Appendix 2
PacifiCorp's Washington Demand-Side Management Business Plan For 2020-2021

Demand-side Management 2020-2021 Business Plan - Washington

November 1, 2019

PACIFIC POWER
A DIVISION OF PACIFICORP

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Executive Summary

As required by the Washington Utilities and Transportation Commission's direction (Order 01 of Docket UE-171092 Condition List Item 5), Pacific Power and Light Company (Pacific Power) must file with the Commission a Biennial Conservation Plan including revised program details and program tariffs, together with identification of its 2020-2029 achievable conservation potential, by November 1, 2019. In compliance with the Commission's direction to include revised program details and program tariffs as part of the Company's Biennial Conservation Plan, the Company has prepared this Demand-side Management (DSM) Business Plan (Business Plan), for years 2020-2021.

Pacific Power's Business Plan for 2020-2021 reflects updated savings projections and budgets by program or initiative for 2020 and 2021. The updates reflect the Company's current projections based on the best available information at the time of filing (November 1, 2019). Pacific Power will add, delete and/or modify programs, measures, initiatives or specific projects described in this Business Plan going forward as appropriate and as circumstances warrant.

To achieve its biennial conservation target (BCT) and support regional efforts, the Company offers comprehensive programs for residential and non-residential customers and funds a portion of the Northwest Energy Efficiency Alliance (NEEA).

Program or initiative	Residential	Non-residential
Low Income Weatherization	√	
Home Energy Savings	√	
Home Energy Reports	√	
Wattsmart Business		√
NEEA	√	√

Program and portfolio cost effectiveness was assessed using the proxy decrement values tied to P-18 proxy portfolio generated by the 2019 IRP process and non-energy impacts (NEIs) as applicable. While the Commission uses the Total Resource Cost (TRC) test, as modified by the Northwest Power and Conservation Council[1] as its primary criterion for cost-effectiveness, the Company assesses cost-effectiveness from five standard perspectives. The portfolio is expected to be cost-effective for 2020-2021, with a PacifiCorp Total Resource Cost (PTRC) benefit-to-cost ratio of 2.09 including NEEA and NEIs.

This Business Plan includes a section with the following information for each DSM program:

- Program, initiative and/or project descriptions
- Description of planned program changes
- Program evaluation update[2]
- Program details including specific measures, incentives, and eligibility requirements

[1] The Company refers to this test as the PacifiCorp Total Resource Cost test, or PTRC, to distinguish in from a TRC test without the 10 percent Northwest Power Act credit.
[2] Final evaluation reports are available on the Company's website at: https://www.pacificorp.com/environment/demand-side-management.html.

2020-2021 Budget and Savings by Program

Table 1 below provides the projected savings and expenditures by program, initiative, and sector to achieve the 100,203 megawatt-hour (MWh) (including line losses) EIA Penalty Threshold target for 2020 and 2021 described in the Company's 2020-2021 Biennial Conservation Plan, dated November 1, 2019. The "Total Pacific Power Conservation" row, which excludes costs and savings associated with Northwest Energy Efficiency Alliance (NEEA) initiatives, is directly comparable to the EIA Penalty Threshold noted above. As shown, the Company is projecting to acquire 100,332 MWh in savings over the biennial period, slightly above the EIA Penalty Threshold.

Table 1. 2020 - 2021 Biennial Savings and Budget Projections by Program

	2020 PacifiCorp Washington Conservation Estimates			2021 PacifiCorp Washington Conservation Estimates			2020 + 2021
Program or Initiative	**Gross kWh/Yr Savings @site**	**Gross kWh/Yr Savings @gen**	**Estimated Expenditures**	**Gross kWh/Yr Savings @site**	**Gross kWh/Yr Savings @gen**	**Estimated Expenditures**	**Gross MWh Savings @gen**
Low Income Weatherization (114) [1]	145,860	159,965	$ 750,000	145,860	159,965	$ 835,000	320
Home Energy Savings (118) [2]	9,900,260	10,857,615	$ 3,838,181	11,138,263	12,215,333	$ 4,653,213	23,073
Home Energy Reports (N/A) [3]	4,230,000	4,639,041	$ 287,500	4,030,000	4,419,701	$ 266,500	9,059
Total Residential Programs	**14,276,120**	**15,656,621**	**$ 4,875,681**	**15,314,123**	**16,794,998**	**$ 5,754,713**	**32,452**
wattSmart Business (140) - Commercial	20,031,448	21,940,646	$ 4,459,109	24,942,634	27,319,916	$ 5,304,239	49,261
wattSmart Business (140) - Industrial	8,016,977	8,671,243	$ 1,824,576	8,439,741	9,128,508	$ 1,830,154	17,800
wattSmart Business (140) - Irrigation	373,653	409,785	$ 101,437	373,653	409,785	$ 100,398	820
Total Business Programs	**28,422,079**	**31,021,674**	**$ 6,385,122**	**33,756,028**	**36,858,210**	**$ 7,234,791**	**67,880**
Northwest Energy Efficiency Alliance [4]	3,151,202	3,452,317	831,388	3,046,798	3,338,854	842,389	6,791
Total Other Conservation Initiatives	**3,151,202**	**3,452,317**	**$ 831,388**	**3,046,798**	**3,338,854**	**$ 842,389**	**6,791**
Be wattsmart, Begin at Home	-	-	$ 64,523	-	-	$ 64,523	-
Customer outreach/communication	-	-	$ 250,000	-	-	$ 250,000	-
Program Evaluations (& savings verification) [5]	-	-	$ 549,524	-	-	$ 259,662	-
Potential study update/analysis [6]	-	-	$ 120,115	-	-	$ 15,368	-
System Support [7]	-	-	$ 157,735	-	-	$ 148,543	-
End use load research & RTF funding			$ 109,500			$ 65,500	
Total Portfolio-Level Expenses	-	-	**1,251,397**	-	-	**803,596**	-
Total PacifiCorp Conservation [8]	**42,698,199**	**46,678,295**	**$ 12,512,200**	**49,070,151**	**53,653,208**	**$ 13,793,100**	**100,332**
Total System Benefit Charge Conservation	**45,849,401**	**50,130,612**	**13,343,588**	**52,116,948**	**56,992,062**	**$ 14,635,489**	**107,123**
Total Conservation	**45,849,401**	**50,130,612**	**$ 13,343,588**	**52,116,948**	**56,992,062**	**$ 14,635,489**	**107,123**

Notes for Table 1:

1. Low income forecasts for 2020 and 2021 are based on forecasts from the community action agencies. The per-home savings of 1,122 kilowatt-hour (kWh) are from the 2013-2015 program evaluation.

2. The forecast for Home Energy Savings includes the impacts of adjustments for updated cost and savings information for certain appliances, lighting, building shell and heating, ventilation and air-conditioning (HVAC) measures. Updated information becomes available as the Regional Technical

Forum (RTF) updates deemed measures and changes to the Washington State Energy Code (WSEC) take effect. Updates are further explained in "Appendix 1 Conservation Forecast Adjustments" to the Company's Biennial Conservation Plan.

3. The behavioral program forecast is based on the Company's recent request that program administrator propose a "refresh" for the 2020-2021 biennial period to address statistical significance issues identified in the last evaluation report and propose new treatment and control groups in place of those used (and added) since the program was first introduced. The forecast, and associated cost-effectiveness analysis assumes a two-year measure life. First year savings as measured by program impact evaluations will be counted toward the EIA Penalty Threshold.

4. Includes both Pacific Power's direct funding of NEEA and the Company's internal management costs. NEEA 2020 and 2021 forecasted expenditures are based on Pacific Power's share (2.55 percent) of the estimated annual costs provided in NEEA's 2020-2024 Business Plan. The 2020-2021 biennial electric savings forecast was provided by NEEA and includes savings above the Northwest Power and Conservation Council's 7th power plan baseline and includes updates to measures performed by the RTF) and excludes the estimate of savings from local programs including those operated by Pacific Power and the rest of the region's utilities/program administrators. Savings from NEEA's trackable measures category are not included in this forecast. See the Biennial Conservation Target section of the 2020-2021 Biennial Conservation Plan for Pacific Power treatment of NEEA savings consistent with the Statewide Advisory Group and the direction received in docket UE-171092.

5. For detail on planned evaluations, see the program detail sections in this Business Plan.

6. Potential study update and analysis costs for 2020 and 2021 represent estimated study costs for the 2021 Conservation Potential Assessment. These costs are subject to change as new requirements become effective. Per Pacific Power's Evaluation, Measurement & Verification (EM&V) framework, these costs are not included in program cost-effectiveness analysis.

7. System Support costs, including Technical Reference Library (TRL) and Demand-side Management Central (DSMC) costs, are the costs necessary for on-going maintenance and updates to the system. Per Pacific Power's EM&V framework, these costs are not included in program- or portfolio-level cost-effectiveness analysis.

8. Excludes costs and savings associated with NEEA initiatives. Savings in this row are directly comparable to the Company's EIA Penalty Threshold.

Direct Benefits to Customers

Estimates of direct benefits to customers delivered by the 2020 - 2021 expenditures including all portfolio costs are provided in Table 2. This additional metric to assess program impacts is consistent with conversations between Commission Staff and the Company that occurred during the preparation of prior conservation plan(s) and reports. Direct benefits are in addition to the benefits all customers receive through implementation of cost effective energy efficiency resources; lower energy costs.

Table 2. Direct Benefits to Customers Including Portfolio Expenses

Program or Initiative	Estimated Expenditures	Direct Benefit to Customer ($)	Direct Benefit to Customer
Low Income Weatherization (114)	$ 1,585,000	$ 1,322,000	83%
Home Energy Savings (118)	$ 8,491,393	$ 4,924,321	58%
Home Energy Reports (N/A)	$ 554,000		
Total Residential Programs	$ 10,630,393		
wattsmart Business (140) - Commercial	$ 9,763,349		
wattsmart Business (140) - Industrial	$ 3,654,730		
wattsmart Business (140) - Agricultural	$ 201,835		
Total Business Programs	$ 13,619,914	$ 8,598,634	63%
Northwest Energy Efficiency Alliance	$ 1,673,777	$ 1,133,144	68%
Total Other Conservation Initiatives	$ 1,673,777		
Be wattsmart, Begin at Home	$ 129,046		
Customer outreach/communication	$ 500,000		
Program Evaluations (& savings verification)	$ 809,186		
Potential study update/analysis	$ 135,483		
Systems Support	$ 306,278		
End Use Load research & RTF Funding	$ 175,000		
Total Portfolio-Level Expenses	$ 2,054,993		
Total PacifiCorp Conservation	**$ 26,305,300**		
Total System Benefit Charge Conservation	**$ 27,979,077**		
Totals	**$ 27,979,077**	**$ 15,978,099**	**57%**

Table 3 estimates direct benefits to customers considering only program expenses in the denominator. This additional assessment removes the impacts of increasing portfolio expenses for projects with long-term system and regional benefits; i.e., end use load research or pilots. This assessment focuses on customer benefits that are directly affected by program design which the Company understood was a key component of this metric.

Table 3. Direct Benefits to Customers Excluding Portfolio Expenses

Program or Initiative	Estimated Expenditures	Direct Benefit to Customer ($)	Direct Benefit to Customer (%)
Low Income Weatherization (114)	$ 1,585,000	$ 1,322,000	83%
Home Energy Savings (118)	$ 8,491,393	$ 4,924,321	58%
Home Energy Reports (N/A)	$ 554,000		
Total Residential Programs	$ 10,630,393		
wattsmart Business (140) - Commercial	$ 9,763,349		
wattsmart Business (140) - Industrial	$ 3,654,730		
wattsmart Business (140) - Agricultural	$ 201,835		
Total Business Programs	$ 13,619,914	$ 8,598,634	63%
Northwest Energy Efficiency Alliance	$ 1,673,777	$ 1,133,144	68%
Total Other Conservation Initiatives	$ 1,673,777		
Be wattsmart, Begin at Home			
Customer outreach/communication			
Program Evaluations (& savings verification)			
Potential study update/analysis			
System Support			
End Use Load research & RTF Funding			
Total Portfolio-Level Expenses			
Total PacifiCorp Conservation	**$ 24,250,307**		
Total System Benefit Charge Conservation	**$ 25,924,084**		
Totals	**$ 25,924,084**	**$ 15,978,099**	**62%**

Notes for Tables 2 and 3

- Low Income Weatherization: Payments to community action agencies for measure installation are included as direct benefits to customers.
- Home Energy Savings: Customer incentives, upstream, mid-stream and mail-by-request buy downs are included as direct benefits to customers.
- Wattsmart Business: Customer and vendor incentives and expenditures for customer site-specific energy engineering ($1,050,600) are included as direct benefits to customers.
- NEEA: Company subtracted $55,000 in internal management costs and then applied the 70 percent estimate provided by WUTC Staff to NEEA funding to calculate the direct benefit to customers.

Pilots

In accordance with WAC 480-109-100 (1) (c), the Company must implement pilot projects when appropriate and as long as the overall portfolio remains cost effective. In considering which pilots to pursue, the Company focused on its unique service territory (small towns and rural), being resource efficient and building on prior work, pilots that increase savings acquisition now or in the future and pilots that address an identified need or barrier. Pilots described here have been presented to the Company's DSM Advisory Group for review and comment. Using the existing programs described in detail below, the Company plans to pursue the pilot initiatives described below in 2020-2021.

On-Bill Financing for owned manufactured homes located on rented space

- **Purpose**: Reduce upfront cost barrier to participation in residential energy efficiency programs by offering on-bill financing. This offer further complements the third party financing in residential and business customers offered in 2018-2019 biennial period.
- **Costs**: Up to $20,000 in start-up costs. $200 per funded loan application. $300 per application underwriting fee (regardless of loan funding). Costs will be included as a residential program expenses and recovered through the tariff rider. Pacific Power internal on-going loan administration costs will also be included as a program expense and recovered through the tariff rider. Pacific Power is not loaning its own funds and will not be receiving any interest income from loan payments.
- **Size**: The Company expects between 60-100 completed loans over the two-year period.
- **Implementation**: Build upon current experience utilizing Craft3, to operate as funder and loan administrator for on-bill financing for residential customers who participate in the Home Energy Savings program. Financing will be available for the net (after incentives) costs of equipment eligible for Home Energy Savings incentives.
- **Marketing**: Home must be in good condition and built after June 15, 1976 (the first HUD standard). The offer will be marketed primarily through installing contractors and the program administrator. Craft3 will work jointly to identify and train contractors. Marketing and screening will be in place to help insure customers eligible for low income services are directed to the community action agencies instead of participating in the loan offer. Individual loan offers are subject to both customer and home park screening by Craft3.

Manufactured Homes Targeted Delivery

- **Purpose:** Increase installation of energy efficiency measures within new and existing manufactured homes.
- **Costs:** Costs are included in the existing program delivery and incentive budgets for the biennial period.
- **Size:** The Program Administrator expects 500-1,000 manufactured home projects over the two-year period.
- **Implementation:** Program Administrator will use an RFP process to create a closed network of contractors who specialize in manufactured home measures. Build awareness and utilization of available customer incentives for manufactured home measures, including duct sealing, heat pumps, water heaters, evaporative coolers, central air, windows and insulation.

- **Marketing:** Utilize geo-targeted analysis, marketing, outreach and lead sharing methods to optimally reach customers, including customers in underserved areas or non-participating areas. Trade Allies will be trained on available financing options from nonprofit lender Craft3, who offers loans with affordable rates and convenient repayment directly on the Pacific Power utility bill.

CTA-2045 enabled heat pumps (water and space heating)

- **Purpose:** Increase deployment of CTA-2045 enabled heat pumps (water and space heating) ahead of the code/standards start date provided in HB 1444 which are applicable to water heating equipment. CTA-2045 technology allows utilities to manage energy loads of heat pump water heaters and space heaters. This new approach to demand response greatly reduces the cost of controlling water heaters and space heaters, while at the same time allowing daily control and improving the customer experience. The prior pilot would be continued to increase stocking, sales and incentive applications for heat pump water heaters within Pacific Power's service area. Equipment eligibility aligns with Northwest Energy Efficiency Alliance's (NEEA's) Qualified Products List (QPL). In 2020-2021, the pilot will also focus on increasing sales of CTA-2045 equipped units ahead of the standards start date by providing an additional incentive of $50 for each heat pump water heating and $100 for each heat pump space heating unit purchased with CTA-2045 capability.
- **Costs:** Costs are included in the program delivery and incentive budgets for the biennial period.
- **Size:** Twenty to 45 units.
- **Implementation:** Home Energy Savings program team will leverage program administrator's existing relationships and Memorandum of Understandings (MOUs) with retailers in Pacific Power's service area. Program staff will build new relationships with heat pump water heater and heat pump space heating manufacturers and distributors to increase availability of models and push sales of CTA 2045 equipped units.
- **Marketing:** Continue sales training and enhanced outreach to retailer and manufacturers with existing MOUs. Promote the additional incentive for CTA-2045 ready models through direct outreach email and phone communications. Create cobranded materials with retailers and manufacturers to increase visibility.

Geo-Targeted Energy Efficiency

- **Purpose:** Focus on increasing participation in specific area(s) where additional value such as preventing or deferring possible infrastructure investments has been identified. This builds up work in targeted areas identified during 2017-2019 which, while successful, did not eliminate or defer the traditional construction solution. In 2020, in alignment with the conditions list, the Company will determine if there are specific areas to target and, if so, begin that targeting. Based on prior experience, the focus will be on areas with longer construction/investment lead times.
- **Costs:** Costs are included in the existing program delivery and incentive budgets for the biennial period.
- **Size:** to be determined.

- **Implementation:** Determine if there are areas appropriate to target. Identify the scope, timing and characteristics of the need for these areas. Obtain customer lists for these areas.
- **Marketing:** Increase frequency of existing program incentives and outreach tactics including direct mail/email, trade ally engagement and personal selling.

Non-Residential Lighting Controls

- **Purpose:** Increase installation of lighting controls as part of business customer lighting retrofit projects.
- **Costs:** Included in existing program delivery budgets.
- **Size:** Up to 15 projects.
- **Implementation:** Leverage the Northwest Energy Efficiency Alliance's Luminaire Level Lighting Control (LLLC) initiative including vendor training support. Customer incentives are structured so that lighting upgrades combined with advanced networked lighting controls provide the highest incentive for lighting projects. Continue and evolve vendor incentives for lighting controls (see Vendor Incentive pilot below).
- **Marketing:** NXT Level training and good/better/best communications, continuing and improving lighting controls training for vendors, and providing outreach coordinator feedback to approved Wattsmart Business Vendors on lighting control opportunities in their projects.

Business Vendor Incentives

- **Purpose:** Increase energy savings of certain Wattsmart Business measure categories, hard-to-reach customer segments and geo-targeted locations by providing limited time incentives to specifically qualified vendors/contractors in addition to customer incentives. Vendor incentives can help address market barriers in Washington such as cost of learning a new technology, and competition for limited resources for promoting efficiency upgrades due to labor shortages.
- **Costs:** Costs are included in the program delivery and incentive budgets for the biennial period and include up to $150,000 for vendor incentives in 2020 and up to $250,000 for 2021.
- **Size:** Dependent on which measure categories are incentivized.
    - **Examples:**
        - Advanced Networked Lighting Controls: 5-10 projects
        - Advanced Rooftop Unit Controls (ARC): 20-30 rooftop units
        - Ductless Heat Pumps (e.g. replacing electric resistance heating): 5-10 units
- **Implementation**: Vendor incentives for Wattsmart Business will be "turned on" for a limited period of time to encourage specific measure, sector, or location participation. For lighting, the incentives will be offered to Premium Vendors to encourage project completion. For HVAC, the incentives will initially focus on increasing participation of the existing and expanded ARC measures. The strategies and outcomes of the 2020 vendor incentives will be evaluated before 2021 and adjusted as needed.
- **Marketing:** Utilize E-blasts to highlight vendor incentive offerings for the vendor network. Outreach Coordinators will work with vendors one-on-one to support the pilot.

Staff Areas of Interest

In developing its 2020-2021 Biennial Conservation Plan and Business Plan, Staff informed Pacific Power of several areas of particular interest[3], aside from the requirements of WAC 480-109 and Order 01 of Docket UE-171092. This section discusses each of these areas of interest and how the Company has and will address each during the 2020-2021 biennium.

1. NEEA treatment: Staff anticipates each utility will request a penalty threshold excluding NEEA savings and supports the compromise agreed to in the SWAG. One way in which we plan to support our recommendation is to clearly understand each utility's plan as it relates to NEEA for the upcoming biennium. The NEEA activities each utility plans to participate in should be described in a table or short narrative. Optional activities that a utility chooses not to participate in should be identified and an explanation of why the company has chosen not to participate should be provided. In addition, since NEEA business planning has recently finished and the budget of all funders was reduced as a result of other major funder constraints, staff expects to see each utility's plan to pursue any cost-effective market transformation not included in NEEA's final budget. If the absence of a regional entity conducting this activity makes it not cost-effective or feasible to accomplish, please explain why.

   Response: Pacific Power coordinated with NEEA in responding to this request to help insure transparency and alignment. Except as noted, information below was provided by NEEA via email on September 26, 2019.

   Pending completion of Pacific Power's funding contract for NEEA's 2020-2024 business cycle, Pacific Power plans to participate in all NEEA "Core" electric activities included in its 2020-2024 Strategic & Business Plans[4], as summarized in the Executive Summary (pages 24-25), and detailed in the Operations and Budget section and Appendices.

   The following are the "special projects" outlined in NEEA's Business Plan (page 32). These are in addition to the "core" electric activities that Pacific Power plans to participate in as part of its funding of NEEA's 2020-2024 business plan.

   1. C&I SEM
   2. Industrial Technical Training
   3. Multi-Family Building Stock Assessment

   At this point, Pacific Power plans to fund #1 and is coordinating with NEEA as plans for #3 develop. NEEA staff is still facilitating conversations with the region to define the scope of the Multi-Family Building Stock Assessment Special Project. The Industrial Technical Training Special Project did not have enough regional interest to warrant continued exploration by NEEA staff. As is explained on page 93 of NEEA's Business Plan, the additional opportunities in Demand Management have yet to be developed; Pacific Power will monitor these opportunities as their scope and costs are developed,

[3] August 13, 2019 email from Jennifer Synder to IOU contacts and cc: DSM AG members.
[4] https://neea.org/img/documents/NEEA-2020-2024-Strategic-and-Business-Plans.pdf

and determine its participation level based on value to the region and to Pacific Power customers.

On July 31, 2019, in response to Pacific Power's request, NEEA provided an assessment of individual funder implementation of NEEA's unfunded initiatives. The memo is included in the NEEA section of this plan on page 73.

2. Implementing SB 5116: In addition to other legislation, the Clean Energy Transformation Act (CETA) is now the law. While we are still awaiting rules and some targets seem far out in the future, each utility should be making best faith efforts to comply. For the upcoming BCPs, we encourage utilities to include the cumulative impacts to the extent possible, using analysis performed by the University of Washington, Department of Environmental and Occupational Health Sciences (SB 5116, Section 24), and address the new public interest definition where appropriate. While staff would love to see comprehensive program designs for HTR markets that include highly impacted and vulnerable communities, the bulk of what we expect to see at this point is a plan to evaluate what needs to happen to prepare for 2022.

