Construction incentives to target specific building types and hard to reach customer segments, such as rural customers, small businesses, and affordable housing. Housing affordability is currently a major crisis in this region, and PSE is promoting additional energy efficiency incentives on top of tax incentives to help ensure new projects are sustainable.

f. Key Variance Drivers

The electric MFNC program budget ended the year at 57 percent of what was budgeted for the 2018 year. The Direct Benefit to Customer (DBtC) also came in lower than expected due to multiple projects moving into 2019 as a result of developer timelines being pushed out. The Final savings counts were at 67.5 percent of the anticipated goal.

The MFNC natural gas program budget ended the year at 82 percent of goal and final savings counts were at 94 percent. Multifamily projects that have substantial commercial elements frequently surpass expected completion dates.

Had the remaining 2018 projects closed in 2018 and were not extended into 2019 the MFNC program would have achieved 3.14 million kWh and 170,000 therms—putting the program at 126 percent of the forecasted electric goal and 281 percent of natural gas.

g. Multifamily New Construction Measures

PSE provides a general overview of prescriptive measure categories reported in the 2018 Multifamily New Construction program in Table IV-10. Whole building savings calculations are based on energy modeling. Customer's energy modelers create baseline models based on Washington State Code (WSEC) and follow ASHRAE Appendix G guidelines where applicable and standard practice.

Additionally, program staff developed a technical guidance document to provide direction on standard practice to customers providing their own energy models. Engineers review all submitted files to ensure baseline models follow modeling guidelines and meet energy code requirements, and proposed models match design drawings and project submittals. Additional details on assumptions such as building occupancy may also be verified with project owner.

Specific project MFNC packaged incentive offerings savings are based on prototype modeling created specifically for PSE's territory. Results are reviewed by PSE engineering staff, similar to prescriptive measures or calculators. In cases where it makes sense, PSE has aligned with other regional multifamily offerings and affordable housing incentives to streamline the experience for the customer. For prescriptive and lighting measures, PSE uses the measures and calculators already in place for PSE customers. Any new measures follow approved processes for measure development with all calculations available for review by PSE engineering. All savings calculation documents are maintained in project folders. Many Multifamily New Construction programs are based on custom grants, and as such, are not listed here.

Table IV-10: Multifamily New Construction 2018 Prescriptive Measure Summary

Multifamily New Construction Prescriptive Measure Counts			
Measure Type	**Measure**	**Electric**	**Natural Gas**
Clothes Washer	Residential Use Washer	600	
Water	Residential Use Showerhead	1,000	1,900

PSE intentionally left this page blank.

V. BUSINESS ENERGY MANAGEMENT

Chapter 5 provides a summary of the results made possible by customers served by Business Energy Management (BEM) staff. PSE will discuss savings and expenditure metrics, highlights of programs that drove results, ongoing efforts to connect with potentially hard-to-reach customer segments, cost-effectiveness results, and measure savings type profiles.

A. 2018 Business Energy Management Sector Summary

The following discussions provide brief summaries of the BEM sector. PSE provides detailed program discussions in Chapter 6: *BEM Program Details*. Table V-1 and Table V-2 provide, at a program level, BEM savings and expenditure figures.

The Sector surpassed its electric savings goals: 103 percent, while it fell short of its natural goal, at 77 percent. BEM program staff managed the expenditures quite well. Electric spending was 6 percent lower than planned, while natural gas expenditure finished 2018 on-target.

Table V-1: Business Energy Management 2018 Savings

	2018 Savings			2018 Goal
Schedule	**Programs**	**Total**	**% of Goal**	
Electric	Electric			Electric
Gas	Gas			Gas
E250	C/I Retrofit	65,855	114.0%	57,750
E251	C/I New Construction	13,517	67.6%	20,000
E253	Resource Conservation Manager - RCM	11,474	88.3%	13,000
E258	Large Power User - Self Directed: 449 + non-449	32,381	93.3%	34,693
E261	Energy Efficiency Technology Evaluation	0		0
E262	Commercial Rebates	27,453	133.5%	20,560
	Total Electric Programs	**150,681**	103.2%	146,003
G250	C/I Retrofit	449,741	112.4%	400,000
G251	C/I New Construction	147,805	140.8%	105,000
G253	RCM	292,801	43.7%	670,000
G261	Energy Efficiency Technology Evaluation	0		n/a
G262	Commercial Rebates	227,848	80.9%	281,734
	Total Gas Programs	**1,118,195**	76.8%	**1,456,734**

Table V-2: Business Energy Management 2018 Expenditures

2018 Expenditures				2018 Budget
Schedule	Programs	Total	% of Budget	
Electric	Electric			Electric
Gas	Gas			Gas
E250	C/I Retrofit	$ 14,262,521	93.9%	$ 15,181,831
E251	C/I New Construction	$ 2,992,680	62.4%	$ 4,795,910
E253	Resource Conservation Manager - RCM	$ 990,164	68.5%	$ 1,444,640
E258	Large Power User - Self Directed: 449 + non-449	$ 14,029,181	89.5%	$ 15,670,547
E261	Energy Efficiency Technology Evaluation	$ -		$ -
E262	Commercial Rebates	$ 7,790,330	136.5%	$ 5,705,298
	Total Electric Programs	**$ 40,064,876**	93.6%	$ 42,798,226
G250	C/I Retrofit	$ 1,805,122	111.6%	$ 1,617,100
G251	C/I New Construction	$ 577,317	115.6%	$ 499,460
G253	RCM	$ 437,262	77.9%	$ 561,112
G261	Energy Efficiency Technology Evaluation	$ -		$ -
G262	Commercial Rebates	$ 968,069	86.8%	$ 1,114,930
	Total Gas Programs	**$ 3,787,770**	99.9%	$ 3,792,602

B. Notable Accomplishments

Several programs within the BEM Sector continued their noteworthy drive and proactive management to engage a wide range of customers, developers, contractors, and vendors to achieve the maximum savings while meeting customer expectations. The Commercial Kitchens and Laundry program made notable innovations by expanding their midstream offerings, and aligning with their Retail program counterparts. Concurrently, 30 percent of 200 measure rebates were executed at a midstream point-of-purchase. In what is quickly becoming a leading Energy Efficiency standard practice, the Small Business Direct Install program initiated several key partnerships with conservation districts across the PSE territory to collaboratively promote PSE services to small agricultural customers.

The Commercial/Industrial (C/I) New Construction program, in conjunction with the Multifamily New Construction program, engaged with a major consultant to improve program marketing and outreach, and also improved the design of their Lighting Power Density (LPD) workbook, streamlining the grant application process for customers. The Commercial Strategic Energy Management (CSEM) group developed an online training curriculum for CSEM customers, and the Industrial System Optimization Program (ISOP) engaged with 17 industrial customers, 12 of which progressed to full project implementation.

C. Key Performance Drivers

PSE provides program-specific discussions on key drivers of BEM savings and expenditures in Chapter 6. The following sections provide brief highlights of those; readers may reference the above tables for these highlights.

1) Key Savings Contributors

Small Business Direct Install (SBDI), Lighting to Go, and C/I Retrofit led the Sector's electric savings achievement for 2018, while the remaining BEM programs finished the year within expected parameters. SBDI realized increased savings when the program proactively revised its Tubular LED (TLED) measure to a no-cost installation. Technology advancements in LED lighting and product cost reductions led to higher-than-planned savings in the Lighting to Go and Business Lighting[30] programs. High equipment costs and fluctuating market conditions had an adverse effect on the Commercial Kitchen & Laundry program's electric savings achievement, while several C/I New Construction large indoor horticulture project were delayed in 2018.

On the natural gas side, a single large project contributed 93 percent of C/I New Construction's overall savings. Similarly, the C/I Retrofit program had a large heat recovery project completed in the first half of the year, contributing to the program's natural gas savings achievement. In the Commercial HVAC program, distributors embraced the program at a higher-than-anticipated rate, resulting in increased savings. Conversely, the cost of therm savings was much higher than planned in the SBDI natural gas program, while a variance due to the time of CSEM customer analysis contributed to lower-than-expected savings in those programs.

2) Key Expenditure Drivers

As noted in the previous section, program staff proactively and prudently managed their budgets in 2018. In the majority of cases, expenditures were commensurate with savings achievement. The Business Lighting program realized significant cost savings when the TLED incentive was adjusted to match the Lighting to Go $2 per lamp rebate.

[30] Business Lighting is a sub-set of C/I Retrofit. The other C/I Retrofit subset is ISOP.

The Commercial HVAC program discontinued the Commercial Rooftop Unit (RTU) incentive, as a result of re-aligning its offerings through the Commercial Midstream program, and ISOP implemented a new incentive structure, where customers may receive incentives up to 100 percent of the measure cost.

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

PSE provides additional detail on its initiative to connect with potentially hard-to-reach customer segments in the program discussions in Chapter 6. Here, BEM provides some highlights of those discussions.

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. Commercial New Construction's Lighting Power Density incentive approach also addresses the needs of smaller customers that do not qualify for whole-building incentives. In 2018, C/I New Construction improved and streamlined the LPD application process for customers.

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

The Business Rebates programs manage a suite of prescriptive measures that are designed to target hard-to-reach customers who do not traditionally participate in energy efficiency programs. For instance, most restaurant customers overlap some underserved or hard-to-reach segments, due to many factors: many are small businesses; some rent their space; some are in rural communities; some have uncertainty as to the longevity of their business; and others have reduced awareness of energy efficiency.

The Commercial Kitchen & Laundry program continued to reach these customers in unique ways that work for them, including door-to-door outreach through small business community outreach, and the sustained midstream rebate delivery through local equipment distributors. The kitchen program also continued its partnership with the Small Business Direct Install blitz activities, allowing for direct face time with individual restaurant customers.

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, Washington), or be skeptical of efficiency services. Small-to-medium agriculture customers are, to a larger extent than small business customers, geographically diverse. Farms are characteristically in outlying areas that are rarely targeted for conservation by other vendors. 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.

The small-to-medium sized hotel customer has many barriers to participating in PSE's programs, including 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. The SBDI program serves as a central point of contact for this wide range of small business customers. This program brings the opportunity to these customers in a way that they can understand, providing a starting point on their energy efficiency projects. 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.

SBDI partnered with the Energy Efficient Communities organization to coordinate 5 multi-day "blitzes" that covered 11 communities in 2018. Some of the blitzes incorporated rural locations, and addressed small commercial kitchens, lodging, agriculture, and several other small business entities.

E. BEM Cost Effectiveness

Table V-3 represents the Total Resource Cost (TRC) and Utility Cost (UC) benefit-to-cost ratios for BEM.

Table V-3: Business Sector Cost-Effectiveness Tests

Benefit to Cost Ratios Business Energy Management		
	Utility Cost	**Total Resource Cost**
Electric	2.79	1.87
Gas	1.75	1.74

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

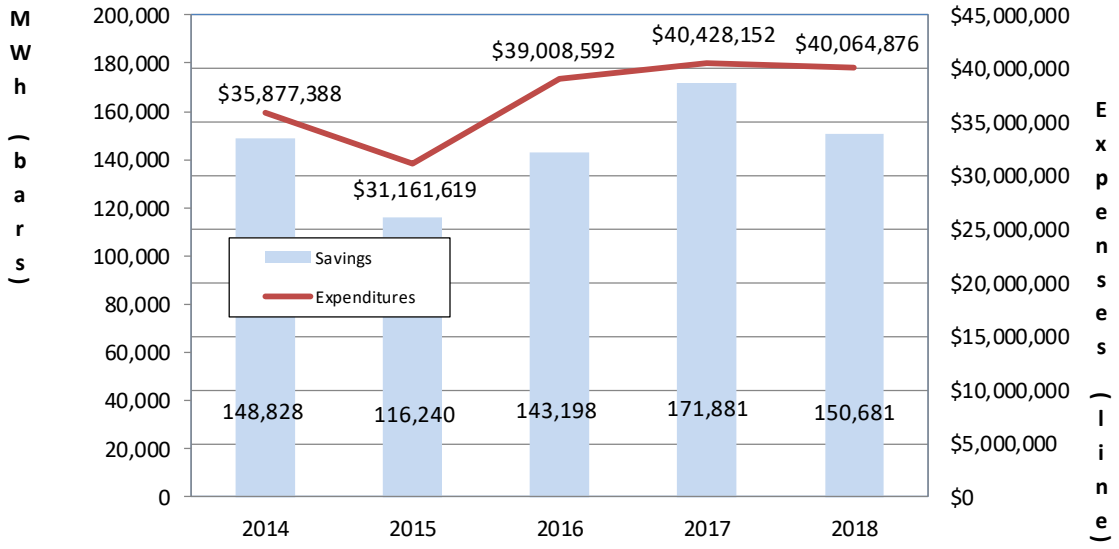
PSE presents a complete listing of cost-effectiveness ratios by program in *Exhibit 2: Program Cost Effectiveness*. The overall BEM Sector finished 2018 with an electric TRC of 1.87 and a natural gas TRC of 1.45. All BEM electric programs finished 2018 with a TRC above 1.0, with the exception of Commercial HVAC and its associated program, Commercial Midstream. These programs were both impacted by the program startup costs (with no corresponding savings) and measure revision processed required in the beginning of the year.

On the natural gas side, all programs finished the year with TRCs above 1.0 The Sector consistently applied the principles of the Commission's 2012 natural gas policy statement,[31] which indicated that while a balanced TRC is optimally preferred, a portfolio should maintain a UC benefit/cost ratio above 1.0.

F. Five-Year Trends

Figure V-1 provides a representation of BEM's 5-year electric savings and expenditures. BEM's electric savings are 1 percent higher in 2018, as compared to five years earlier, while electric expenditures over the same timeframe increased by 11 percent. From 2017 to 2018, electric savings decreased 12 percent, and spending was 1 percent lower.

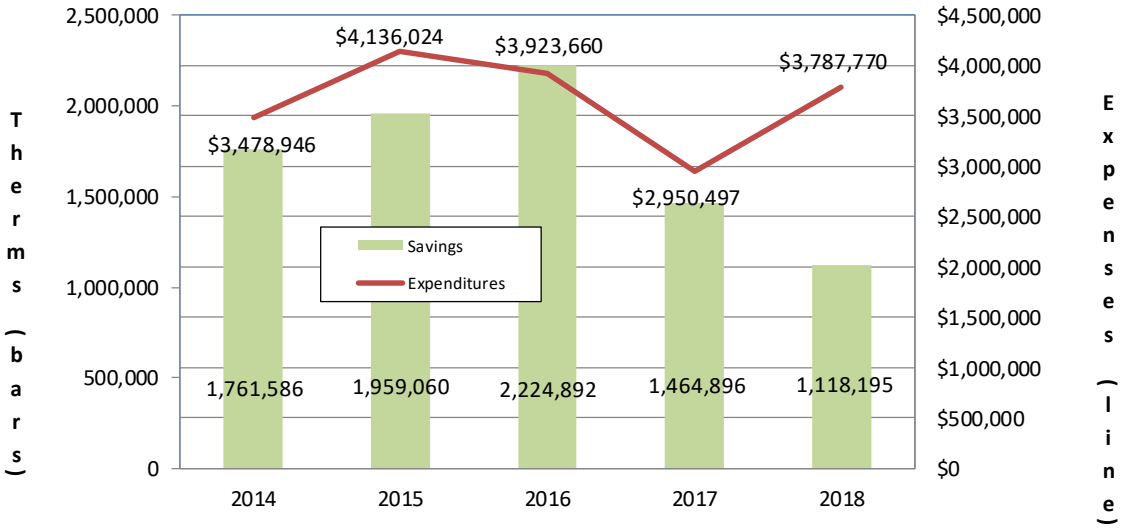
Figure V-1: Business Energy Management Five-Year Trends: Electric



[31] Docket UG-121207.

Figure V-2 provides a view of BEM's 5-year natural gas savings and expenditures. BEM's natural gas savings have gone down 36 percent from 2014 to 2018, and the commensurate spending increased 9 percent. 2018 natural gas savings saw a decrease of 24 percent from 2017 levels, while expenditures were 28 percent higher than in 2017.

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



G. Program Measure Tables

PSE provides project and measure tables in each of the program discussions in Chapter 6: *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. PSE provides only a representative sampling of measure types. The listed measures or projects aren't intended to comprise the total amount of 2018 program savings. Program measure tables aren't intended to be used as audit tools or to reconcile actual tracking records.

It is noteworthy that selected measures may have units indicated in the "Dual" savings column in applicable program measure tables. These are measures—water-saving, some insulation, and various HVAC categories, for instance—where it isn't possible to conclusively determine the customer's primary applicable fuel type, or equipment that conserve both electric and natural gas: commercial dishwashers, for instance, and many custom grant projects have both electric and natural gas savings.

H. Program Discussions

The program discussions In Chapter 6 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.

VI. BUSINESS PROGRAM DETAIL DISCUSSIONS

The following discussions provide program-specific reviews of 2018 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

Some notable accomplishments of the C/I Retrofit program include:

- The C/I Retrofit program finished above the program's electric savings target while coming in under budget.
- The C/I Retrofit program finished above the program's gas savings target while coming in commensurately above budget.
- A significant quantity of the electric savings target came from the completion of numerous HVAC controls projects.

a. Adaptive Management

Program staff continued to focus on internal process improvements in 2018 to streamline the tracking of C/I Retrofit projects. Program staff enhanced forecasting tools to allow EME's to better view and update project completion dates.

b. Pilot-Like Initiatives

BEM created an incentive mechanism to provide grant funding for qualifying installations of Variable Refrigerant Flow (VRF) systems. The incentive offering was incorporated into the 2019 ACP.

c. Key Variance Drivers

A major contributor to exceeding the electric savings target was the completion of a significant number of HVAC controls projects performance payments. Most projects exceeded the minimum 6 percent savings requirement needed to receive an incentive.

Savings contributions toward the gas target came from multiple measures. A single major contributor to the gas savings target was a large heat recovery project completed in the first half of the year.

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 approximately 780 projects in 2018. The average project size was just over 45,000 kWh per project. The Business Lighting program exceeded the 2018 savings goals by 4 percent while coming in under budget by 9 percent. The budget savings is primarily a result of the TLED incentive matching the Lighting-To-Go $2/tube incentive and customers using TLEDs instead of new fixtures or fixture retrofits.

b. Adaptive Management

The Business Lighting Team consistently monitors the trends of the lighting market. The trend in 2018 was continued adoption of LED products and reduced LED prices as predicted at the beginning of the year.

In October 2018, the team decided to keep the base incentive at $0.15/kWh for fixtures and kits, $2 each for TLED tubes, but raised the Luminaires Level Lighting Control bonus to $75/fixture (from $50/fixture) to spur more projects with integrated controls for 2019. Program staff designed a new application/calculator to take effect Jan 1, 2019.

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 2018, the program paid 385 of these projects. These projects accounted for approximately 50 percent of the project count and 10 percent of the program savings. Additionally, 14 Relight Washington (small Washington cities) street lighting projects were completed in 2018.

d. Key Variance Drivers

LED technology, fixtures and TLED tubes are being adopted at a fast rate in part due to continued LED price reductions throughout 2018. Budget variances were driven primarily by adjusting the TLED incentive to match the Lighting-To-Go $2/tube incentive and customers using TLEDs instead of new fixtures or fixture retrofits.

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 program focuses on operational and maintenance (O&M) measures to be verified through custom analysis on an individual project or site basis. Incentives are based on actual savings achieved. Customers agree to continue monitoring and verification following implementation to assure persistence of the savings.

i. Program Accomplishments

The Industrial System Optimization Program engaged with 17 industrial customers in 2018, the first of a two-year program cycle. Of these customers, 12 customers have progressed towards full project implementation and 3 of these projects were completed in 2018.

ii. Adaptive Management

PSE implemented a new incentive structure in the 2018-2019 program cycle: when a customer implemented action items within 120 days after the optimization report was presented, the customer received an incentive up to 100 percent of the cost.

This motivated the customers to complete projects to save energy right away, resulting in two new projects completion within the first year of the program cycle. This is first in ISOP program.

iii. Pilot-Like Initiatives

ISOP implemented an Industrial Strategic Energy Management (I-SEM) cohort in the program cycle. The I-SEM cohort had four industrial customer participants. Three workshops and a Kaizen event[32] for all participants were completed. More workshops will be implemented in 2019. Customers had been actively implementing SEM strategies and the identified energy saving measures.