   Response: The Company is an active participant in the multiple rule making processes that will further define "vulnerable populations" and "highly impacted communities". While, final CETA rules will provide clarity and further inform programs or tactics to increase the reach to these populations, the Company has a number of current and on-going activities that deliver services to these populations while the rules are being developed.

   Low Income Weatherization – Company funding along with Washington MatchMaker Program funds is directed to four agencies to provide weatherization services at no cost to participating customers. When matching funds are expended, the Company fully funds work. Life safety repairs at eligible homes are also completed in addition to weatherization projects. On-going communication between the agencies and the advisory groups (DSM and Low Income) help insure program changes/enhancements are assessed and implemented as needed.

   Low Income Bill Assistance Program (LIBA)
   - 5 Year Plan: 2017 – 2022
   - Credit Time Period – 12 months
   - Discount applied to the kWh usage over 600
   - 1 year and 2 year enrollments

   Low Income Energy Assistance Program (LIHEAP)
   - Income Guidelines: At or below 125% Poverty Level.
   - Eligible for assistance once in a program year, October 1 – June 30
   - Household's average monthly income
   - Number of people in the household

Manufactured Home energy efficiency incentives – Company has continuously evolved the provision of incentives and services for manufactured homes (which are typically more affordable housing than many alternatives). No cost duct sealing has been offered for customers in prior years and will continue in the upcoming biennial period. A pre-qualified contractor network for this sector is also a proposed pilots. A dedicated financing offer (with completive interest rates) for owned homes on rented manufactured home park spaces is another pilot being proposed by the Company.

Non-energy impacts (health impacts of wood smoke reductions) are included cost effective calculations which improves the economics and availability of ductless heat pumps installed in the place of other electric heat equipment.

3. Distribution efficiency: Staff expects to see improved transparency in the distribution efficiency plan. This is especially true for utilities rolling out AMI capabilities. Pilots that test methods for achieving additional conservation with improved metering must be pursued.

   Response: The Company does not currently have AMI capability in Washington. The Company's transition to the CYME software and plan to perform in depth analysis of four distribution circuits in 2020 is outlined in the Biennial Conservation Plan and was reviewed with stakeholders at the August 2019 DSM AG meeting.

4. Coordination between utilities: During the 2020-21 biennium, staff is interested in exploring ways in which coordination between utilities could improve outcomes for customers, the utilities, and the region. Identifying possible areas for coordination in the BCP could help spur collaboration. This opportunity is especially evident in service areas which have different utilities providing electric and natural gas service but exists amongst neighboring utilities as well.

   Response: Collaboration and coordination with other utilities makes sense for our customers and other market actors such as trade allies and helps in the implementation of new legislation. Pacific Power plans to continue and evolve utility and regional coordination in 2020-2021. Examples of coordination to be continued include the following:
   - Reciprocal participation in other IOU DSM Advisory Groups in Washington.
   - Serving as a voting member of the Regional Technical Forum.
   - Serving on Northwest Energy Efficiency Alliance's board, RPAC and advisory groups
   - Participating in commercial lighting program managers meetings.
   - Participating in ad-hoc residential lighting program manager meetings to coordinate market actions in response to HB 1444 and federal standard changes.
   - Joining Bonneville Power Administration strategic energy management engagements such as the culinary water cohort.
   - Co-sponsoring training with other regional entities such as Northwest Energy Efficiency Alliance, Lighting Design Lab, Bonneville Power Administration and

utilities located close to Pacific Power. Example: advanced networked lighting controls training for trade allies.
- Inviting Cascade Natural Gas to present and exhibit at annual trade ally events in Yakima and Walla Walla so trade allies have the information they need to promote both electric and gas efficiency.
- Ad-hoc sharing of performance experience and referrals for delivery contractors.
- Serving on the advisory group for Lane Community College's online energy management certificate program available in the region.

Residential Program Details

Home Energy Savings (Schedule 118)

Years of Implementation
Pacific Power Electric Service Schedule No. 118 for the Home Energy Savings Program was submitted under Advice Letter No. 06-004 on August 11, 2006. The program was initially approved with an effective date of September 14, 2006.

Program Description
The program provides a broad framework to deliver incentives for more efficient products and services for Washington residential customers with a new or existing home, multi-family unit or manufactured home. A third party administrator hired by the Company delivers the savings and incentives of the program. Operating in tandem, Schedule 118 and the program website (http://www.homeenergysavings.net/Washington/washington_home.html) inform customers and contractors of the offerings and qualifications for incentives.

Measures eligible for incentives include efficient clothes washers, heat pump water heaters, light emitting diode ("LED") lighting, lighting fixtures, heating and cooling equipment, HVAC equipment, insulation, and windows. The program offers mail-by request wattsmart Starter Kits containing free LEDs and customers with electric water heat also receive a free showerhead and aerators. . In addition, the program includes a performance path option as well as stand-alone measures for new homes and separate measures for manufactured and multifamily homes.

Incentives are provided in three ways: post-purchase delivery to the customer for the majority of measures, through a retailer and/or manufacturer buy-down for LEDs and fixtures, and direct installation of a measure, such as duct sealing where the program pays all of the measure and installation cost so there is no cost to the customer. Buy-downs result in lower retail prices for customers at the point of purchase as opposed to post-purchase incentives that customers must submit an application to receive.

Complete details on incentives and services are on the program website https://wattsmartsavings.net/washington-residential/ and in the tables and copy of the program tariff below.

Program Updates

The Home Energy Savings program was updated in the fourth quarter of 2019 using the program change process (including Advisory Group review and comment) described below. The changes are effective on January 1, 2020. The information provided in this business plan reflects the program offers/qualifications as of January 1, 2020.

Planned Program Changes

Future changes including measure additions, deletions, and changes in qualifying standards will be based on cost-effectiveness, evaluation findings, participation and evolving codes and standards and information on lighting baseline equipment sales within the territory. In addition, the program is reviewed during the first year of the biennial period year and any changes from updated RTF information as of October 1 are incorporated through the program change process to be effective on January 1 of the second year of the biennial period.

Evaluation Update

Last Evaluation Report:

Program Years	Evaluation Report Date	Completed by
2015-2016	November 9, 2017	The Cadmus Group, Inc.

Future Evaluation Report(s):

Program Years	Evaluation Report Date	To be Completed by
2017-2018	By year-end 2019	ADM Associates, Inc.

Program Details

General program details for this program are contained in the program tariff; additional program detail is available on the program website. Any changes to the details included in the program tariff must be filed and approved by the Commission prior to becoming effective. In addition, there are program details managed outside of the program tariff. The program tariff and the text below from the Advice Letter (Docket UE-061297), filed August 11, 2006, describe the information that is managed outside of the tariff and the process for changes.

> The comprehensive nature of the program and changing equipment standards indicate a flexible and market-driven program delivery is required. The Company is proposing that Schedule 118 outline the basic program elements including customer eligibility, use of a program administrator for delivery, the seasonal nature of selected incentive offers, and that current incentive levels may change. Specific details such as incentive levels, eligible equipment specifications and dates for incentive availability would be managed by the program administrator using a dedicated program Web site with easy links from the Company web site.
>
> Changes in equipment eligibility or minimum efficiency levels would be driven by program and market data. The Company and program administrator will be assessing program performance on an on-going basis and proposing changes at least once per year. Changes may be proposed more frequently if there is compelling market feedback that changes need to occur ahead of the annual changes. Similar to the filing process, the Company would present information on proposed changes to its Advisory Group and seek comments prior to making

changes. Changes in equipment specifications or incentive levels would be clearly posted on the Web site and emailed to the appropriate Commission staff person with at least 45 days advance notice.

The incentive tables, program definitions and custom incentives offered are managed outside of the program tariff on the Company website via the process described above.

The following program information is contained either on the Company's website referenced above or in the program tariffs at the end of this business plan.

Washington Home Energy Savings

Definitions

British Thermal Unit (Btu): It is approximately the amount of energy needed to heat 1 pound of water from 39° to 40° Fahrenheit.

Contractor: Any party that is licensed to install or service HVAC, plumbing, or weatherization equipment or products.

Cubic Feet per Minute (CFM): A measurement of the velocity at which air flows into or out of a space.

Customer: Any party who has applied for, been accepted and receives service at the real property, or is the electricity user at the real property.

Direct Install: Installation of an Energy Efficiency Measure directly by the Program, or a Program-approved contractor or other 3rd party.

Downstream: Payment of incentive made by the Company to a customer, owner, contractor or other approved third party for the purchase or installation of an Energy Efficiency Measure pursuant to an approved energy efficiency incentive application.

Energy Efficiency Incentive: Payments of money made by Company to Owner or Customer or other approved party for installation of an Energy Efficiency Measure pursuant to an approved Energy Efficiency Incentive Application.

Gallons Per Minute (GPM): Volumetric flow rate used in rating equipment which saves water

Heating Seasonal Performance Factor (HSPF): Is the efficiency of heat pumps measured by the ratio of Btu heat output over the heating season to watt-hours of electricity used. The higher the number, the greater the efficiency.

Heating, Ventilation and Air Conditioning (HVAC): Refers to technology of indoor environmental comfort.

Integrated Modified Energy Factor (IMEF): Measures energy consumption of the total laundry cycle (washing and drying). It indicates how many cubic feet of laundry can be washed and dried with one kWh of electricity; the higher the number, the greater the efficiency.

Light Emitting Diode (LED): A semiconductor light source.

Manufactured Homes (mobile homes): A type of prefabricated housing that is largely assembled in factories and transported to the site of use. Units are at least 320 square feet and installed with a permanent chassis to assure the initial and continued transportability of the home.

Market Partner: An approved third party (contractor, retailer, dealer, wholesaler or manufacturer) who installs Energy Efficiency Measures at the real property or sells Energy Efficiency Measures to a Customer or Contractor. Applies to parties in the downstream, midstream, upstream, or direct install delivery channels.

NorthWest Energy Efficient Manufactured Home (NEEM): Organization based in the NorthWest that certifies new manufactured homes are built to various energy efficient standards such as ENERGY STAR or eco-rated.

New Home: A newly constructed single family residence.

Owner: The person who has both legal and beneficial title to the real property, and is the mortgager under a duly recorded mortgage of real property, the trustor under a duly recorded deed of trust.

Prescriptive incentives: Per unit incentives are listed in the program incentive tables for specific EEMs. Incentives are subject to change.

RTF: Regional Technical Forum

R-Value: Indicates insulation's resistance to heat flow. The higher the R-value, the greater the insulating effectiveness.

Seasonal Energy Efficiency Ratio (SEER): Is the efficiency of air conditioners measured by the cooling output in Btu during a typical cooling-season divided by the total electric energy input in watt-hours during the same period. The higher the unit's SEER rating the more energy efficient it is.

Utility Combined Energy Factor (UCEF): ENERGY STAR uses Combined Energy Factor to compare the energy efficiency of gas and electric clothes dryers in pounds per kilowatt hour. The higher the value, the more efficient the dryer is.

U-Factor: Measures the rate of heat transfer and indicates how well the window insulates. U-factor values generally range from 0.25 to 1.25 and are measured in $Btu/h \cdot ft^2 \cdot °F$. The lower the U-factor, the better the window insulates.

Upstream: Payment of incentive made by the Company directly to a manufacturer, retailer, or other pre-approved vendor to apply a pre-purchase discount for customers.

Incentives

Table 1: Appliance Incentives

Measure	Qualifications	Customer Incentive	Market Partner Incentive
Clothes Washers	IMEF ≥ 2.76	$50	
Hybrid/Heat Pump Clothes Dryer	UCEF ≥ 3.20	$600	

Notes for appliance incentives table:

- Incentives for clothes washer apply to mid/upstream and/or downstream. Only one incentive will be provided per qualifying clothes washer.
- Incentives for clothes washers may be paid to the customer, retailer, and/or manufacturer and may be split between customer, retailer, and/or manufacturer. The sum of incentive payments per unit will not exceed the amounts listed in the table. The end use customer portion of the incentive will clearly be displayed on the website with applicable dates. The end use portion of the incentive may be changed.
- Homes must have either an electric water heating or an electric dryer heat for clothes washers to be eligible for incentives.
- Incentives for hybrid/heat pump clothes dryer apply to mid/upstream and/or downstream. Only one incentive will be provided per qualifying clothes dryer.
- Incentives for hybrid/heat pump clothes dryers may be paid to the customer, retailer, and/or manufacturer and may be split between customer, retailer, and/or manufacturer. The sum of incentive payments per unit will not exceed the amounts listed in the table. The end use customer portion of the incentive will clearly be displayed on the website with applicable dates. The end use portion of the incentive may be changed.

  See additional requirements on program website.
- Acronyms:
  IMEF: Integrated Modified Energy Factor
  UCEF: Utility Combined Energy Factor

Table 2 - Lighting Incentives

Measure	Qualifications	Customer Incentive	Market Partner Incentive
LED Bulbs (General Purpose)	ENERGY STAR qualified	$0	Up to $3.00
LED Bulbs (Specialty)	ENERGY STAR qualified	$0	Up to $3.00
LED Fixtures	ENERGY STAR qualified Torchiere and portable products are not qualified.	$0	Up to $23.00

Notes for lighting incentive table:

- Incentives for and LED bulbs and fixtures apply to mid/upstream, mail-by-request, and/or direct install.
- Mail-by-request and direct install are offered on an initiative basis and may not be available for the entire year. See program website for availability information
- LED bulb and fixture must be listed on the program's qualified product list on the program website in order to qualify for an incentive. Qualifying product may be purchased a participating retailers only
- Reduced price LED or fixture offer may end early if entire allocation is sold.
- Acronyms:
  LED: Light Emitting Diode

Table 3 – Single Family HVAC Incentives

Measure	Qualifications	Customer Incentive	Market Partner Incentive
Evaporative Coolers -2,000-3,499 CFM	2,000-3,499 CFM	$50	
Evaporative Coolers – 3,500+ CFM	Minimum 3,500 CFM (must be the primary cooling source)	$250	
Central Air Conditioner with Best Practice Installation and Sizing	≥15 SEER Central air conditioner must be installed and sized per program's requirements.	$125	
Duct Sealing and Insulation	$R_{initial} \leq 2$ and replace all existing insulation with at least R-8. Home's primary heat source must be either a heat pump or electric forced air furnace. Existing ducts must be unsealed.	$800	
Duct Sealing	Home's primary heat source must be either a ducted heat pump or electric forced air furnace. Insulation removed for purposes of sealing must be reinstalled or replaced after sealing is completed. Existing ducts must be unsealed. Duct sealing must be done per program's requirements.	$300	

Ductless Heat Pump	≥ 9.0 HSPF, single-head or multi-head unit. Home's previous primary heating source must either have been an electric forced air furnace or a zonal electric system.	$1,300
Electronic Line Voltage Thermostat	Must meet Bonneville Power Administration (BPA) specifications. Home's primary heating source must be an electric zonal heating system.	$45
Heat Pump Commissioning Controls Sizing	Heat Pump must be new and commissioning, controls, and sizing be completed per program requirements.	$250
Federal Standard Heat Pump Conversion with Best Practice Installation and Sizing	For replacement of existing electric furnace with new federal standard efficiency heat pump. Heat Pump must include Best Practices Installation & Proper Sizing.	$1,300
9.0+ HSPF Heat Pump Conversion with Best Practice Installation and Sizing	For replacement of existing electric furnace with new high efficiency heat pump. ≥ 9.0 HSPF must include Best Practices Installation & Proper Sizing.	$2,000
Heat Pump Upgrade with Best Practice Installation and Sizing	For upgrade of existing heat pump to new high efficiency heat pump. ≥ 9.0 HSPF must include Best Practices Installation & Proper Sizing.	$300
Heat Pump (CTA-2045)	For heat pump equipment with demand response capability compliant with CTA-2045 standard.	$100 per heat pump
Smart Thermostat	Unit must be on Energy Star Qualified Products List.	$50

Notes for HVAC incentive table:

- Incentives for all HVAC measures apply to downstream and/or mid/upstream. Only one incentive will be provided per unit.
- Incentives for CTA-2045 compliant heat pump is an additional incentive that apply to heat pump commissioning, heat pump conversion, and heat pump upgrade measure offerings. Equipment must meet all program qualifications to be eligible.
- Incentives may be paid to the customer, dealer, manufacturer, and/or trade ally and may be split between customer, dealer, manufacturer, and/or trade ally. The sum of the incentive payments per

unit will clearly be displayed on the website with applicable dates. The end use portion of the incentive may be changed.

- Maximum of 10 line voltage thermostats per house hold.
- Maximum one smart thermostat per house hold.
- Occupancy sensing feature must be enabled for smart thermostats incentives.
- Homes must have a ducted electric heating system to be eligible of smart thermostat incentives. Customers may self-install smart thermostats. Contractor not required.
- Work must be completed per program requirements listed on the program website.
- See additional installation requirements on program website.
- Acronyms:
  SEER: Seasonal Energy Efficiency Ratio
  HSPF: Heating Seasonal Performance Factor
  CFM: Cubic Feet per Minute

Table 4 – Single Family Weatherization Incentives

Measure	Qualifications	Customer Incentive	Market Partner Incentive
Insulation – Attic	$R_{initial} \leq 19$ $R_{final} \geq 49$	$0.05/sf. for electrically cooled home $0.30/sf. for electrically heated home	$0/sf.
Insulation – Floor (to R-19)	$R_{initial} = 0$ $R_{final} \geq 19$ Home's primary heat source must be electric.	$0.20/sf.	$0/sf.
Insulation – Floor (to R-30)	$R_{initial} = 0$ $R_{final} \geq 30$ Home's primary heat source must be electric.	$0.30/sf.	$0/sf.
Insulation - Wall	$R_{initial} = 0$ $R_{final} \geq 13$ or fill cavity Home's primary heat source must be electric.	$0.40/sf.	$0/sf.
Windows	U-factor of 0.25 or lower. Home's primary heat source must be electric.	$0.65/sf	$0/sf.

Notes for weatherization incentive table:

- See additional installation requirements on program website.
- Home's primary heat source must be either a heat pump, electric forced air, zonal, or ductless heat pump heating system to qualify for the electrically heated incentive.
- Home's primary heat source must be a gas heating system to qualify for the electrically cooled incentive.
- Acronyms:

  R-Value: Thermal resistance of a material

  U-Factor: Inverse of R-value used to measure the amount of heat transmitting through a square foot of material

Table 5 – Single Family New Homes Incentives

Measure	Qualifications	Customer/Builder Incentive	Market Partner Incentive
Performance Path	Incentives available for new electric heated or gas heated homes that exceed the prevailing code by a minimum of 10% as modeled using program required tools and software. The home's performance must be modeled and verified by an independent third party Rater. Homes must have electric water heating to qualify.	Electric space heating, electric water heating $1,500 Electrical space heating with electric water heating exceeding code by 20% or more: $2,500 Compressor based electric cooling. Electric water heating. Space heated by gas or other fuel. $500	

Notes for New Homes incentive table:

- See additional installation requirements on program website.
- Incentives for performance path apply to downstream and mid/upstream. Only one incentive will be provided per home. Electrically heated and non-electrically heated incentives may not be combined.
- Incentives may be paid to the customer, builder, or rater and may be split between customer, builder, and/or rater. The sum of the incentive payments per unit will clearly be displayed on the website with applicable dates. The end use portion of the incentive may be changed.

Table 6 – Single Family Water Heating Incentives

Measure	Qualifications	Customer Incentive	Market Partner Incentive
Heat Pump Water Heater	Northern Climate Specification Tier 3 and above replacing an existing electric tank type water heater.	Tier 3 or higher: $600	
Heat Pump (CTA-2045)	For heat pump water heater equipment with demand response capability compliant with CTA-2045 standard.	$50 per heat pump	
Low-Flow Showerheads	Flow rate ≤ 2.00 GPM		Up to $15
Low-Flow Aerators	Kitchen Aerator: Flow rate ≤ 1.50 GPM Bath Aerator: Flow rate ≤ 0.50 GPM		Up to $5

Notes for water heating table:

- Incentives for heat pump water heater measures apply to downstream, mid/upstream, and direct install. Direct install will be offered on an initiative basis and may not be available for the entire year. See program website for availability information.
- Incentives for CTA-2045 compliant heat pump is an additional incentive that apply to the current heat pump water heater offering. Equipment must meet all program qualifications to be eligible.
- Incentives for heat pump water heaters may be paid to the customer, retailer/dealer, or manufacturer and may be split between customer retailer/dealer, and/or manufacturer. The sum of incentive payments per unit will clearly be displayed on the website with applicable dates. The end use portion of the incentive may be changed.
- Incentives for low-flow showerheads and low-flow aerators, apply to upstream, mail-by-request, and direct install. Mail-by-request and direct install will be offered on an initiative basis and may not be available for the entire year. See program website for availability information.
- See additional installation requirements on program website.
- Acronyms:
  GPM: Gallons per minute

Table 7 – Single Family Power Strip Incentives

Measure	Qualifications	Customer Incentive	Market Partner Incentive
Advanced Power Strip	Load or occupancy sensing. Shuts off power to selected peripheral devices during sleep mode or when no motion is detected for a set period of time.	$0	Up to $40

Notes for power strip table:

- Advanced power strips are only available through direct install. Direct install equipment will be offered on an initiative basis and may not be available for the entire year. See program website for availability information.

Table 9 - Manufactured Homes Incentives

Measure	Qualifications	Customer Incentive	Market Partner Incentive
Advanced Power Strip	Load or occupancy sensing. Shuts off power to selected peripheral devices during sleep mode or when no motion is detected for a set period of time.	$0	Up to $40
Evaporative Coolers -2,000-3,499 CFM	2,000-3,499 CFM	$50	
Evaporative Coolers – 3,500+ CFM	Minimum 3,500 CFM (must be the primary cooling source)	$250	
Ductless Heat Pump	≥ 9.0 HSPF, single-head or multi-head unit Home's previous primary heating source must either have been an electric forced air furnace or a zonal system.	$1,300	
Heat Pump (CTA-2045)	For heat pump equipment with demand response capability compliant with CTA-2045 standard.	$100 per heat pump	
Electronic Line Voltage Thermostat	Must meet Bonneville Power Administration (BPA) specifications.	$45	
Insulation - Attic	$R_{initial} \leq 19$ $R_{final} \geq 49$ Homes' primary heating must be either a heat pump, electric forced air, zonal, or ductless heat pump system to qualify for the electrically heated incentive.	$0.30/sf.	$0/sf.
Insulation – Floor (to R-19)	$R_{initial} = 0$ $R_{final} \geq 19$ Home's primary heat source must be either a heat pump, electric forced air, zonal, or ductless heat pump system to qualify for the electrically heated incentive.	$0.20/sf.	$0/sf

Insulation – Floor (to R-30)	$R_{initial} = 0$ $R_{final} \geq 30$ Home's primary heat source must be either a heat pump, electric forced air, zonal, or ductless heat pump system to qualify for the electrically heated incentive.	$0.30/sf.	$0/sf.
Insulation - Wall	$R_{initial} = 0$ $R_{final} \geq 11$ or fill cavity Home's primary heat source must be either a heat pump, electric forced air, zonal, or ductless heat pump system to qualify for the electrically heated incentive.	$0.40/sf.	$0/sf.
Windows	U-factor of 0.25 or lower. Home's primary heat source must be either a heat pump, electric forced air, zonal, or ductless heat pump system to qualify.	$0.65/sf	$0/sf.