6) 2018 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. A project may consist of a single structure or multiple structures. 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.

[32] A "Kaizen Event" for the ISOP program is an intense multi-day blitz to walk through a facility and make corrective actions that reduce energy usage, identify actions that can reduce energy usage through operational, behavioral, maintenance, and capital projects. It brings together PSE, Cascade Energy, Plant Maintenance, Plant Operational, and Plant Management staff to work as a team to identify and document the actions identified during the event.

Table VI-1 provides a representative number of Commercial/Industrial Retrofit projects completed in 2018.

Table VI-1: Commercial/Industrial Retrofit Projects

Commercial/Industrial Retrofit Custom Grants	Number of Custom Grant Projects		
Program Project Classification	Electric	Natural Gas	Both Electric & Natural Gas
Commercial/Industrial Custom Grants			
Commercial & Industrial Retrofit	90	30	30
C/I Lighting Grants			
Business Lighting Grants	760	0	0
Contracted Programs			
Energy Smart Grocer Program	5	2	0
ISOP	10	0	0
Total Project Count	865	32	30

Custom Grant projects often consist of more than a single measure

PSE presents a representative number of electric and natural gas measure categories installed in their respective programs in Table VI-2. A key contributor to overall Commercial/Industrial Retrofit's achievement is its Business Lighting Grants, noted at the bottom of the table.

It is important to clarify that these are measure categories, not individual measures, and PSE rounds totals greater than 10 for this Report. 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.

Table VI-2: (a) Highlights of Commercial/Industrial Retrofit and Lighting Grants Measure Categories

Highlights of Measure Categories by Program	Count of Measure Categories		
	Electric	Natural Gas	Total Measure Count
Commercial & Industrial Retrofit			
(All custom grants)			
Boiler - Hot Water - Custom	1	15	16
CBTU - Commissioning Phase	2	1	3
Chiller - Custom	1	0	1
Compressed Air System - Custom	2	0	2
Compressor or Dryer or Receiver - Custom	5	0	5
Energy Recovery System - Custom	0	1	1
Fan - VFD - Custom	20	2	22
Generic Measure - Custom	1	2	3
HVAC - Central Equipment & Other - Custom	10	2	12
HVAC Control - Only, Base & Performance Custom	30	15	45
Insulation - Building Shell & Exterior Roof - Custom	2	4	6
Motor - Custom	20	0	20
Process - Control, Modification & Heating System - Custom	20	5	25
Pump - VFD - Custom	6	0	6
Refrigeration - Custom	10	6	16
RTU Control - Advanced - Custom & Prescriptive	1	2	3
Unitary Equipment - Custom	7	1	8
Water Heater - Commercial - Custom	1	4	5
Total Measures	**139**	**60**	**199**
Commercial & Industrial Lighting Grants			
Generic Measure - Prescriptive	20	0	20
Lighting - Custom	740	0	740
Lighting - Street - Custom	30	0	30
Total Measures	**790**	**0**	**790**

Table VI-2: (b) Highlights of Commercial/Industrial Contracted Program Measure Categories

Highlights of Measure Categories by Program	Count of Measure Categories		
	Electric	Natural Gas	Total Measure Count
Contracted Programs			
Energy Smart Grocer Program			
Refrigeration - Open Case Door	3	2	5
HVAC System	3	0	3
Lighting - General	2	0	2
Refrigeration System	1	0	1
Total Measures	**9**	**2**	**11**
ISOP			
Generic Measure - Custom	9	0	9
Total Measures	**9**	**0**	**9**

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 E/G 262, Business Rebates. The incentive amount for a Measure is the same as that which is available under Schedule E/G 262, but energy savings may be calculated based on actual Site-Specific conditions and Code Baseline adjustments, if necessary.

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) 2018 Accomplishments

In 2018, the team engaged with CLEAResult in conjunction with the Multi-Family New Construction program to improve marketing and outreach. As a part of continuous improvement efforts, program staff updated the Lighting Power Density workbook to streamline calculation processes. Several members of the team attended a training series created by UW's Integrated Design Lab, and a training committee was formed to standardize trainings offered to EMEs. PSE retired the Energy Smart Grocer (ESG) program at the end of 2017, but there were three projects that were carried over to 2018 and closed in February.

3) Pilot-Like Initiatives

C/I New Construction staff began developing an Early Design Assist program that will be piloted in 2019. This program will incentivize developers to consider their buildings' energy consumption holistically early in the design process.

4) Adaptive Management

Program staff continue to focus on creating a culture of collaboration and transparency with their customers participating in the new construction programs, and actively seek feedback on the grant project process.

Staff also continue to seek EME feedback to update program guidelines, especially EME training and increased project experience.

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

The Commercial New Construction Program applies to and serves Small Business, Commercial Tenant, and Industrial customers.

6) Key Variance Drivers

a. Natural Gas Savings Higher than Expected

Natural Gas savings in New Construction are primarily driven by a small number of large projects. In 2018, one gas project saved 93 percent of the goal, which contributed to the target being exceeded by 41 percent.

b. Electric Savings Lower than Expected

Several large cannabis lighting projects that were forecasted to be installed in 2018 were not completed, which resulted in electric savings being 32 percent lower than expected. Spending also decreased accordingly, while cost-effectiveness was maintained.

7) 2018 Project and Measure Type Summary

The C/I New Construction representative number of projects completed in 2018 are shown in Table VI-3. PSE rounds figures over 10 for this Report.

Table VI-3: Commercial/Industrial New Construction Projects

Commercial New Construction	Number of Custom Grant Projects		
Program Project Classification	Electric	Natural Gas	Both Electric & Natural Gas
Commercial/Industrial New Construction			
Commercial/Industrial New Construction	50	1	8
ESG New Construction	2	0	0
Total Project Count	52	1	8

Custom Grant projects often consist of more than a single measure

PSE presents the number of electric and natural gas measures installed in Table VI-4.

Table VI-4: Commercial/Industrial New Construction Measure Categories

Highlights of Measure Categories by Program	Count of Measure Categories		
	Electric	Natural Gas	Total Measure Count
Commercial/Industrial New Construction			
(All custom grants)			
Boiler - Hot Water - Custom	0	1	1
Chiller - Custom	1	0	1
Commissioning - Custom	2	2	4
Field Services - Custom	1	0	1
HVAC - Central Equipment - Custom	1	1	2
Lighting - Custom	31	0	31
Lighting Power Density Reduction - Custom	17	0	17
Water Heater - Commercial -Custom	1	1	2
Whole Building Design - Custom	7	6	13
Total Measures	**61**	**11**	**72**
Contracted Programs			
ESG New Construction			
Lighting - General	2	0	2
Refrigeration System	1	0	1
Total Measures	**3**	**0**	**3**
Total Measure Category Count	**64**	**11**	**75**

C. Commercial Strategic Energy Management

Schedules E/G 253

1) Description

PSE offers Commercial Strategic Energy Management Services (CSEM) 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 CSEM 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 CSEM Services.

Customers qualify for the CSEM 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 CSEM 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.

A CSEM customer employs, contracts, or designates existing staff to implement CSEM 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 Energy Manager, 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 CSEM practices and “target grants” for meeting or exceeding pre-established energy-reduction targets.

The CSEM 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 CSEM agreement in three-year increments to provide continued support and additional performance incentives.

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

a. Program Start Up

- Designing and implementing a CSEM program.
- 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 CSEM 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 CSEM customers to facilitate greenhouse gas accounting and other climate change and sustainability initiatives. The value of this service routinely exceeds those stated in the CSEM program scope of work.

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

2) 2018 Accomplishments

In 2018, the CSEM program completed a third-party process and impact evaluation, began planning program updates based on evaluation recommendations, contributed to the energy savings target, developed a new on-line training curriculum, and provided one in-person training and 5 webinars for participating customers.

The team also held the annual customer meeting and awards ceremony with a broadened scope to include multi-family and industrial SEM customers. 2018 was also a grant renewal year for the majority of participants, so the CSEM team updated grants along with completing annual energy savings analyses for customers.

Program Savings: The CSEM program achieved its electric and natural gas savings from 31 projects.

- Electric Savings – The CSEM program achieved 88 percent of the target savings. Due to the variability of metered savings, this variance from forecasted savings is well within the normal range.

- Natural Gas Savings – The CSEM program achieved 43.7 percent of the target savings. This variance from forecasted savings was due to the timing of analyses for customers; PSE expects that gas savings will be significantly higher in 2019.

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

Trainings completed in 2018 were:

In-person Customer Trainings:

- Communicating with Executives and Building Occupants

Customer Webinars:

- Smart Pumps and Heat Pump Water Heaters
- Understanding Rate Schedules
- MyDataManager Training
- Follow-up webinar to the Communication training with access to individual coaching

3) Adaptive Management

The CSEM 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 CSEM program, program staff worked with the evaluation team to identify opportunities for improvement.

Adaptive Management initiatives completed in 2018 include:

- Creation of a PSE-specific landing page on NEEA's SEMHUb (an on-line training tool for SEM)
- Development of a Beginner's and Advanced curricula on the SEMHub for PSE customers.
- Quarterly reports from PSE identifying customer buildings with the most and least energy savings.
- Training with follow-up webinars and coaching to encourage implementation of new energy saving initiatives.

4) Key Variance Drivers

a. Gas Savings Lower than Expected

In 2018, annual analyses were completed after new grants were in place for each customer. Due to the back and forth discussions on participating customer sites, the analyses for all customers were not completed before the end of the year. Some of these customers are large users of gas. PSE will capture their savings in 2019.

5) 2018 Results by Customer Sector

Table VI-5 below shows the number of RCM program projects. Table VI-6 presents a representative summary view of 2018 incentive and allowance categories paid. PSE rounds totals over 10 for this Report.

Table VI-5: Number of CSEM Projects

	Project Count Per Program			
	Electric	Gas	Both Electric & Gas	All Projects Combined
CSEM	14	4	11	29
Total Measure Count:	14	4	11	29

Table VI-6: Representative CSEM Incentives & Allowance

	Measures Per Sector
	Customer Count
CSEM	
Performance Incentive - Year 1	11
Performance Incentive - Year 2	5
Performance Incentive - Year 3	18
Performance Target Incentive - year 1	11
Performance Target Incentive - year 2	5
Performance Target Incentive - year 3	18
Start Up Incentive - Year 1	1
Training Allowance - Year 1	6
Training Allowance - Year 2	9
Training Allowance - Year 3	23
Total Customers	**107**

Custom Grant projects often consist of more than a single measure

D. Large Power User/Self Directed

Schedule E258

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.

1) Description

The Large Power User/Self-Directed program operates in a 4-year cycle, with two phases in each cycle. The most recently-completed program cycle spanning January 1, 2015 to December 31, 2018. The above-noted RFP process is the first phase, and is classified as the non-competitive phase. Customers are given until April of the third year of the cycle to propose projects that utilize their incentive allocations under the non-competitive phase. Customers who do not designate projects that fully utilize their allocation by April of the third year forfeit their remaining balance to a competitive phase, in which remaining funds are available to all program participants via competitive bid.

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.

In the Competitive Phase, eligible customers respond to an RFP in order to obtain remaining incentive funding that was unclaimed during the non-competitive phase. In this phase, eligible customers may have access to funds beyond their original allocation. The competitive phase RFP is issued in May of the third year of the cycle. PSE ranks proposals received based on cost-effectiveness and other criteria specified in the RFP. Funding is awarded in order of project ranking, until either all competitive phase funds are allocated, or all qualified proposals are funded, whichever happens first. Any remaining money is transferred to the general Energy Efficiency program budget at the end of the program cycle.

2) Program Accomplishments

Sixty-one projects were completed and incentivized in 2018, representing annual electric savings of approximately 32 million kWhs.

3) Key Variance Drivers

PSE paid $12.7 million in incentives in 2018 to program customers. Total program spending was $14 million, which includes the annual NEEA contribution and PSE administration costs. Since 2018 was the last year of the program cycle, the spending and savings increased substantially from 2017 as customers finished their projects before the end-of-year deadline.

4) 2018 Project and Measure Type Summary

Table VI-7 shows the distribution of projects by customer rate schedule.[33] Table VI-8 indicates a representative number of measure types installed to provide a sense of program scale. PSE rounds totals more than 10 for this Report. A project may include substantially more than one measure.

Table VI-7: Large Power User/Self-Directed Number of Projects

PROGRAM	Project Count Per Program
	Electric Only
High Voltage Program	18
High Voltage Program Non-449	43

[33] It is important to note that listed "O&M" or "Operations & Maintenance" projects do not indicate 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).

Table VI-8: Large Power User/Self-Directed Measure Classifications

PROGRAM MEASURE CATEGORY	Count
Compressor or Dryer or Receiver - Custom	1
Fan - VFD - Custom	5
Generic Measure - Custom	2
HVAC - Central Equipment - Custom	4
HVAC - Other - Custom	1
HVAC Control - Base - Custom	1
HVAC Control - Only - Custom	6
Lighting - Custom	26
Lighting - Street - Custom	1
Motor - Custom	1
Process - Control - Custom	2
Process - Modification - Custom	4
Pump - Custom	3
Pump - VFD - Custom	2
RTU Control - Advanced - Prescriptive	1
Total Measure Count	**60**

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) 2018 Accomplishments and Activities

PSE is working with NEEA to further research on Condensing Gas RTU applications in its territory. Recently, a demonstration project was installed for one of PSE's Renton Customers. A PSE engineer was on site through the installation, and will be providing data and savings analysis support over the next few years.

F. Business Rebates

Schedules E/G 262

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

- Commercial Kitchen Equipment,
- Commercial Clothes Washers,
- Commercial HVAC,
- Commercial Retail Lighting – Lighting to Go.

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

- Upstream Commercial HVAC and Water Heat Rebates,
- Commercial Maintenance measures including web enabled thermostats and Advanced rooftop controls.
- 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 Retrofit program.

Staff review program refinements and cost-effectiveness 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.

1) 2018 Accomplishments and Activities

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).

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 VI-9 and Table VI-10, respectively) of the overall Schedule 262 programs to facilitate the appropriate level of reporting transparency.

Table VI-9: Business Rebate Programs, 2018 Savings

		2018 Savings		2018 Goal
Schedule	Programs	Total	YE % of Goal	
Electric	Electric			Electric
Gas	Gas			Gas
E262	Business Rebates			
	Lighting to Go (AKA Business Lighting Markdowns)	11,790	125.2%	9,419
	Commercial Kitchen & Laundry	171	36.3%	472
	Commercial Midstream	183	8.6%	2,115
	Commercial HVAC	1,210	117.0%	1,034
	Small Business Direct Install	14,099	187.5%	7,520
Subtotals		**27,453**	**133.5%**	**20,560**
G262	Business Rebates			
	Commercial Kitchen & Laundry	101,594	119.3%	85,159
	Commercial Midstream	95,026	61.8%	153,875
	Commercial HVAC	17,398	128.9%	13,500
	Small Business Direct Install	13,830	47.4%	29,200
Subtotals		**227,848**	**80.9%**	**281,734**

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 Small Business Direct Install and Midstream Commercial HVAC.

The team also participated in the initiation of a small-to-medium business research project, which evaluated customer expectations, needs, and satisfaction with PSE by customer segment and program type.

Table VI-10: Business Rebate Programs, 2018 Expenditures

2018 Expenditures				2018 Budget
Schedule	Programs	Total	YE % of Budget	
Electric	Electric			Electric
Gas	Gas			Gas
E262	Business Rebates			
	Lighting to Go (AKA Business Lighting Markdowns)	$ 988,826	190.3%	$519,672
	Commercial Kitchen & Laundry	$ 106,599	67.4%	$158,206
	Commercial Midstream	$ 291,271	47.1%	$617,822
	Commercial HVAC	$ 500,852	151.2%	$331,268
	Small Business Direct Install	$ 5,902,782	144.7%	$4,078,330
Subtotals		**$ 7,790,330**	**136.5%**	**$5,705,298**
G262	Business Rebates			
	Commercial Kitchen & Laundry	$ 271,953	104.1%	$261,173
	Commercial Midstream	$ 456,704	77.2%	$591,322
	Commercial HVAC	$ 57,092	72.7%	$78,534
	Small Business Direct Install	$ 182,320	99.1%	$183,901
Subtotals		**$ 968,069**	**86.8%**	**$1,114,930**

2) Lighting to Go

PSE's Lighting to Go program provides instant point-of-sale rebate savings to lighting contractors and commercial customers who purchase qualified equipment from approved distributors for use in commercial customers' businesses. 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.

b. Key Variance Drivers

Lighting to Go's budget variance of approximately 90 percent was primarily driven by incentives paid that were more than double those forecast. High customer demand led to a 25 percent greater-than-planned electric savings.

3) Commercial Kitchens & Laundry

PSE continued the historical regional delivery method of this program; offering a joint utility application across multiple 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 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 completed an effort to research and redesign its approach, revamping and expanding the midstream distributor offering. This included an informed and coordinated distributor outreach and education plan as well as training materials and tools designed for and with the distributors themselves. This new midstream point of purchase (POP) approach and delivery will expand the pool of participating equipment distributors, increasing participation in the program, which will in turn increase both distributor and customer satisfaction.

This updated midstream offering plan closely aligns with the look and experience the residential customer has through the larger Residential Retail Programs, allowing for a cohesive experience and consistent PSE presence in the field.

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 industry-specific expos and conferences, presentations to regional and segmental association, as well as the continued midstream rebate delivery through local equipment distributors.

The kitchen program also continued to partner with the Small Business Direct Install blitz activities, allowing for direct face time with nearly 100 individual restaurant customers.

The program was represented at eight individual expo events in 2018 where its impression reached nearly 3,000 customers within this hard-to-reach segment. The program also incentivized over 200 pieces of equipment, 30 percent of which received rebates at Point of Purchase (POP) through the midstream program delivery and the participating distributors.

c. Pilot-Like Initiatives

The Kitchen program completed an engineering analysis to set the ground work to offer a new Demand Control Kitchen Ventilation as part of the measure mix.

d. Adaptive Management

In order to improve distributor satisfaction with an ever changing program, PSE worked to design and implement a renewed and improved in-store POP presence, including training schedules, delivery materials and tools, in-store signage, and more streamlined interaction with PSE as the regional lead of the program.

e. Key Variance Drivers

Due to fluctuating market conditions and the high cost of new equipment, electric and natural gas savings and expenditures for the Commercial Kitchen & Laundry sector came in under target. Work was done to design and implement a revamp of in-store POP presence, which included training schedule, delivery materials, in-store signage, and more streamlined interaction with PSE as the regional lead of the program. 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.

4) Small Business Direct Install

The Small Business Direct Install (SBDI) program is designed to encourage hard-to-reach small business customers to complete energy efficiency upgrades to their facilities and buildings through lighting, refrigeration, and HVAC retrofits. The programs will focus on providing varying levels of business energy assessments to identify basic and complex retrofit opportunities and facilitate participation in PSE's rebate programs, based on segment type, such as hospitality, grocery and agriculture.

a. Program Accomplishments

During 2018, PSE successfully completed 5 small business blitzes in 11 cities, closely coordinating with the Community Outreach and Government Relations teams. Small business blitzes bring the SBDI program to a community, through partnership with City, Chambers of Commerce staff, and downtown associations, offering free and low cost energy efficiency projects to all of the small businesses in the downtown corridor over the course of two-to-three days.

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

In 2018, the program altered its community blitz approach slightly to serve multiple small communities during one event, to expand reach while serving rural customers who may not have been served previously due to the amount of opportunity available. This allowed the program to serve 11 communities in 5 events.

d. Adaptive Management

In 2018, PSE incorporated both the Lodging and Agriculture programs into the Small Business Direct Install program. PSE learned that there is little difference in the measures installed for these customers than those provided through the SBDI program. For this reason, PSE provided segment-specific outreach efforts, but rolled all savings into one program and budget.

PSE completed a lodging project through SBDI, which started in 2017 and was completed in 2018. This project contributed a significant amount of the achieved therms and kWh to the program at a lower than anticipated cost.

PSE also developed several key partnerships with Conservation Districts across the territory, in order to collaboratively promote PSE's energy efficiency services to small agriculture customers. PSE also developed a process that allows a seamless transfer of qualified customers from the Home Energy Assessment program to SBDI, ensuring that a home on a residential schedule with a commercial operation can participate in both programs.

The Small Business program team partially funded and participated in the development and implementation of a large scale small-to-medium business research project, segmented by 10 common business types. The primary objective of the survey was to identify program-specific opportunities to close customer service gaps. Over half of the survey focused on the small business customer's energy efficiency needs, and targeted existing participants in energy efficiency programs.

e. Key Variance Drivers

In the electric sector, the program came in significantly over target and slightly over budget; PSE maintained a lower variance on budget than on savings. This was due to an unanticipated increase in savings from reducing the cost of installing tubular LEDs to no-cost. There is a pent up demand for these replacements in the small business sector, and as a hard-to-reach customer, PSE was supportive of meeting this demand through the program. PSE did so at a lower acquisition cost than originally projected.

The program underperformed on savings and budget targets on the natural gas side. One driver was that the therm savings that were achieved were more expensive than originally anticipated. It is no longer possible for this program to effectively achieve therm savings, as aerator savings have significantly declined and other measures are saturated (showerheads and sprayheads) from past PSE efforts. The therm savings that were achieved were through a small lodging project, and were paid at the same rate used for the custom incentive program.

5) Commercial HVAC

Commercial HVAC retrofit rebates are designed to help PSE's small and medium commercial customers reduce their energy usage without having to upgrade costly rooftop equipment.

a. Program Accomplishments

In 2018, the Commercial HVAC program continued its planned transition to more effectively serve the commercial customer base. PSE discontinued the commercial Roof Top Unit (RTU) replacement incentive. Program uptake remained low and the program was struggling to maintain cost effectiveness. PSE changed tactics and is now working with the supply chain through a midstream program to increase the access its customers have to high efficient equipment and focus efforts on maintaining and increasing the efficiency of existing equipment stock.

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

The program spent much of 2018 recruiting distributors to participate in the Midstream program, developing a commercial connected thermostat and commercial ductless heat pump rebate, both maintenance measures designed to help customers remove inefficient electric resistance heating from their businesses.

c. Pilot-Like Initiatives

The first phase of the midstream program was launched as a pilot, focused on researching market demand and determining whether or not it would be a cost effective delivery method. The positive outcomes from the research allowed PSE to move forward with program design and contracting with a third party provider.

d. Adaptive Management

Due to the portfolios unanticipated success achieving therm savings, the implementer worked with distribution to phase in the innovative approach to test acceptance and ensure that systems were set up before a territory-wide implementation. This approach proved to be successful. The program also instituted new processes and policies as it ramped up, to ensure alignment (and reduce overlap) with existing PSE programs.

e. Key Variance Drivers

The Commercial HVAC electric and natural gas savings performed as anticipated.

6) Business Rebates 2018 Measure Highlights

PSE presents a high-level view of the Business Rebates projects managed in 2018 in Table VI-11.

It is interesting to note that in this organization, more than one measure type may be installed in a single project. PSE rounds figures greater than 10 for this Report.

Table VI-11: Number of Business Rebate Projects Managed in 2018

Business Rebates	Number of Projects		
Program Project Classification	Electric	Natural Gas	Both Electric & Natural Gas
Business Rebates			
Commercial Kitchen Laundry	30	110	2
Commercial HVAC - Elec	80	0	35
Small Business Direct Install	1,300	20	10
Business Lighting Markdown	6,300	0	0
Total Project Count	**7,710**	**130**	**47**

In Table VI-12, PSE indicates the number of measures, by category, installed in 2018 for three of the Business Rebates programs: Business Lighting Markdown (also referred to as "Lighting to Go"), Commercial Kitchen & Laundry, and Commercial HVAC. 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 VI-12: Number of Business Rebate Measures Installed by Type

Business Rebates Measure Counts				
Program Measure Type	Measure	Electric	Dual	Natural Gas
Business Lighting Markdown (Lighting To Go)				
Lighting	LED Fixture	47,300		
	LED Lamp	51,000		
	TLED Lamp	67,000		
Commercial Kitchen & Laundry				
Commercial Kitchen	Food Cabinet	-		
	Fryer			90
	Ice Maker	20		
	Oven	20		50
	Steam Cooker	-		2
Dishwasher	Commercial Dishwasher	10	3	2
Laundry	Commercial Clothes Washer			20
	Commercial Water Heater			2
Water	Commercial Water Heater			10
Commercial HVAC				
Damper	Damper		40	
Economizer Controller	Economizer Replacement	1	-	
Gas Pack	Gas Pack	70	80	
Heat Pump	Commercial Heat Pump	120	-	
HVAC Sensor	Sensor Replacement	30	-	
Maintenance	Basic Maintenance	90	70	
Occupancy Sensor	HVAC Occupancy Control	440		
Thermostat	Thermostat Replacement	70		
Ventilation	Demand Control Ventilation		10	

Table VI-13 provides a summary of measure counts installed in 2018 for the Direct Install programs.

Table VI-13: Number of Business Rebate Measures Installed by Type, Direct Install Programs

Business Rebates Measure Counts - Direct Install Programs				
Program / Measure Type	Measure	Electric	Dual	Natural Gas
Lodging Direct Install				
Lighting	LED Fixture	800		
	Tubular Fixture	4		
	LED Lamp	2,800		
	T8 Lamp	1,000		
	TLED Lamp	-		
Occupancy Sensor	Lighting Control	-		
Refrigeration Control	Refrigeration Control	-		
Showerhead	Commercial Use Showerhead	-		-
Signage	LED Sign	-		
Thermostat	Programmable Thermostat	-		
Water	Commercial Use Sprayhead	-		-
	Commercial Use Aerator	-		250
Small Business Direct Install				
Lighting	Refrigeration Lighting	90		
	LED Fixture	4,200		
	Tubular Fixture	4,800		
	LED Lamp	16,400		
	T8 Lamp	100		
	TLED Lamp	25,900		
Motor	Electronically Commutated Motor	40		
Occupancy Sensor	Lighting Control	90		
Refrigeration Control	Refrigeration Control	130		
Sealing	Auto Closer	2		-
	Gasket	5		-
	Strip Curtain	20		
Signage	LED Sign	-		
Thermostat	Programmable Thermostat	1		
Water	Commercial Use Aerator	20		130
	Commercial Use Showerhead	10		5
	Commercial Use Sprayhead	10		5

VII. PILOTS WITH UNCERTAIN SAVINGS

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 may share similar Pilot measures. PSE discusses pilots that have uncertain savings potentials in this Chapter. PSE discusses programs or measure offerings that could be considered analogous to pilots—but have a reasonable expectation of savings achievement—in applicable REM and BEM program sections in the previous Chapters.

Table VII-1 presents 2018 pilot program expenditures.

Table VII-1: 2018 Residential and Business Pilot Program Savings

2018 Savings				2018 Goal
Schedule	**Programs**	**Total**	**% of Goal**	
Electric	Electric			Electric
E249	Residential Pilot	0		0
E249	Business Pilot: Pay for Performance	0		840
Subtotal		**0**	0.0%	840
G249	Residential Pilot	0		0
G249	Business Pilot: Pay for Performance	0		7,500
Subtotal		**0**		7,500

Table VII-2 presents 2018 pilot program savings.

Table VII-2: 2018 Residential and Business Pilot Program Expenditures

2018 Expenditures				2018 Budget
Schedule	**Programs**	**Total**	**% of Budget**	
Electric	Electric			Electric
E249	Residential Pilot	$ -		$ -
E249	Business Pilot: Pay for Performance	$ 13,728		$ 84,000
Subtotal		**$ 13,728**	16.3%	$ 84,000
G249	Residential Pilot	$ -		$ -
G249	Business Pilot: Pay for Performance	$ -		$ 11,925
Subtotal		**$ -**	0.0%	$ 11,925

B. Commercial Pay for Performance

In 2018, PSE launched the Commercial Pay for Performance (P4P) pilot, with the goal of enlisting 5 existing buildings with at least 15 percent energy savings potential, coming from capital projects. Approximately 75 people attended the launch webinar, and PSE has since contracted with 1 customer in June, 2018. In August, after receiving no additional applications, PSE partnered with NEEC to create an industry-centric blog post to both the NEEC & Smart Building Center sites. This increased the inquiry rate, and PSE is still looking for four more projects.

To make participation easier, PSE has since revised its application to a fillable PDF in order make it easier to complete. PSE has also met with the Marketing team to create a P4P webpage that is still in the queue to be launched. The program manager also has quarterly meetings with counterparts at other utilities in order to stay informed on program development and lessons learned.

This pilot is proving to have a long lead time to develop projects, due primarily to two key issues:

1) It takes significant time to find a building with the 15 percent energy savings required to apply, and
2) Customers may find it difficult to acquire (come up with) sufficient capital funds to implement those projects within the one-year contract stipulation.

Additionally, while PSE heard that having a longer term revenue stream was desired by contractors, customers may not be as willing to accept such a long contract period, especially since the incentive is not guaranteed.

PSE's evaluation consultant completed two deliverables in 2018:

1) An evaluation on best practices on P4P programs, and
2) The creation of a program logic flowchart that ensures future evaluation data would be available.

PSE intentionally left this page blank for chapter pagination.

VIII. REGIONAL EFFICIENCY PROGRAMS AND RELATIONSHIPS

A. Overview

Table VIII-1 and Table VIII-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 VIII-1: NEEA and Production & Distribution 2018 Savings

2018 Savings				2018 Goal
Schedule	Programs	Total	% of Goal	
Electric	Electric			Electric
E254	Northwest Energy Efficiency Alliance	10,775	86.0%	12,527
E292	Production & Distribution Facilities	3,782	504.3%	750
Subtotal		**14,557**	109.6%	13,277
	NEEA Natural Gas Market Transformation Initiative	0		0
Subtotal		**0**		0

Table VIII-2: NEEA and Production & Distribution 2018 Expenditures

2018 Expenditures				2018 Budget
Schedule	Programs	Total	% of Budget	
Electric	Electric			Electric
E254	Northwest Energy Efficiency Alliance	$ 4,033,724	77.6%	$ 5,200,000
E292	Production & Distribution Facilities	$0		$ -
Subtotal		**$ 4,033,724**	77.6%	$ 5,200,000
	NEEA Natural Gas Market Transformation Initiative	$ 2,282,499	113.8%	$ 2,006,136
Subtotal		**$ 2,282,499**	113.8%	$ 2,006,136

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 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.

These committees and their respective sub-committees require a significant commitment; meetings are often all-day, and are held quarterly at a minimum. Energy

Efficiency staff become closely engaged in upstream/midstream channel partnership strategies, cost-effectiveness calculation development, product training and technology portfolio determination, and long-term strategies. PSE ratepayers also provided funding for the recent RBSA oversample, facilitated by NEEA.

As discussed in several preceding program reviews, Energy Efficiency staff collaborated with NEEA on several distributor training initiatives for Dealer Channel programs, limited-time-offers (LTOs) and sales SPIFs for distributors. The Single Family New Construction program partnered with NEEA to help builders add measures to more readily meet new energy codes, and the CSEM program created a new landing page on NEEA's SEMHub website.

Exhibit 10 of this Report summarizes NEEA's 2018 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) 2018 NEEA Savings

NEEA provided its savings forecasts during PSE's 2018-2019 Biennial Conservation Plan (BCP) development in the latter part of 2017. In consultation with the CRAG, PSE adapted the source figures provided by NEEA. In Q3, 2018, during PSE's 2019 ACP development, NEEA notified PSE that it was revising its biennial savings projection downward. The revised 2018 electric savings figure is noted in Exhibit 1. NEEA's final 2018 electric savings results will include NEEA initiatives started in 2018 as well as impacts of 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 2020.

a. NEEA Expenses

Exhibit 1 indicates an apparent under-spend in the NEEA category of approximately $1.2 million. Actual payments that PSE made to NEEA totaled $4.034 million in 2018. One driver of the difference is a funder's share adjustment made by NEEA in March.

Additionally, accounting transfers addressed expenses incurred for NEEA's end-use load research and PSE staff costs associated with NEEA committee participation. Each year, a journal entry is made to transfer 10 percent of Large Power User/Self-Directed funding allocations, representing PSE's administrative burden, as well as a 7.5 percent allocation to contribute to regional market transformation (NEEA) activities.

b. NEEA's Natural Gas Market Transformation Collaborative

NEEA provides a more comprehensive discussion of its 2018 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 2018 expenses exceed the budget of $2.01 million by approximately $274,000. One driver of this variance is invoice timing: NEEA bills funders a quarter ahead. Therefore, the December 2017 invoice is paid by PSE in January 2018, etc. Additionally, in May 2018, NEEA discovered that it was not billing PSE the updated 2018 quarterly amount. In practice, NEEA takes the annual total (in the case of 2018, $2,006,136) and divides by 4, for quarterly invoices of $501,534. However, the first two invoices for 2018 were based on the 2017 annual amount. NEEA requested and received permission to generate a one-time invoice for the difference in Q2 2018.

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 (18230660) in 2018.

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.

In 2018, there was progress made on the Energy Efficient Water Heater and Condensing RTUs. More manufacturers became engaged with natural gas heat pump water heater technologies, and the initial RTU failures were overcome, with two new manufactures enlisted for four pilots, starting at the end of 2018. NEEA also explored internal-combustion-engine water/space heat technology as part of their scanning efforts, and indicated that, given manufacturer reticence to improve natural gas clothes dryer efficiency, this measure would be relegated to a scanning approach. The hearth measure is also in a scanning mode, until new codes are enacted.

c. Exhibit 10: NEEA 2018 Report of Activities and Initiatives

Exhibit 10 of this Report summarizes 2018 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) 2018 Accomplishments

PSE implemented CVR at three substations in 2018, resulting in savings that were 400 percent over the 2018 goal. Also, phase balancing analysis was done at four substations and the results of the study are being utilized to determine which substations are adequate for implementation of CVR in 2019.

IX. MEASUREMENT & VERIFICATION

PSE's Energy Efficiency department provides a discussion of Measurement & Verification (M&V) at this point in the 2018 Annual Report because M&V relates directly to the REM, BEM, Pilots and Regional savings programs just reviewed. This Report is the appropriate document for PSE to provide this discussion; Exhibit 3: *Program Details*, does not lend itself to an overview of these critical operational functions.

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.

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. These are key contributors to Energy Efficiency's success.[34] The Report discusses Rebate Processing, Verification Team, and Data & Systems Services activities in Chapter 11: *Portfolio Support*. 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;
- The correct application of savings values indicated by evaluation studies, engineering analyses, or the RTF;

[34] The Budget, Evaluation, Administration & Regulatory Team also 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.

- Savings values, to ensure that they are properly archived;
- All tracking systems, to ensure that they 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.

Energy Efficiency verifies electric and natural gas conservation savings and expenditures using a wide range of metrics, processes, tools, systems, and reports. Several Energy Efficiency groups perform more than one measurement and/or verification process. Program staff in particular review and verify measure installations, grant status, and sales reports[35] for measure type and measure count accuracy. The Verification Team's essential role in the overall M&V process is clearly indicated in the team's name: verification of measure installations. Data and Systems Services staff, rebate analysts, Budget, Administration & Regulatory (BAR) staff, and third-party reviewers also perform critical measurement and verification tasks.

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 Energy Efficiency's new system "DSMc", and the organization that that manages that system, Data and Systems Services.

A. Energy Efficiency Accounting and Tracking Infrastructure

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. All are critical in Energy Efficiency's measurement and verification efforts. PSE references these systems in Figure IX-1 on page 163. Readers will note that DSMc—often referenced in this Report—is central to Energy Efficiency data and information reporting.

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

1) Demand Side Management Central (DSMc)

DSMc consolidated the different functionality (programs, measures, reporting, etc.) that were provided by disparate, largely custom in-house applications, and functions as Energy Efficiency's central conservation project management system. Consistent with long-standing standard practices with other reporting systems, Energy Efficiency policies strictly limit access to DSMc 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.

PSE plans that the *EES Tracking & Forecasting Database* will continue to be used for internal forecasting and aggregation of reporting of project data, in conjunction with DSMc. CSY, CMS, and the Source of Savings Database—formerly employed to track projects, measure data, customer rebate application status, etc.—will continue to be available for historical archival reference.

2) SAP

SAP, PSE's enterprise financial accounting system, will continue to operate as it does today with respect to Energy Efficiency program operations, program spending, and incentive payment distribution. SAP interacts with DSMc to import and export financial data related to conservation projects.

3) CSY

CSY will continue to be available for historical reference when needed. As they do for DSMc, Energy Efficiency policies strictly limit access to CSY to authorized staff only. Following the successful transition to DSMc, all CSY access is now "Read Only".

4) Measure Metrics

In 2018, Energy Efficiency began the transition away from separate measure savings archival systems. DSMc now contains the master measure library, which provides all measure used for each applicable program. The Source of Savings database,[36] a Microsoft® Access™ file, was retired in 2017, but remains available for archival reference.

5) CMS

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. As these functions are now addressed through DSMc, CMS will continue to be used for referrals, and may continue to be used for brochure disbursement and collateral inventory management, as well as archival reference.

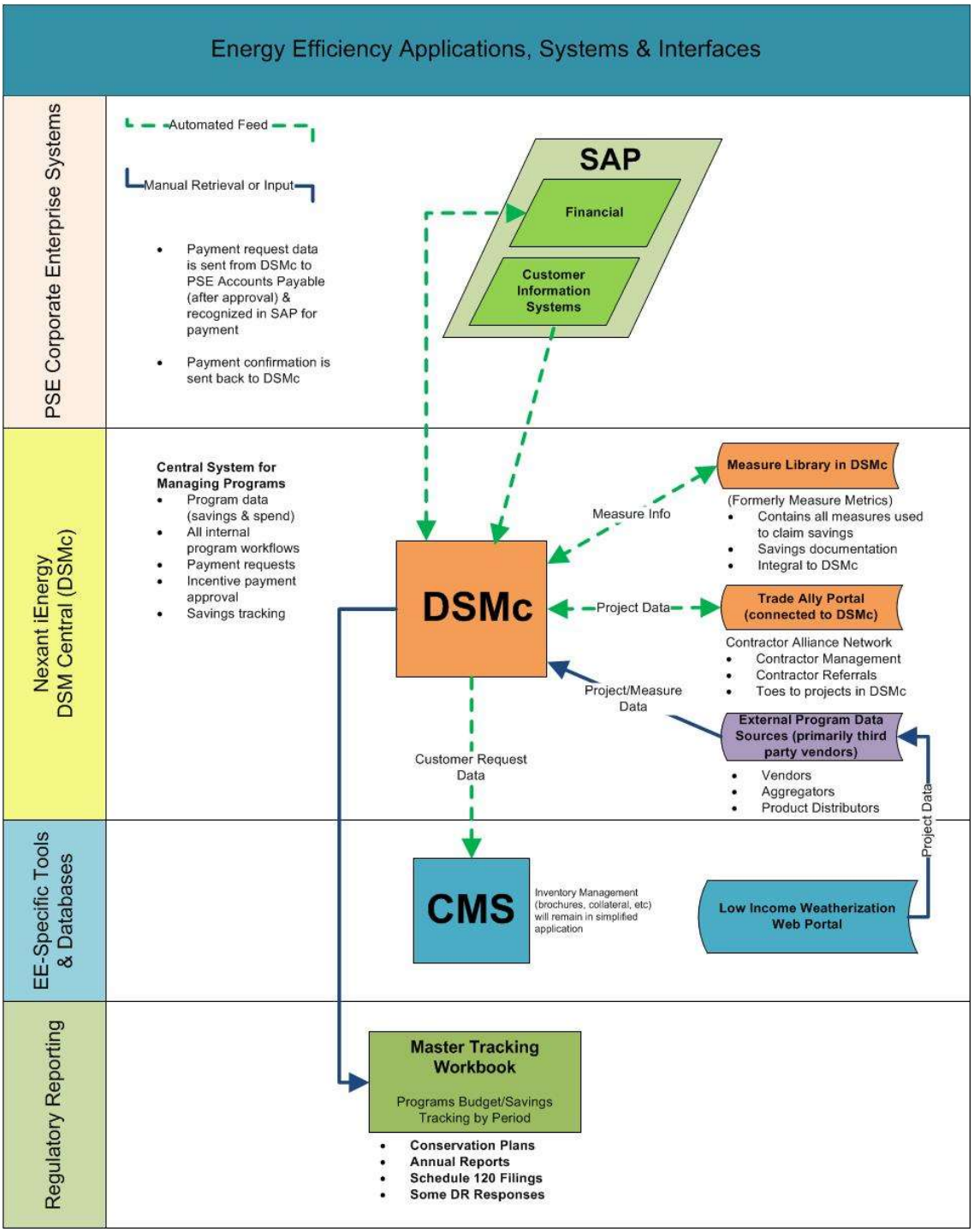
6) Master Tracking Workbook

As the name implies, the Master Tracking Workbook is a Microsoft® Excel™ file, which BAR staff use to log all expense and savings data by month for internal Energy Efficiency reporting and external reporting. The majority of financial and savings tables in this Report, including Exhibit 1, are linked together in the Master Tracking Workbook. The Workbook is also the source of Energy Efficiency's annual Schedule 120 review with UTC Staff and CRAG members. Maintenance of this workbook is one key to assuring segregation of duties and provides an additional review step in Energy Efficiency's reporting.