Notes for manufactured homes table:

- Advanced power strips are only available through direct install. Direct install equipment will be offered on an initiative basis and may not be available for the entire year. See program website for availability information.
- Incentives for CTA-2045 compliant heat pump is an additional incentive that apply to ductless heat pump, heat pump commissioning, heat pump conversion, and heat pump upgrade measure offerings. Equipment must meet all program qualifications to be eligible. Manufactured homes are eligible for only one duct sealing incentive. The direct install offer may not be combined with the non-direct install offer.
- Duct sealing direct install will be offered on an initiative basis and may not be available for the entire year. See program website for availability information.
- Incentives for central air conditioner, not-direct install duct sealing, electronic line voltage, evaporative cooler, ductless heat pump, heat pump, and smart thermostat measures apply to downstream and mid/upstream. Only one incentive will be provided per unit.
- Incentives for central air conditioner, not-direct install duct sealing, electronic line voltage, evaporative cooler, ductless heat pump, heat pump, and smart thermostat may be paid to the customer, dealer, manufacturer, or trade ally and may be split between customer, dealer, manufacturer, and/or trade ally. The sum of the incentive payments per unit will clearly be displayed on the website with applicable dates. The end use portion of the incentive may be changed.
- Incentives for new manufactured homes may be paid to customer, dealer/retailer, or manufacturer and the available incentive per home and may be split between customer, dealer/retailer, and/or manufacturer. The sum of incentive payments per home will not exceed the amounts listed in the table. The end use customer portion of the incentive will

be clearly displayed on the web site with applicable dates. The end use customer portion of the incentive may be changed.

- See additional installation requirements on program website.
- Contractors providing the direct install duct sealing services will be reimbursed for actual job costs which may include surcharge for mileage, duct testing, and other job expenses, the total of which may not exceed the incentive. No additional costs will be billed to the customer.
- Acronyms:

NEEM: Northwest Energy Efficient Manufactured Homes

IECC: International Energy Conservation Code

HSPF: Heating Seasonal Performance Factor

R-Value: Thermal resistance of a material

U-Factor: Inverse of R-value used to measure the amount of heat transmitting through a square foot of material

Table 9 – Multifamily Homes Incentives

Measure	Qualifications	Customer Incentive	Market Partner Incentive
Advanced Power Strip	Load or occupancy sensing. Shuts off power to selected peripheral devices during sleep mode or when no motion is detected for a set period of time.	$0	Up to $40
Evaporative Coolers -2,000-3,499 CFM	2,000-3,499 CFM	$50	
Evaporative Coolers – 3,500+ CFM	Minimum 3,500 CFM (must be the primary cooling source)	$250	
Ductless Heat Pump	≥ 9.0 HSPF, single-head or multi-head unit Home's previous primary heating source must either have been an electric forced air furnace or a zonal system.	$1,300	
Heat Pump (CTA-2045)	For heat pump equipment with demand response capability compliant with CTA-2045 standard.	$100 per heat pump	
Electronic Line Voltage Thermostat	Must meet Bonneville Power Administration (BPA) specifications.	$45	

Insulation - Attic	$R_{initial} \leq 19$ $R_{final} \geq 49$ Homes' primary heating must be either a heat pump, electric forced air, zonal, or ductless heat pump system to qualify for the electrically heated incentive.	$0.30/sf.	$0/sf.
Insulation – Floor (to R-19)	$R_{initial} = 0$ $R_{final} \geq 19$ Home's primary heat source must be either a heat pump, electric forced air, zonal, or ductless heat pump system to qualify for the electrically heated incentive.	$0.20/sf.	$0/sf
Insulation – Floor (to R-30)	$R_{initial} = 0$ $R_{final} \geq 30$ Home's primary heat source must be either a heat pump, electric forced air, zonal, or ductless heat pump system to qualify for the electrically heated incentive.	$0.30/sf.	$0/sf.
Insulation - Wall	$R_{initial} = 0$ $R_{final} \geq 11$ or fill cavity Home's primary heat source must be either a heat pump, electric forced air, zonal, or ductless heat pump system to qualify for the electrically heated incentive.	$0.40/sf.	$0/sf.
Windows	U-factor of 0.25 or lower. Home's primary heat source must be either a heat pump, electric forced air, zonal, or ductless heat pump system to qualify.	$0.65/sf	$0/sf.

Notes for multifamily homes table:

- Advanced power strips are only available through direct install. Direct install equipment will be offered on an initiative basis and may not be available for the entire year. See program website for availability information.
- Incentives for CTA-2045 compliant heat pump is an additional incentive that apply to ductless heat pump, heat pump commissioning, heat pump conversion, and heat pump upgrade measure offerings. Equipment must meet all program qualifications to be eligible.
- Incentives for electronic line voltage and ductless heat pump, heat pump measures apply to downstream and mid/upstream. Only one incentive will be provided per unit.

- Incentives for electronic line voltage and ductless heat pump may be paid to the customer, dealer, manufacturer, or trade ally and may be split between customer, dealer, manufacturer, and/or trade ally. The sum of the incentive payments per unit will clearly be displayed on the website with applicable dates. The end use portion of the incentive may be changed.
- See additional installation requirements on program website.
- Acronyms:
  HSPF: Heating Seasonal Performance Factor
  R-Value: Thermal resistance of a material
  U-Factor: Inverse of R-value used to measure the amount of heat transmitting through a square foot of material

Home Energy Reports

Years of Implementation

The Home Energy Report program was implemented in August 2012 with a treatment group of 13,500 customers and was scheduled to run through December 2015 (41 months). In September 2014, based on the solid results of the initial 18 month evaluation results, the program was extended to run through December 2017. The program was also expanded to include a second treatment group of 35,000 households. In 2017, the Company issued an RFP for delivery service starting in January 2018. Bidgely started work as the new provider in 2018 and began sending reports in August 2018 using the same treatment and control groups used by OPower during the prior contract period. Similar to the prior contract, Bidgely's contract is turnkey and includes providing software services, report delivery (both email and print) to customers and reported energy savings.

Program Description

The Home Energy Report program is designed to better inform residential customers about their energy usage by providing comparative energy usage data for similar homes located in the same geographical area. The Bidgely software creates individualized energy reports for customers that analyze their energy usage, disaggregates energy use into end uses and offers recommendations on how to save energy and money by making small changes to their energy consumption. Equipped with this information, customers can modify behavior and/or make structural, equipment, lighting or appliance changes to reduce their overall electric energy consumption.

Evaluation Update

Last Evaluation Report:

Program Years	Evaluation Report Date	Completed by
2016-2017	May 2018	ADM Associates, Inc.

Future Evaluation Report(s):

Program Years	Evaluation Report Date	To be Completed by
2018-2019	Estimated by April 15, 2020	RFP in progress

Program Details

Reports for the pilot program were initially provided to approximately 13,500 customers, which as expected has decreased over the initial month pilot period related to normal attrition for customer opt-outs and move-outs. The 35,000 households in the expansion group has also decreased over time. As of August 2019, there are approximately 32,000 customers receiving reports from Bidgely.

For this biennial period, the Company will continue to utilize a two year measure life for assessing cost effectiveness. The two year life aligns more closely with assumptions utilized by other Washington investor owned utilities responsible for complying with I-937.

Savings will being tracked and reported annually based on reporting from the provider. Home Energy Report savings reported against the EIA Penalty Threshold will be first year savings and based on an ex-post evaluation of the program performance.

Planned Program Changes

The Home Energy Reports program for 2020-2021 will be a "refresh" with new treatment and control groups starting in January 2020. This approach is designed to address statistical significance issues identified in the last evaluation report. These changes are intended to maximize cost effective energy savings, expand reach of the program via digital channels and simplify execution by reducing number of treatment waves. With this approach, the email treatment group size is maximized and paper customers with >40th percentile of annual consumption also receive reports.

Low Income Residential Program Details

The Company offers a Low Income Weatherization program (Schedule 114) to its income-eligible residential customers.

Low Income Weatherization (Schedule 114)

Years of Implementation
The Low Income Weatherization program has been in effect since the mid-1980's and has successfully assisted in funding the weatherization of over 7,720 homes in Pacific Power's Washington territory.

Program Description
Pacific Power partners with four local non-profit agencies, Blue Mountain Action Council in Walla Walla, Northwest Community Action Center in Toppenish and Opportunities Industrialization Center of Washington in Yakima to provide weatherization services to income qualifying households throughout its Washington service area. The leveraging of Pacific Power funding along with Washington MatchMaker Program funds allows the agencies to provide these energy efficiency services at no cost to participating customers. The Company provides rebates to partnering agencies for 50 percent of the cost of services while MatchMaker funds are available, and covers 100 percent of costs when these state funds are depleted. Participants qualify whether they are homeowners or renters residing in single-family homes, manufactured homes or apartments. In calendar year 2018 a total of 108 homes were completed with 56 (52 percent) single family homes, 42 (39 percent) manufactured homes and 10 (9 percent) apartments.

Planned Program Changes
The Low Income Weatherization program was last revised through the submission of tariff revisions in 2017. These proposed revisions were determined by the Low Income Weatherization Advisory Group and included the elimination of an annual funding cap. The changes were approved by the Commission and became effective on May 1, 2017.

Senate Bill (SB) 5116 Clean Energy Transformation Act passed the Washington Legislature and was signed into law in May 2019. Under Section 12, Utility Low Income Programs and Assistance, utilities must make funding available for low-income households by July 31, 2021. Pacific Power is participating in bill proceedings and rule makings to determine whether current low income weatherization program will be impacted and if any modifications may be required.

Consistent with rules and staff direction, cost-effectiveness for the low-income weatherization program will not be assessed at a program or portfolio level. Reporting for the program will include number of residences weatherized, number of measures installed, energy savings and total expenditures.

Evaluation Update

Last Evaluation Report:

Program Years	Evaluation Report Date	Completed by
2013-2015	January 10, 2018	Opinion Dynamics

Future Evaluation Report(s):

Program Years	Evaluation Report Date	To be Completed by
2016 - 2018	Estimated by April 30, 2020	ADM Associates, Inc.

Program Details

Details for this program are contained in the program tariff. Any changes to the details included in the program tariff must be filed and approved by the Commission prior to becoming effective.

Non-Residential Program Details

The Company offers Wattsmart Business (Non-Residential Energy Efficiency - Schedule 140) to non-residential customers in the State of Washington. The program provides a comprehensive set of financial and service incentives to assist the Company's non-residential customers in improving the energy efficiency of their facilities.

Wattsmart Business (Schedule 140)

Years of Implementation

Wattsmart Business (Schedule 140) was created in 2014 by the consolidation of two existing programs: Energy FinAnswer and FinAnswer Express. The Energy FinAnswer program was originally implemented in the 1990s as an energy efficiency improvement financing program. The program was modified to an incentive-based program under Schedule 125 in October 2000. The Small Retrofit Incentive and Retrofit Incentive (Schedules 115 and 116) were created in November 2000 and were improved and renamed FinAnswer Express (Schedule 115) in May 2004.The consolidation of the programs to Wattsmart Business was approved with Docket UE-132083, effective January 1, 2014.

Program Description

Wattsmart Business was designed to support continuing acquisition of all cost-effective conservation from business customers and help reinforce the ongoing ethos of energy efficient new construction, facility upgrades, and ongoing operations.

Prescriptive incentives ("Typical Upgrades" or "listed incentives") are offered to commercial, industrial and irrigation customers for typical lighting, HVAC, motor, building envelope, food service, appliances, irrigation, dairy/farm equipment, compressed air and other retrofits or new installations. Typical Upgrades include an expedited energy analysis and incentives based on the equipment installed $/horsepower, $/ton, etc.) or based on annual energy savings determined using a program simplified analysis tool. The program includes an incentive offer specifically for small business customers receiving electric service on Schedule 24[5]. Participating customers utilizing an approved contractor are eligible for an enhanced incentive offer up to 80 percent of the project cost. There is also a midstream point-of-purchase delivery channel for lighting. Prescriptive incentives for this offer are referred to as Instant Incentives.

Custom incentives and analysis are offered for commercial, industrial, and irrigation customer retrofits and new construction measures that meet minimum efficiency qualifications of the prescriptive incentives but do not have a prescriptive incentive available. The program includes a vendor neutral investment grade energy analysis and cash incentives equal to $0.15 per kWh of annual energy savings (up to 70 percent of project costs).[6] There is a cap to prevent incentives from bringing the payback for a project below one year. Custom analysis includes a post-installation verification and, if required, the program includes energy commissioning. The

[5] There are maximum annual usage limits to help keep this offer targeted to small businesses. The eligibility requirements are posted on the website at https://www.pacificpower.net/savings-energy-choices/business/wattsmart-efficiency-incentives-washington/wa-small-medium-business/wa-small-business-lighting.html.

[6] Note there are no incentive caps for new construction projects where energy code applies.

program provides energy project manager (EPM) co-funding to increase end user management and engineering manpower devoted to electrical energy projects/activities increasing the number of commercial and industrial projects that can be completed. EPM co-funding is performance based and contingent on customer's commitment to an energy savings goal over a prescribed timeframe; typically 12 months. Co-funding is proportionate to the energy savings goal at $0.025/kWh (subject to a minimum co-funding level and salary cap).

Energy Management was added to Wattsmart Business in January 2014. Energy Management services and incentives are intended to help customers ensure ongoing efficiency improvements in the operation and management of facilities and industrial processes. Energy Management is a system of practices that creates reliable and persistent electric energy savings through improved operations, maintenance and management practices at customer sites. It is designed to complement program offerings for capital improvements and the Energy Project Manager co-funding offer. Savings are site specific and monitoring of building systems and industrial process controls is used to identify and quantify energy savings.

A financing offer was added to the program in 2017. This financing is optional and is available for customers who need additional help to fund the portion of the project cost not covered by incentives. Financing can be in the form of a capital equipment lease, tax exempt municipal lease, Energy Services Agreement, etc. The financing is offered through a third party, National Energy Improvement Fund (formerly called HBC Energy Capital).

The program is marketed primarily via Pacific Power account managers, Wattsmart Business vendors, Wattsmart Business consultants, and project staff. Other leads come via advertising, company newsletters, word-of-mouth, past participants returning for additional projects and a combination of other Company outreach efforts.

Wattsmart Business was updated in the fourth quarter of 2019 using the program change process (including Advisory Group review and comment) described below. The changes are effective on January 1, 2020. The information provided in this business plan reflects the program offers/qualification on January 1, 2020.

Planned Program Changes

Future changes will be based on changes in Washington State Energy Code (a new version is expected July 2020), federal standards, third party specification, cost-effectiveness, participation and updated market information.

Evaluation Update

Last Evaluation Report:

Program Years	Evaluation Report Date	Completed by
2016-2017	November 6, 2018	The Cadmus Group

Future Evaluation Report(s):

Program Years	Evaluation Report Date	To be Completed by
2018-2019	By year-end 2020	RFP in progress

Program Details

General program details for this program are contained in the program tariff; additional program detail is available on the program website. Any changes to the details included in the program tariff must be filed and approved by the Commission prior to becoming effective. In addition, there are program details managed outside of the program tariff. The program tariff utilizes the modification procedure established with the approval of Advice No. 06-008[7] by the Washington Utilities and Transportation Commission. The program tariff and the text below from the Advice Letter 06-008 (Docket UE-061710), filed on November 8, 2006, describe the information that is managed outside of the tariff and the process for changes.

> Future changes in the … incentive tables and definitions would be driven by program and market data. The Company assesses program performance on an ongoing basis and would propose changes at least annually. Changes may be proposed more frequently if there is compelling market data. Similar to the filing process, the Company would present information on proposed changes to its Advisory Group and seek comments prior to making changes. Changes would be clearly posted on the program web site and e-mailed to the appropriate Commission staff person with at least 45 days advance notice.

The incentive tables, program definitions and custom incentives offered are managed outside of the program tariff on the Company website[8] via the process described above.

The current information for the program can be found on the Company's website at www.bewattsmart.com.

[7] The description of the process for changes was also included in the Wattsmart Business program filing, Advice 13-08, filed November 12, 2013 and approved by the Commission.

[8] https://www.pacificpower.net/content/dam/pcorp/documents/en/pacificpower/savings-energy-choices/wattsmart-business/washington/WA_wattsmartBusiness_Incentive_tables_information.pdf

Washington Wattsmart Business

Definitions

Customer: Any party who has applied for, been accepted and receives service at the real property, or is the electricity user at the real property.

Energy Efficiency Incentive: Payments of money made by Pacific Power to Owner or Customer for installation of an Energy Efficiency Measure pursuant to an acknowledged Energy Efficiency Incentive Offer Letter or approved Energy Efficiency Incentive Application.

Energy Efficiency Incentive Offer Letter: An offer made by Pacific Power and acknowledged by Owner or Customer providing for Pacific Power to furnish Energy Efficiency Incentives for an Energy Efficiency Project.

Incentive Application: An application submitted by Owner or Customer to Pacific Power for Energy Efficiency or Energy Management Incentives.

Energy Efficiency Measure (EEM): Qualifying measures are any measures which, when installed in an eligible facility, result in verifiable electric energy efficiency improvement compared to a baseline as determined by Pacific Power. The baseline will be determined with reference to existing equipment, applicable state or federal energy codes, industry standard practice and other relevant factors. Qualifying measures include Waste Heat to Power and regenerative technologies.

Energy Efficiency Measure (EEM) Cost:

- New Construction/Major Renovation: EEM Cost is the total installed cost of energy efficiency equipment or system minus the cost of the code compliance/common practice equipment or system.
- Retrofit: EEM Cost is the total installed cost of the energy efficiency equipment or modification.
- In the case of New Construction, Major Renovations, and Retrofits, EEM Costs shall mean the Owner or Customer's reasonable costs incurred (net of any discounts, rebates or incentives other than Energy Efficiency Incentives from Pacific Power, or other consideration that reduces the final actual EEM Cost incurred by the Owner or Customer) to purchase and install EEMs at the Owner's or Customer's facility. If the Owner or Customer installs the EEM then the cost of installation shall be equal to the Owner's or Customer's actual labor costs for such installation.

Energy Efficiency Project: One or more EEM(s) at a Non-residential Facility[9] with similar one year payback limitations (see below) covered by one Energy Efficiency Incentive Offer Letter.

Energy Efficiency Project Cost: The sum of EEM Costs for one or more EEM(s) with similar one year payback limitations (see below) covered by one Energy Efficiency Incentive Offer Letter.

[9] Measures at multiple Non-residential Facilities may be included in one Offer Letter for convenience; however, project incentive caps (if any) are applied per individual Non-residential Facility.

Energy Management Offer Letter: An offer made by Pacific Power and acknowledged by Owner or Customer and Pacific Power providing for Pacific Power to furnish Energy Management Incentives for an Energy Management Project.

Energy Management Incentive: Payments of money made by Pacific Power to Owner or Customer for implementation of an Energy Management Measure pursuant to an executed Energy Management Offer Letter.

Energy Management Measure (EMM): an operational improvement which, when implemented in an eligible facility, result in electric savings compared to current operations as determined by Pacific Power.

Energy Management Project: One or more EMM(s) at a Non-residential Facility covered by one Energy Management Offer Letter.

Energy Project Manager: an employee or direct contractor of the Customer who will manage electrical energy efficiency projects that deliver savings toward the Customer/Owner's energy savings goal.

Energy Project Manager Co-funding: funding towards the Energy Project Manager agreed upon full value salary that is solely attributable to electrical energy efficiency work.

Major Renovation: A change in facility use type or where the existing system will not meet Owner/Customer projected requirements within existing facility square footage.

Mixed Use: Buildings served by a residential schedule and a rate schedule listed under Washington Schedule 140 shall be eligible for services under this schedule provided the Energy Efficiency Project meets the definition of New Construction or Major Renovation.

New Construction: A newly constructed facility or newly constructed square footage added to an existing facility.

Non-residential Facility: A Customer site that is served by Pacific Power and meets the applicability requirements of Washington Schedule 140, the program tariff, on file with the Washington Utilities & Transportation Commission.

Owner: The person who has both legal and beneficial title to the real property, and is the mortgager under a duly recorded mortgage of real property, the trustor under a duly recorded deed of trust.

Retrofit: Changes, modifications or additions to systems or equipment in existing facility square footage.

Waste Heat to Power: Waste heat to power is the process of capturing heat discarded by a process (with no increase in fuel input for the process) and using that heat to generate electricity for use by the Non-residential Facility in place of electricity provided by Pacific Power.

Incentives – General Information

Incentives for measures listed in the incentive tables

Per unit incentives are listed in the program incentive tables for specific Energy Efficiency Measures (EEMs) and are subject to the incentive caps below. Incentives are subject to change and current incentives can be found at www.pacificpower.net.

Custom incentives

Energy Efficiency Measures not listed in the prescriptive incentive tables (typical upgrades) may be eligible for a Custom Energy Efficiency Incentive. Pacific Power will complete an analysis of the EEM Cost and electric energy savings and determine whether to offer a custom Energy Efficiency Incentive and the incentive amount.

Energy management incentives

Non-capital improvements to operations and maintenance within a qualifying facility may be eligible for an Energy Management Incentive. Pacific Power will partner to complete an analysis of the electric energy savings of potential energy management measures and determine whether to offer an Energy Management Incentive and the incentive amount.

Energy project manager co-funding

Pacific Power can fund an additional $0.025/per kWh of verified Wattsmart Business energy savings, up to 100 percent of the Energy Project Manager's salary. Salary is based on a letter from the Customer/Owner's human resources or accounting department stating the base annual salary and an appropriate overhead percentage, and subject to approval by Pacific Power.

Baseline adjustments

Pacific Power may adjust baseline electric energy consumption and costs to reflect any of the following: energy codes, standard practice, changes in capacity, changes in production or facility use and equipment at the end of its useful life. Such adjustments may be made for lighting energy efficiency measures installed in new construction projects where energy code does not apply.

INCENTIVES:[10],[11]

Category		Incentive	Percent Project Cost Cap[12]	1-Year Simple Payback Cap for Projects[13]	Maximum Simple Payback Threshold for Projects[14]	Other Limitations
Prescriptive Incentives (Typical Upgrades)[15]	Lighting - Retrofit	See incentive lists	70%	Yes	Yes	See incentive lists
	Lighting - New Construction/ Major Renovation		None	No	No	
	Motors		None	No	No	
	HVAC[16]		None	No	No	
	Building Envelope		None	No	No	
	Food Service[17]		None	No	No	
	Appliances		None	No	No	
	Office		None	No	No	
	Irrigation Pump VFD		70%	Yes	Yes	

[10] The Customer or Owner may receive only one financial incentive from Pacific Power per measure. Financial incentives include energy efficiency incentive payments and energy management payments. Energy Project Manager Co-Funding is available in addition to the project incentives.