[36] It is important to note that the Source of Savings database archived only per-measure savings data, and was not used for tracking cumulative savings.

Energy Efficiency illustrates its system interfaces in Figure IX-1.

Figure IX-1: Energy Efficiency Management Tracking and Reporting Interface



B. 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.

Where applicable and possible,[37] 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. PSE intends that the following discussions provide general overviews, rather than comprehensive process reviews.

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.

[37] 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.

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;
- 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[38] of this Report lists the savings values for all prescriptive measures, by program 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 DSMc.

[38] PSE created Exhibit 5: *Prescriptive Measures*, from a report in DSMc.

When necessary, program staff apply any measure savings revisions at the beginning of the year following the publication of the updated measure savings value, if that publication occurs prior to September 1 of a planning year. This is 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, but not limited to 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, the source of savings for these types of measures aren't archived in DSMc.[39]

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 DSMc. Energy Efficiency staff regularly compare the savings figures indicated in the measure business cases against those archived in DSMc, which is the key source of accumulated and recorded year-to-date aggregate savings. When necessary, PSE follows a rigorous savings adjustment process if it is discovered that certain savings values disagree between the references.

Rebate application processing and analysis is another vital measure savings verification component. A complete discussion of the Rebates Processing organization's activities and accomplishments is included in Chapter 10: *Portfolio Support*, starting on page 175.

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

c. Savings Tracking

After vetting a measure's savings value and obtaining the director of Energy Efficiency's approval, the measure value and source of savings data is archived.[40] Program staff then follow a meticulous process to verify and report their measures' monthly installations.

Program data is systematically uploaded and coupled to information in the measure library in DSMc, where the archived savings value is linked to the applicable measure quantity. Program staff check vendor/contractor invoices and reports for measure values and counts prior to payment to ensure entry accuracy, prevention of double-counting, etc.

To ensure accurate savings reporting,[41] program staff and Data and Systems Services staff confirm the monthly savings and expenditure figures in DSMc. After this check, the data is locked for entry, and is available for department-wide reporting (discussed in the Savings Reporting section). DSMc also tracks and reports on calculated and custom measure data, which is aggregated and logged into DSMc.

d. Business Energy Management Custom Project Verification

When EMEs manage custom grants, they conduct a full range of verification activities, 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.

EMEs verify project elements such as measure quantity, baseline energy consumption, potential savings, projected and actual equipment performance, and actual conservation results.

[40] The primary source of savings archival database is DSMc. Savings are accumulated and reported as projects are completed in DSMc. Although DSMc is now fully on-line, PSE anticipates that DSMc will be the primary repository of savings tracking, with the EES Tracking Database being used as a vetting tool. Additionally, all financial data originates with SAP, which will continue to be the sole financial repository.

[41] 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 DSMc.

Every custom grant project includes a peer review by a more senior EME. A large number of Business Lighting Rebate projects are also selected for EME review, and the Verification Team inspects a calculated number of projects and commercial prescriptive rebates at customer locations. Before a custom grant is authorized for payment, it must meet verification requirements.

Business Energy Management staff use DSMc 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 every electric and natural gas savings adjustment, along with its respective adjustment value, and an aggregate total of all adjustments that were performed throughout 2018. 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*.

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 the Budget, Administration & Regulatory manager only after the applicable program manager has addressed five questions:

1. What was the reporting discrepancy?
2. How was the discrepancy discovered?
3. What was the effect of the discrepancy?
4. How was it corrected?
5. How did program staff ensure that the discrepancy is not repeated?

Once approved, an adjustment entry is made in DSMc. Adjustments apply only to the ongoing reporting of cumulative savings values. They do not apply to archived, per-measure savings values, unless analysis reveals that those are erroneous.

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 DSMc 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 database.[42] Rather, they are retired.

2. In the case of an evaluation, industry study or RTF revision updating the savings value of a current measure. If a measure's UES value is adjusted mid-year (prior to September 1), PSE updates the value at the beginning of the following year, consistent with Energy Efficiency's *Measure Revision Guidelines*.

3) Savings Reporting

When DSMc became fully operational in 2018, Energy Efficiency retired CSY (for the purposes of ongoing conservation project management). Once compiled and verified in DSMc and the EES Tracking Database, all program figures are copied to the Master Tracking Workbook, managed by BAR staff. This step provides segregation of duties, and an extra opportunity for staff examination before the data are archived.

After BAR staff populate the Master Tracking Workbook (the final step noted in Figure IX-1 on page 163) with the monthly savings and financial information, they forward the summary report to program staff for a last double-check and vetting.

[42] Including CSY, The Source of Savings database, and DSMc.

The aggregated monthly data is linked to 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.

C. 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[43] 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 the previous year's Schedule 120 expenses in preparation for its annual Commission open meeting, BAR staff[44] 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.

[43] PSE discusses SAP in more detail on page 161.

[44] Members of Energy Efficiency's Budget, Administration, and Regulatory department.

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.

1) Expense Tracking

SAP accumulates charges (or credits), and applies them to applicable Energy Efficiency order numbers.[45] 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.[46] SAP provides functionality that allows authorized users to "drill down" into expenses; accessing specific invoices or 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.[47] The process used to effect those infrequent adjustments is similar to that discussed in the measure savings adjustment section above, although controlled at a corporate level with strict policy guidance.

Moving expenses from an incorrect account to the correct account is accomplished by the use of a journal entry (JE).

[45] The order numbers used by Energy Efficiency programs are listed in the "Sector Views" of the 2018-2019 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.

[46] Cost elements can include, but are not limited to categories such as labor, overhead, outside services, employee expenses, etc.

[47] 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.

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, BAR staff download SAP financial records for all Energy Efficiency order numbers and enter them into the EES Master Tracking Workbook. The EES Tracking and Forecasting Database also archives expense data, using a feed from SAP.[48]

The Workbook and Database are intentionally separate to ensure segregation of duties, thus providing an additional point of reconciliation.

D. Final Assembly of Energy Efficiency Information

Once BAR staff load the monthly electric and natural gas savings and expenditure data into the Master Tracking Workbook, the data is vetted by applicable Energy Efficiency staff. Any needed adjustments are made, and linked spreadsheets within the workbook are ready to be extracted into the many Annual Report tables and Exhibits reference herein. The assembled data is also used as a reference in the creation of Exhibit 2: *Cost-Effectiveness Results*. As previously noted, PSE creates Exhibit 5: *Prescriptive Measures* from a measure report in DSMc.

E. Data and Systems Services

Data and Systems Services perform 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, verification, and Evaluation processes. The organization is the primary PSE contact for the vendor that produces the Biennial Electric Conservation Achievement Review (BECAR). This team manages system administration, technical support, and system enhancements for the DSMc project management application.

[48] Figure IX-1 on page 163 illustrates these systems.

PSE provides a complete discussion of the team's 2018 activities and accomplishments in Chapter 11: *Portfolio Support*, in the Data and Systems Services section.

F. M&V Accomplishments, Continuous Improvement and Adaptive Management

The following points are illustrative of PSE's commitment to continuous improvement and adaptive management in all facets of its Energy Efficiency business—not just to program that generate conservation savings. Throughout 2018, 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 requests. Highlights of key M&V accomplishments include:

- The savings adjustment documentation was enhanced, ensuring that electric and natural gas savings reconciliations were tracked separately, clarifying staff lookups.
- Data and Systems Services enhanced the 2019 ACP Planners' interface with the Exhibit 1: Savings and Budgets workbook, reducing the potential for keying errors.
- The Budget and Administration team added several steps and worksheet lookups in the Master Tracking Workbook to reduce defect opportunities and add reconciliation steps.

PSE discusses additional M&V-specific 2018 accomplishments and continuous improvement initiatives in applicable Verification Team, Rebates Processing, Data and Systems Services, and Program Evaluation sections of the Report.

PSE intentionally left this page blank.

X. 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) incentives are properly set, and (3) 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 X-1 provides a 2018 year-to-date summary of expenditures for the Portfolio Support organizations.

Table X-1: Portfolio Support, 2018 Expenditures

2018 Expenditures				2018 Budget
Schedule	**Programs**	**Total**	**% of Budget**	
Electric	Electric			Electric
Gas	Gas			Gas
	Data and Systems Services	$ 1,004,723	91.2%	$ 1,101,678
	Rebates Processing	$ 471,923	83.9%	$ 562,526
	Verification Team	$ 492,586	91.4%	$ 538,894
	Programs Support	$ 388,617	93.7%	$ 414,566
	Trade Ally Support	$ 154,167	130.7%	$ 118,000
	Contractor Alliance Network	$ (35,597)	104.7%	$ (34,000)
	Automated Benchmarking System	$ 157,273	77.2%	$ 203,670
	Energy Advisors	$ 1,100,090	95.6%	$ 1,150,707
	Energy Efficient Communities	$ 858,213	87.1%	$ 985,335
	Customer Digital Experience			
	Customer Online	$ 612,854	104.5%	$ 586,196
	Market Integration	$ 207,690	79.3%	$ 261,961
	Customer Awareness Tools	$ 916,628		
	ShopPSE	$ (4,737)		
	Events	$ 483,986	76.1%	$ 635,662
	Brochures	$ 47,611	57.6%	$ 82,624
	Education	$ -	0.0%	$ 8,700
	Total Electric	**$ 6,856,030**	**103.6%**	**$ 6,616,519**
	Data and Systems Services	$ 149,935	91.1%	$ 164,618
	Rebates Processing	$ 72,690	87.1%	$ 83,484
	Verification Team	$ 75,424	94.5%	$ 79,848
	Programs Support	$ 57,784	93.0%	$ 62,154
	Trade Ally Support	$ 18,417	83.7%	$ 22,000
	Contractor Alliance Network	$ (133,802)	393.5%	$ (34,000)
	Automated Benchmarking System	$ 32,403	83.1%	$ 38,973
	Energy Advisors	$ 135,483	78.0%	$ 173,706
	Energy Efficient Communities	$ 123,750	88.1%	$ 140,519
	Customer Digital Experience			
	Customer Online	$ 98,316	111.5%	$ 88,204
	Customer Awareness Tools	$ 137,640		
	Market Integration	$ 33,129	35.5%	$ 93,346
	ShopPSE	$ (4,233)		
	Events	$ 107,641	92.2%	$ 116,754
	Brochures	$ 4,714	48.0%	$ 9,821
	Education	$ -	0.0%	$ 1,300
	Total Gas	**$ 909,293**	**87.4%**	**$ 1,040,727**

B. Data and Systems Services

The Data and Systems Services organization performs the critical role of planning, development, support, and enhancement of Energy Efficiency systems and tools. The team manages the ongoing support of the department's Demand Side Management central (DSMc) system, which:

- Compiles and tracks Energy Efficiency programs, projects and measures, and
- Processes Residential, Commercial Rebates and Commercial Grants through structured workflows to provide a consistent review, approval and payment process.
- Creates reporting, forecasting, and business performance metrics.

This group also oversees the department's EES Tracking and Forecasting system which is used to track and forecast program savings and expenses. This system allows the department to better monitor its progress towards meeting annual savings and spending targets for the entire EES portfolio of programs.

The Data and Systems Services organization also conducts analytics by understanding and presenting program data as meaningful knowledge and insights. The team is responsible for reviewing and ensuring data integrity from a wide variety of sources, including vendors, program staff, and contractors.

1) 2018 Accomplishments and Activities

In 2018, the D&SS organization completed building a new rebate payment feature into its DSMc system. This feature allows customers who submit their residential space or water heating rebate online to select whether they want to receive their rebate as a check payment or whether they want to apply their rebate to their PSE billing account as a bill credit. Based on the success of this initial launch, the team plans to extend this payment option to all rebates and grants that are processed internally at PSE.

The team also built several new EE programs into its DSMc System. This included the Commercial Midstream, Commercial HVAC Rebate, Natural Gas Water Heating, Multi Family Appliance Decommissioning, Manufactured Home New Construction, and Single Family New Construction programs.

The D&SS team had several additional accomplishments outside the work they did relative to DSMc. In 2018, the organization:

- Successfully managed the onboarding of a new external vendor for the retail programs, testing their rebate portal, reviewing their data submissions.
- Contributed to the department's top to bottom review of its biennial planning process, resulting in a variety of updated planning tools and processes for the upcoming BCP.

2) Adaptive Management through Continuous Improvement

The team implemented a host of new reports in its DSMc system to better assist Program Managers to track and manage their programs, provide detailed and accurate reporting for SOX audits, and to enable community specific Energy Efficiency activity reporting. In addition, a new City/Zip check process was implemented to review, clean, and standardize program data that the team receives from external vendors. The team also created an invoice tracking process to enable more effective financial and data verification from external vendors.

C. 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; and
- Coordinating timely customer payments with PSE Accounts Payable.

As noted in Chapter 9: *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 X-2 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 X-2: 2018 In-House Residential Rebates Paid

Program	Count	Electric Incentives Paid	Gas Incentives Paid
Electric Home Heating	4,400	$4,070,000	$0
Electric Water Heating	600	$470,000	$0
Home Performance with Energy Star	10	$10,000	$0
Natural Gas Fuel Conversion	300	$410,000	$0
Natural Gas Home Heating	6,300	$0	$2,150,000
Residential Windows	1,900	$220,000	$560,000
Single Family Weatherization	3,300	$300,000	$1,580,000
Totals	**16,810**	**$5,480,000**	**$4,290,000**

1) 2018 Continuous Improvements and Accomplishments

The Rebate Processing team successfully managed processing over 16,500 rebates for residential and commercial customers. The ease of the online Public User Interface has greatly streamlined the overall process. The organization achieved a significant highlight this year by training all PSE Contractor Alliance Network members on using the PUI.

Each contractor that submits an instant rebate for a PSE customer is now required to do so online. This greatly enhances the tracking and reporting of their submittals experience. It also speeds up the processing timeframe to that customers and contractors receive their payment in a timelier manner.

D. 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.

[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 2018.

3) 2018 Team Accomplishments

The Verification Team completed over 2,000 site and phone verifications for over 20 unique energy efficiency programs; both residential and commercial. Table X-3 represents a summary of on-site project inspections completed by the Verification Team through 2018. Please note that PSE rounds the indicated figures greater than 10 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.

Table X-3: Summary of Verifications by Measure Type

Measure Category	Count
Business Lighting Program	6
Commercial Cooking Equipment	20
Ductless Heat Pump	200
Forced Air Furnace to Heat Pump Conversion	100
Fuel Conversion	70
Gas Boiler	8
Gas Furnace	350
Gas Fireplace	70
Heat Pump Water Heater	80
Heat Pumps	180
Heat Pump-Lockout Control	130
High Efficiency Heat Pump & Air Conditioner	9
Hospitality Rebates	4
Integrated Space & Water Heat	20
Multifamily Retrofit	3
Single Family Weatherization- Windows	210
Single Family Weatherization- Insulation	600
Small Business Direct Install	50
TOTAL VERIFICATIONS	2,100

In 2018, the team received approval to pilot its new “Virtual Verification” program late in the year. This pilot allows the Verification Team to contact customers via their smart phone and walk them through a “virtual” verification of their equipment while the QA Specialist is not physically onsite at their location.

The QA Specialist is able to walk the customer through the inspection on an app such as FaceTime, WebEx video conferencing, etc. to easily ascertain the equipment information,[50] and still provide the same level of service and professionalism. While this is still in its early stages, the team is confident that this can greatly reduce time spent on jobs that are simple to do; particularly if a customer lives in the far reaches of PSE's service territory. The team anticipates that this will provide many of PSE's customers with another option that will make participating in a verification less time-consuming and more cost-effective. It is important to note that verification by a home, project, business or dwelling can involve a significant number of individual measures.

E. Programs Support

Programs Support functions include data management, employee engagement, communications, and integration work by Programs Support staff, and all supporting implementation of Residential and Business Energy Management customer programs. The Programs Support budget is predominantly labor and includes training, planning and development costs projected by Programs Support staff.

Program Support roles include, but aren't limited to:

- Collaboration with Energy Efficiency stakeholders on internal employee and customer communications;
- Biennial and strategic program planning support;
- Customer experience – Energy Efficiency program participation surveys;
- Operational strategy and implementation;
- Organizational change management;
- Developing program manuals, policies, document control and department presentations;
- Integration liaisons with Marketing, Outreach, Digital Experience, and other PSE internal departments;
- Trade Ally support; and
- Best practices and continuous improvement.

[50] A key element of the Virtual Verification is that customers are not asked to inspect weatherization measures, measure for which a ladder would be required, etc. Only those measures that are easily accessible and visible are considered.

1) 2018 Accomplishments and Activities

A key 2018 focus area for Programs Support staff was enhancing internal customer communications to customer-facing employees, and collaborating with program staff and marketing to provide talking points and monthly highlights. The organization also was a central contributor to developing and managing Energy Efficiency policies, enhancing document control, managing internal websites, and coordinating reports and presentations to various PSE staff. Staff also led streamlining processes and continuous improvement efforts.

2018 was a Year in which Energy Efficiency, and in particular, the Programs Support staff devoted much of the year to developing and rolling out updated and enhanced planning processes for the next biennial program years (2020-2021).

Planning years are significant in that all program teams and Energy Efficiency support groups work together to develop and tailor their program portfolio mix for the next two years. Programs Support facilitates and manages the planning process—from beginning to end. Some of the key planning activities included:

- Schedule and adhere to timelines;
- Develop and distribute Request for Proposals/Information (RFPs/RFIs);
- Prepare internal and external communications (OCM activities—keeping all Stakeholders informed);
- Organize and lead regular planning meetings;
- Create working templates, forms and tracking documents; and
- Follow up with program leads to ensure key milestones have been met.

F. 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.

PSE budgets and tracks other Trade Ally expenses not related to dues, for example conference attendance by PSE Energy Efficiency staff, 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 2018 focused mainly on local or regional conservation efforts. 2018 memberships[51] included:

- Association of Energy Services Professionals – AESP;
- Building Owners and Managers Association of Seattle & King County – BOMA;
- Consortium for Energy Efficiency – CEE;
- Electric League of the Pacific Northwest;
- Energy Solutions Center – ESC;
- Northwest Energy Efficiency Council – NEEC; and
- Washington Association of Maintenance and Operation Administrators – WAMOA.

PSE also enhanced its resources by subscribing to eSource in 2018.

This extensive industry database provides an additional insight for program staff to ensure that they maintain awareness in utility and efficiency developments. 2018'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).

3) Key Variance Drivers

Trade Ally Support exceeded its 2018 anticipated spend for electric by approximately 30 percent, while spending on the natural gas side was 16 percent below budget. This was the result of an unbudgeted contribution for NEEC's Smart Building Center (SBC). PSE ensured that the SBC support is included in the 2019 ACP.

G. 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.

[51] These are included in Exhibit 1, Supplement 3 of this report, which provides a high-level view of 2018 expenditures for memberships and sponsorships.

1) 2018 Program Review

In 2018, the Contractor Alliance Network (CAN) had 188 member contractors enrolled in the network. These contractors were responsible for closing just over 1,700 customer referrals which generated over $7.5 million in project costs for contractors installing energy efficiency equipment.

Another key focus of 2018 was the development of an enhanced trade ally network and associated strategy. This strategy is intended to deepen the relationship with trade allies who participate in PSE energy-efficiency programs, and reach a broader range of trade allies who 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.

2) Program Accomplishments

In 2018, the program team focused on the development of a restructured trade ally network design to be implemented in 2019. Through internal and external feedback, the program team identified key strategies to further engage trade allies and enhance the value proposition of the network to both end-use customers and trade professionals.

Some of the key insights include:

- Development of account support tools for trade professionals.
- Restructuring of EE product and service referral offerings to align with customer and trade professional needs.
- Rebranding the network to align with customer preference and better represent trade professionals associated with PSE EE programs.
- Centralizing internal resources to provide improved visibility within the department regarding trade ally interactions.
- Scoping a software solution to provide better access to referrals, rebate information and performance metrics.

In alignment with the trade ally strategy outlined above, the CAN team worked in collaboration with the program staff to develop and support two unique limited time promotional offers.

One of the offers leveraged local distributer relationships to facilitate zero cost extended financing on qualifying ductless heat pump equipment. The financing originated through the manufacturer and was provided by dealer direct to the customer.

The other promotion supplied a Sales Performance Incentive Fund (SPIF) to participating contractors who installed qualifying heat pump water heater (HPWH) equipment. The HPWH promotion leveraged regional support from NEEA to provide participating contractors with education on best practices in installing HPWHs as well as information on market potential in the region.

The CAN team also introduced two new products into the network in 2018: High Performance Homes, and Customer Field Services Gas Equipment Referral Pilot.

The High Performance Homes product aligns with the implementation of the Single-family New Construction program. With this product the CAN team worked with program staff to identify qualified Home Raters and incorporate them into the trade ally network.

The Customer Field Services Gas Equipment Referral Pilot leverages PSE's Gas First Response team, located in PSE's Georgetown facility, to utilize the CAN referral mechanism and provide direct contractor referrals to customers who need additional services outside of their scope.

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

In 2018, the Contractor Alliance Network team, in collaboration with program staff, continued to support the Manufactured Home customer segment through dedicated referral products for both Weatherization and HVAC measures. In addition to this, the CAN team also provided direct marketing to this customer segment through the promotional offers outlined above.

The CAN team also facilitated outreach to the network around PSE's Home Energy Assessment and Small Business Direct Install program – recognizing them as customers of PSE and likely small businesses that could benefit from PSE rebates themselves. It also provides them with the experience necessary to effectively promote the program to their customers.

4) Key Variance Drivers

CAN revenues generated from referral fees mainly underperformed in 2018. However, the program remained viable, generating enough revenue to cover general operations. However, referral volume was reduced by roughly 20 percent in 2018 compared to 2017, directly impacting potential sales and subsequent revenue.

The primary driver impacting lower than anticipated revenue is primarily a result of revisions to PSE technologies. In 2018, PSE updated both its website and Interactive Voice Response (IVR) system which subsequently reduced marketability of the CAN referral program.

With respect to the website, the referral form was rendered inoperable for a significant period of time during the historically high volume period. The program team is working with both the web development team and Energy Advisors to optimize both the IVR and web customer intake channels in 2019.

Outside Service expenditures also deviated from the 2018 budget. The original budget was put in place and earmarked for the development of a trade ally portal. The portal would in effect be a software application to centralize trade ally resources, including contact management, referral reporting, performance dashboards, etc. The project was delayed in 2018 due to other strategic planning priorities and is expected to be reviewed for proposed implementation in 2019.

It is important to note that all CAN revenue reported is integrated into the annual Conservation Rider (Schedule 120) filing—decrementing the expenses paid by PSE ratepayers.

1. As PSE transitions to a new reporting system, additional revenue that is outstanding from the last quarter of the year will be realized in 2018.
2. The accrual of aging accounts resulting in write-offs associated with revised FTIP policies and procedures.
3. Program staff are researching the potential that there may be some remaining unreported referral fees in 2018. Associated projects will be vetted and reported in the 2018 program year.

It is important to note that all CAN revenue reported is integrated into the annual Conservation Rider (Schedule 120) filing—decrementing the expenses paid by PSE ratepayers.

H. 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 their property, they will be a part of what is becoming an industry standard and will receive quick and accurate data on a monthly basis for their entire building.

This tool will enable enrollees 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 received come from building owners (or their contractors) that were tracking their energy usage or tracking the results of energy efficiency projects.

1) Program Accomplishments

PSE continued to see an uptick in use of MyData in 2018. 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. In 2018, PSE received another 1,565 new requests to use MyData.

It is important to clarify that each customer may be responsible for more than one building or facility.

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

The MyData software platform is available to all PSE customers. It is used extensively by Small-to-Medium Business (SMB) customers in Seattle to assist in compliance with the benchmarking regulations.

3) Adaptive Management

Program staff continue to use customer feedback to plan for future improvements.

I. 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 suited 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, and make suggestions on how customers can reduce their energy use. Energy Advisors 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.

1) 2018 Accomplishments

The Energy Advisor team interacted with over 85,000 PSE customers this year. This included over 17,000 customer engagements while staffing community events. The development of online self-service options has led to a decrease in customer calls to the Energy Advisor line. The online Public User Interface has also made it easier for customers to submit rebate applications without having to contact an EA. A big accomplishment this year was the team's focus on promoting self-service tools and their benefits during every customer interaction. This greatly enhances PSE customers' ability to evaluate and manage their energy usage throughout the year. Table X-4 presents highlights of key 2018 Energy Advisor metrics.

Table X-4: Key Energy Advisor Metrics

2018 Energy Advisors	
Calls Answered	63,100
Emails	3,800
Events Staffed	>160
Walk-in Customers Served	>450

The metrics noted in Table X-4 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) 2018 Adaptation and Continuous Improvement

New for 2018, energy advisors are utilizing the DSMc system to check rebate status for customers and contractors. They are also promoting the Public User Interface (PUI) so customer can submit their rebate applications and check rebate statuses online.

PSE continues to improve its information distribution to customers based on their evolving requirements. For example, PSE makes use of emails with PDF attachments and hyperlinks via its Energy Advisors, as well as mailed hardcopy brochures and rebate applications through its brochure fulfillment process.

J. 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 at the local level. The program works to leverage community resources to connect with, educate and move customers to Energy Efficiency program participation.

1) Description

Puget Sound Energy's EEC channel works to generate participation in PSE's Energy Efficiency programs through direct-to-customer outreach and through partnerships at the local level. 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. As an outreach team for both residential and commercial programs, the EEC team also works on cross-program promotion, where appropriate.

The following discussions provide reviews of key 2018 Energy Efficient Communities' areas of focus.

2) Program Accomplishments

In 2018, the EEC team accomplished a variety of customer outreach initiatives in support of various EE programs, including the following:

- Conducted 10 home energy assessment door-to-door blitzes in Duvall, Federal Way, Newcastle, Shoreline, Burien, Olympia, Orting, Sedro Wooley, Kirkland and Nooksack/Everson to drive awareness and program participation. Sent postcards to nearly 20,000 customers, knocked on almost 11,000 doors and secured almost 950 program sign-ups. Three of these blitzes were in rural communities.
- Supported five Small Business Direct Install blitzes in Duvall, Des Moines/Normandy Park, Yelm/Rainier/Tenino, Renton and Everson/Nooksack. Engaged with over 1,200 small businesses and completed upgrades for more than 250 customers. Yelm/Rainier/Tenino and Everson/Nooksack are rural communities, so these blitzes made a huge impact to the businesses in these areas.
- Delivered dozens of presentations to chambers, homeowners associations, downtown associations, non-profit organizations, etc. and tabled at hundreds of local events to promote select energy efficiency programs.

3) Continuous Improvement and Adaptation

The Energy Efficient Communities team continued to reach diverse customer segments by:

- Conducting small business meet and greets in Mill Creek, Kingston, Kirkland, Lacey, Cle Elum/Roslyn, and Point Roberts. The purpose of this tactic is to have a light touch with PSE's small business customers to drive awareness of PSE's energy efficiency programs. The EEC team engaged with over 200 businesses in these communities and targeted areas that they haven't been in a few years.
- Partnering with 24 non-profit organizations (Powerful Partnerships) that specialize in supporting local families in need or environmental protection. The team extended its reach through these organizations to promote select energy efficiency programs through monthly digital/print/web/social outlets, as well as dozens of tabling events. From March through June alone, EEC had over 800 meaningful conversations with customers.

- Creating county profiles that showcase the number of residential and commercial rebates processes, as well as the total residential and commercial incentives that PSE paid each year. These profiles are available on PSE's website and are used during presentations to a variety of audiences, such as city councils; as handouts to select audiences, like homeowner association meetings; and tabling events.

4) Pilot-Like Initiatives

In 2018, the EEC team tested new outreach tactics to:

- Strategically engage PSE's underserved populations. Specifically, the team piloted an initiative to promote the home energy assessment and low income weatherization programs to customers visiting local regional foodbanks. By leveraging PSE community investment dollars, the team set up tables at 21 food banks in various counties, resulting in over 900 engaged conversations. Team members also worked with select food banks to provide translation services as needed to reduce language barriers. The EEC team concurred that this targeted outreach approach was valuable and will be replicate and/or expanded in 2019.
- Drive awareness of PSE Energy Efficiency programs at the local level. In October 2018, the team launched its first set of newsletters tailored for each county PSE serves. These digital newsletters will be sent out biannually moving forward to showcase local outreach initiatives, such as small business direct install blitzes.

K. Customer Digital Experience

The focus of the Customer Digital Experience initiatives is to significantly improve Energy Efficiency's ability to communicate the "how and why" of energy efficiency, using new technologies and engaging interactive methods. Ongoing work includes the design of web tools and mobile-friendly apps that are effective in delivering electricity and natural 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 supports interactive content development, e-newsletters and other miscellaneous software applications, including online form, database and web hosting services.

These tools, implemented in 2014 and regularly improved and updated since then, help customers understand the specifics behind their energy usage, show neighbor comparisons (residential customers),[52] 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. Ongoing management includes purchases made through shopPSE, (http://PSE.com/shoppse).

PSE's "Savings & Energy Center" continues to see significant page traffic and overall engagement with customers.

PSE provides several highlights of its 2018 online metrics in Table X-5.

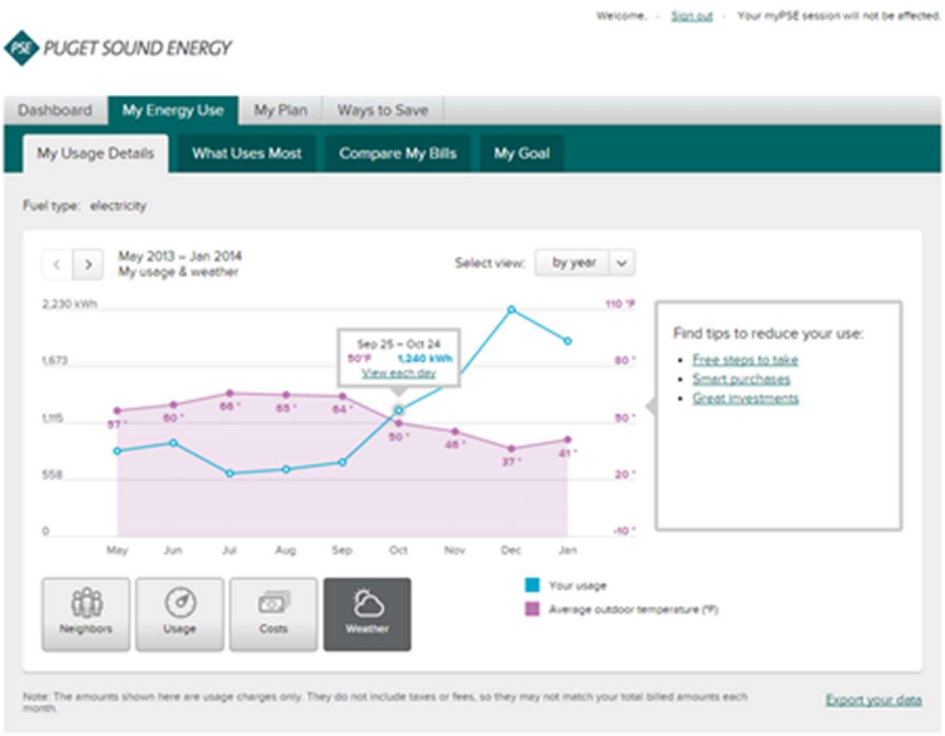
Table X-5: Energy Efficiency On-Line Metrics

2018 Customer Online Experience Metrics	Web Page Views 2018
Savings & Energy Center *[all EE-related content pages on pse.com]*	2,023,734
myPSE account Energy Center tools *[pse.com Energy center landing page and Opower tools]*	384,135
Ask an Energy Advisor inquiry form page *[https://www.pse.com/rebates/ask-advisor-form]*	13,352
Contractor Referral Service referral page *[https://www.pse.com/rebates/find-a-contractor]*	39,173

[52] Specific customer details; addresses, names, account information, etc. are rigorously protected. Instead, only general, non-specific comparisons will be provided.

PSE provides a screen image of its myPSE Account Energy Center Tools in Figure X-1.

Figure X-1: Screen Images of myPSE Account Energy Center Tools



1) Customer Awareness Tools

The Customer Awareness Tools category is comprised of four electronic services provided to PSE customers via a variety of media, designed to fit customers' communication expectations. The services include:

a. Unusual Usage Alerts (UUA)

- Delivered to customers when their energy usage is abnormal compared to the previous year.
- Since the service's inception, over 600,000 PSE customers have received the alerts.
- Unusual usage alerts are triggered when a customer is trending to use more than 30 percent of they used for the same billing cycle the year prior.

b. My Energy Usage

- When PSE customers log onto their myPSE account, they can view their energy usage center, which is moderated by PSE's contractor.
- Additionally, the energy usage center also allows customers to select ways to be more energy efficient to help them save energy.

c. Seasonal Readiness Emails (SRE)

- PSE's contractor sends up to 250,000 reports to customers twice a year during the changing seasons, once in the summer and once in the winter.
- Since 2017, the open rate was over 33 percent for both the summer and winter notifications.

d. Customer Engagement Tracking (CET)

The Customer Engagement Tracker (CET) survey is an instrument designed to explore utility customer reactions to the Home Energy Reports program and other related outreaches. The instrument incorporates a variety of standardized questions that enable applicable comparisons to other surveyed contractor utility deployments, representing over 69,000 customer interviews across 44 distinct utility partners. At PSE, the instrument aims to accomplish the following key objectives:

- Explore customer interaction with and reception of the Home Energy Reports; for both those in PSE's legacy deployments as well as the 2014 expansion groups,
- Gauge overall impact of the program on the PSE customer relationship, both via self-reported influence and by measuring differences in engagement between program participants and non-participants (controls).
- Compare results between PSE deployments and to those of other contractor utility partners, with an eye towards potential program improvements.

2) ShopPSE

ShopPSE is Energy Efficiency's online retail website:

https://shop.pse.com/

That provides PSE customers with a wide variety of energy-savings devices, including LED lamps and showerheads.

3) Customer Digital Experience Accomplishments

In 2018, Customer Digital Experience continued to provide the tools found in the myPSE Account Energy Center to help customers understand the specifics behind their energy usage and show neighbor comparisons (residential customers).[53] 2018 marked a substantial increase in web visitors, suggesting that customers are favoring the digital experience.

In 2018, ShopPSE resulted in 671 purchases of showerheads and LED bulbs.

The Customer Digital Experience also assisted customers in saving energy through email engagement messaging. For example, unusual usage alerts (UUA) notify customers when their usage is trending to be more than 30 percent higher from the same time from the previous year and provides tips on how to curb usage and save energy. In 2018, PSE sent 418,162 unusual usage alerts to customers with an open rate of 48 percent, which is significantly higher than the industry standard. [54]

According to a survey PSE conducted in 2018, almost 60 percent of UUA recipients take some sort of action; 20 percent specifically cite taking steps save energy. Additionally Energy Efficiency communicated with customers via seasonal readiness emails, that provided tips to help customers save energy throughout the winter and summer seasons.

Lastly, in 2018, Customer Digital Experience also provided customers with their E-Bill notifications, a service that provide customers with an email when their bill is ready to view with a chart showing approximate energy usage for major use categories (for example, 50 percent towards heating).

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

Customer Digital Experience maintains technical and content design standards that support the accessible presentation of information about energy efficiency programs to customers with disabilities.

[53] Specific customer details; addresses, names, account information, etc. is rigorously protected. Instead, only general, non-specific comparisons will be provided.

[54] Per Oracle's year-end report to PSE.

The standards use assistive technology for browsing the web, referencing the Americans with Disabilities Act and W3C Web Accessibility Initiative Web Content Accessibility Guidelines (WCAG).

5) Adaptive Management

PSE stopped providing the E-Bill services through Energy Efficiency in October 2018 in order to transfer this service to another department in effort to streamline customer communications within PSE.

6) Key Variance Drivers

In 2018, there was a budget variance of nearly $940,000 dollars associated with Customer Awareness Tools, due to an inadvertent forecasting error in the beginning of 2018 that was corrected and reported as soon as discovered in July 2018.

L. 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 social media and media engagement. Other tasks include traditional marketing executions that center on promotional channels used across all programs, such as advertising, events, collateral, and websites.

In 2018, to reinforce and broaden the impact of energy efficiency programmatic marketing, PSE added one additional energy efficiency television and digital video ad to the series, promoting rebates and instant discounts offered by PSE.

The ads can be viewed here:

- PSE Rebates Make it Easy, featuring new characters “JoAnne” and “Rocky the Raccoon”: https://www.youtube.com/watch?v=mm5R0hV0Ucc

The two advertisements received more than 21.5 million impressions in PSE’s service area over an 8-month period.

Research conducted in October 2018 showed 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.

M. 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 strategies 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 customer segments such as seniors, rural communities, small business owners, etc.

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 Energy Efficiency programs, drive energy savings, and reach a broad and diverse audience base through door-to-door, open houses, and community events.

1) 2018 Accomplishments

In 2018, the 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 over half a million people to share the message of Energy Efficiency programs.

2) 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 countries. Community events into which PSE expanded its participation include:

- Island County festivals
- Whatcom, Skagit, Kitsap, Kittitas, Thurston Counties – Home Shows
- Kittitas County Fair, Wild Horse REC events, Farmers Market
- King County festivals, home fair and low income community events
- Kitsap community fairs
- Multi-Family Residential energy fairs
- Food Banks
- Powerful Partners tabling events

3) Reaching into PSE Businesses

The Events team, in concert with the Energy Efficient Communities team, continued Energy Efficiency's ongoing practice of engaging PSE employees, its vendor partners, and key client in extolling the customer benefits of energy efficiency. These efforts included at events:

- TechniArt Corporate Fairs (also termed "Pop-up events" in the Single Family Existing and Direct-to-Consumer program discussions) in the PSE business campuses and offices.
- Customer Employee events: Boeing, Expedia, Microsoft and City Halls.

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

In partnership with Energy Efficiency and local Outreach Leads, the events team delivered numerous tabling events at local Food Banks where staff engaged this vulnerable community segment and educated them on energy savings through PSE's energy-efficiency and weatherization programs.

Table X-6 provides a summary of 2018 events in which PSE presented energy-efficiency information. PSE rounds totals over 10 for this Report.

Table X-6: Total Events

2018 Events	Count
REM	250
BEM	30
Residential Door-to-Door	10
Customer Outreach	420
Contractors, Partners in Community	80
Total	**790**

N. 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.

1) 2018 Accomplishments

The brochures staff in collaboration with PSE's Communications Marketing group continued to work toward improving the customer experience by reducing the overall variety of available brochures. This reduction of titles helped bring focus to those that are used most frequently.

2) Adaptive Management

Selected brochures that were taken out of print as part of the improved focus of inventory are being posted to the PSE website for online access.

3) Hard-To-Reach, Potentially Underserved Segments

PSE made available more copies of foreign language energy-efficiency brochures to support its hard-to-reach community efforts at food bank tablings and ethnic events.

4) Key Variance Drivers

The shift of inventory needs resulted in lower spending from the projected budget. Table X-7 provides a view of 2018 brochure distribution.