[11] Incentives for prescriptive measures are restricted to the amounts shown on the website.

[12] All EEM Costs are subject to Pacific Power review and approval prior to making an Energy Efficiency Incentive Offer. All final EEM Costs are subject to Pacific Power review and approval prior to paying an Energy Efficiency Incentive per the terms of the Energy Efficiency Incentive Offer or approved Application. Pacific Power review and approval of EEM Costs may require additional documentation from the Customer or Owner.

[13] The 1 year simple payback cap means incentives will not be available to reduce the simple payback of a project below one year. If required, individual measure incentives will be adjusted downward pro-rata so the project has a simple payback after incentives of one year.

[14]The Maximum Simple Payback Threshold for projects is available on the Pacific Power website. For Energy Efficiency Projects where the Maximum Simple Payback Threshold applies, to be eligible for Energy Efficiency Incentives, the Energy Efficiency Project simple payback before incentives must not exceed the Maximum Simple Payback Threshold. Pacific Power may accept a project with a projected payback period in excess of the threshold if project benefits satisfy the Commission's approved cost-effectiveness test.

[15] For Rate Schedule 51, 52 and 57 Street Lighting Service, the street lighting owner (Pacific Power) is not eligible for incentives.

[16] Evaporative pre-cooler incentives are subject to the project cost cap, the one-year payback cap and the maximum simple payback threshold.

[17] Demand controlled kitchen ventilation exhaust hood incentives are subject to the project cost cap, the one-year payback cap and the maximum simple payback threshold.

Category		Incentive	Percent Project Cost Cap[12]	1-Year Simple Payback Cap for Projects[13]	Maximum Simple Payback Threshold for Projects[14]	Other Limitations
	Irrigation Water Distribution		None	No	No	
	Farm and Dairy		70%	Yes	Yes	
	Compressed Air		70%	Yes	Yes	
	Wastewater and other Refrigeration		70%	Yes	Yes	
Enhanced Incentives for Small Businesses	Lighting - Retrofit	Determined by Pacific Power with not-to-exceed amounts as shown in incentive table for this offer	80%	No	Yes	Available to all Schedule 24 customers meeting small business criteria on Pacific Power's website. Qualifying equipment must be installed by an approved contractor/vendor.
Mid-market incentives		Determined by Pacific Power with not-to-exceed amounts as shown in incentive table for this offer	No	No	No	Incentives available at the point of purchase through approved distributors/retailers or via a post-purchase customer application process.
Direct Install incentives		Determined by Pacific Power with not-to-exceed amounts as shown in incentive table for this offer	No	No	No	Specific limitations will be outlined on the program website.

Category	Incentive	Percent Project Cost Cap[12]	1-Year Simple Payback Cap for Projects[13]	Maximum Simple Payback Threshold for Projects[14]	Other Limitations
Custom Non-Lighting Incentives for qualifying measures not on the prescriptive list.[18] [19]	$0.15 per annual kWh savings	70%	Yes	Yes	N/A
Energy Management	$0.02 per kWh annual savings	N/A	No	No	N/A
Energy Project Manager Co-Funding	$0.025 per kWh annual savings	100% of salary and eligible overhead	No	No	Minimum savings goal posted on Pacific Power website

Energy Project Manager Co-funding Incentives

Payment No.	Payment Amount	Milestone
1 - Initial payment	1/3 of funding amount* (not to exceed $25,000)	1. You select an Energy Project Manager 2. We work together on Comprehensive Plan for electric energy savings 3. You sign the Energy Project Manager Offer Letter
2 - Final payment	$0.025 per kwh of energy savings achieved, to a maximum 100 percent of approved Energy Project Manager Salary and less the initial payment	1. At the end of performance period as defined in the Energy Project Manager Offer Letter

**Funding amount is based on the lesser of (a) $0.025 per kWh or (b) the total annual cost of the Energy Project Manager (salary plus overhead).*

[18] Project Cost and 1-Year Simple Payback Caps and the maximum simple payback threshold do not apply to New Construction and Major Renovation projects that are subject to state energy code.
[19] Refer to the Pacific Power website for Waste Heat to Power incentive eligibility requirements.

Lighting System Retrofits Incentive Table

Category	Eligibility Requirements		Incentive
Interior Lighting	Full Fixture Replacement	With upgrade to Advanced Controls	$0.16/kWh
		With upgrade to Basic Controls	$0.14/kWh
		Without controls upgrade	$0.12/kWh
	Fixture Retrofit Kits	With controls upgrade to Basic or Advanced Networked Lighting Controls	$0.12/kWh
		Without controls upgrade	$0.10/kWh
	Lamp Replacement	Lamp-only Replacements	See Mid-market incentive table
	Controls-only Retrofit	Controls-only upgrade to Advanced Networked Lighting Controls	$0.16/kWh
		Controls-only upgrade to Basic Controls	$0.12/kWh
Exterior Lighting	Full Fixture Replacement (except Street Lighting)	With upgrade to Advanced Dimming Controls	$0.10/kWh
		Without controls upgrade	$0.06/kWh
	Fixture Retrofit Kits (except Street Lighting)	With upgrade to Advanced Dimming Controls	$0.07/kWh
		Without controls upgrade	$0.05/kWh
	Lamp Replacement (except Street Lighting)	Lamp-only Replacements	See Mid-market incentive table
	Street Lighting	With upgrade to Advanced Dimming Controls	$0.07/kWh
		Without controls upgrade	$0.05/kWh
	Controls-only Retrofit	Controls-only upgrade to Advanced Dimming Controls	$0.07/kWh
Non-General Illuminance	LED Case Lighting – Refrigerated Case	LED replacing fluorescent lamp in existing refrigerated cases. LED must be listed on qualified equipment list.	$10/linear foot
	LED Case Lighting – Freezer Case		$10/linear foot
	Refrigerated Case Occupancy Sensor	Installed in existing refrigerated case with LED lighting	$1/linear foot
Custom Lighting	Custom	Not listed above	$0.05/kWh

Notes for retrofit lighting incentive table

1. To be eligible for the incentives listed, the new lighting system must use less energy than the existing lighting system replaced or the baseline lighting system as determined by Pacific Power. To be eligible for an incentive for a system with controls, the new controls must save energy relative to existing controls.
2. Incentives are capped at 70 percent of Energy Efficiency Project Costs and incentives will not be available to reduce the Energy Efficiency Project simple payback below one year. Energy Efficiency Project Costs are subject to Pacific Power approval.
3. Incentives listed as $/kWh are per kWh annual energy savings as determined by Pacific Power.
4. Eligible retrofit lighting equipment is defined in qualified equipment lists posted on the Washington energy efficiency program section of Pacific Power's website.
5. A complete list of lighting equipment not eligible for retrofit incentives is available on the Washington energy efficiency program section of Pacific Power's website.

New Construction/Major Renovation Lighting Incentive Table

Measure	Category	Eligibility Requirements	Incentive
Interior Lighting	Troffer	Product must be listed on qualified equipment list. Products must be installed in buildings where energy code applies.	$10/Fixture
	Linear Ambient		$10/Fixture
	High Bay		$20/Fixture
	Other (not listed above)		$0.50/Fixture Wattage
	Advanced Networked Lighting Controls		$0.80/W Controlled
Exterior Lighting	Advanced Lighting Controls	Product does not need to be listed on qualified equipment list.	$0.40/W Controlled
Custom Lighting	Custom	Products must be installed in buildings where energy code does not apply.	$0.08/kWh annual energy savings

Notes for New Construction/Major Renovation Lighting Incentive Table

1. Project Cost Caps of 70% and 1-Year Simple Payback Caps apply to New Construction and Major Renovation projects that are not subject to state energy code. The 1 year simple payback cap means incentives will not be available to reduce the simple payback of a project below one year. If required, individual measure incentives will be adjusted downward pro-rata so the project has a simple payback after incentives of one year.
2. Lighting equipment installed to comply with the applicable version of the state energy code, but not exceeding that code, is not eligible for incentives. Lighting equipment that exceeds the applicable version of the state energy code is eligible for incentives.
3. Interior lighting fixtures must meet Design Lights Consortium Premium category requirements and must be found on the Qualified Products List.

Motor Incentives Table

Equipment Type	**Size Category**	**Sub-Category**	**Minimum Efficiency Requirement**	**Customer Incentive**
Variable-Frequency Drives (HVAC fans and pumps)	≤ 100 horsepower	HVAC fans and pumps	See Note 2	$65/horsepower
Green Motor Rewinds	≥ 15 and ≤ 5,000 hp	--	Must meet GMPG Standards	$1/horsepower (See Note 3)
Electronically Commutated Motor (ECM) - Retrofit Only	≥ 1 and ≤ 10 hp	HVAC fans and pumps	Must meet NEMA Standards	$75/horsepower

Notes for other motor incentives table:
1. Equipment that meets or exceeds the efficiency requirements listed for the equipment category in the above table may qualify for the listed incentive.
2. Throttling or bypass devices, such as inlet vanes, bypass dampers, three-way valves, or throttling valves must be removed or permanently disabled to qualify for HVAC fan or pump VFD incentives. VFDs required by or used to comply with the applicable version of the energy code are not eligible for incentives. Savings will only be realized for installations where a variable load is present.
3. Green Motor Rewind motors that are installed or placed in inventory may qualify for an incentive. For Green Motor Rewinds, the participating electric motor service center is paid $2/horsepower for eligible Green Motor Rewinds. A minimum of $1/hp is paid by the service center to the Customer as a credit on the motor rewind invoice. The balance is retained by the service center.

GMPG = Green Motors Practices Group
HP = Horsepower
HVAC = Heating, Ventilating and Air Conditioning
NEMA = National Electrical Manufacturers Association
VFD = Variable Frequency Drive

HVAC Equipment Incentive Table

			Minimum Efficiency Requirement & Customer Incentive		
Equipment Type	**Size Category**	**Sub-Category**	**$25/ton**	**$50/ton**	**$75/ton**
Unitary Commercial Air Conditioners, Air-Cooled (See note 7)	< 65,000 Btu/hr (single phase)	Split system and single package	--	CEE Tier 2	CEE Advanced Tier
	All equipment sizes (three phase)	Split system and single package	--	CEE Tier 2	CEE Advanced Tier
Unitary Commercial Air Conditioners, Water Cooled (See note 7)	All equipment sizes	Split system and single package	CEE Tier 1	--	--
Unitary Commercial Air Conditioners, Evaporatively Cooled (See note 7)	All equipment sizes	Split system and single package	--	CEE Tier 1	--
Packaged Terminal Air Conditioners (PTAC)	≤ 8,000 Btu/hr	Single package	12.2 EER	--	--
	> 8,000 Btu/hr and < 10,500 Btu/hr	Single package	11.9 EER	--	--
	≥ 10,500 Btu/hr and ≤ 13,500 Btu/hr	Single package	10.7 EER	--	--
	> 13,500 Btu/hr	Single package	9.9 EER	--	--
Packaged Terminal Heat Pumps (PTHP) (Heating & Cooling Mode)	≤ 8,000 Btu/hr	Single package	--	12.2 EER and 3.4 COP	--
	> 8,000 Btu/hr and < 10,500 Btu/hr	Single package	--	11.5 EER and 3.3 COP	--
	≥ 10,500 Btu/hr and ≤ 13,500 Btu/hr	Single package	--	10.7 EER and 3.1 COP	--
	> 13,500 Btu/hr	Single package	--	9.8 EER and 3.0 COP	--
Heat Pumps, Air-Cooled (Cooling Mode) (See note 7)	< 65,000 Btu/hr (single phase)	Split system and single package	--	CEE Tier 2	--
	< 65,000 Btu/hr (three phase)	Split system and single package	CEE Tier 1	CEE Tier 2	--
	≥ 65,000 Btu/hr (three phase)	Split system and single package			--
Heat Pumps, Air-Cooled (Heating Mode)	< 65, 000 Btu/hr (single phase)	Split system and single package (See note 3)	--	CEE Tier 2	--
	< 65,000 Btu/hr (three phase)	Split system and single package (See note 3)	CEE Tier 1	CEE Tier 2	--
	≥ 65,000 Btu/hr (three phase)	(See note 3)			
Heat Pumps, Water-Source (Cooling Mode)	< 135,000 Btu/hr	(See note 3)	--	CEE Tier 1	--

Heat Pumps, Water-Source (Heating Mode)	< 135,000 Btu/hr	(See note 3)	--	CEE Tier 1	--
VRF Air-Cooled Heat Pumps (Cooling Mode)	<65,000 Btu/hr	Multisplit System or Multisplit System with Heat Recovery	--	--	15 SEER and 12.5 EER
	≥65,000 Btu/hr and <135,000 Btu/hr		--	--	11.5 EER and 16 IEER
	≥135,000 Btu/hr and <240,000 Btu/hr		--	--	10.9 EER and 15.4 IEER
	>240,000 Btu/hr		--	--	9.6 EER and 14.3 IEER
VRF Air-Cooled Heat Pumps (Heating Mode) (See note 3)	<65,000 Btu/hr		--	--	8.5 HSPF
	≥65,000 Btu/hr and <135,000 Btu/hr	47°Fdb/43° wb outdoor air	--	--	3.4 COP
		17°Fdb/15° wb outdoor air	--	--	2.4 COP
	>135,000 Btu/hr	47°Fdb/43° wb outdoor air	--	--	3.2 COP
		17°Fdb/15° wb outdoor air	--	--	2.5 COP
VRF Water-Cooled Heat Pumps (Cooling Mode)	< 135,000 Btu/hr	Multisplit System or Multisplit System with Heat Recovery	--	--	CEE Tier 1
VRF Water-Cooled Heat Pumps (Heating Mode) (See note 3)	< 135,000 Btu/hr	Multisplit System or Multisplit System with Heat Recovery	--	--	CEE Tier 1
Heat Pumps, Ground-Source or Groundwater-Source (Heating & Cooling Mode)	All sizes	(See note 3)	--	ENERGY STAR Qualified	--
Ground Source or Groundwater-Source Heat Pump Loop	All sizes	Open Loop	**$25/ton**	--	--
		Closed Loop			

Equipment Type	Size Category	Sub-Category	Minimum Efficiency Requirement & Customer Incentive	
			$200/ton	**$250/ton**
Heat Pumps, Air-Cooled, replacing electric resistance heating (Cooling Mode) (Retrofit only) (See note 3)	All sizes	Split system and single package	CEE Tier 1	
	< 65,000 Btu/hr		CEE Tier 1	CEE Tier 2
Heat Pumps, Air Cooled, replacing electric resistance heating (Heating Mode) (Retrofit only) (See note 3)	All sizes	Split system and single package	CEE Tier 1	
	< 65,000 Btu/hr		CEE Tier 1	CEE Tier 2
Equipment Type	**Size Category**	**Sub-Category**	**Minimum Efficiency Requirement**	**Customer Incentive**
Heat Pump (CTA-2045) (See note 8)	All sizes	Split system and single package	For heat pump equipment with demand response capability, compliant with CTA-2045	$100/heat pump

Notes for HVAC Equipment incentive tables

1. Equipment that meets or exceeds the efficiency requirements listed for the size category in the above table may qualify for the listed incentive. Equipment must meet all listed efficiency requirements to qualify for the listed incentives.
2. PTHPs can replace electric resistive heating, which must be removed.
3. Incentives for heat pumps are available per ton of cooling capacity ONLY. No incentives are paid per ton of heating capacity. Heat Pumps must meet both the cooling mode and heating mode efficiency requirements to qualify for per ton cooling efficiency incentives.
4. Equipment size categories are specified in terms of net cooling capacity at AHRI standard conditions as determined by AHRI Standard 210/240 for units <65,000 Btu/hr, AHRI Standard 340/360 for units ≥65,000 Btu/hr, AHRI Standard 1230 for VRF systems, and AHRI Standard 310/380 for PTAC and PTHP units.
5. Ground and Water Source Heat Pumps must meet or exceed listed efficiency requirements when rated in accordance with ISO-13256-1 to qualify for the listed incentive.
6. Efficiency requirements align with the Consortium for Energy Efficiency (CEE) Unitary Air-Conditioning and Heat Pump Specification for equipment with heating sections other than electric resistance. CEE minimum efficiency requirements are listed on Pacific Power's website.
7. Equipment must meet CEE part load efficiency requirements (SEER or IEER). Equipment does not need to meet CEE full load efficiency requirements (EER), as long as the part load efficiency requirement is also specified for the equipment in CEE. If CEE only lists full load efficiency requirements (EER), then equipment must meet this standard. Additionally, the equipment must meet or exceed state or federal full load efficiency standards, whichever is more stringent.
8. Incentive for CTA-2045 compliant heat pump is an additional incentive that applies to heat pumps listed in the above table. Unitary air conditioners, PTACs, PTHPs, and heat pump loops do not qualify for this incentive. Equipment must meet all program qualifications to be eligible.

AHRI = Air-Conditioning, Heating and Refrigeration Institute
CEE = Consortium for Energy Efficiency
COP = Coefficient of Performance
CTA = Consumer Technology Association
EER = Energy Efficiency Ratio
HSPF = Heating Seasonal Performance Factor
HVAC = Heating, Ventilation and Air-Conditioning

IEER = Integrated Energy Efficiency Ratio
IPLV = Integrated Part Load Value
PTAC = Packaged Terminal Air Conditioner
PTHP = Packaged Terminal Heat Pump
SEER = Seasonal Energy Efficiency Ratio
VRF = Variable Refrigerant Flow

Other HVAC Equipment and Controls Incentives

Equipment Type	Size Category	Sub-Category	Minimum Efficiency Requirement	Customer Incentive
Evaporative Cooling	All sizes	Direct or Indirect		$0.06/ CFM
Indirect-Direct Evaporative Cooling (IDEC)	All sizes	--	Applicable system components must exceed minimum efficiencies required by energy code	$0.15/kWh annual energy Savings (See Note 2)
Chillers	All except chillers intended for backup service only	Serving primarily occupant comfort cooling loads (no more than 20% of process cooling loads)	Must exceed minimum efficiencies required by energy code	$0.15/kWh annual energy Savings (See Note 3)
365/366 day Programmable or Occupancy-based Thermostat	All sizes in portable classrooms with mechanical cooling	Must be installed in portable classroom unoccupied during summer months	365/366 day thermostatic or occupancy based setback capability	$150/thermostat
Occupancy Based PTHP/PTAC control (Retrofit only)	All sizes with no prior occupancy based control	--	See Note 4	$50/controller

Evaporative Pre-cooler (Retrofit Only)		For single air-cooled packaged rooftop or matched split system condensers only.	Minimum performance efficiency of 75%. Must have enthalpy controls to control pre-cooler operation. Water supply must have chemical or mechanical water treatment.	$75/ton of attached cooling capacity (See Note 5)
Advanced Rooftop Unit Control (Existing RTU)	≥ 5 tons and ≤ 10 tons	Must be installed on existing unitary packaged rooftop units (no split-systems), ≥ 5 tons nominal cooling capacity with constant speed supply fans.	Controls must include: - Either a supply fan VFD or multi-speed supply fan motor with controller that meets ventilation and space conditioning needs - Digital, integrated economizer control	$2,000
	> 10 tons and ≤ 15 tons			$2,800
	> 15 tons and ≤ 20 tons			$4,000
	> 20 tons			$4,500
Advanced Rooftop Unit Control (Existing RTU, Demand-Controlled Ventilation only)	≥ 5 tons and ≤ 10 tons	Must be installed on existing unitary packaged rooftop units (no split-systems), ≥ 5 tons nominal cooling capacity.	Controls must include: - Digital, integrated economizer controls that modulate based on occupancy - CO2 or occupancy-based sensor	$500
	> 10 tons and ≤ 15 tons			$600
	> 15 tons and ≤ 20 tons			$700
	> 20 tons			$800
Advanced Rooftop Unit Control (New RTU)	≥ 5 tons and ≤ 10 tons	Must be installed on unitary packaged rooftop units (no split-systems), ≥ 5 tons nominal cooling capacity.	Controls must include: - Either a supply fan VFD or multi-speed supply fan motor with controller that meets ventilation and space conditioning needs - Digital, integrated economizer control	$1,400
	> 10 tons and ≤ 15 tons			$2,000
	> 15 tons and ≤ 20 tons			$2,800
	> 20 tons			$3,200
Smart Thermostat	Residential (used in a business)		See Home Energy Savings program	

Notes for other HVAC equipment and controls incentive table

1. Equipment that meets or exceeds the efficiency requirements listed for the equipment category in the above table may qualify for the listed incentive.
2. Incentives are paid at $0.15/kWh annual energy savings. IDEC energy savings subject to approval by Pacific Power.
3. Incentives are paid at $0.15/kWh annual energy savings. Chiller energy savings subject to approval by Pacific Power.

4. Controller units must include an occupancy based control and include the capability to set back the zone temperature during extended unoccupied periods and set up the temperature once the zone is occupied.

5. Incentives for Evaporative Pre-coolers are capped at 70 percent of Energy Efficiency Project Costs and incentives will not be available to reduce the Energy Efficiency Project simple payback below one year. Energy Efficiency Project Costs are subject to Pacific Power approval. Evaporative pre-cooler incentives are subject to the maximum simple payback threshold.

CFM = Cubic Feet per Minute
DCV = Demand-Controlled Ventilation

IDEC = Indirect Direct Evaporative Cooling
PTHP = Packaged Terminal Heat Pump
PTAC = Packaged Terminal Air Conditioner

Building Envelope (Retrofit) Incentives

Equipment Type	Category	Minimum Efficiency Requirement	Customer Incentive
Cool Roof	--	ENERGY STAR Qualified	$0.05/square foot
Roof/Attic Insulation	--	Minimum increment of R-10 insulation	$0.08/square foot
Wall Insulation	--	Minimum increment of R-10 insulation	$0.10/square foot
Windows (See Note 3, 4)	Site-Built	U-Factor ≤ 0.30 and SHGC ≤ 0.33 (Glazing Only Rating)	$0.34/square foot
	Assembly	U-Factor ≤ 0.30 and SHGC ≤ 0.33 (Entire Window Assembly Rating)	$0.34/square foot
Window Film	Existing Windows	See Note 5	$0. 15/kWh annual energy savings (See Note 5)

Notes for retrofit building envelope incentive table
1. Equipment that meets or exceeds the efficiency requirements listed for the equipment category in the above table may qualify for the listed incentive.

2. Building must be conditioned with mechanical cooling to be eligible for envelope incentives.
3. Energy performance of window assemblies and glazing products must be rated in accordance with NFRC. Site-Built metal window systems must include a thermal break within the frame or other appropriate NFRC certification to qualify for incentives. Skylights are not eligible to receive incentives.
4. Window square footage is determined by the dimensions of the entire window assembly, not just the window glass.
5. Incentives for window film are calculated based on film specifications and window orientation at $0.15/kWh annual energy savings. Energy savings subject to approval by Pacific Power.

NFRC = National Fenestration Rating Council
SHGC = Solar Heat Gain Coefficient

Building Envelope (New Construction/Major Renovation) Incentives

Equipment Type	Category	Minimum Efficiency Requirement	Customer Incentive
Windows (See Note 3, 4)	Site-Built	U-Factor ≤ 0.30 and SHGC ≤ 0.33 (Glazing Only Rating)	$0.34/square foot
	Assembly	U-Factor ≤ 0.30 and SHGC ≤ 0.33 (Entire Window Assembly Rating)	$0.34/square foot

Notes for building envelope (new construction/major renovation) incentives table

1. Equipment that meets or exceeds the efficiency requirements listed for the equipment category in the above table may qualify for the listed incentive.
2. Building must be conditioned with mechanical cooling to be eligible for envelope incentives.
3. Window square footage is determined by the dimensions of the entire window assembly, not just the window glass.
4. Energy performance of window assemblies and glazing products must be rated in accordance with NFRC. Site-Built metal window systems must include a thermal break within the frame or other appropriate NFRC certification to qualify for incentives. Skylights are not eligible to receive incentives.

NFRC = National Fenestration Rating Council
SHGC = Solar Heat Gain Coefficient

Food Service Equipment Incentives

Equipment Type	Equipment Category	Minimum Efficiency Requirement	Customer Incentive
Commercial Dishwasher (High Temperature models w/ electric boosters Only)	Undercounter	ENERGY STAR Qualified	$100
	Stationary Rack, Single Tank, Door Type		$400
	Single Tank Conveyor		$1,000
	Multiple Tank Conveyor		$500
Electric Insulated Holding Cabinet	Full Size	ENERGY STAR Qualified	$700
	3/4 Size		$300
	1/2 Size		$200
Electric Steam Cooker	All sizes	ENERGY STAR Qualified	$300
Electric Convection Oven	Full Size	ENERGY STAR Qualified	$200
Electric Griddle	--	ENERGY STAR Tier 2 Qualified	$150
Electric Combination Oven	5-15 pans	ENERGY STAR Qualified	$1,000
	16-20 pans	ENERGY STAR Qualified	$275
Ice Machines (Air-Cooled Only)	Harvest Rate < 300 lbs/day	ENERGY STAR Qualified	$100
	Harvest Rate 301 - 500 lbs/day	ENERGY STAR Qualified	$150
	Harvest Rate 501 – 1,000 lbs/day	ENERGY STAR Qualified	$200
	Harvest Rate 1,001 – 1,500 lbs/day	ENERGY STAR Qualified	$300
	Harvest Rate > 1,500 lbs/day	ENERGY STAR Qualified	$500
Demand Controlled Kitchen Ventilation Exhaust Hood	Must be installed on commercial kitchen exhaust system.	Variable speed motors must be controlled to vary fan speed depending upon kitchen demand, as indicated by connected sensors.	$0.15/kWh annual energy savings (See note 2)
Anti-Sweat Heater Controls (Retrofit Only)	Low-Temp (Freezing) Cases	Technologies that reduce energy consumption of anti-sweat heaters based on sensing humidity.	$20/linear foot (case length)
	Med-Temp (Refrigerated) Cases		$16/linear foot (case length)

Notes for food service equipment incentives table

1. Equipment that meets or exceeds the efficiency requirements listed for the equipment category in the above table may qualify for the listed incentive.

2. Incentives are paid at $0.15/kWh annual energy savings. Demand controlled kitchen ventilation exhaust hood energy savings subject to approval by Pacific Power.

3. Demand controlled kitchen ventilation exhaust hoods required by or used to comply with the applicable version of the energy code are not eligible for incentives.

4. Incentives for Demand Controlled Kitchen Ventilation Exhaust Hoods are capped at 70 percent of Energy Efficiency Project Costs and incentives will not be available to reduce the Energy Efficiency Project simple payback below one year. Energy Efficiency Project Costs are subject to Pacific Power approval. Demand Controlled Kitchen Ventilation Exhaust Hood incentives are subject to the maximum simple payback threshold.

Appliances Incentive Table

Equipment Type	Equipment Category	Minimum Efficiency Requirement	Customer Incentive
High-Efficiency Clothes Washer	Residential (used in a business)	See Home Energy Savings program	
	Commercial (must have electric water heating)	ENERGY STAR® Qualified	$100
Heat Pump Water Heater	Residential (used in a business)	See Home Energy Savings program	
Heat Pump Clothes Dryer	Residential (used in a business)	See Home Energy Savings program	
Hybrid Heat Pump Clothes Dryer	Residential (used in a business)	See Home Energy Savings program	

Notes for appliances incentive table

1. Equipment that meets or exceeds the efficiency requirements listed for the equipment category in the above table may qualify for the listed incentive.
2. Equipment must meet the efficiency rating standard that is in effect on the date of purchase.
3. Refer to Pacific Power's Home Energy Savings program for efficiency requirements and incentives for listed residential appliances used in a business.

Incentives for Office Energy Efficiency Measures

Equipment Type	Replace	Minimum Efficiency Requirements	Customer Incentive
Smart Plug Strip	--	1. Incentive applies to any plug strip on Qualified Product List that eliminates idle or stand-by power consumption of connected plug-load appliance through the use of an electric load sensor. 2. Applies only to electric plug-load applications (e.g. computer monitors)	$5/qualifying unit

Notes for office energy efficiency measures incentives table

1. Equipment that meets or exceeds the efficiency requirements listed for the equipment category in the above table may qualify for the listed incentive. Qualified Product List is available on the energy efficiency section of the Pacific Power website.

Irrigation Incentives for Wheel Line, Hand Line, or Other Portable Systems (Retrofit Only)

Irrigation Measure	Replace	With	Limitations	Customer Incentive
New rotating, sprinkler replacing worn or leaking impact or rotating sprinkler	Leaking or malfunctioning impact rotating sprinkler	Rotating sprinkler	1. Fixed-in-place (solid set) systems not eligible. 2. Incentive limited to two sprinklers per irrigated acre.	$0.50 each
New impact Sprinkler replacing worn or leaking impact sprinkler	Leaking or malfunctioning impact sprinkler	New impact sprinkler	1. New nozzle shall be included in new sprinkler. 2. Fixed-in-place (solid set) systems not eligible. 3. Incentive limited to two sprinklers per irrigated acre.	$0.50 each
New nozzle replacing worn nozzle of same design flow or less on existing sprinkler	Worn nozzle	New nozzle (including flow control nozzles) of same design flow or less	1. Flow rate shall not be increased. 2. Fixed-in-place (solid set) systems not eligible. 3. Incentive limited to two nozzles per irrigated acre.	$0.50 each
New gasket replacing leaking gasket, including mainline valve or section gasket, seal, or riser cap (dome disc)	Leaking gasket	New gasket, including mainline valve or section gasket, seal, or riser cap (dome disc)	1. New gasket must replace leaking gasket. 2. Fixed-in-place (solid set) systems not eligible. 3. Incentive limited to two gaskets per irrigated acre.	$2 each
New drain replacing leaking drain	Leaking drain	New drain, including drains on pivots and linears	1. New drain must replace leaking drain. 2. Fixed-in-place (solid set) systems not eligible. 3. Incentive limited to two drains per irrigated acre.	$2 each
Cut and press or weld repair of leaking wheel line, hand line, or portable main line	Leak in wheel line, hand line, or portable main line	Cut and pipe press or weld repair	Invoice must show number of leaks repaired	$8/repair
New or rebuilt wheel line leveler replacing leaking or malfunctioning leveler	Replace leaking or malfunctioning leveler	New or rebuilt leveler	1. Applies to leaking or malfunctioning levelers only. 2. For rebuilds, invoice must show number of rebuild kits purchased and installed.	$1 each

Irrigation Incentives for Pivot and Linear Water Distribution Systems (Retrofit Only)

Irrigation Measure	Replace	With	Limitations	Customer Incentive
Low pressure sprinkler (e.g. rotating, wobbling, multi-trajectory spray) replacing impact sprinkler	Impact sprinkler	New low pressure sprinkler (on-board nozzle is considered part of sprinkler, not a separate item with additional incentive)	New sprinkler is of same design flow or less	$2 each
Low pressure sprinkler (e.g. rotating, wobbling, multi-trajectory spray) replacing worn low pressure sprinkler	Worn low pressure sprinkler (e.g. rotating, wobbling, multi-trajectory spray)	New low pressure sprinkler (on-board nozzle is considered part of sprinkler, not a separate item with additional incentive)	1. New sprinkler is of same design flow or less.	$4 each
Pressure regulator	Worn pressure regulator. May also add regulator where there had been none before.	New pressure regulator of same design pressure or less.	1. New regulator must be of same design pressure or less	$3 each

Irrigation Incentives for Any Type of System (Retrofit or New Construction, Including Non-agricultural Irrigation Applications)

Irrigation Measure	Replace	With	Limitations	Customer Incentive
Irrigation pump VFD		Add variable frequency drive to existing or new irrigation pump	1. Pumps serving any type of irrigation water transport or distribution system are eligible – wheel lines, hand lines, pivots, linears, fixed-in-place (solid set). 2. Both retrofit and new construction projects are eligible. 3. Incentives are capped at 70 percent of Energy Efficiency Project Costs, and incentives will not be available to reduce the Energy Efficiency Project simple payback below one year. Energy savings and Energy Efficiency Project Costs are subject to Pacific Power approval.	$0.15/kWh annual savings

Notes for irrigation incentive tables

1. Equipment that meets or exceeds the requirements above may qualify for the listed incentive.
2. Except for the pump VFD measure, incentives listed here are available only for retrofit projects where new equipment replaces existing equipment (i.e. new construction is not eligible).
3 Except for the pump VFD measure, equipment installed in fixed-in-place (solid set) systems is not eligible. Incentive is limited to two units per irrigated acre.

VFD = Variable Frequency Drive

Farm and Dairy Incentives

Equipment Type	Equipment Category	Minimum Efficiency Requirements	Customer Incentive
Automatic Milker Takeoffs (Retrofit Only)	--	Equipment must be able to sense milk flow and remove milker when flow reaches a pre-set level. The vacuum pump serving the affected milking units must be equipped with a VFD. Incentive is available for adding automatic milker takeoffs to existing milking systems, not for takeoffs on a brand new system where there was none before. Replacement of existing automatic milker takeoffs is not eligible for this listed incentive, but may qualify for a Custom Energy Efficiency Incentive.	$235 each
Agricultural Engine Block Heater Timers	--	Timer must be a UL-listed device and rated for a minimum of 15 amps continuous duty.	$10 each
High Efficiency Circulating Fans (See Note 2)	12-23" Diameter	Fan must achieve an efficiency level of 11 cfm/W	$25/fan
	24-35" Diameter	Fan must achieve an efficiency level of 18 cfm/W	$35/fan
	36-47" Diameter	Fan must achieve an efficiency level of 18 cfm/W	$50/fan
	≥48" Diameter	Fan must achieve an efficiency level of 25 cfm/W	$75/fan
Heat Recovery	--	Heat recovery unit must use heat rejected from milk cooling refrigeration system to heat water. Customer must use electricity for water heating.	$0.15/kWh annual energy savings
High-efficiency Ventilation Fans (See Note 2)	12-23" Diameter	Fan must achieve an efficiency level of 11 cfm/W	$45/fan
	24-35" Diameter	Fan must achieve an efficiency level of 13 cfm/W	$75/fan
	36-47" Diameter	Fan must achieve an efficiency level of 17 cfm/W	$125/fan
	≥48" Diameter	Fan must achieve an efficiency level of 19.5 cfm/W	$150/fan
Milk Pre-coolers (Retrofit Only)	--	The equipment must cool milk with well-water before it reaches the bulk cooling tank.	$0.15/kWh annual energy savings
Programmable Ventilation Controllers	--	Controller must control ventilation fans based on temperature or other applicable factors such as humidity, odor concentration, etc...	$20/fan controlled

Variable Frequency Drives for Dairy Vacuum Pumps (Retrofit Only)	--	VFD must vary motor speed based on target vacuum level. Incentive available for retrofit only (i.e. new construction and replacement of existing VFD not eligible.).	$165/hp
Potato or Onion Storage Fan VFD	--	Add variable frequency drive to existing or new fan in potato or onion storage	$175/hp

Notes for farm and dairy incentives table

1. Equipment that meets or exceeds the efficiency requirements above may qualify for the listed incentive.
2. Fan performance must be rated by an independent testing body in accordance with the appropriate ANSI/AMCA standards.
3. Incentives are capped at 70 percent of Energy Efficiency Project Costs and incentives will not be available to reduce the Energy Efficiency Project simple payback below one year. Energy savings and Energy Efficiency Project Costs are subject to Pacific Power approval.
4. Except where noted, all equipment listed in the table is eligible for incentives in both new construction and retrofit projects.

AMCA = Air Movement and Control Association International, Inc.
ANSI = American National Standards Institute
VFD = Variable Frequency Drive
cfm = cubic feet per minute
W = watt

Compressed Air Incentives

Equipment Category	Replace	With	Limitations	Customer Incentive
Receiver Capacity Addition	Limited or no receiver capacity (≤ 2 gallons per scfm of trim compressor capacity)	Total receiver capacity after addition must be > 2 gallons per scfm of trim compressor capacity	1. Compressor system size ≤ 75 horsepower, not counting backup compressor(s). 2. Trim compressor must use load/unload control, not inlet modulation or on/off control. 3. Systems with VFD compressor or using variable displacement compressor are not eligible.	$3/gallon above 2 gallons per scfm
Cycling Refrigerated Dryers	Non-cycling refrigerated dryer	Cycling refrigerated dryer	1. Rated dryer capacity must be ≤ 500 scfm 2. Dryer must operate exclusively in cycling mode and cannot be equipped with the ability to select between cycling and non-cycling mode. 3. Refrigeration compressor must cycle off during periods of reduced demand	$2/scfm
VFD Controlled Compressor	Fixed speed compressor	≤ 75 hp VFD controlled oil-injected screw compressor operating in system with total compressor capacity ≤ 75 hp, not counting backup compressor capacity	1. Total compressor capacity in upgraded system is ≤ 75 hp, not counting backup compressor capacity. 2. Compressor must adjust speed as primary means of capacity control	$0.15/kWh annual energy savings
Zero Loss Condensate Drains	Timer drain	Zero loss condensate drain (See Note 4)	Drain is designed to function without release of compressed air into the atmosphere. Any size system is eligible – there is no restriction on compressor size.	$100 each
Outside Air Intake	Compressor intake drawing air from compressor room	≤ 75 hp compressor where permanent ductwork between compressor air intake and outdoors	Ductwork must meet manufacturer's specifications, which may include: (a) ≤ 0.25" W.C. pressure loss at rated flow, and (b) allow use of compressor room air during extremely cold outside air conditions	$6/hp

Notes for compressed air incentive table

1. Equipment that meets or exceeds the efficiency requirements above may qualify for the listed incentive.
2. Except for the zero loss condensate drain measure, eligibility for incentives is limited to compressed air systems with total compressor capacity of 75 hp or less, not including backup compressor capacity that does not normally run.
3. Incentives are capped at 70 percent of Energy Efficiency Project Costs and incentives will not be available to reduce the Energy Efficiency Project simple payback below one year. Energy savings and Energy Efficiency Project Costs are subject to Pacific Power approval.
4. Zero Loss Condensate Drains purchased as an integral part of another measure are eligible for the incentive shown above.

hp = horsepower
PPM = parts per million
PSI = pounds per square inch
scfm = cubic feet of air per minute at standard conditions (14.5 psia, 68°F, and 0% relative humidity)
VFD = Variable Frequency Drive

Incentives for Wastewater and other Refrigeration Energy Efficiency Measures

Equipment Type	Replace	With	Customer Incentive
Adaptive refrigeration control	Conventional controls (defrost timeclock, space thermostat, evaporator fan control, if any, thermal expansion valve in some instances)	Adaptive refrigeration controller and, in some instances, electric expansion valve	$0.15/kWh annual energy savings
Fast acting door	Manually operated door, automatic door with long cycle time, strip curtain, or entryway with no door in refrigerated/conditioned space	Fast acting door	$0.15/kWh annual energy savings
Wastewater – low power mixer	Excess aeration capacity	Extended range circulator	$0.15/kWh annual energy savings

Notes for other energy efficiency measures incentives table:

1. Equipment that meets or exceeds the efficiency requirements above may qualify for the listed incentive.
2. Incentives are capped at 70 percent of Energy Efficiency Project Costs and incentives will not be available to reduce the Energy Efficiency Project simple payback below one year. Energy savings and Energy Efficiency Project Costs are subject to Pacific Power approval.

Enhanced Incentives for Small Businesses – Lighting (Retrofit only)[20]

Measure	Category	Eligibility Requirements	Customer Incentive
LED**	2x4 Troffer Retrofit to TLED (Lo-W) 2-lamp	TLED lamps with electronic ballast replacement or LED driver (external or integral). Lamp wattage reduction ≥ 10 Watts.	$52/Fixture
	2x4 Troffer Retrofit to TLED (Hi-W) 2-lamp		$64/Fixture
	2x4 Troffer Retrofit to TLED (Lo-W) 3-Lamp		$67/Fixture
	2x4 Troffer Retrofit to TLED (Hi-W) 3-Lamp		$70/Fixture
	2x4 Troffer Retrofit to TLED (Lo-W) 4-lamp		$72/Fixture

**All LED equipment must be listed on qualified equipment list available on the Pacific Power website.
[10]Incentives for measures in this table are available only to Small Business customers as defined in the INCENTIVES table.

	2x4 Troffer Retrofit to TLED (Hi-W) 4-lamp		$76/Fixture
	2x2 Troffer Retrofit to TLED		$76/Fixture
	2x4 Troffer Volumetric Kit (Lo-W)	LED volumetric kit, 2x4 or 2x2 troffer retrofit	$120/Fixture
	2x4 Troffer Volumetric Kit (Hi-W)		$136/Fixture
	2x2 Troffer Volumetric Kit		$96/Fixture
	2x4 Troffer Flat Panel Kit (Lo-W)	LED flat panel fixture/kit, 2x4 or 2x2 troffer retrofit or replacement	$96/Fixture
	2x4 Troffer Flat Panel Kit (Hi-W)		$120/Fixture
	2x2 Troffer Flat Panel Kit (Hi-W)		$64/Fixture
	Industrial Strip Kit w/ TLED (Lo-W) 2-lamp	(1) 8’ T12 to (2) 4’ TLED lamps and electronic ballast or LED driver replacement and retrofit kit.	$84/Fixture
	Industrial Strip Kit w/ TLED (Hi-W) 2-lamp		$92/Fixture
	Industrial Strip Kit w/ TLED (Lo-W) 4-lamp		$104/Fixture
	Industrial Strip Kit w/ TLED (Hi-W) 4-lamp		$104/Fixture
	LED High Bay/Low Bay Fixture (Lo-W)	Must replace T8/T5HO fluorescent, incandescent, or HID high bay	$120/Fixture
	LED High Bay/Low Bay Fixture (Hi-W)		$160/Fixture
	LED High Bay/Low Bay Fluorescent to TLED ≤ 4-Lamp	Type A, B, or C TLEDs replacing T8/T5HO fluorescent lamps and ballast with TLED lamps and electronic ballast or LED driver. Cannot reuse existing ballast.	$78/Fixture
	LED High Bay/Low Bay Fluorescent to TLED > 4-Lamp		$90/Fixture
	LED Wall Pack Fixture (Lo-W)		$80/Fixture
	LED Wall Pack Fixture (Hi-W)		$140/Fixture
Lighting Control	Occupancy Sensor Retrofit	PIR, Dual Tech, or Integral Sensor	$0.30/Watt controlled

Notes for enhanced incentives for small businesses – Lighting table:

1. To be eligible for the incentives listed, the new lighting system must use less energy than the existing lighting system replaced or the baseline lighting system as determined by Pacific Power.
2. Incentives are capped at 80 percent of Energy Efficiency Project Costs. Energy Efficiency Project Costs and energy savings are subject to Pacific Power approval.
3. Qualified equipment lists are posted on the Washington energy efficiency program section of Pacific Power's website.
4. Low and high wattage ranges are posted on the Washington energy efficiency program section of Pacific Power's website.
5. Watt controlled refers to the total wattage of lighting fixtures down circuit from the control.

Lo-W – Low wattage
Hi-W – High wattage
HO – High Output
TLED – Tubular Light Emitting Diode
PIR – Passive infrared

Mid-Market Incentives[21]

Measure	Category	Eligibility Requirements	Maximum Incentive[22]
LED	PAR Reflector Lamp	LED must be listed on qualified equipment list	Up to $15/Lamp
	BR Reflector Lamp	LED must be listed on qualified equipment list	Up to $13/Lamp
	MR16 Reflector Lamp	LED must be listed on qualified equipment list	Up to $10/Lamp
	PLC Pin-based Lamp <10 W	LED must be listed on qualified equipment list	Up to $10/Lamp
	PLC Pin-based Lamp ≥ 10 W	LED must be listed on qualified equipment list	Up to $15/Lamp
	PLL Pin-based Lamp	LED must be listed on qualified equipment list	Up to $15/Lamp
	Decorative Lamp	LED must be listed on qualified equipment list	Up to $10/Lamp
	Recessed Downlight Kit	LED must be listed on qualified equipment list	Up to $15/Fixture
	T8 TLED Lamp – Type A, A/B Dual Mode	LED must be listed on qualified equipment list	Up to $10/Lamp
	T8 TLED Lamp – Type B	LED must be listed on qualified equipment list	Up to $15/Lamp

[21] Incentives for measures in this table are available through Pacific Power-approved retailers/distributors or a customer application process.
[22] Actual incentives will be posted on Pacific Power's website and subject to change with 45 days' notice. Change notices will be prominently displayed on program website and communicated to participating retailers/distributors and Trade Allies.

	T8 TLED Lamp – Type C	LED must be listed on qualified equipment list	Up to $25/Lamp
	T5 TLED Lamp	LED must be listed on qualified equipment list	Up to $15/Lamp
	HID Replacement Lamp <40 W	LED must be listed on qualified equipment list	Up to $50/Lamp
	HID Replacement Lamp ≥40 and < 80 W	LED must be listed on qualified equipment list	Up to $70/Lamp
	HID Replacement Lamp ≥80 and < 150 W	LED must be listed on qualified equipment list	Up to $90/Lamp
	HID Replacement Lamp ≥150W	LED must be listed on qualified equipment list	Up to $110/Lamp
	Wall Pack Fixture	LED must be listed on qualified equipment list	Up to $30/Fixture

Notes for mid-market incentives:

1. Incentives are capped at 70 percent of qualifying equipment costs. Qualifying equipment costs are subject to Pacific Power approval.

Qualified equipment lists referenced in the above table are posted on the Washington energy efficiency program section of Pacific Power's website.