Table X-7: Brochures and Mailings Distributed

Energy Efficiency Brochures	Number
Brochures Mailed	3,500
Brochures Downloaded from PSE.com	18,000
Energy Efficiency Brochures & Customer Referral Letters *(Per a Sampling of Energy Efficiency Items Mailed Via USPS)*	**Number**
Post CAN Thank You Customer Completion Letters	1,800
Home Energy Assessment Letters	30
Electric Heating Letters	100
Natural Gas Heating Letters *(Natural Gas Furnace)*	500
Natural Gas & Electric Insulation Letters	600
Customer Referral Letters	4,800
Energy Efficiency Brochures	3,500
Customer Natural Gas & Electric Thank You Kits	70

O. Energy Education

Schedules E/G 202

1) Description

The Energy Efficiency Education program provides opportunities to broaden knowledge of conservation and increase participation in efficiency programs. PSE's energy education program 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. Integral to its education program, PSE works with the Independent Colleges of Washington, which are comprised of:

- Gonzaga University,
- Heritage University,
- Pacific Lutheran University,
- Saint Martin's University,
- Seattle Pacific University,
- Seattle University,
- University of Puget Sound,
- Walla Walla University,
- Whitman College,
- Whitworth University

PSE works with those specific to its service territory, however:

- Pacific Lutheran University
- Saint Martin's University
- Seattle Pacific University
- Seattle University
- University of Puget Sound

2) Adaptive Management

With limited staffing to bring education into the community, PSE focused on its successful relationship with the Independent Colleges of Washington (ICW). Its initial February call for project proposals resulted in only one proposal which staff identified as non-viable. PSE directed ICW to request new proposals for the next time period. The 2018-2019 college year brought in a new proposal in November.

The Energy Education team had ICW award the scholarship to a Pacific Lutheran University student project to study behavioral impacts on Smart Home technologies. The results of this project will be reported toward the end of the 2019 school year.

XI. EFFICIENCY RESEARCH & COMPLIANCE

A. Overview

Functions of this group include:

- Conservation Supply Curves,
- Strategic Planning,
- Market Research,
- Program Evaluations and
- Biennial Electric Conservation Achievement Review (BECAR).

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 requirements. Table XI-1 provides a 2018 summary of expenditures for the Research & Compliance Sector.

Table XI-1: Research & Compliance 2018 Expenditures

2018 Expenditures				2018 Budget
Schedule	Programs	Total	% of Budget	
Electric	Electric			Electric
Gas	Gas			Gas
	Conservation Supply Curves	$ 412,790	82.1%	$ 502,686
	Strategic Planning	$ 831,857	93.4%	$ 890,429
	Market Research	$ 205,569	86.8%	$ 236,764
	Program Evaluation	$ 2,037,420	100.1%	$ 2,035,607
	BECAR	$ 49,772	55.3%	$ 90,000
	Total Electric	**$ 3,537,407**	**94.2%**	**$ 3,755,486**
	Conservation Supply Curves	$ 60,639	80.7%	$ 75,114
	Strategic Planning	$ 66,652	81.4%	$ 81,864
	Market Research	$ 30,590	86.5%	$ 35,379
	Program Evaluation	$ 319,447	120.9%	$ 264,275
	Total Gas	**$ 477,329**	104.5%	$ 456,632

B. Conservation Supply Curves and Strategic Planning

Although separately listed in PSE's Exhibit 1: *Savings and Budgets*, the Conservation Supply Curves and Strategic Planning functions are managed in the same Energy Efficiency organization, and tend to have overlapping goals and focus.

1) Conservation Supply Curve Description

The purpose of the Conservation Supply Curve function is to complete a Conservation Potential Assessment (CPA) or the company's Integrated Resource Plan (IRP). The Conservation Potential Assessment, conducted by a third-party consultant, identifies the amount of energy savings potential that is technically available, and of that, what portion is achievable over the 20-year planning horizon of PSE's IRP. PSE then determines the amount of conservation potential that is economic (that is, cost effective) relative to supply-side options in its overall resource portfolio analysis for the 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. Development of the natural gas conservation target follows a similar process.

2) Strategic Planning Description

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, end-use research, or other strategic efforts related to energy efficiency.

Strategic Planning roles include, but are not limited to:

- Internal and external research, planning and development,
- Biennial and strategic program planning support,
- Development and maintenance of avoided costs and cost-effectiveness models,
- Legislative and regulatory policy analysis,
- Coordination with regional organizations including NEEA and RTF,
- Supporting energy efficiency third-party program bidding activities.

3) Cost-Effectiveness

Cost-effectiveness modeling and calculations are also conducted within the Strategic Planning team. PSE comprehensively addresses program-level detailed views of electric and natural gas cost-effectiveness results for 2018 in Exhibit 2.

4) 2018 Accomplishments and Activities

In 2018, Cadmus Group completed the CPA of technically achievable savings for PSE's 2019 IRP, covering the period 2020-2039. Stakeholders were consulted at various points in the process and results were presented to the IRP Technical Advisory Group in December 2018. The budget included costs to complete the conservation potential assessment and incorporate the results of that assessment in the resource portfolio analysis.

Other notable accomplishments in 2018 included:

- Completed analysis of public health impacts from reduced residential wood smoke emissions due to installation of ductless heat pumps.
- Completed oversample of the Regional Building Stock Assessment in PSE's service area for multifamily homes.
- Presentation to the CRAG on PSE analysis of energy efficiency program participation in hard-to-reach markets.
- Developed analytics and presentations for the Statewide Advisory Group on an EE performance incentive framework, incorporation of NEEA savings in targets, and input on development of a Resource Value Framework.

The Strategic Planning function also provided budget contributions to the RTF, Regional End Use Load Study and the RBSA.

5) Key Variance Drivers

Total spending for Conservation Supply Curves was $104,000 (18 percent) lower than planned because the timing of some Outside Services work for the Conservation Potential Assessment was shifted to 2019, as well as some work that occurred in December 2018 not being invoiced until January 2019.

Strategic Planning expenditures were $74,000 (8 percent) less than the total budget due to shifting of Outside Services costs for CBSA oversampling out of 2018.

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) 2018 Results

In 2018, PSE Energy Efficiency Market Research efforts focused on a variety of effort to improve Energy Efficiency marketing effectiveness.

a. Program Accomplishments

In 2018, the organization completed the following:

- Energy Efficiency (EE) Awareness Survey Brand Tracking Study.
- Refreshed the propensity model gauging customer likelihood to participate in PSE's EE appliance, weatherization, Home Energy Assessment, and space heat programs.
- Conducted research and provided support materials for targeted door-to-door campaigns in 10 PSE communities.
- Conducted user experience research, analytics, and metrics for EE marketing campaigns.
- Conducted market research supporting trade ally rebranding efforts.
- Supported primary research surveying the EE awareness, barriers, and preferences of small and medium business customers.

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

- Provided research identifying Low Income eligible Mobile/Manufactured Home customers.
- Continued to provide support from the previous HTR study.
- Reviewed and highlighted emerging HTR secondary research as available to continue support EE HTR efforts.

c. Adaptive Management

In 2018 Market Research's contributions to adaptive management are included in the organization's accomplishments listed in the previous section. The staff's adaptive management efforts were part of continuous improvement efforts included more proactively in the front end of the research process.

d. Key Variance Drivers

Market Research experienced staff turnover during an 8 month period resulting in some variance in labor expenses.

D. Program Evaluation

The Program Evaluation function is focused on implementing PSE's overall Evaluation, Measurement & Verification (EM&V) function in compliance with applicable regulatory conditions to achieve the continual improvement of energy-efficiency service delivery to customers.

1) Description

PSE Evaluation staff are committed to the evaluation of energy savings and the continual improvement of energy-efficiency service delivery to customers. 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 (Exhibit 6), in accordance with the guiding Evaluation Framework (Exhibit 8), ensuring that all programs receive review on a maximum four-year cyclic basis.

Evaluations are conducted by third-party evaluation consultants that are selected by a competitive Request for Proposals (RFP) process. For 2018-2019, PSE has contracted with one third-party evaluator, Opinion Dynamics, for all programs except Home Energy Reports (HER). This approach will encourage greater efficiency and integration of data and results. The HER program will continue to be evaluated by DNV-GL, the same consultant used in previous years, to maintain analytical consistency and continuity.

Evaluation resources focused on residential programs in 2018. The level of detail at which each program is evaluated was determined by prioritizing each program into evaluation tiers. All levels of rigor will be consistent with the principles, objective, and metrics prescribed in the guiding Evaluation Framework (Exhibit 8) in PSE's 2018-2019 Biennial Conservation Plan. In prioritizing programs for evaluation, PSE considers the regulatory timing requirements, level of energy savings, significant program changes, results of prior evaluations and whether a program is new or never been evaluated before.

In 2018, the HER and Multifamily Retrofit programs received comprehensive evaluations, consistent with regulatory requirements and CRAG guidance. Other programs received various levels of market and process evaluations and engineering reviews of energy savings.

After an evaluation deliverable is completed, members of the EES program team participate in the Evaluation Report Response (ERR) process to ensure that evaluation results are implemented in the program. The Program Team completes the ERR, indicating what actions will be taken in response to evaluation findings and recommendations. This ensures a closed-loop system with Evaluation findings and Implementation responses and adjustments being documented in the Source of Savings database.

Final evaluation reports with appended ERRs are posted to the Conduit Northwest website (https://conduitnw.org).

PSE frequently shares the results of its evaluations with the RTF to support continuous improvement of measure energy savings values 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.

2) Evaluation Studies

The Evaluation Team completed the following impact evaluations in 2018, which are included in this Report as Exhibit 6, Supplement 1:

- Multifamily Retrofit Program
- Home Energy Reports

3) Additional 2018 Activities and Accomplishments

- Residential Portfolio Early Evaluability Assessment
  - Comprehensive review and mapping of organizational structures; Developed and confirmed Key Performance Indicators.
  - Deemed savings review for Single Family Existing, Multifamily Retrofit, and Low Income Weatherization programs Home Energy Assessment.
- Non-Residential Cross-Program Tracking and Design Interim Findings
  - Comprehensive review and mapping of organizational structures; Developed and confirmed Key Performance Indicators.
  - Deemed savings review for Small Business Direct Install, Commercial Kitchens & Laundry, and Lighting to Go.
- Home Energy Assessments
  - Analysis of follow-on savings from HEA recommendations.
- ShopPSE
  - Best Practice Review.
- Commercial Pay for Performance
  - Best Practice Review.
- Contractor Alliance Network
  - Commercial Contractor Engagement Assessment.
- Developed Evaluation Plans for deployment in 2019 including Commercial/industrial impact evaluation sample designs and project data acquisition plans.
- Launching the 2018 Home Energy Reports impact evaluation.

4) Pilot-Like Initiatives

The Evaluation team designed the research strategy to test Smart Thermostat technologies for the Multifamily Sector, in collaboration with the Washington State Community Energy Efficiency program and the Bonneville Power Administration.

5) Adaptive Management through Continuous Improvement

Adaptive Management is core to PSE's new approach of examining all tariffed programs within a two-year period. This examination revisited program theories, Key Performance Indicators (KPIs) and deemed savings values, and identified opportunities to update and improve various programs including the CAN program, Home Energy Assessments and Web Enabled Thermostats. Programs have undertaken specific improvement actions in response.

Evaluation staff continuously look to improve program evaluations, including integration of advanced data analytics (often called EM&V 2.0). EM&V 2.0 combines the principles from the EM&V Framework (Exhibit 8), with specialized software and technology applications to provide more timely feedback and granular results to program implementation teams. Part of this work will include assessment of the extent to which M&V 2.0 techniques can replace or supplement traditional impact evaluation and project verification methods.

PSE piloted use of EM&V 2.0 techniques in 2016-2017 and concluded that application to commercial/industrial projects was promising. To that end, PSE is incorporating EM&V 2.0 advanced analytics into its core evaluation activities, with a particular focus on performance of the C/I Retrofit, Commercial Strategic Energy Management, and Large Power User programs. 2018 focused on work planning and acquisition of project data for subsequent analysis.

6) Key Variance Drivers

Evaluation spending was very close to budget overall but had two offsetting variances. Outside Services spending was $179,000 higher than planned due to shifting of some residential evaluation work forward into 2018. Labor, associated overheads and employee expenses were $122,000 lower than the total budget due to a staffing vacancy for part of the year.

E. Biennial Electric Conservation Achievement Review (BECAR)

PSE, along with Commission staff, co-manages the Biennial Electric Conservation Achievement Review (BECAR), which is required to comply with WAC 480-109-120 (4)(v).

BECAR is an independent review of PSE's biennial electric savings and adaptive management practices. Every two years, PSE and Commission Staff, with review by PSE's CRAG, selects a consultant to conduct the BECAR for the biennium. The review examines electric savings baselines, measure savings calculation methodology, tracking and reporting accuracy, validates reported electric savings, reviews Company actions taken in response to the recommendations from the previous BECAR, and assesses whether the company has undertaken follow-up actions on program evaluation studies completed during the biennium.

PSE provides the CRAG with interim BECAR status and reports throughout the biennium, and includes the BECAR final report as an appendix to its Biennial Electric Achievement Report to the Commission, in accordance with WAC 480-109-120(4).

1) 2018 Accomplishments and Activities

In 2018, the final 2016-17 BECAR report was completed and included in the Biennial Conservation Report. The 2018-19 BECAR was then launched, with selection of Evergreen Economics as the lead consultant. Accomplishments for the 2018-19 BECAR were work plan development and review of 2018 deemed unit energy savings values.

2) Key Variance Drivers

BECAR expenditures were $40,000 (45 percent) less than planned because Outside Services charges were less than anticipated.

XII. OTHER ELECTRIC PROGRAMS

A. Overview

In 2018, the only program (partially) funded by the Conservation Rider, for which conservation savings are not claimed, was Net Metering. Net Metering primarily focuses on customer-side generation, including solar, wind, anaerobic digesters (bionatural gas, etc.) and small-scale hydro. Net Metered systems are smaller than 100 kiloWatts (kW).[55] Only Other Electric Programs are excluded from Energy Efficiency's cost-effectiveness calculations.

1) Sector Performance

Table XII-1 provides a 2018 summary of expenditures and energy savings for Other Electric Programs.

Table XII-1: Other Electric Program 2018 Expenditures

2018 Expenditures				2018 Budget
Schedule	Electric			Electric
E150	Net Metering	$ 1,261,278	118.6%	$ 1,063,890
E195	Electric Vehicle Charger Incentive	$ 199		$ -
	Demand Response	$ 2,748		
	Total Electric	**$ 1,264,225**		$ 1,063,890

[55] 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 animal waste gas generators of no more than 100 kilowatts (kW). PSE was required to offer this Schedule on a first-come, first-served basis until cumulative generating capacity taking part in this scheduled reaches 22.4 Megawatts (MW). After reaching that point, it is up to the utility's discretion as to whether they continue offering Net Metering as an option. Net Metered 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 WA State Renewable Energy Production Incentives, which is the state's performance based incentive described in Schedule 151.

While schedule 150 applies to customers who generate electricity using water, wind, solar energy or biogas from animal waste as fuel in 2018, 99.9 percent of new net metered systems were solar PV (photovoltaic) with a median size of 8.8 kW DC; and 7.8 kWh AC for residential systems alone.

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 credited against the customer's consumption. PSE also allows net metered customers to aggregate net excess generation from their net metered service to offset consumption at one or two other electric service meters in the same account holder's name.

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, with no compensation to the customer.

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."

Additionally, in January 1999, the UTC issued an accounting order under Docket UE-990016 which requires the collection of unbilled distribution costs from all customers through Schedule 120. In 2018, the actual costs collected under that order exceeded the program's budgeted amounts by 70 percent. The difference is due to a higher number of system installations than anticipated, as well as an increase in the average system size, which leads to a higher output of solar energy.

The number of customers interconnecting on-site generation to PSE's grid has continued to grow, as is the size and complexity of systems. This impacts how utilities plan, and meet customer tracking, accounting, and reimbursement expectations. The Customer Connected Solar Team coordinates with other WA utilities and industry groups to stay informed on best practices, and to gain access to national experts to help address interconnection and net-meter billing challenges faced by a rapidly maturing market.

3) Program accomplishments

In 2018, 1,600 new customer-generators (more than 20 percent of all net metered customers) were added to the program. At the close of 2018, PSE was net metering 7,779 customer accounts for a combined customer-generating capacity of 62.2 MW DC.

PSE has also continued to utilize the online interconnection software tool known as PowerClerk to facilitate better management of incoming applications and to store information about the existing 7,779 net metered customers. PSE will be looking utilize even more capabilities around this tool in 2019.

Figure XII-1 provides a program view of the most recent 10-year cumulative year-end number of interconnected customer net metered systems.[56]

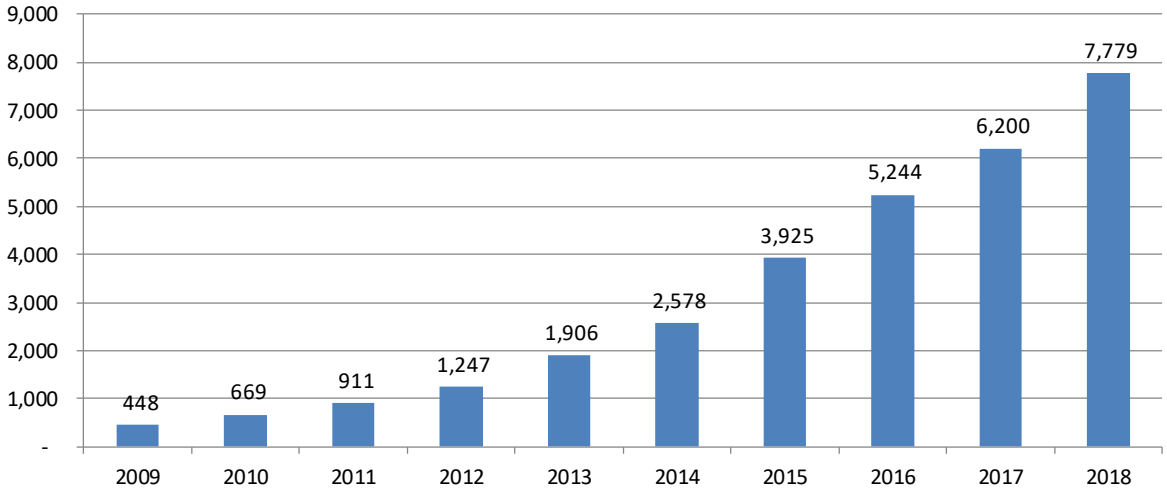
4) Adaptive Management

In 2018, PSE continued to refine its use of 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 PSE, installers and customers. Today, PSE has over 6,000 records in PowerClerk, and program staff are better able to manage changes to each project's status.

[56] The Net Metering program started in 1999 with one interconnected system. Between 1999 and 2007, that figure grew to 176 systems.

Program staff have seen more accuracy in its reporting, a reduction in the volume of hard copies, and a decrease in the time required to process each application.

Figure XII-1: Net Metering Customer-Generator System Count, 2009-2018



C. Production Metering

Schedule 151

PSE administers the Washington State Renewable Energy Production Incentive Program, which provides qualifying Customer-Generators with production payments in accordance with State legislation and WAC 458-20-273. PSE receives tax credits for renewable production payments, as outlined in RCW 82.16.

The Production Incentive Program is operated in conjunction with, and in addition to, the Net Metering program. For the 2016-2018 State Fiscal Year, PSE paid 5,300 participating customers $13.2 million in production incentives.

On July 1 2018, WAC 458-20 was revised to lock in the current incentive rates for existing participants and to establish a new program for Customer-Generators going forward. PSE filed revisions to Schedule 151 in accordance with the program changes in the rule. PSE's role, under the revisions, is to: help inform customers and their installers of participation requirements; provide annual production data to Washington State University Energy Extension for state certified customers; and to make annual payments to participants.

Eligibility, program terms and payment amount are determined by the state program administrator.

D. Electric Vehicle Charger Incentive

Schedule E195

PSE's Electric Vehicle Charger Incentive program (EVCI) is a pilot program that concluded at the end of 2017. Minimal PSE labor costs associated with finalizing the EVCI evaluation study (less than $200) were carried over to 2018, due to accounting lags.

E. Demand Response

Schedule E271, E249a

2017 Demand Response program labor and overhead costs of approximately $2,700 carried over to 2018 due to accounting lags.

XIII. 2018 COMPLIANCE

By the end of 2018, PSE achieved its mid-biennial expectations 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 2018.

A. RCW 19.285

Consistent with RCW 19.285.040, the Company filed its 2019 Annual Conservation Plan with the Commission on November 15, 2018. PSE collaborated with CRAG members and Commission staff to develop this comprehensive Plan, which addressed several key focus areas for the coming biennium. The Plan also identified PSE's ten-year conservation potential and its two-year conservation target.