PAR = Parabolic Aluminized Reflector
BR = Bulged Reflector
HID = High Intensity Discharge (e.g. high pressure sodium, metal halide)
HO = High Output
MR = Mirrored Reflector
PLC = Pin Lamp Compact Fluorescent
PLL = Pin Lamp Long Compact Fluorescent
TLED = Tubular Light Emitting Diode
W = Watt

Direct Install Incentives

Measure	Category	Eligibility Requirements	Maximum Incentive
Smart Plug Strip	--	1. Incentive applies to any plug strip that eliminates idle or stand-by power consumption of connected plug-load appliance through the use of an occupancy sensor, electric load sensor, or timer. 2. Applies only to electric plug-load applications with at least 1 device controlled by power strip.	Up to $30/qualifying unit
LED	T8 TLED Lamp – Type A, A/B Dual Mode	LED must be listed on qualified equipment list	Up to $10/Lamp
	PAR Reflector Lamp		Up to $15/Lamp
	BR Reflector Lamp		Up to $15/Lamp

Notes for Direct Install Incentives

1. Incentives will be set at the full cost of the installed equipment, without exceeding the "up to" amount.

PAR = Parabolic Aluminized Reflector
BR = Bulged Reflector
TLED = Tubular Light Emitting Diode

Other Programs & Initiatives

This section of the business plan includes information on the Company's Energy Education in Schools program, a general "education only" program; NEEA, an external group partly funded through Company dollars; and Production Efficiency, energy efficiency improvements at Company owned non-hydro generation facilities serving the Company's Washington territory.

Energy Education in Schools

Years of Implementation

This "education only" program replaced the previous "education and savings" program which ran from April 2003 through June 2012. The program, Be Wattsmart, Begin at Home, was implemented with school presentations beginning in February 2013 (See "Year One Timeline" below under "Program Details"). Program costs are reflected in Tables 1, 2 and 3 of this report.

Program Description

The Company issued a competitive RFP in 2018 to select a contractor to deliver school assembly energy efficiency presentations. Through that process, the Company has contracted with the National Energy Foundation (NEF) to implement the Be Wattsmart, Begin at Home program in schools during the 2018-19, 2019-20, and 2020-21 school years, with an option to extend the contract for an additional two years.

Program costs fall under Paragraph (7) (d) in Order 01 of Docket UE-132047, Conservation Efforts without Approved EM&V Protocol, where the Company can spend up to ten (10) percent of its conservation budget on programs whose savings impact has not yet been measured provided the overall portfolio of programs still pass the Total Resource Cost as described in Paragraph (10) (a) of the same Order 01.

NEF is a non-profit corporation with over 40 years experience providing energy education and awareness. The mission of NEF is to "cultivate and promote an energy literate society".

Evaluation Information

As this is an "education only" initiative, no third-party impact evaluation is anticipated beyond verification that the program is being delivered as reported. See "household audits cards" in "Program Details" section below.

Program Details

The centerpiece of the program is a series of 45 to 60 minute 5th grade appropriate presentations to educate students on core electricity components and efficient use, including the importance of energy efficiency and how students can become more energy efficient. The targeted grade levels is 4th grade based on curriculum correlations with the Washington Office of Superintendent of Public Instruction Learning Standards. The school visit includes a custom designed presentation and hands-on group activities. Teachers receive a packet of instructional materials in advance of the school presentations to assist with the energy literacy education.

The school presentations are designed to get students "thinking" about energy and energy efficiency. In addition, an integrated follow-up to the school presentations will be provided through a home audit and household audit activity that is intended to provide students and their parents with an opportunity to "act" on the information they have learned. Students are provided informational booklets and a "Home Energy Checklist" activity to fill out regarding the energy use and energy efficiency topics they were taught. Students return the Home Energy Checklist to their teachers, who in turn submit them to NEF. NEF provides teachers with an incentive for collecting the household audit cards. Each teacher returning at least 80 percent of their students' completed Home Energy Checklists receive a $50 mini-grant. Those returning 50-79 percent of the Home Energy Checklists receive a $25 mini-grant. The data is summarized and reported to determine energy efficiency behavioral data and other program participation information.

Program Metrics per Year

Total number of schools:	approximately 47
Total number of students:	approximately 3,600
Percent of eligible schools reached:	approximately 80 percent
Total teachers	approximately 150
Target return rate - Home Energy Checklists	approximately 60 percent

Anticipated Outcomes

- Teachers, students, and families become more energy literate, particularly in the understanding of energy efficiency.
- Teachers, students, and families learn to become responsible energy stewards for the future of their community and state.
- Teachers, students, and families make a commitment to use energy more wisely at home, at school, at work, and in the community.
- Teachers, students and families will have a greater awareness of what it means to be Wattsmart, and the resources available to them.
- A culture of energy efficiency will be developed among teachers, students, and families.
- Families will become more aware and motivated to take advantage of energy efficiency programs provided by the Company.
- Data will be gathered, analyzed, summarized, and reported regarding student sharing of energy efficiency messages with their family, home energy use, energy efficiency practices, and how the program is achieving its anticipated outcomes.

Northwest Energy Efficiency Alliance

Years of Implementation
NEEA has been serving the Northwest region of Oregon, Washington, Idaho, and Montana since 1997.

Program Description
NEEA is a non-profit corporation supported by, and working in collaboration with, the Bonneville Power Administration, Energy Trust of Oregon and more than 100 Northwest utilities including Pacific Power.

Program Details
NEEA works in collaboration with its funders and other strategic market partners to accelerate the innovation and adoption of energy-efficient products, services, and practices.

Costs includes both Pacific Power's direct funding of NEEA and the Company's internal management costs. NEEA 2020 and 2021 forecasted expenditures are based on Pacific Power's share (2.55 percent) of the estimated annual costs provided in NEEA's 2020-2024 Business Plan. The 2020 -2021 biennial electric savings forecast was provided by NEEA and includes savings above the Council's 7th power plan baseline and excludes the estimate from savings from local programs including those operated by Pacific Power and the rest of the region's utilities/program administrators. Savings from NEEA's trackable measures category are not included in this forecast.

NEEA's savings counting methodology (including provisions to prevent double counting) can be found in the Q2 2019 Cost Effectiveness Advisory Committee (CEAC) Packet. The savings calculation are found in Appendix A. Advisory Committee information (including CEAC) can be found on NEEA's web site at:
https://neea.org/get-involved/advisory-committee-resources?committeeTypes=cost-effectiveness-type

See Appendix 3 to the Biennial Conservation Plan for more detail on NEEA's forecast and savings calculation methodology and Pacific Power's regional savings share. See the Biennial 2020-2021 Conservation Target section of the Biennial Conservation Plan for Pacific Power treatment of NEEA savings consistent with Statewide Advisory Group report filed in docket UE-171092.

In summary NEEA's plan to accomplish this goal includes:

- Building and leveraging relationships to influence the market.
- Designing and executing strategic market interventions to expand the availability and demand for energy efficient products, services and practices.
- Identifying, developing and advancing emerging opportunities to fill the pipeline for energy efficiency.
- Delivering education and training to expand market capacity to deliver and maintain energy-efficient products, services and practices.

- Facilitating regional coordination, collaboration and knowledge sharing to align interests and accelerate energy efficiency efforts.
- Demonstrating and promoting the value of energy efficiency to increase demand.
- Developing market intelligence and resources to help NEEA partners achieve their goals.
- Advancing the adoption and implementation of increasingly efficient energy codes and standards to lock in long-term savings.

NEEA's initiatives are outlined in the 2020-2024 Business and Strategic Plans and annual reports. More information on NEEA's initiatives and business and strategic plans can be found at the following on the NEEA website:

- Market Transformation Programs
  https://neea.org/our-work/programs

- Strategic and business plans for 2020-2024
  https://neea.org/resources/neea-2020-2024-strategic-and-business-plans

NEEA's assessment of individual funder pursuit of unfunded NEEA initiatives was prepared at Pacific Power's request. It is provided here and referred to in Staff Areas of Interest section of this plan.

Memorandum

July 31, 2019

TO: Don Jones

FROM: Susan Hermenet

CC: NEEA Directors, BJ Moghadam

SUBJECT: 2020 – 2024 NEEA Business Plan Energy Savings

Request:
This memo is in response to your request for NEEA staff's perspective regarding whether some or all of the regional market transformation work that didn't make it into the 2020-2024 business plan can be achieved by an individual utility in their service territory. Specifically:

- What are the programs/activities tied to the estimated savings NEEA provided the WUTC by email on May 30, 2019?
- *Could* those activities be conducted by individual utilities or would they require regional scope and/or economies of scale to succeed? Or some of both?
- Are there any specific assumptions/tactics tied to the activities? (e.g. number of trade allies engaged, percent of market, percent of utilities running programs, specific provider or platform needed to do the work, etc.)
- Are there any assumptions about specific markets, or is it more of full regional view?

NEEA Staff Perspective:
The 2020 – 2024 business plan was the result of a NEEA Board of Directors process with a key principle of keeping the regional alliance intact. A target budget was established that allowed all current funders to participate. At this funding level, the Board had to prioritize the highest value market transformation activities to include in the Business Plan, and identify those to be scaled down or not included.

The work that did not make it in the business plan (as described in NEEA's May 30, 2019 response to WUTC) has an estimated 3-9 aMW of 5-year and 12-50 aMW of 10-year regional co-created electric energy savings. This work is associated with new market transformation programs and programs in early development. Given both the nascent phase/maturity of these programs, as well as the small relative size of program reductions (as opposed to removal of a whole program), staff believes that it would be difficult and/or cost-preventative for a single utility to pick up this work.

Consistent with boundary conditions in the NEEA strategic plan, the work associated with these programs is focused on upstream market actors. For example, it includes influencing manufacturer product offerings and quality, validating product performance, establishing product specifications and test standards, partnering with industry associations such as Attachments Energy Rating Council (AERC) and the Consumer Technology Association (CTA) on things like product labeling and other market barriers, researching market characteristics and establishing baselines.

This work, by its very nature, is most effective at a regional level and does not lend itself well to a fragmented approach. To be most effective, these activities need a consolidated approach that leverages aggregated regional support to influence key upstream market actors. Additionally, a utility-by-utility approach would not only lose the economies of scale that make this work cost effective, but could also result in duplicative efforts and/or market confusion. Lastly, since these activities are in the early phases of transformation, there is a decent potential some of them could fail, so the ability to spread the risk across multiple funders is also a benefit.

It is also important to note the *range* of the energy savings estimates. The reason for this is the high uncertainty associated with new programs, and the assumptions driving the forecasts. A key focus in the early development of market transformation efforts is to establish key assumptions through research efforts. These key assumptions inform such items as baseline and savings rate, which increase the certainty of forecasts.

Customer Outreach and Communications

Years of Implementation

In 2011, the Company implemented Wattsmart, the demand-side management communication and outreach campaign. The Wattsmart program was put into action to meet the program design principle conditions of Order 02 in Docket UE-100170 specific to energy efficiency program outreach.

Program Description

The conditions for outreach for programs required Pacific Power to establish a strategy for informing participants about program opportunities. The Wattsmart communications campaign was designed to create awareness of the importance of being energy efficient, and to help increase participation in the Company's demand-side management programs. The programs are funded through the system benefit charge adjustment (Schedule 191) collected on customer bills.

Program Details

Provided in the table below is a summary of the media channels that were used to deliver the Wattsmart campaign in 2018.

Communication Channel	Value to Communication Portfolio
Television	Advertisements targeting both residential and business customers were featured throughout the year. TV spots ran in February, March, April, May, June, July, September, November and December in 2018. Stations on which campaign spots aired include: KAPP (ABC), KCYU (FOX), KIMA (CBS), KNDO (NBC), KUNW (UNIV) and Charter (Cable) to deliver more than 1.6 million impressions.
Radio	An average of 120 radio spots ran per week in February, March, April, May, June, July, September, November and December in 2018. Radio stations on which campaign spots aired include: KATS-FM (Adult Oriented Rock), KHHK-FM (CHR), KMNA-FM (Mexican Regional) KFLD-AM (News/Talk) Tri Cities Stations:, KEYW-FM (Hot AC), KORD-FM (Country), KUJ-FM (CHR), and KZTB-FM (Mexican Regional) Radio advertising delivers 900,800 impressions.
Newspaper	Newspaper placements included: Dayton Chronicle, La Voz Hispanic News, The Waitsburg Times, Walla Walla Union-Bulletin and Yakima Herald-Republic.
Website: Pacificpower.net/***watt***smart Be***watt***smart.com	Pacific Power's ***watt***smart website, pacificpower.net/***watt***smart, and promotional URL be***watt***smart.com link directly to the energy efficiency landing page and fulfill the campaign's call-to-action to engage customers in the Company's energy efficiency programs. These sites further support all other forms of communications by serving as a source for detailed information regarding the company's programs and other energy efficiency opportunities.
Twitter	Other interactive campaign elements such as online media and social media work with traditional media to enhance the campaign by driving traffic to the program websites. Energy efficiency tweets are scheduled on a weekly basis.
Facebook	Facebook is used to build awareness for early adopters regarding energy efficiency tips and provides a forum to share information. Information and tips are posted three times a week. We also use promoted posts and mobile posts to help expand the reach. In addition, paid Facebook ads encourage clicks to drive traffic to the website.
Other Online	Digital advertising supports the broadcast and print media in increasing awareness to a segment of customers who are likely to be receptive to energy-saving messaging. Some of these uses include banner ads on regional and news sites and entertainment platforms such as Pandora and YouTube, behavioral ad targeting, demographic targeting, geographic targeting and pay-per-click ad placements.

The 2018 Communications and Outreach plan was reviewed with the Demand-side Management Advisory Group in December 2017. The 2018 plan contained all the same components of the 2017 plan with the additional focus on Facebook and YouTube advertising, an increased digital presence, the continuation of television to target business customers, and a decrease in newspaper and magazine advertising.

The Company's 2018 research showed that among respondents 78 percent (residential) and 70 percent (non-residential) think Pacific Power is doing a good job of offering solutions to help customers use energy more efficiently. Similarly 80 percent (residential) and 66 percent (non-residential) report the Company is doing a good job of providing information on how to control electricity costs.

The objectives of the communications and outreach campaign in the 2020-21 biennium are to continue to increase awareness of the availability and benefits of energy efficiency programs,

cash incentives and resources in order to boost participation and achieve energy conservation targets in Washington. In 2020-21, the Company will develop new residential creative to replace what was developed in 2016. We intend to continue building on the success of the existing Wattsmart integrated communications campaign including the use of television advertising to target both residential and business customers. In 2019, the Company created case-study based campaigns featuring Washington business customers that have participated in and benefitted from Wattsmart Business. By sharing their experiences, it helps to break down barriers to participation and encourage other businesses to pursue energy efficiency upgrades in order to boost their bottom lines, enhance their workplaces and realize other benefits.

Proposed adjustments for the 2020/2021 biennium:

Communication Tactic	2020/2021
Television: A selection of ads will be rotated, both 30-second and 15-second TV spots, with an average of 100 TV placements each week that the campaign is on the air. KAPP (ABC), KIMA (CBS), KNDO (NBC), KUNV (UNIV) and Charter (Cable).	Create new residential creative and continue to refine messaging based on customer research. Use case-study based Wattsmart Business creative developed in 2019 to promote business efficiency.
Radio: Radio stations on which campaign spots will air include KARY-FM (Oldies), KATS-FM (Classic Rock), KDBL-FM (Country), KFFM-FM (Contemporary Hits), KHHK-FM (Rhythmic CHR) KRSE-FM (Modern), KXDD-FM (Country), KZTA-FW (Mexican Regional).	Develop new residential creative and continue to refine messaging based on customer research. Use case-study based Wattsmart Business creative developed in 2019 to promote business efficiency.
Newspaper Dayton Chronicle, The East Washingtonian, La Voz Hispanic News, The Waitsburg Times, Walla Walla Union Bulletin and Yakima Herald-Republic.	Create new residential creative and continue to refine messaging based on customer research. Use case-study based Wattsmart Business creative developed in 2019 to promote business efficiency.
Web: pacificpower.net/Wattsmart, and promotional URL bewattsmart.com link directly to the energy efficiency landing page.	Messages rotate each month based on the season. Push customers the Company's responsive and simplified web pages to get the customers to the information they are seeking quickly.
Twitter	Tweets posted on a weekly basis.

Facebook	Information and tips posted three - five times a week. Promoted video and static posts and mobile ads will be added where appropriate. Promote business case studies, to get additional leverage from these tools.
Digital	Include video and static banner ads on local sites, blogs, behavioral ad targeting, and pay-per-click ad placements and digital search for business customers. Include digital pre-roll for business and residential customers.
PR: Capitalize on existing assets and tools to deploy news media outreach and consumer engagement efforts that are aligned with marketing (corporate) objectives.	Pitches will be focused on promoting business case studies and seasonal messaging.

Given the dynamic nature of communications, the company will review the proposed plan with the demand-side advisory group in the fourth quarter of 2019 and seek their comments to shape the final 2020 plan.

Cost Effectiveness

2020-2021 Portfolio

The cost effectiveness of individual programs proposed for the 2020-2021 biennium period and the portfolio views described below was assessed based on forecasted expenditures and energy savings.

Cost effectiveness is provided at the following levels:

- Individual program[23] or initiative[24] level
- Residential energy efficiency portfolio (Company programs)
- Non-residential energy efficiency portfolio(Company programs) [25]
- Total Company portfolio with portfolio costs added
- Total Company portfolio with portfolio costs and non-energy benefits added
- Total Company portfolio with portfolio costs and NEEA added
- Total Company portfolio with portfolio costs, NEEA and non-energy benefits added

Forecasted energy savings utilized in this analysis are gross savings and the impact of line losses is indicated with an "at site" or "at generation" designation. Line losses for retail customer programs are based on the Company's 2012 line loss study.

Consistent with the new rules and staff direction, cost-effectiveness for the low-income weatherization program will not be assessed at a program or portfolio level. Reporting for the program will include number of residences weatherized, number of measures installed, energy savings and total expenditures.

All cost effectiveness calculations utilize a Net-to-gross ratio of 1.0 consistent with the Council's methodology and 8(a) of Order 01 in Docket UE-171092. The energy savings attributed to each program are shaped according to specific end-use savings (the hourly calculation of when energy is used for the various end-use measures from which the savings are derived). Program costs and the value of the energy savings are then compared on a present value basis with the P-18 proxy decrement values described below.

As described at the August 2019 DSM AG meeting, normally at this stage the Company would have energy efficiency avoided costs (known as decrement values) that tie to underlying energy efficiency portfolio from a preferred portfolio in a filed IRP. The delay of the 2019 IRP and the passage of Senate Bill 5116 necessitated the use of the P-18 proxy portfolio utilizing the social cost of carbon to generate energy efficiency selections to begin the target setting process. The use of the proxy portfolio also necessitated an alternate approach to valuation that a) aligned with P-18 selections, b) didn't require a preferred portfolio and c) didn't divert resources from the 2019 IRP process.

[23] Home Energy Savings, Home Energy Reports
[24] NEEA
[25] Wattsmart Business

The proxy decrement process starts with premise that the highest cost Washington energy efficiency bundle selected in each year in the P-18 proxy portfolio establishes the value of the energy efficiency. It is assumed that the cost and value of the highest cost bundle are equal. This is a reasonable premise as the absence of selections from the next higher cost bundle indicates that higher cost bundles are not economic. The next step is to spread the value across the year such that the hourly values and the load profile of the highest cost bundle are equal to the bundle cost. This accounts for the variations in energy and capacity values over the course of a year. The energy price component is built up from the Company's market prices, social cost of carbon GHG costs, and the value of risk (stochastic, plus 10% premium). Any remaining value (up to the highest bundle's cost) that is not reflected within the energy price component is assigned as a capacity value, and would account for avoided generation, transmission, and distribution costs. Capacity is allocated to the summer and winter hours with Loss of Load Probability (LOLP) events from the study prepared at the beginning of PacifiCorp's 2019 IRP process. Because Washington load is winter peaking while PacifiCorp's system is summer peaking, fifty percent of the capacity value was allocated to summer hours and fifty percent was allocated to summer hours as a proxy.

The result of this process is 8,760 hourly decrement values that correspond to the value of the highest cost Washington energy efficiency bundle, recognizing both energy and capacity impacts of energy efficiency savings. These hourly decrement values can be applied to any energy efficiency load profile to determine cost-effectiveness of specific programs.

Costs utilized in the portfolio analysis are those with no direct energy savings attributed to them and include Energy Education in Schools, Customer outreach/communications and Program Evaluations (and savings verification).

The Technical Reference Library and potential study update costs required by I-937 are considered initiative compliance costs rather than program costs and will not be included in the determination of the demand-side management program cost effectiveness. These costs will be included in portfolio cost effectiveness calculations.

The five California Standard Practice Manual cost effectiveness tests as modified in the Northwest were utilized in the cost benefit analysis. Additional information on cost effectiveness in WAC and the test utilized by the council is provided below.

As specified in WAC 480-109-100 "A utility's conservation portfolio must pass a cost effectiveness test consistent with that used in the Northwest Conservation and Electric Power Plan. A utility must evaluate conservation using the cost effectiveness test consistent with those used by the council and as required by the commission except as provided by WAC 480-109-100 (10)."

The Northwest Power and Conservation Council's Seventh Power Plan provides information on cost effectiveness on page G-11 of Appendix G. "The Council uses the total resource net levelized cost (TRC net levelized cost) for its analysis of the cost of the conservation measures,

which is similar to the Societal Cost Test outlined in the National Action Plan for Energy Efficiency and the California Standard Practice Manual."

As the result of the passage of Senate Bill 5116 (CETA) in 2019, on-going reviews of the cost effectiveness methodology and the steps necessary to fully incorporate an updated Resource Value Test from the National Standard Practice Manual are on hold until rules implementing CETA are developed[26].

Production Efficiency

The Production Efficiency Economic Evaluation Methodology was developed and shared with Washington' Demand-side Management Advisory Group in 2013. It is provided again for reference.

Production Efficiency Economic Evaluation Methodology

The Company provides power to Washington customers through the West Control Area Allocation Methodology. Inherent in this methodology is the reality that the power produced is distributed to multiple states. The Company has an obligation to ensure that the projects pursued as a result of the Washington Initiative 937 can be proven to be cost-effective in the most stringent of the jurisdictions the Company serves. The Company will not carry unreasonable or unnecessary recovery risk that may arise due to concerns in the methodology used to financially justify projects. Additionally, the Company operates multiple facilities jointly with other utilities that do not carry responsibility to comply with Washington Initiative 937. Justifying projects to these joint owners is required before approval to proceed with a project can be obtained.

In an attempt to reduce the recovery risk to the Company and to help justify production efficiency projects to joint owners, the cost-effective methodology was examined for relevance to the production perspective. The Company has concluded that the previous production efficiency project analyses employed the same evaluation methodology used for retail DSM projects and did not adequately address the unique differences and cost recovery rules attributed to production projects. The Company therefore has revised the production cost effective analysis methodology to better comply with the rules and regulations of its multiple state utility commissions while also meeting the evaluation requirements of the Washington Initiative 937.

The key differences between the previous (DSM Method) and the current (Production Method) are as follows:

[26] Review of Cost Effectiveness Methodology – August 8, 2019 Open meeting memo

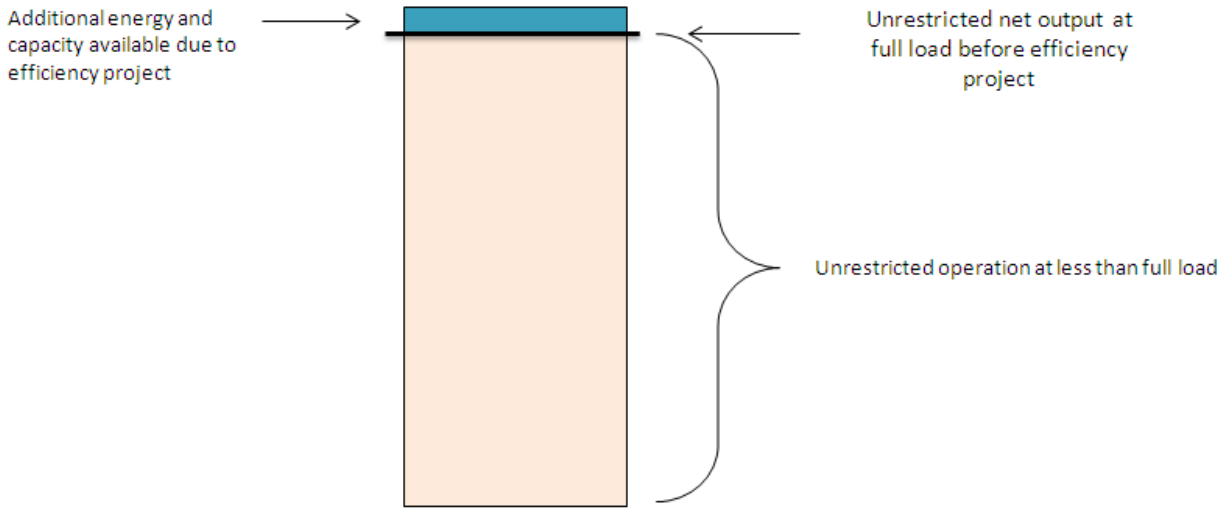
Component	DSM Method	Production Method
T&D Deferral Credit	Financial model included T&D deferral credit.	Financial model excludes T&D deferral credit
Production Capital	Production Capital was not treated as a rate based asset.	Production Capital revenue requirement is calculated assuming rate base treatment.
Energy Savings Value	All MWh efficiency savings are valued as dispatchable energy.	MWh efficiency savings are split between dispatchable energy and non-dispatchable energy for valuation.
Capacity Resource Deferral	DSM Capacity Resource Deferral value was included as a $/MWh value.	Capacity resource deferral value is converted to $/kW for inclusion in evaluation.

Explanation of the above differences:

1. The DSM methodology analyzes energy savings at the retail distribution level. As such, the incremental reduction in retail energy delivery requirements is credited with an incremental value of deferring transmission and distribution costs. Production efficiency projects, however, do not change retail energy delivery requirements and are therefore evaluated at the production level without additional transmission and distribution deferral credit.

2. Capital for retail DSM projects is funded through a DSM tariff rider and is not included in rate base for regulatory recovery treatment. The full capital cost for production efficiency projects is placed in rate base and is recovered over time through depreciation expense.

3. Depending on the dispatch level of the plant, production efficiency projects may make more energy available to be consumed or sold or may simply result in fuel savings from reduced generation. If the plant is operating at or near full load and is not restricted for dispatch reasons, the energy efficiency savings are valued at the full DSM production $/MWh values from the Company's filed Integrated Resource Plan. However, if additional energy is available but cannot be dispatched, then the energy efficiency is valued as a reduction in fuel cost needed to produce the same output. The following figure illustrates this concept:



Unrestricted operation was assessed to be at or below the capacity factor of the unit in question. Under this condition, the additional energy saved is only providing a savings in fuel cost through heat rate improvement.

4. For production project evaluations, capacity is typically assessed as a $/kW value. For evaluating the capacity resource deferral attributed to production efficiency projects, the $/MWh value used for valuing retail DSM capacity deferral was converted to $/kW.

Attachment 1 – Portfolio and Program Cost-Effectiveness

Memorandum

To: Don Jones, Jr. and Nancy Goddard, Pacific Power
From: Kurtis Kolnowski and Brielle Bushong, AEG
Date: September 30, 2019
Re: Washington Portfolio Level Cost-Effectiveness Analysis – 2020-2021 Biennium

AEG estimated the cost-effectiveness of Pacific Power's overall energy efficiency portfolio and individual programs in the state of Washington based on Program Year (PY) 2020 and PY2021 costs and savings estimates provided by Pacific Power.[27] The memo provides analysis inputs and results in the following tables:

The following assumptions were utilized in the analysis:

- Avoided Costs: developed from a draft run of Portfolio "P-18 v06292019" in PacifiCorp's 2019 Integrated Resource Plan IRP),[28] converted into annual values using load shapes from the same IRP.

[27] Consistent with Section 480-109-100 (10) (b) of the Washington Administrative Code, the Low-Income Weatherization program is excluded from this analysis.
[28] Proxy decrement study aligned with P-18 proxy portfolio.

- Modeling Inputs: measure savings, costs, non-energy impacts (NEIs), measure lives, incentive levels, program delivery, and portfolio costs were based on estimates provided by PacifiCorp.
- Net-to-Gross (NTG): ratios are assumed to be 1.0, consistent with condition (8)(a) to Order 01 in Docket UE-152-072.
- Retail Rates: 2018 rates provided by PacifiCorp and escalated by inflation for future years.

The following tables summarize cost-effectiveness assumptions and results for the Washington portfolio and associated programs.

Table 1: Utility Inputs

Parameter	Value
Discount Rate[29]	6.920%
Residential Line Loss	9.670%
Commercial Line Loss	9.531%
Industrial Line Loss	8.161%
Irrigation Line Loss	9.670%
Residential Energy Rate ($/kWh)	$0.0836
Commercial Energy Rate ($/kWh)	$0.0717
Industrial Energy Rate ($/kWh)	$0.0887
Irrigation Energy Rate ($/kWh)	$0.1327
Inflation Rate[30]	2.280%

Table 2: Portfolio-Level Costs, Nominal - PY2020 and PY2021

Category	PY2020	PY2021
Be wattsmart, Begin at Home	$64,523	$64,523
Customer Outreach/Communication	$250,000	$250,000
Program Evaluations (& Savings Verification)	$549,524	$259,662
Potential Study Update/Analysis	$120,115	$15,368
System Support	$157,735	$148,543
End Use Load Research & RTF Funding	$109,500	$65,500
Total	**$1,251,397**	**$803,596**

Table 3: Program Costs, Nominal - PY2020 and PY2021

Program	Program Delivery	Utility Admin	Incentives	Total Utility Budget	Gross Customer Costs
Home Energy Savings	$3,432,050	$135,022	$4,924,321	$8,491,393	$7,112,029
Home Energy Reports	$499,000	$55,000	$0	$554,000	$0
Wattsmart Business	$5,352,988	$1,118,891	$7,148,034	$13,619,914	$17,781,254
NEEA	$1,618,777	$55,000	$0	$1,673,777	$0

[29] Consistent with draft assumptions for PacifiCorp's 2019 Integrated Resource Plan.
[30] Future rates determined using a 2.28% annual escalator.

Total (excluding Portfolio-Level)	**$10,902,815**	**$1,363,913**	**$12,072,356**	**$24,339,084**	**$24,893,282**

Table 4: Savings by Program - PY2020 and PY2021

Program	Gross kWh Savings at Site	Realization Rate	Adjusted Gross kWh Savings at Site	Net to Gross Ratio	Net kWh Savings at Site	Average Measure Life
Home Energy Savings	21,038,523	82%	17,154,977	100%	17,154,977	10
Home Energy Reports	8,260,000	100%	8,260,000	100%	8,260,000	2
Wattsmart Business	62,178,106	94%	58,190,406	100%	58,190,406	10
NEEA[31]	6,198,000	100%	6,198,000	100%	6,198,000	14
Total Program	**97,674,629**	**92%**	**89,803,383**	**100%**	**89,803,383**	**9**

Table 5: Portfolio-Level Benefit/Cost Ratios - PY2020 and PY2021

Program	PTRC	TRC	UCT	PCT	RIM
Total Portfolio	1.83	1.66	2.53	2.59	0.81
Total Portfolio with NEIs	1.99	1.83	2.53	2.84	0.81
Total Portfolio with NEEA	1.94	1.76	2.62	2.80	0.82
Total Portfolio with NEEA and NEIs	2.09	1.92	2.62	3.05	0.82

Table 6: Total Portfolio Cost-Effectiveness Results - PY2020 and PY2021

Cost-Effectiveness Test	Levelized $/kWh	Costs	Benefits	Net Benefits	Benefit/Cost Ratio
Total Resource Cost Test (PTRC) + Conservation Adder	$0.0650	$33,908,883	$62,097,360	$28,188,476	1.83
Total Resource Cost Test (TRC) No Adder	$0.0650	$33,908,883	$56,452,145	$22,543,262	1.66
Utility Cost Test (UCT)	$0.0428	$22,335,985	$56,452,145	$34,116,160	2.53
Participant Cost Test (PCT)		$22,470,515	$58,245,003	$35,774,488	2.59
Rate Impact Test (RIM)		$69,683,372	$56,452,145	($13,231,227)	0.81
Lifecycle Revenue Impacts ($/kWh)					$0.0013361
Discounted Participant Payback (years)					3.15

[31] NEEA savings are adjusted to exclude C&S outside CPA potential consistent with PY2020 and PY2021 Business Plan.

Table 7: Total Portfolio Including NEIs Cost-Effectiveness Results - PY2020 and PY2021

Cost-Effectiveness Test	Levelized $/kWh	Costs	Benefits	Net Benefits	Benefit/Cost Ratio
Total Resource Cost Test (PTRC) + Conservation Adder	$0.0650	$33,908,883	$67,579,081	$33,670,197	1.99
Total Resource Cost Test (TRC) No Adder	$0.0650	$33,908,883	$61,933,866	$28,024,983	1.83
Utility Cost Test (UCT)	$0.0428	$22,335,985	$56,452,145	$34,116,160	2.53
Participant Cost Test (PCT)		$22,470,515	$63,726,724	$41,256,209	2.84
Rate Impact Test (RIM)		$69,683,372	$56,452,145	($13,231,227)	0.81
Lifecycle Revenue Impacts ($/kWh)					$0.0013361
Discounted Participant Payback (years)					2.91

Table 8: Total Portfolio Including NEEA Cost-Effectiveness Results - PY2020 and PY2021

Cost-Effectiveness Test	Levelized $/kWh	Costs	Benefits	Net Benefits	Benefit/Cost Ratio
Total Resource Cost Test (PTRC) + Conservation Adder	$0.0619	$35,423,340	$68,714,452	$33,291,112	1.94
Total Resource Cost Test (TRC) No Adder	$0.0619	$35,423,340	$62,467,683	$27,044,344	1.76
Utility Cost Test (UCT)	$0.0417	$23,850,441	$62,467,683	$38,617,242	2.62
Participant Cost Test (PCT)		$22,470,515	$63,021,174	$40,550,660	2.80
Rate Impact Test (RIM)		$75,973,999	$62,467,683	($13,506,316)	0.82
Lifecycle Revenue Impacts ($/kWh)					$0.0014567
Discounted Participant Payback (years)					3.00

Table 9: Total Portfolio Including NEIs and NEEA Cost-Effectiveness Results - PY2020 and PY2021

Cost-Effectiveness Test	Levelized $/kWh	Costs	Benefits	Net Benefits	Benefit/Cost Ratio
Total Resource Cost Test (PTRC) + Conservation Adder	$0.0619	$35,423,340	$74,196,173	$38,772,833	2.09
Total Resource Cost Test (TRC) No Adder	$0.0619	$35,423,340	$67,949,404	$32,526,065	1.92
Utility Cost Test (UCT)	$0.0417	$23,850,441	$62,467,683	$38,617,242	2.62
Participant Cost Test (PCT)		$22,470,515	$68,502,895	$46,032,381	3.05
Rate Impact Test (RIM)		$75,973,999	$62,467,683	($13,506,316)	0.82
Lifecycle Revenue Impacts ($/kWh)					$0.0014567
Discounted Participant Payback (years)					2.78

Table 10: Benefit/Cost Ratios by Program - PY2020 and PY2021

Program	PTRC	TRC	UCT	PCT	RIM
Home Energy Savings	1.43	1.30	1.64	2.41	0.67
Home Energy Savings with NEIs	2.00	1.87	1.64	3.26	0.67
Home Energy Reports	3.49	3.17	3.17	0.00	0.81
Wattsmart Business	2.13	1.93	3.44	2.57	0.90
Wattsmart Business with NEIs	2.13	1.93	3.44	2.58	0.90
NEEA	4.37	3.97	3.97	0.00	0.96

Table 11: Home Energy Savings Cost-Effectiveness Results - PY2020 and PY2021

Cost-Effectiveness Test	Levelized $/kWh	Costs	Benefits	Net Benefits	Benefit/Cost Ratio
Total Resource Cost Test (PTRC) + Conservation Adder	$0.0844	$9,638,130	$13,799,527	$4,161,398	1.43
Total Resource Cost Test (TRC) No Adder	$0.0844	$9,638,130	$12,545,025	$2,906,895	1.30
Utility Cost Test (UCT)	$0.0670	$7,660,149	$12,545,025	$4,884,876	1.64
Participant Cost Test (PCT)		$6,427,089	$15,490,460	$9,063,370	2.41
Rate Impact Test (RIM)		$18,701,500	$12,545,025	($6,156,475)	0.67
Lifecycle Revenue Impacts ($/kWh)					$0.0003586
Discounted Participant Payback (years)					4.22

Table 12: Home Energy Savings Including NEIs Cost-Effectiveness Results - PY2020 and PY2021

Cost-Effectiveness Test	Levelized $/kWh	Costs	Benefits	Net Benefits	Benefit/Cost Ratio
Total Resource Cost Test (PTRC) + Conservation Adder	$0.0844	$9,638,130	$19,248,845	$9,610,715	2.00
Total Resource Cost Test (TRC) No Adder	$0.0844	$9,638,130	$17,994,343	$8,356,213	1.87
Utility Cost Test (UCT)	$0.0670	$7,660,149	$12,545,025	$4,884,876	1.64
Participant Cost Test (PCT)		$6,427,089	$20,939,778	$14,512,688	3.26
Rate Impact Test (RIM)		$18,701,500	$12,545,025	($6,156,475)	0.67
Lifecycle Revenue Impacts ($/kWh)					$0.0003586
Discounted Participant Payback (years)					3.05

Table 13: Home Energy Reports Cost-Effectiveness Results - PY2020 and PY2021

Cost-Effectiveness Test	Levelized $/kWh	Costs	Benefits	Net Benefits	Benefit/Cost Ratio
Total Resource Cost Test (PTRC) + Conservation Adder	$0.0303	$502,013	$1,752,343	$1,250,331	3.49
Total Resource Cost Test (TRC) No Adder	$0.0303	$502,013	$1,593,039	$1,091,027	3.17
Utility Cost Test (UCT)	$0.0303	$502,013	$1,593,039	$1,091,027	3.17
Participant Cost Test (PCT)		$0	$1,453,914	$1,453,914	n/a
Rate Impact Test (RIM)		$1,955,926	$1,593,039	($362,887)	0.81
Lifecycle Revenue Impacts ($/kWh)					$0.0001894
Discounted Participant Payback (years)					0.00

Table 14: Wattsmart Business Cost-Effectiveness Results - PY2020 and PY2021

Cost-Effectiveness Test	Levelized $/kWh	Costs	Benefits	Net Benefits	Benefit/Cost Ratio
Total Resource Cost Test (PTRC) + Conservation Adder	$0.0560	$21,895,394	$46,545,489	$24,650,095	2.13
Total Resource Cost Test (TRC) No Adder	$0.0560	$21,895,394	$42,314,081	$20,418,687	1.93
Utility Cost Test (UCT)	$0.0314	$12,300,476	$42,314,081	$30,013,605	3.44
Participant Cost Test (PCT)		$16,043,425	$41,300,629	$25,257,204	2.57
Rate Impact Test (RIM)		$47,152,598	$42,314,081	($4,838,517)	0.90
Lifecycle Revenue Impacts ($/kWh)					$0.0012646
Discounted Participant Payback (years)					3.86

Table 15: Wattsmart Business Including NEIs Cost-Effectiveness Results - PY2020 and PY2021

Cost-Effectiveness Test	Levelized $/kWh	Costs	Benefits	Net Benefits	Benefit/Cost Ratio
Total Resource Cost Test (PTRC) + Conservation Adder	$0.0560	$21,895,394	$46,577,892	$24,682,498	2.13
Total Resource Cost Test (TRC) No Adder	$0.0560	$21,895,394	$42,346,484	$20,451,090	1.93
Utility Cost Test (UCT)	$0.0314	$12,300,476	$42,314,081	$30,013,605	3.44
Participant Cost Test (PCT)		$16,043,425	$41,333,032	$25,289,607	2.58
Rate Impact Test (RIM)		$47,152,598	$42,314,081	($4,838,517)	0.90
Lifecycle Revenue Impacts ($/kWh)					$0.0012646
Discounted Participant Payback (years)					3.85

Table 16: NEEA Cost-Effectiveness Results - PY2020 and PY2021

Cost-Effectiveness Test	Levelized $/kWh	Costs	Benefits	Net Benefits	Benefit/Cost Ratio
Total Resource Cost Test (PTRC) + Conservation Adder	$0.0300	$1,514,456	$6,617,092	$5,102,636	4.37
Total Resource Cost Test (TRC) No Adder	$0.0300	$1,514,456	$6,015,538	$4,501,082	3.97
Utility Cost Test (UCT)	$0.0300	$1,514,456	$6,015,538	$4,501,082	3.97
Participant Cost Test (PCT)		$0	$4,776,172	$4,776,172	n/a
Rate Impact Test (RIM)		$6,290,628	$6,015,538	($275,090)	0.96
Lifecycle Revenue Impacts ($/kWh)					$0.0001206
Discounted Participant Payback (years)					0.00

Table 17: Home Energy Savings Non-Energy Impacts - PY2020 and PY2021

Measure	Annual Non-Energy Impacts per Measure	Total Installs	Measure Life	Total Present Value NEIs
Energy Savings Kit - Best - 2 Bathrooms - WA	$165,482.00	2	9	$2,089,527
Energy Savings Kit - Best - 1 Bathroom - WA	$101,845.50	2	9	$1,286,876
Energy Savings Kit - Water Feature 1 - WA	$1,178.00	2	10	$16,054
Energy Savings Kit - Water Feature 2 - WA	$24,491.48	2	10	$333,522
Fixture - Downlight - 4000 to 7999 Lumens - WA	$10,163.16	2	6	$93,934
Fixture - Downlight - 2000 to 3999 Lumens - WA	$13,041.90	2	6	$120,382
Fixture - Track - 1000 to 1999 Lumens - WA	$9,818.88	2	8	$113,534
Fixture - Track - 4000 to 7999 Lumens - WA	$7,074.84	2	8	$82,012
Fixture - Exterior Porch - 4000 to 7999 Lumens - WA	$4,904.13	2	5	$38,693
Fixture - Ceiling & Wall Flush Mount - 1000 to 1999 Lumens - WA	$5,041.84	2	7	$52,732
Fixture - Exterior Security - 4000 to 7999 Lumens - WA	$3,800.00	2	11	$55,366
LEDs - Reflectors & Outdoor - 250 to 1049 Lumens - WA	$918.22	2	3	$4,670
Fixture - Track - 2000 to 3999 Lumens - WA	$2,787.12	2	8	$32,308
Fixture - Exterior Porch - 500 to 999 Lumens - WA	$3,261.28	2	5	$25,934
Fixture - Ceiling & Wall Flush Mount - 250 to 499 Lumens - WA	$2,370.07	2	7	$24,788
Fixture - Bathroom Vanity - 2000 to 3999 Lumens - WA	$2,186.38	2	9	$27,662
LEDs - Reflectors & Outdoor - 1050 to 1489 Lumens - WA	$1,764.10	2	3	$8,973
LEDs - MR 250 to 499 Lumens (Pin Base) - WA	$1,822.48	2	2	$6,384
Fixture - Bathroom Vanity - 250 to 499 Lumens - WA	$1,605.03	2	9	$20,307
Fixture - Track - 250 to 499 Lumens - WA	$406.08	2	8	$4,704
LEDs - Non-MR Bi-Pin 250 to 499 Lumens (Pin Base) - WA	$274.23	2	10	$3,741
LEDs - Reflectors & Outdoor - 1490 to 2600 Lumens - WA	$464.64	2	4	$3,051
Fixture - Bathroom Vanity - 0 to 249 Lumens - WA	$1,147.23	2	9	$14,515

Measure	Annual Non-Energy Impacts per Measure	Total Installs	Measure Life	Total Present Value NEIs
LEDs - Non-MR Bi-Pin 500 to 999 Lumens (Pin Base) - WA	$264.88	2	9	$3,351
LEDs - MR 500 to 999 Lumens (Pin Base) - WA	$165.66	2	2	$580
LEDs - Globe - 1490 to 2600 Lumens - WA	$560.28	2	5	$4,455
Manufactured Home - Duct Sealing - Contractor Install - eFAF - WA	$1,374.54	1	18	$13,907
Manufactured Home - Smart Thermostat - Heat Pump - WA	$262.95	1	5	$1,080
HPWH Tier 3 Ducted Gas Heat 0-55 Gallons - Self Install - WA	$982.87	1	13	$8,252
HPWH Tier 3 Garage 0-55 Gallons - Self Install - WA	$1,207.98	1	13	$10,142
HPWH Tier 3 Indoor Heat Pump 0-55 Gallons - Self Install - WA	$569.84	1	13	$4,784
HPWH Tier 4 Splits Any Size - WA	$655.56	1	13	$5,504
HPWH Tier 3 Ducted Electric Resistance Heat 0-55 Gallons - Self Install - WA	$474.36	1	13	$3,983
HPWH Tier 3 Indoor Electric Resistance Heat 0-55 Gallons - Self Install - WA	$574.25	1	13	$4,821
Clothes Washers - CEE Tier 2 - Electric DHW & Electric Dryer - WA	$15,393.89	2	14	$261,538
Manufactured Home - Smart Thermostat - eFAF - WA	$358.47	1	5	$1,473
Clothes Dryer - Vented_UCEF 5.30 to 6.09 - WA	$338.25	1	12	$2,698
Clothes Dryer - Vented_UCEF 3.80 to 4.19 - WA	$272.37	1	12	$2,173
Clothes Dryer - Ventless_UCEF 5.30 to 6.09 - WA	$641.69	2	12	$9,730
Clothes Dryer - Ventless_UCEF 3.80 to 4.19 - WA	$752.77	2	12	$11,386
New Homes - Whole Home Performance Path - Electrically Heated - 20% and higher - Tier 2 - WA	$309.73	1	28	$3,788
Clothes Dryer - Ventless_UCEF 3.20 to 3.39 - WA	$362.31	2	12	$5,535
New Manufactured Home - Ecorated - Any Electric - WA	$120.00	1	42	$1,630
Multifamily - Evaporative Coolers - 2000-3499 CFM - WA	$160.55	1	9	$1,050
Clothes Washers - CEE Tier 3 - Electric DHW & Electric Dryer - WA	$4,040.73	2	14	$68,555
Clothes Washers - CEE Tier 3 - Electric DHW & Gas Dryer - WA	$5,385.60	2	14	$91,590
Evaporative Coolers - 2000-3499 CFM - WA	$158.34	1	9	$1,035
Clothes Washers - CEE Tier 2 - Electric DHW & Gas Dryer - WA	$4,288.94	2	14	$72,806
Manufactured Home - Heat Pump - Upgrade with Best Practice Install & Sizing - WA	$80.00	1	15	$732
Clothes Washers - CEE Tier 3 - Gas DHW & Electric Dryer - WA	$3,070.94	2	14	$52,144