B. WAC 480-109

PSE complied with all applicable WAC 480-109 requirements in 2018. 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 2016-2018 conditions, outlined in Attachment A of Order 01 in Docket UE-152058 into its standard business operations.

D. 2018 Compliance Results

PSE tracks and reports compliance with Commission requirements outlined in the documents listed in Table XIII-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 number) is highlighted in a different color in the Exhibit for easier reference.

PSE highlights several key deliverables that were satisfied in 2018 in Table XIII-2. Please note that PSE only listed key or significant deliverables satisfied in that table. Exhibit 9 contains the comprehensive list of satisfied requirements.

Table XIII-1: Tracking Compliance Requirements

Requirement Documents Tracked in Exhibit 9: Requirement Compliance Checklist			
Docket Number	Name	Pertains To	Exhibit 9 Color Code
UG-011571	2001 General Rate Cast, Exhibit 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-171087	Order 01 Attachment A	2018-2019 conditions.	Yellow

Table XIII-2: Highlights of Key 2018 Completed Requirements

Section	Requirement, UG-011571	Applicable Compliance Vehicle
H.21	Completed -- Annual budgets will be built up from the bottom.	2019 Exhibit 1: Savings and Budgets
H.25	Completed -- (Rider) funds may include reasonable administration costs for PSE's net metering program.	2019 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.	2019 Exhibit 2: Cost-Effectiveness Estimates
F.11	Completed -- The annual budget of the program will be built up from the bottom.	2019 Exhibit 1
G.14	Completed -- PSE will continue to honor Commitments 22 and 23 from U-072375 with regard to future funding levels.	2019 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	2019 Exhibit 1, LIW program detail pages
Section	**Requirement, UE-121697 & UG-121705**	**Applicable Compliance Vehicle**
pg. 17, G.31	Completed -- 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	2019 Exhibit 1
(5)	Completed -- PSE must maintain its program descriptions on file with the Commission.	2019 Exhibit 3: Program Details
(6)(c)	Completed -- PSE must spend a reasonable amount of its conservation budget on EM&V.	2019 ACP 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	2019 ACP Exhibit 1, line bi indicates non savings-specific anticipated spending

Table XIII-2, Continued

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.	2018 Exhibit 5: Prescriptive Measure Savings Values
100(10)	Completed -- A utility may fund low-income measures based on TREAT models that achieve a Savings to Investment Ratio of 1.0.	2019 ACP Overview, page 61
110(2)	Completed -- A utility must meet with its advisory group at least four times per year.	2018 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.	2019 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 continuous improvement principles by providing Stakeholders with a single representation of compliance deliverables status. Exhibit 9 includes all unique electric and natural gas portfolio requirements, sorted by classification, over the current two-year period. PSE updated the Checklist in 2018 to reflect inclusion of the updated 2018-2019 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,[57] describe the makeup of the Conservation Resource Advisory Group (CRAG), etc.

[57] This requirement is regarding funding levels for Low Income Weatherization programs in the 2008 PSE Merger Agreement.

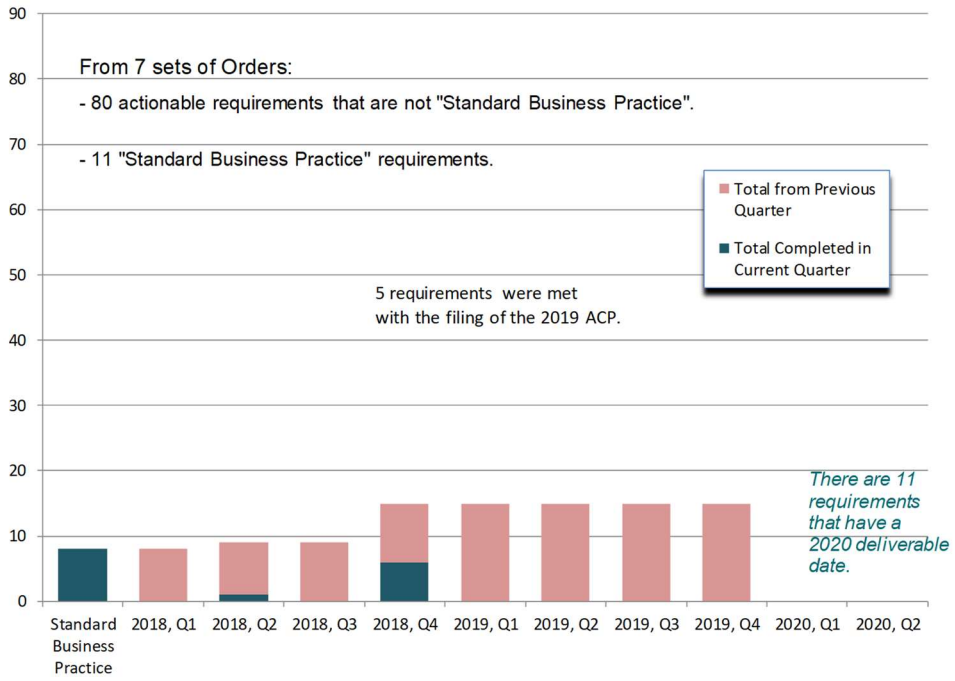
They describe no set deliverable date, or have no specific CRAG role. Energy Efficiency routinely reviews these to ensure that there are no updates or revisions. Where there are none, the conditions are notated as “completed”. In the attached Exhibit 9, these are noted in the “Deliverable Provided Date” 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:

As readers will note in Figure XIII-1, there are many requirements that aren’t completed until the final quarter of the biennium. This is due to the nature of many of the deliverables. Readers should not infer from this that PSE delays requirement completion until the end of the biennium; rather, most 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 XIII-1 presents PSE's completed deliverables as of the end of 2018.

Figure XIII-1: 2018-2019 Requirement Completion Status



F. Compliance Controls

Energy Efficiency's application of compliance controls reflects its use of adaptive management through continuous improvement. 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 PSE corporate guidelines and policies: SoX reporting requirements; safety processes; cyber-security; and Corporate Contracting department requisites, for instance.

The successful follow-through on several significant 2018 filings (the 2017 Annual Report, Schedule 120, Biennial EIA Report, the 2019 ACP, for example) is a reflection on Energy Efficiency's strict attention to regulatory requirements.

PSE intentionally left this page blank.

XIV. 2018 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 2018.

A key 2018 accomplishment was the renewal of the *CRAG Communications* newsletters, which kept CRAG member abreast of Energy Efficiency developments between CRAG meetings. PSE received feedback from CRAG members, both directly and through casual reference, that its efforts were recognized and appreciated. Similarly, PSE recognizes and appreciates that Commission Staff and the CRAG expended significant effort to understand, become involved with, and help resolve strategic and policy issues in 2018.

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 2018 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 2018. 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[58] indicated in XIV.A.1 on the following page.

[58] 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

- March 1, 2018: Filed electric Schedule 120, UE-180185. Effective May 1, 2018, the updated Schedule 120 represents an average increase of the electric Conservation Rider portion of affected customer bills by 0.99 percent.
- March 1, 2018: Filed natural gas Schedule 120, UG-180186. Effective May 1, 2018, the updated Schedule 120 represents an average decrease of the natural gas Conservation Rider portion of affected customer bills by 0.1 percent.
- March 31, 2018: Filed 2017 Annual Report of Conservation Accomplishments, UE-152058. 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.
- June 1, 2018: Filed an updated Exhibit 5-2018-2019 Prescriptive Measures, UE-171087. This revision updated all prescriptive measure attributes, including savings values, measure cost, incentive amount, measure life, etc.
- June 1, 2018: Filed the 2016-2017 Biennial Conservation Report, UE-152058. 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).
- August 13, 2018: Filed the second quarter update to Exhibit 4 and Exhibit 3-Program Details, UE-171087. These are the final revisions to these documents for 2018. The next update was the 2018-2019 Biennial Conservation Plan versions.
- November 15, 2018: Filed 2019 Annual Conservation Plan, UE-171087 and UG-171088. The plan indicates a 2019 electric savings target of 520,456 MWh, and 6.155 million therms.
- November 15, 2018: Filed Conservation tariff revisions for Schedules 258, UE-180954.
- November 27, 2018: Filed BCP replacement pages to correct typographical error on Sheet 258-B, UE-180954.

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 2018. Each member of the CRAG demonstrated considerable engagement and a thorough understanding of PSE programs and implementation strategies through the year.

CRAG members brought to bear a considerable understanding of technical elements associated with some of Energy Efficiency's more complicated conservation measures and offerings, and a thorough understanding of the impact and implications of how those would affect potential savings and costs. CRAG members provided valuable consideration and insights of State policy goals and initiatives, along with their constituents' expectations. The CRAG's perspective on the region's dynamic marketplace was also invaluable. As a result, PSE adaptively managed its Portfolio throughout the year with these considerations in mind.

In addition to attending four CRAG meetings, most CRAG members also made significant contributions to the Statewide Advisory Group (SWAG) in 2018. Members invested significant time, meeting seven times in 2018. Members discussed and made significant progress on issues ranging from cost-effectiveness calculation methodologies, whether NEEA savings should be included in utilities' EIA Penalty Thresholds, to a potential utility incentive mechanism.

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 CRAG in response to Section D of Exhibit F in the 2001 General Rate Case Stipulation Agreement, Dockets 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 2018, 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 15, 2018. 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) 2018 Adaptation through Continuous Improvement

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 that are formatted to immediately call attention to the desired level of action;
- PSE added a program-by-program comparison chart in Exhibit 1 of the 2019 Annual Conservation Plan, providing CRAG members with a direct and streamlined way of comparing 2019 values indicated in the 2018-2019 BPC to the updated values in the 2019 ACP.
- PSE combined Exhibit 3: Program Details and Exhibit 4: Measures, Incentives & Eligibility into a single document. This provided the CRAG with a single, complete Energy Efficiency program reference without the need to have two separate documents open at once.
- Populating large files (such as the Biennial Electric Conservation Report and ACP) on PSE's secure FTP site for easy access, removing the burden of large and cumbersome email attachments.

4) CRAG Activities

In 2018, PSE welcomed one new permanent CRAG member. 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. PSE facilitated ad-hoc meetings, including a primer for Energy Efficiency's CVR (Conservation Voltage Regulation) program, and its annual Schedule 120 financial review in its offices in Bothell. PSE also renewed its CRAG field trips, by conducting a very informative mid-year visit to an indoor horticulture facility near Olympia in the spring of 2018.

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 2019 Biennial 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 noted in the chapter introduction, PSE also renewed its periodic newsletter *CRAG Communications*, and issued two editions in 2018: Volume 3, Number 1 on February 15, and Number 2 on April 25. These newsletters provide the CRAG with program updates, marketplace developments, and pending initiatives.

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 2018, PSE met the requirements of WAC 480-109-110(2) and condition (3)(e) 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;
- Marketing and program updates; and
- PSE emails meeting materials to attendees participating via conference call prior to the meeting call to order.

All of the meetings coincided with the development of the 2018-2019 Biennial Conservation Plan; the BCP development therefore represented a year-long engagement with the CRAG. All 2018 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 five 2018 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 7 Meeting Highlights:

Consistent with PSE's long-established practice, during the first CRAG meeting of the year, 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, a status review of the Demand Response Initiative, and a progress report on the Biennial Electric Conservation Achievement Review. PSE reviewed its findings of the Hard-To-Reach analyses, and Low Income Weatherization initiatives, put into place following PSE's commitment to the Commission at the January 10 open meeting. The attendees also discussed the upcoming Statewide Advisory Group: its formation, charter, and initiatives.

Key Outcomes

The attendees agreed that:

1) PSE addressed customers-on-Special Contracts' access to Schedule 258 appropriately in its recent draft tariff revisions.
2) Generally, PSE's plans for using the Microsoft low-income funding are sound and should proceed.
3) The CRAG should be engaged in advising PSE on its HTR going-forward planning process.
4) PSE should continue investigating the potential of creating adjusted incentives for areas where infrastructure improvements are being considered.
5) A follow-up discussion on wood smoke once the other two IOUs reviewed their draft reports is appropriate.
6) It would be a good idea to include interested CRAG members in designing 2018-2019 evaluation metrics.
7) It would be a good idea for PSE to somehow weight 2018-2019 BECAR RFP responses to account for SBW's tenure.

b. May 23 Meeting

PSE and UTC Staff agreed that the May 18 SWAG meeting constituted the equivalent of one of the four required CRAG meetings, consistent with WAC 480-109-110(2). This rationale was supported by:

1) The May 18 SWAG meeting and the May 23 CRAG meeting created a slight scheduling conflict,
2) Because most CRAG members are also participate in the SWAG. and
3) Several topics were germane to both groups.

At the May 18 SWAG meeting, the primary topic was the potential to include NEEA in the IOUs' EIA Penalty Threshold. The attendees heard from various NEEA staff on how savings are calculated, what NEEA's market transformation strategies are, how cost-effectiveness for NEEA measures are calculated, etc.

Key Outcomes

The attendees agreed that:

1) The group generally now have a much better understanding of NEEA savings.
2) The IOUs will draft their contributions to the Commission-required NEEA recommendations, due by the end of 2018.

c. August 22 Meeting Highlights:

This primary focus of this meeting was on the development of the 2019 Annual Conservation Plan. The meeting was a WebEx conference call. The attendees heard about Energy Efficiency's mid-year status, Residential Energy Management and Business Energy Management program updates, an update on the Ductless Heat Pump Wood Smoke analysis, and the deliverables and timeline for the 2019 ACP.

Key Outcomes

The attendees agreed that:

1) PSE is taking a leadership role in piloting manufactured home replacements and low-income solar projects.
2) It would be appropriate for PSE to discuss the 2019-2022 Large Power User/Self-Directed rate-setting at the next CRAG meeting (October 17).
3) The CRAG should discuss CVR design and reporting at the October 17 CRAG meeting.
4) It is a good idea to include a measure life cycle discussion (including how incentives are managed) in the next CRAG meeting.
5) The IOUs' continued efforts on $PM_{2.5}$ analyses are appreciated, as this is a critical issue.

d. October 17 Meeting Highlights:

This meeting's agenda consisted of several important topics:

1) A review of the originally-indicated 2019 attributes (as noted in the 2018-2019 Biennial Conservation Plan) versus the updated, 2019 ACP attribute key drivers,
2) A wrap-up of the Hard-To-Reach analysis initiative,
3) A review of the Large Power User/Self-Directed (Schedule 258) operational/financial mechanics,

4) A primer on how Energy Efficiency sets its incentives and how program staff manage the overall measure lifecycle, and
5) A discussion on Conservation Voltage Optimization (CVR) plans for 2019.

Key Outcomes

1) PSE is taking appropriate steps in engaging the CRAG in its Transmission & Distribution program updates.
2) It would be appropriate for PSE to discuss the Schedule 258 financials' impact on 2019 rates at the beginning of 2019.
3) It would be good if Andy provided a tutorial on navigating Exhibit 1 in the coming weeks.
4) PSE is taking appropriate steps to engage Hard-To-Reach/Potentially Underserved customer segments.

PSE intentionally left this page blank.

XV. 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[59] 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.

[59] 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.[60] 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.

[60] 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

NWPCC	NorthWest Power Conservation Council
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).[61]
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.[62]
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.

[61] Schedule 83, section 4, Definitions, #z. Schedule 183, section 4, #x.

[62] Schedule 83, section 4, Definitions, #bb. Schedule 183, section 4, #z.

C. Revised Savings Terminology

The below table provides a comparison of savings terminology that the IOUs created and agreed would clarify the numerous elements that comprise their savings goals and penalty thresholds. PSE first used these updated terms in its 2019 Annual Conservation Plan. As PSE was not applying these terms to its 2018 savings attributes, it provides the below table as reference only.

"Definition" cells highlighted in green are key/important terms that are most frequently referenced in PSE filings.

PSE's formerly used terms	Updated Terms (2018)	Definition
Total Biennial Potential	**CPA Pro-Rata Share**	Pro-rata share of the utilities IRP's Conservation Potential Assessment's 10-year potential or 2 year total (whichever is greater). Includes NEEA.
Total Base Savings	**EIA Target**	[(CPA Pro-Rata Share) + (other programs/measures with confident savings that were omitted from CPA)]
Decoupling Penalty Target	**Decoupling Threshold**	[EIA Target * 0.05]
Total Portfolio Target	**Total Utility Conservation Goal/Achievement**	All savings programs funded by Conservation Riders [EIA Target + Decoupling Threshold]
Excluded	**Adjusted Programs**	Programs approved by the Commission to be excluded from a Penalty Threshold. For last three biennia, these included NEEA and Pilots with Uncertain Savings.
Utility-Specific Savings	**Utility-Specific Conservation Goal/Achievement**	[Total Utility Conservation Goal/Achievement – (Excluded programs (for instance, NEEA, Pilots with uncertain savings, retail wheeling accounts, etc.) + adjustments)]

Revised Savings Terminology, continued

PSE's formerly used terms	Updated Terms (2018)	Definition
EIA Penalty Target	**EIA Penalty Threshold**	[Utility-Specific Conservation - Decoupling Threshold]
Excess Savings (1)	**Excess Savings for Carbon (Dept of Commerce driven)**	(Referencing results, rather than targets) The difference of [Total Utility-Conservation Achievement – Total Utility Conservation Goal]
Excess Savings (2)	**PSE Excess Savings for Penalty Thresholds (UTC Driven)**	(Referencing results, rather than targets) The difference of [(Total Utility-Specific Conservation Achievement) - (EIA Penalty Threshold + Decoupling Penalty Threshold)]

PSE intentionally left this page blank.

CONCLUSION

This concludes the Energy Efficiency 2018 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 2018 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 2018 Report of Activities and Initiatives

B. Supplements

Exhibit 1 *(Table of savings and expenditures)*
- Supplement 1: Expenditures by Cost Element Group
- Supplement 2: 2018 Savings adjustments
- Supplement 3: 2018 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 2018

Energy Efficiency looks forward to a productive and successful 2018.

Respectfully submitted,

The Men and Women of Energy Efficiency

Exhibit 1 Savings and Expenditures

ELECTRIC & GAS RIDER CONSERVATION EXPENDITURES & SAVINGS
January - December 2018

Index[3]	100%	Through December 2018	Electric						Gas					
	Schedule (Both electric and gas, unless otherwise noted)	Programs	YTD Actual		Percentage		Budget		YTD Actual		Percentage		Budget	
			Blue type indicates a sub-total. Sub-totals sum to the figure above.						Blue type indicates a sub-total. Sub-totals sum to the figure above.					
a			$ Spent	MWh Svgs.	% of $ Budget	% of Svgs. TOTAL	$ BUDGET	MWh Svgs. Goal	$ Spent	Therms Svgs.	% of $ Budget	% of Svgs. TOTAL	$ BUDGET	Therms Svgs. Target
		Residential Energy Management												
b	201	Low Income Weatherization	$ 5,052,281	1,901	104%	92%	$ 4,856,679	2,066	$ 831,130	21,541	190%	220%	$ 437,426	9,770
c	214	Single Family Existing	**$ 21,566,685**	**119,545**	**92%**	**121%**	**$ 23,365,857**	**98,820**	**$ 6,873,230**	**2,551,448**	109%	155%	**$ 6,331,873**	**1,650,763**
d		*Residential Lighting*	*$ 9,895,423*	*72,226*	*79%*	*115%*	*$ 12,605,450*	*62,650*						
e		*Space heat*	*$ 3,639,184*	*8,051*	*110%*	*107%*	*$ 3,304,298*	*7,549*	*$ 2,530,417*	*733,431*	*113%*	117%	*$ 2,242,207*	*629,098*
f		*Water heat*	*$ 333,008*	*659*	*83%*	*67%*	*$ 402,152*	*980*	*$ 292,911*	*52,448*	*102%*	56%	*$ 287,116*	*94,126*
g		*Single Family Rental Pilot*	*$ 13,883*	*0*	*13%*	*n/a*	*$ 109,928*	*0*	*$ 13,989*	0	*14%*	0%	*$ 99,928*	-
h		*Home Energy Assessments*	*$ 2,284,047*	*4,861*	*86%*	*94%*	*$ 2,644,880*	*5,148*			*n/a*	0%	*$ -*	-
i		*Home Appliances*	*$ 2,755,325*	*4,108*	*116%*	*67%*	*$ 2,374,444*	*6,172*		*24,820*	*n/a*	210%	*$ -*	*11,791*
j		*Web-Enabled Thermostats*	*$ 154,439*	*1,114*	*104%*	*96%*	*$ 149,025*	*1,166*	*$ 707,599*	*286,455*	*117%*	84%	*$ 604,925*	*342,000*
k		*Showerheads*	*$ 506,733*	*2,493*	*121%*	*169%*	*$ 417,202*	*1,476*	*$ 283,289*	*108,684*	*97%*	179%	*$ 293,465*	*60,700*
l		*Weatherization*	*$ 862,096*	*1,926*	*89%*	*93%*	*$ 969,270*	*2,079*	*$ 2,831,531*	*452,870*	*105%*	115%	*$ 2,703,547*	*393,048*
m		*Home Energy Reports*	*$ 1,122,547*	*24,107*	*288%*	*208%*	*$ 389,208*	*11,600*	$ 213,494	892,740	212%	744%	*$ 100,685*	*120,000*
n	215	Single Family New Construction	*$ 51,828*	*14*	*25%*	*6%*	$ 210,361	254	$ 23,411	0	24%	0%	$ 95,599	9,875
o	215	*Energy Star Manufactured Home*	*$ 22,508*	*21*			$ -	0	$ -					
p	216	Fuel Conversion	*$ 204,667*	*499*			$ -	0						
q	217	Multi Family Retrofit	*$ 7,723,127*	*11,433*	*74%*	*65%*	$ 10,385,755	17,569	*$ 239,830*	19,520	37%	24%	*$ 656,719*	*80,227*
r	218	Multi Family New Construction	*$ 695,509*	*1,267*	*57%*	*51%*	$ 1,225,948	2,499	*$ 365,707*	60,603	82%	111%	*$ 446,096*	*54,735*
s		**Total Residential Programs**	**$ 35,316,606**	**134,680 MWh**	**88%**	**111%**	**$ 40,044,600**	**121,208 MWh**	**$ 8,333,308**	**2,653,112**	**105%**	**147%**	**$ 7,967,713**	**1,805,370 Therms**
t		**Business Energy Management**							$ -					
u	250	Commercial Industrial Retrofit	*$ 14,262,521*	*65,855*	94%	114%	$ 15,181,831	57,750	$ 1,805,122	449,741	112%	112%	$ 1,617,100	400,000
v	251	Commercial Industrial New Construction	*$ 2,992,680*	*13,517*	62%	68%	$ 4,795,910	20,000	$ 577,317	147,805	116%	141%	$ 499,460	105,000
w	253	Commercial Strategic Energy Management	*$ 990,164*	*11,474*	69%	88%	$ 1,444,640	13,000	$ 437,262	292,801	78%	44%	$ 561,112	670,000
x	258	Large Power User - Self Directed Program 449	$ 4,813,426	*13,631*	65%	75%	$ 7,398,340	18,193						-
y	258	Large Power User - Self Directed Non 449	$ 9,215,755	*18,750*	111%	114%	$ 8,272,207	16,500						-
z	261	Energy Efficient Technology Evaluation	$ -	-				0	$ -	-			$ -	n/a
aa	262	Commercial Rebates	**$ 7,790,330**	***27,453***	**137%**	**134%**	**$ 5,705,298**	**20,560**	**$ 968,069**	**227,848**	**87%**	**81%**	**$ 1,114,930**	**281,734**
ab		*Lighting to Go (AKA Business Lighting Markdowns)*	*$ 988,826*	*11,790*	*190%*	*125%*	*$ 519,672*	*9,419*						
ac		*Commercial Kitchen & Laundry*	*$ 106,599*	*171*	*67%*	*36%*	*$ 158,206*	*472*	*$ 271,953*	*101,594*	*104%*	119%	*$ 261,173*	*85,159*
ad		*Commercial HVAC*	*$ 500,852*	*1,210*	*151%*	*117%*	*$ 331,268*	*1,034*	*$ 57,092*	*17,398*	*73%*	129%	*$ 78,534*	*13,500*
ae		*Commercial Midstream*	*$ 291,271*	*183*	*47%*	*9%*	*$ 617,822*	*2,115*	*$ 456,704*	*95,026*			*$ 591,322*	*153,875*
af		*Small Business Direct Install*	*$ 5,902,782*	*14,099*	*145%*	*187%*	*$ 4,078,330*	*7,520*	*$ 182,320*	*13,830*	*99%*	47%	*$ 183,901*	*29,200*
ag		**Total Business Programs**	**$ 40,064,876**	**150,681 MWh**	**94%**	**103%**	**$ 42,798,226**	**146,003 MWh**	**$ 3,787,770**	**1,118,195**	**100%**	**77%**	**$ 3,792,602**	**1,456,734 Therms**
ah		**Pilots**												
ai	249	Residential Pilots - Individual Energy Reports	$ -	0			$ -	0 MWh	$ -	-			$ -	Therms
aj	249	Business Pilots - Individual Energy Reports	$ 13,728	0	16%		$ 84,000	840 MWh	$ -	-			$ 11,925	7,500 Therms
ak		**Total Pilots**	**$ 13,728**	**0 MWh**	**16%**	**0%**	**$ 84,000**	**840 MWh**	**$ -**	**-**	**0%**	**0%**	**$ 11,925**	**7,500 Therms**
al		**Regional Efficiency Programs**												
am	254	NW Energy Efficiency Alliance	$ 4,033,724	10,775	78%	86%	$ 5,200,000	12,527						
an		NW Gas Market Transformation Collaborative							$ 2,282,499		114%		$ 2,006,136	
ao	292	Electric Generation, Transmission and Distribution	$ -	3,782		504%	$ -	750						
ap		**Total Regional Programs**	**$ 4,033,724**	**14,557 MWh**	**78%**	110%	**$ 5,200,000**	**13,277**	**$ 2,282,499**		**114%**		**$ 2,006,136**	

<Grand Totals from bottom of page 2--for reference only. These are NOT sub-totals from the above sectors.>

See bottom of page 2.

		GRAND TOTAL CUSTOMER SOLUTIONS	**$ 91,086,596**	**299,918**	**$ -**	**$ -**	**$ 99,562,721**	**281,328**	**$ 15,790,198**	**3,771,307**	**$ -**	**$ -**	**$ 15,275,735**	**3,269,604**
		Total aMW Savings		**34.2 aMW**				**32.1 aMW**						
			91.5%	**106.6%**					**103.4%**	**115.3%**				
		PSE LIW Shareholder Funding[3]							$ -	n/a	0%	n/a	$ 400,000	n/a

Exhibit 1 Savings and Expenditures

ELECTRIC & GAS RIDER CONSERVATION EXPENDITURES & SAVINGS
January - December 2018

ENERGY EFFICIENCY

Index[3]	100%	Through December 2018	Electric				Gas			
	Schedule (Both electric and gas, unless otherwise noted)	Programs	YTD Actual	Percentage	Budget		YTD Actual	Percentage	Budget	
			Blue type indicates a sub-total. Sub-totals sum to the figure above.				Blue type indicates a sub-total. Sub-totals sum to the figure above.			
aq		**Energy Efficiency Portfolio Support**								
ar		Data and Systems Services	$ 1,004,723	91%	$ 1,101,678		$ 149,935	91%	$ 164,618	
as		Rebate Processing	$ 471,923		$ 562,526		$ 72,690	87%	$ 83,484	
at		Verification Team	$ 492,586	91%	$ 538,894	n/a	$ 75,424	94%	$ 79,848	n/a
au		Programs Support	$ 388,617	94%	$ 414,566	n/a	$ 57,784	93%	$ 62,154	n/a
av		Trade Ally Support	$ 154,167	131%	$ 118,000	n/a	$ 18,417	84%	$ 22,000	n/a
aw		Contractor Alliance Network [net of (revenue) + cost]	$ (35,597)	105%	$ (34,000)		$ (133,802)	394%	$ (34,000)	
ax		MyData (Automated Benchmarking System)	$ 157,273		$ 203,670		$ 32,403	35%	$ 93,346	
ay		Energy Advisors	$ 1,100,090	96%	$ 1,150,707	n/a	$ 135,483	78%	$ 173,706	n/a
az		Energy Efficient Communities	$ 858,213	87%	$ 985,335	n/a	$ 123,750	88%	$ 140,519	n/a
		Customer Digital Experience								
ba		*Customer Online*	$ 612,854	105%	$ 586,196	n/a	$ 98,316	111%	$ 88,204	n/a
bb		*Market Integration*	$ 207,690	79%	$ 261,961	n/a	$ 33,129	85%	$ 38,973	n/a
bc		*Customer Awareness Tools*	$ 916,628		$ -		$ 137,640		$ -	
bd		*ShopPSE*	$ (4,737)		$ -		$ (4,233)			
be		Events	$ 483,986	76%	$ 635,662	n/a	$ 107,641	92%	$ 116,754	n/a
bf		Brochures, non program-specific	$ 47,611	58%	$ 82,624	n/a	$ 4,714	48%	$ 9,821	n/a
bg	202	Education	$ -	0%	$ 8,700	n/a	$ -	0%	$ 1,300	n/a
bh		**Total Portfolio Support**	**$ 6,856,030**	**104%**	**$ 6,616,519**	**n/a**	**$ 909,293**	**87%**	**$ 1,040,727**	**-**
bi		**Energy Efficiency Research & Compliance**								
bk		Conservation Supply Curves	$ 412,790	82%	$ 502,686	n/a	$ 60,639	81%	$ 75,114	n/a
bl		Strategic Planning	$ 831,857	93%	$ 890,429	n/a	$ 66,652		$ 81,864	
bn		Market Research	$ 205,569		$ 236,764		$ 30,590		$ 35,379	
bp		Program Evaluation	$ 2,037,420	100%	$ 2,035,607	n/a	$ 319,447	121%	$ 264,275	n/a
bq		Biennial Electric Conservation Acquisition Review	$ 49,772		$ 90,000					
br		**Total Research & Compliance**	**$ 3,537,407**	**94%**	**$ 3,755,486**	**n/a**	**$ 477,329**	**105%**	**$ 456,632**	**-**
bt		**SUBTOTAL CUSTOMER SOLUTIONS - ENERGY EFFICIENCY**	**$ 89,822,370**	**299,918 MWh**	**$ 98,498,831**	**281,328 MWh**	**$ 15,790,198**	**3,771,307 Therms**	**$ 15,275,735**	**3,269,604 Therms**
bu			**91.2%**	**106.6%**			**103.4%**	**115.3%**		
bv		**Total aMW Savings**		**34.2 aMW**		**32.1 aMW**				
bw		**Other Electric Programs[1]**								
bx	150	Net Metering	$ 1,261,278	119% n/a	$ 1,063,890	n/a				
by	195	Electric Vehicle Charger Incentive	$ 199		$ -					
bz		Demand Response	$ 2,748		$ -					
ca		**Total Other Electric Programs**	**$ 1,264,225**	**0 MWh**	**119% 0%**	**$ 1,063,890**				
cb		**GRAND TOTAL CUSTOMER SOLUTIONS**	**$ 91,086,596**	**299,918 MWh**	**$ 99,562,721**	**281,328 MWh**	**$ 15,790,198**	**3,771,307 Therms**	**$ 15,275,735**	**3,269,604 Therms**
cc		**Total aMW Savings**		**34.2 aMW**		**32.1 aMW**				
cd			**91.5%**	**106.6%**			**103.4%**	**115.3%**		
ce		PSE LIW Shareholder Funding[2]					$ -	n/a	0% n/a	$ 400,000 n/a

Footnotes

1 Other Electric programs are separated because they are not included in cost effectiveness calculations.
2 LIW shareholder funding is not limited to the gas fuel type. Condition G(14) indicates that $300,000 in shareholder funding may be applied to electric or gas LIW.
3 Some index letter combination designations are purposely omitted.

= significant savings and expense variances in the HER program was the result of the inadvertent omission of Energy Reporting pilot customers' omission from the 2018-2019 Plan.
= a significant expense variance is the result of the inadvertent omission of Customer Awareness Tools from the 2018-2019 Plan.

Exhibit 2: 2018 Cost-Effectiveness Results
Summary

Electric Programs: Benefit Cost Summary

Program Name	Energy Savings	Utility Costs	Present Value of Non-Energy Benefits	UCT	TRC
Low Income Weatherization	1,900,832	$ 5,052,281	$ 314,008	0.46	0.58
			LIW UC and TRC Excluded from REM total		
Residential Lighting	72,225,580	$ 9,895,423	$ -	3.63	3.12
Single Family Existing Space Heat	8,051,272	$ 3,639,184	$ 1,984,044	2.14	0.83
Single Family Existing Water Heat	658,617	$ 333,008	$ 17,003	1.10	0.97
Single Family Rental Pilot	0	$ 13,883	$ -	-	-
Home Energy Assessments	4,861,476	$ 2,284,047	$ 609,527	1.10	1.50
Home Appliances	4,108,239	$ 2,755,325	$ 1,854,632	0.60	1.44
Web-Enabled Thermostats	1,114,219	$ 154,439	$ 51,845	6.53	4.76
Residential Showerheads	2,492,665	$ 506,733	$ 2,725,378	2.19	16.98
Single Family Existing Weatherization	1,926,078	$ 862,096	$ 283,102	3.33	1.19
Home Energy Reports	24,106,986	$ 1,122,547	$ -	2.19	1.78
Single Family New Construction	14,322	$ 51,828	$ 1,296	0.45	0.42
Manufactured Home New Construction	20,691	$ 22,508	$ 1,741	2.26	1.63
Fuel Conversion	498,839	$ 204,667	$ -	3.34	1.70
Multi-Family Retrofit	11,433,281	$ 7,723,127	$ 756,857	1.47	1.29
Multi-Family New Construction	1,267,063	$ 695,509	$ 1,049,418	1.09	2.33
Total Residential Energy Management (Includes LIW)	**134,680,159**	**$ 35,316,606**	**$ 9,648,852**		
Total Residential Energy Management Cost-Effectiveness (No LIW)	**132,779,327**	**$ 30,264,325**	**$ 9,334,843**	**2.27**	**1.80**
Commercial/Industrial Retrofit	65,855,052	$ 14,262,521	$ -	3.88	1.91
Commercial/Industrial New Construction	13,517,481	$ 2,992,680	$ -	3.27	2.55
Commercial Strategic Energy Management	11,474,335	$ 990,164	$ -	3.82	3.45
Large Power User - Self-Directed Program 449	13,631,197	$ 4,813,426	$ -	2.50	2.42
Large Power User - Self Directed non-449	18,750,039	$ 9,215,755	$ -	1.83	1.45
Energy Efficient Technology Evaluation	0	$ -	$ -	-	-
Lighting to Go (AKA Business Lighting Markdowns)	11,789,734	$ 988,826	$ -	4.98	6.69
Commercial Kitchen & Laundry	171,445	$ 106,599	$ 212,453	0.86	2.59
Commercial HVAC	1,209,679	$ 500,852	$ -	1.75	0.32
Commercial Midstream	182,783	$ 291,271	$ -	0.82	0.73
Small Business Direct Install	14,099,207	$ 5,902,620	$ 15,634	1.32	1.45
Small Agriculture Direct Install	0	$ 151	$ -	-	-
Lodging Direct Install	0	$ 11	$ -	-	-
Total Business Energy Management	**150,680,952**	**$ 40,064,876**	**$ 228,087**	**2.79**	**1.87**
Residential Pilots	0	$ -	$ -	-	-
Business Pilots		$ 13,728			
Total Pilots	**0**	**$ 13,728**	**$ -**	**-**	**-**
Northwest Energy Efficiency Alliance	10,774,800	$ 4,033,724	$ -	0.59	1.35
Transmission & Distribution	3,782,018	$ -	$ -	-	-
Total Regional Programs	**14,556,818**	**$ 4,033,724**	**$ -**	**0.59**	**1.36**
Total Portfolio Support	0	$ 6,856,030			
Total Research & Compliance	0	$ 3,537,408			
Total All Programs used in CE Calculations, Excluding LIW	**298,017,097**	**84,770,090**	**9,562,931**	**2.17**	**1.69**
Total Other Electric Programs	0	$ 1,264,225		n/a	n/a
Total Electric Portfolio	**299,917,930**	**91,086,596**	**9,562,931**		

Gas Programs: Benefit Cost Summary

Program Name	Energy Savings	Utility Costs	Present Value of Non-Energy Benefits	UCT	TRC	
Low Income Weatherization	21,200	$ 831,130	$ 51,937	0.40	0.50	
			LIW UC and TRC Excluded from REM total			
Single Family Existing Space Heat	733,432	$ 2,530,417	$ 383,216	3.38	2.24	
Single Family Existing Water Heat	52,448	$ 292,911	$ 78,706	1.05	0.78	
Single Family Rental Pilot	0	$ 13,989	$ -	-	-	
Home Energy Assessments	0	$ -	$ -	-	-	
Home Appliances	24,821	$ -	$ 869,102	-	-	
Web-Enabled Thermostats	286,455	$ 707,599	$ 229,914	4.10	2.66	
Residential Showerheads	108,684	$ 283,289	$ 2,929,479	1.78	18.08	
Single Family Existing Weatherization	452,869	$ 2,831,531	$ 2,304,286	2.05	0.95	
Home Energy Reports	892,742	$ 213,494	$ -	3.90	3.40	
Single Family New Construction	0	$ 23,411	$ -	-	-	
Multi-Family Retrofit	19,519	$ 239,830	$ 35,756	0.97	0.89	
Multi-Family New Construction	60,603	$ 365,707	$ 511,722	1.13	0.76	
Total Residential Energy Management (Includes LIW)	**2,652,772**	**$ 8,333,308**	**$ 7,394,117**			
Total Residential Energy Management Cost-Effectiveness (No LIW)	**2,631,572**	**$ 7,502,178**	**$ 7,342,180**	**2.62**	**1.67**	
Commercial/Industrial Retrofit	449,741	$ 1,805,122	$ -	1.85	1.18	$ 0.2491
Commercial/Industrial New Construction	147,805	$ 577,317	$ -	2.21	2.38	
Commercial Strategic Energy Management	292,801	$ 437,262	$ -	1.30	1.33	
Energy Efficient Technology Evaluation	0	$ -	$ -	-	-	
Commercial Kitchen & Laundry	101,594	$ 271,953	$ 1,137,141	2.02	5.66	
Commercial HVAC	17,398	$ 57,092	$ -	1.25	1.14	
Commercial Midstream	95,026	$ 456,704	$ -	1.52	2.47	
Small Business Direct Install	13,830	$ 182,314	$ 196,182	0.65	2.38	
Small Agriculture Direct Install	0	$ -	$ -	-	-	
Lodging Direct Install	0	$ 6	$ -	-	-	
Total Commercial Programs	**1,118,195**	**$ 3,787,770**	**$ 1,333,324**	**1.75**	**1.74**	
Total Pilots	0	$ -	$ 47,445	-	-	
Total Regional Program (Gas Market Transformation)	0	$ 2,282,499	$ -	-	-	
Total Portfolio Support	0	$ 909,293	$ -			
Total Research & Compliance	0	$ 477,329	$ -			
Total Gas Programs used in CE Calculations, Excluding LIW	**3,749,767**	**$ 14,959,068**	**$ 8,675,504**	**1.76**	**1.45**	
Total Gas Programs, Including LIW	**3,770,967**	**15,790,198**	**8,774,886**			

NOTE: in both the electric and natural gas summary tables, all program anticipated expenditures are represented, as are the program UC and TRC ratios. However, consistent with the approach presented to the CRAG to exclude Low Income Weatherization cost-effectiveness ratios from its Portfolio view, the Sector cost-effectiveness sub-totals indicated in these Summary tables are linked to their respective program tables in the workbooks "Electric CE" and "Gas CE".

Readers will notice in those tables that all LIW values are excluded from the Sector sub-totals. As a result, those Sector sub-totals are reduced (total of all REM programs minus LIW). Thus, it appears that the REM Sector and overall Portfolio do not these Summary tables, when in fact, it is simply PSE's representation of its commitment to calculate LIW cost-effective, but exclude those figures from the overall Portfolio totals.

= LIW is excluded from Portfolio cost-effectiveness calculations.