Measure	Annual Non-Energy Impacts per Measure	Total Installs	Measure Life	Total Present Value NEIs
Manufactured Home - Insulation - Attic - Electric Resistance - R0 to R22 - WA	$54.60	1	25	$641
Insulation - Wall - Zonal or DHP - R0 to R11 - WA	$40.00	1	45	$550
Clothes Washers - CEE Tier 2 - Gas DHW & Electric Dryer - WA	$2,039.31	2	14	$34,681
Insulation - Wall - Heat Pump - R0 to R11 - WA	$140.92	2	45	$3,650
Low Flow Showerheads - Retail - 1.75 GPM - WA	$4,370.46	2	10	$61,440
HPWH Tier 3 Basement 0-55 Gallons - WA	$26.22	1	13	$220
HPWH Tier 3 Ducted Electric Resistance Heat 0-55 Gallons - WA	$18.09	1	13	$152
Insulation - Floor - Heat Pump - R0 to R30 - WA	$10.00	1	48	$139
Low Flow Showerheads - Retail - 2.00 GPM - WA	$103.88	2	10	$1,417
Insulation - Wall - Electric Heat - CA	$4,440.00	1	45	$61,002
Low Flow Showerheads - Retail - 1.50 GPM - WA	$93.60	2	10	$1,277
Manufactured Home - Windows - Ufactor 30 to Ufactor 25 - Electric Resistance - WA	$87.06	2	25	$1,922
Insulation - Floor - Heat Pump - R0 to R19 - WA	$3.00	1	46	$41
Advanced Power Strips	$262.95	1	5	$1,011
Clothes Dryer - Vented_UCEF 4.70 to 5.29 - WA	$569.84	1	12	$4,251
Clothes Dryer - Ventless_UCEF 6.10 to 7.19 - WA	$655.56	1	12	$4,891
Insulation - Attic - Zonal or DHP - R11 to R49 - WA	$120.00	1	45	$1,542
Windows - Ufactor 30 to Ufactor 25 - Zonal or DHP - WA	$158.34	1	45	$2,035
Clothes Dryer - Vented_UCEF 3.60 to 3.79 - WA	$338.25	1	12	$2,523
Clothes Dryer - Vented_UCEF 4.20 to 4.69 - WA	$272.37	1	12	$2,032
Clothes Dryer - Ventless_UCEF 3.60 to 3.79 - WA	$300.50	1	12	$2,242
Clothes Dryer - Ventless_UCEF 4.20 to 4.69 - WA	$297.56	1	12	$2,220
Clothes Dryer - Ventless_UCEF 7.20 to 8.00 - WA	$309.73	1	12	$2,311
Insulation - Attic - Gas Heated - R11 to R49 - WA	$80.00	1	45	$1,028
Insulation - Attic - Heat Pump - R11 to R49 - WA	$71.40	1	45	$917
Insulation - Attic - Zonal or DHP - R19 to R49 - WA	$54.60	1	45	$702
Insulation - Floor - eFAF - R0 to R19 - WA	$40.00	1	45	$514
Manufactured Home - Insulation - Attic - Heat Pump - R0 to R22 - WA	$31.59	1	25	$347
Manufactured Home - Insulation - Attic - Heat Pump - R11 to R30 - WA	$7,950.00	1	25	$87,278
Multifamily - Insulation - Attic - eFAF - R19 to R49 - WA	$26.22	1	45	$337
Multifamily - Insulation - Attic - Zonal - R19 to R49 - WA	$18.09	1	45	$232
Multifamily - Insulation - Floor - Ductless Heat Pump - R0 to R19 - WA	$9.00	1	49	$117
Multifamily - Insulation - Floor - eFAF - R0 to R19 - WA	$4,440.00	1	45	$57,054

Measure	Annual Non-Energy Impacts per Measure	Total Installs	Measure Life	Total Present Value NEIs
Multifamily - Insulation - Floor - Zonal - R0 to R19 - WA	$13.57	1	45	$174
Multifamily - Insulation - Floor - Zonal - R0 to R30 - WA	$3.00	1	45	$39

Table 18: Wattsmart Business Savings Non-Energy Impacts - PY2020 and PY2021

Measure	Annual Non-Energy Impacts per Measure	Total Installs	Measure Life	Total Present Value NEIs
Rotating sprinkler	$440.00	2	4	$2,890
Impact sprinkler, New or Rebuilt	$1,760.00	2	4	$11,558
Nozzle	$129.00	2	4	$847
Gasket for wheel line, hand line, or portable main line	$200.00	2	5	$1,590
Drain for wheel line, hand line, portable main line, pivot, or linear	$109.50	2	5	$871
Pipe repair	$616.00	2	8	$7,141
Wheel line leveler	$47.00	2	5	$374
Pressure regulator	$450.00	2	5	$3,578
Low pressure sprinkler replacing worn low pressure sprinkler	$447.00	2	5	$3,555

Memorandum
To: Don Jones, Jr. and Nancy Goddard, Pacific Power
From: Kurtis Kolnowski and Brielle Bushong, AEG
Date: September 30, 2019
Re: Washington Home Energy Savings Program Cost-Effectiveness Analysis – 2020-2021 Biennium

AEG estimated the cost-effectiveness of Pacific Power's Home Energy Savings Program in the state of Washington based on Program Year (PY) 2020 and PY2021 costs and savings estimates provided by Pacific Power.[32] The memo provides analysis inputs and results in the following tables:

[32] Consistent with Section 480-109-100 (10) (b) of the Washington Administrative Code, the Low-Income Weatherization program is excluded from this analysis.

Table 21: Home Energy Kit with NEIs Cost-Effectiveness Results - PY2020 and PY2021

Table 22: Lighting with NEIs Cost-Effectiveness Results - PY2020 and PY2021

Table 23: Home Energy Savings Non-Energy Impacts - PY2020 and PY2021

The following assumptions were utilized in the analysis:

- Avoided Costs: developed from a draft run of Portfolio "P-18 v06292019" in PacifiCorp's 2019 Integrated Resource Plan IRP),[33] converted into annual values using load shapes from the same IRP.
- Modeling Inputs: measure savings, costs, non-energy impacts (NEIs), measure lives, incentive levels, program delivery, and portfolio costs were based on estimates provided by PacifiCorp.
- Net-to-Gross (NTG): ratios are assumed to be 1.0, consistent with condition (8)(a) to Order 01 in Docket UE-152-072.
- Retail Rates: 2018 rates provided by PacifiCorp and escalated by inflation for future years.

The following tables summarize cost-effectiveness assumptions and results for the Washington Home Energy Savings Program. The cost-effectiveness analysis inputs are shown in Table 1 through Table 3 below:

Table 1: Cost-Effectiveness Analysis Inputs

Parameter	Value
Discount Rate[34]	6.920%
Residential Line Loss	9.670%
Residential Energy Rate ($/kWh)	$0.0836
Inflation Rate[35]	2.280%
Net-to-Gross	100%
Realization Rate	100%

Table 2: Annual Program Costs, Nominal - PY2020 and PY2021

Measure Category	Program Delivery	Utility Admin	Incentives	Total Utility Costs	Gross Customer Costs
Appliances	$371,487	$9,461	$1,642,200	$2,023,149	$1,470,245
Water Heating	$761,464	$19,340	$888,400	$1,669,204	$1,651,395
HVAC	$1,462,063	$36,338	$1,205,080	$2,703,481	$2,416,774
Whole Home	$89,754	$2,283	$264,600	$356,638	$452,711
Building Shell	$16,968	$430	$41,805	$59,203	$153,151
Plumbing	$2,313	$59	$365	$2,737	$1
Energy Kits	$295,100	$22,779	$86,671	$404,550	$85,920
Lighting	$432,900	$44,332	$795,200	$1,272,432	$881,831
Total Program	**$3,432,050**	**$135,022**	**$4,924,321**	**$8,491,393**	**$7,112,029**

[33] Proxy decrement study aligned with P-18 proxy portfolio.
[34] Consistent with draft assumptions for PacifiCorp's 2019 Integrated Resource Plan.
[35] Future rates determined using a 2.28% annual escalator.

Table 3: Annual Savings - PY2020 and 2021

Measure Category	Gross kWh Savings at Site	Net kWh Savings at Site	Gross kWh Savings at Generator	Net kWh Savings at Generator	Average Measure Life
Appliances	1,469,774	1,469,774	1,611,901	1,611,901	12
Water Heating	3,006,724	2,675,984	3,297,474	2,934,752	13
HVAC	5,684,640	4,547,712	6,234,345	4,987,476	13
Whole Home	354,811	354,811	389,121	389,121	36
Building Shell	66,860	66,860	73,325	73,325	37
Plumbing	9,153	8,146	10,038	8,934	10
Energy Kits	3,546,928	3,546,928	3,889,916	3,889,916	9
Lighting	6,899,633	4,484,761	7,566,828	4,918,438	6
Total Program	**21,038,523**	**17,154,977**	**23,072,948**	**18,813,863**	**10**

Table 4 presents the cost-effectiveness results by measure category and the total program with and without non-energy impacts (NEIs). Including NEIs, the program is cost-effective from all perspectives except the RIM test.

Table 4: Benefit/Cost Ratios by Measure Category - PY2020 and PY2021

Measure Category	PTRC	TRC	UCT	PCT	RIM
Appliances	0.84	0.77	0.70	1.92	0.44
Appliances (with NEIs)	1.22	1.15	0.70	2.40	0.44
Water Heating	1.17	1.06	1.55	1.95	0.64
Water Heating (with NEIs)	1.18	1.08	1.55	1.98	0.64
HVAC	1.20	1.09	1.59	2.04	0.67
HVAC (with NEIs)	1.21	1.10	1.59	2.05	0.67
Whole Home	1.22	1.11	1.70	1.81	0.66
Whole Home (with NEIs)	1.23	1.12	1.70	1.82	0.66
Building Shell	0.76	0.69	1.99	0.95	0.72
Building Shell (with NEIs)	2.19	2.12	1.99	2.54	0.72
Plumbing	3.06	2.78	2.41	4,232.60	0.77
Plumbing (with NEIs)	33.04	32.76	2.41	52,770.51	0.77
Energy Kits	6.85	6.22	6.21	27.01	0.95
Energy Kits (with NEIs)	17.06	16.44	6.21	74.92	0.95
Lighting	1.92	1.75	1.87	3.25	0.71
Lighting (with NEIs)	2.53	2.35	1.87	4.18	0.71
Total Program	**1.43**	**1.30**	**1.64**	**2.41**	**0.67**
Total Program (with NEIs)	**2.00**	**1.87**	**1.64**	**3.26**	**0.67**

Tables 5 through 13 present detailed cost-effectiveness results for the total program and for each measure category, excluding NEIs.

Table 5: Home Energy Savings Program Cost-Effectiveness Results - PY2020 and PY2021[36]

Cost-Effectiveness Test	Levelized $/kWh	Costs	Benefits	Net Benefits	Benefit/Cost Ratio
Total Resource Cost Test (PTRC) + Conservation Adder	$0.0844	$9,638,130	$13,799,527	$4,161,398	1.43
Total Resource Cost Test (TRC) No Adder	$0.0844	$9,638,130	$12,545,025	$2,906,895	1.30
Utility Cost Test (UCT)	$0.0670	$7,660,149	$12,545,025	$4,884,876	1.64
Participant Cost Test (PCT)		$6,427,089	$15,490,460	$9,063,370	2.41
Rate Impact Test (RIM)		$18,701,500	$12,545,025	($6,156,475)	0.67
Lifecycle Revenue Impacts ($/kWh)					$0.0003586
Discounted Participant Payback (years)					4.22

Table 6: Appliances Cost-Effectiveness Results - PY2020 and PY2021

Cost-Effectiveness Test	Levelized $/kWh	Costs	Benefits	Net Benefits	Benefit/Cost Ratio
Total Resource Cost Test (PTRC) + Conservation Adder	$0.1507	$1,673,914	$1,412,020	($261,894)	0.84
Total Resource Cost Test (TRC) No Adder	$0.1507	$1,673,914	$1,283,654	($390,259)	0.77
Utility Cost Test (UCT)	$0.1647	$1,829,535	$1,283,654	($545,880)	0.70
Participant Cost Test (PCT)		$1,330,590	$2,558,389	$1,227,799	1.92
Rate Impact Test (RIM)		$2,901,712	$1,283,654	($1,618,058)	0.44
Lifecycle Revenue Impacts ($/kWh)					$0.0000808
Discounted Participant Payback (years)					6.13

[36] Note that the values in the table have been discounted to 2020 dollars. Therefore, the program and administrative costs are slightly lower than shown in Table 2.

Table 7: Water Heating Cost-Effectiveness Results - PY2020 and PY2021

Cost-Effectiveness Test	Levelized $/kWh	Costs	Benefits	Net Benefits	Benefit/Cost Ratio
Total Resource Cost Test (PTRC) + Conservation Adder	$0.1011	$2,197,270	$2,562,011	$364,741	1.17
Total Resource Cost Test (TRC) No Adder	$0.1011	$2,197,270	$2,329,101	$131,831	1.06
Utility Cost Test (UCT)	$0.0694	$1,506,991	$2,329,101	$822,110	1.55
Participant Cost Test (PCT)		$1,493,941	$2,917,384	$1,423,443	1.95
Rate Impact Test (RIM)		$3,620,713	$2,329,101	($1,291,612)	0.64
Lifecycle Revenue Impacts ($/kWh)					$0.0001050
Discounted Participant Payback (years)					6.66

Table 8: HVAC Cost-Effectiveness Results - PY2020 and PY2021

Cost-Effectiveness Test	Levelized $/kWh	Costs	Benefits	Net Benefits	Benefit/Cost Ratio
Total Resource Cost Test (PTRC) + Conservation Adder	$0.1033	$3,523,718	$4,236,807	$713,089	1.20
Total Resource Cost Test (TRC) No Adder	$0.1033	$3,523,718	$3,851,642	$327,925	1.09
Utility Cost Test (UCT)	$0.0712	$2,428,871	$3,851,642	$1,422,772	1.59
Participant Cost Test (PCT)		$2,179,276	$4,447,043	$2,267,767	2.04
Rate Impact Test (RIM)		$5,791,485	$3,851,642	($1,939,843)	0.67
Lifecycle Revenue Impacts ($/kWh)					$0.0001418
Discounted Participant Payback (years)					5.94

Table 9: Whole Home Cost-Effectiveness Results - PY2020 and PY2021

Cost-Effectiveness Test	Levelized $/kWh	Costs	Benefits	Net Benefits	Benefit/Cost Ratio
Total Resource Cost Test (PTRC) + Conservation Adder	$0.1107	$492,565	$602,013	$109,449	1.22
Total Resource Cost Test (TRC) No Adder	$0.1107	$492,565	$547,285	$54,720	1.11
Utility Cost Test (UCT)	$0.0724	$322,341	$547,285	$224,944	1.70
Participant Cost Test (PCT)		$409,635	$741,142	$331,507	1.81
Rate Impact Test (RIM)		$824,071	$547,285	($276,786)	0.66
Lifecycle Revenue Impacts ($/kWh)					$0.0000158
Discounted Participant Payback (years)					19.24

Table 10: Building Shell Cost-Effectiveness Results - PY2020 and PY2021

Cost-Effectiveness Test	Levelized $/kWh	Costs	Benefits	Net Benefits	Benefit/Cost Ratio
Total Resource Cost Test (PTRC) + Conservation Adder	$0.1852	$154,122	$116,820	($37,302)	0.76
Total Resource Cost Test (TRC) No Adder	$0.1852	$154,122	$106,200	($47,922)	0.69
Utility Cost Test (UCT)	$0.0642	$53,451	$106,200	$52,750	1.99
Participant Cost Test (PCT)		$138,459	$131,914	($6,545)	0.95
Rate Impact Test (RIM)		$147,577	$106,200	($41,377)	0.72
Lifecycle Revenue Impacts ($/kWh)					$0.0000028
Discounted Participant Payback (years)					35.66

Table 11: Plumbing Cost-Effectiveness Results - PY2020 and PY2021

Cost-Effectiveness Test	Levelized $/kWh	Costs	Benefits	Net Benefits	Benefit/Cost Ratio
Total Resource Cost Test (PTRC) + Conservation Adder	$0.0385	$2,139	$6,545	$4,406	3.06
Total Resource Cost Test (TRC) No Adder	$0.0385	$2,139	$5,950	$3,811	2.78
Utility Cost Test (UCT)	$0.0444	$2,468	$5,950	$3,482	2.41
Participant Cost Test (PCT)		$1	$5,593	$5,591	4,232.60
Rate Impact Test (RIM)		$7,731	$5,950	($1,780)	0.77
Lifecycle Revenue Impacts ($/kWh)					$0.0000003
Discounted Participant Payback (years)					0.00

Table 12: Home Energy Kit Cost-Effectiveness Results - PY2020 and PY2021

Cost-Effectiveness Test	Levelized $/kWh	Costs	Benefits	Net Benefits	Benefit/Cost Ratio
Total Resource Cost Test (PTRC) + Conservation Adder	$0.0169	$364,865	$2,497,822	$2,132,957	6.85
Total Resource Cost Test (TRC) No Adder	$0.0169	$364,865	$2,270,747	$1,905,882	6.22
Utility Cost Test (UCT)	$0.0169	$365,522	$2,270,747	$1,905,225	6.21
Participant Cost Test (PCT)		$77,766	$2,100,254	$2,022,488	27.01
Rate Impact Test (RIM)		$2,387,353	$2,270,747	($116,605)	0.95
Lifecycle Revenue Impacts ($/kWh)					$0.0000863
Discounted Participant Payback (years)					0.32

Table 13: Lighting Cost-Effectiveness Results - PY2020 and PY2021

Cost-Effectiveness Test	Levelized $/kWh	Costs	Benefits	Net Benefits	Benefit/Cost Ratio
Total Resource Cost Test (PTRC) + Conservation Adder	$0.0603	$1,229,537	$2,365,489	$1,135,952	1.92
Total Resource Cost Test (TRC) No Adder	$0.0603	$1,229,537	$2,150,445	$920,907	1.75
Utility Cost Test (UCT)	$0.0565	$1,150,971	$2,150,445	$999,474	1.87
Participant Cost Test (PCT)		$797,420	$2,588,740	$1,791,320	3.25
Rate Impact Test (RIM)		$3,020,858	$2,150,445	($870,413)	0.71
Lifecycle Revenue Impacts ($/kWh)					$0.0000965
Discounted Participant Payback (years)					1.80

In addition to the energy benefits reported above, the Home Energy Savings Program measures offer significant non-energy impacts (NEIs). Tables 14 through 21 present detailed cost-effectiveness results for the total program and each measure category with the inclusion of NEIs. Table 22 details the non-energy impacts included in this analysis.

Table 14: Home Energy Savings Program with NEIs Cost-Effectiveness Results - PY2020 and PY2021

Cost-Effectiveness Test	Levelized $/kWh	Costs	Benefits	Net Benefits	Benefit/Cost Ratio
Total Resource Cost Test (PTRC) + Conservation Adder	$0.0844	$9,638,130	$19,248,845	$9,610,715	2.00
Total Resource Cost Test (TRC) No Adder	$0.0844	$9,638,130	$17,994,343	$8,356,213	1.87
Utility Cost Test (UCT)	$0.0670	$7,660,149	$12,545,025	$4,884,876	1.64
Participant Cost Test (PCT)		$6,427,089	$20,939,778	$14,512,688	3.26
Rate Impact Test (RIM)		$18,701,500	$12,545,025	($6,156,475)	0.67
Lifecycle Revenue Impacts ($/kWh)					$0.0003586
Discounted Participant Payback (years)					3.05

Table 15: Appliances with NEIs Cost-Effectiveness Results - PY2020 and PY2021

Cost-Effectiveness Test	Levelized $/kWh	Costs	Benefits	Net Benefits	Benefit/Cost Ratio
Total Resource Cost Test (PTRC) + Conservation Adder	$0.1507	$1,673,914	$2,046,335	$372,421	1.22
Total Resource Cost Test (TRC) No Adder	$0.1507	$1,673,914	$1,917,969	$244,056	1.15
Utility Cost Test (UCT)	$0.1647	$1,829,535	$1,283,654	($545,880)	0.70
Participant Cost Test (PCT)		$1,330,590	$3,192,704	$1,862,114	2.40
Rate Impact Test (RIM)		$2,901,712	$1,283,654	($1,618,058)	0.44
Lifecycle Revenue Impacts ($/kWh)					$0.0000808
Discounted Participant Payback (years)					5.06

Table 16: Water Heating with NEIs Cost-Effectiveness Results - PY2020 and PY2021

Cost-Effectiveness Test	Levelized $/kWh	Costs	Benefits	Net Benefits	Benefit/Cost Ratio
Total Resource Cost Test (PTRC) + Conservation Adder	$0.1011	$2,197,270	$2,599,868	$402,599	1.18
Total Resource Cost Test (TRC) No Adder	$0.1011	$2,197,270	$2,366,958	$169,689	1.08
Utility Cost Test (UCT)	$0.0694	$1,506,991	$2,329,101	$822,110	1.55
Participant Cost Test (PCT)		$1,493,941	$2,955,242	$1,461,300	1.98
Rate Impact Test (RIM)		$3,620,713	$2,329,101	($1,291,612)	0.64
Lifecycle Revenue Impacts ($/kWh)					$0.0001050
Discounted Participant Payback (years)					6.57

Table 17: HVAC with NEIs Cost-Effectiveness Results - PY2020 and PY2021

Cost-Effectiveness Test	Levelized $/kWh	Costs	Benefits	Net Benefits	Benefit/Cost Ratio
Total Resource Cost Test (PTRC) + Conservation Adder	$0.1033	$3,523,718	$4,256,084	$732,366	1.21
Total Resource Cost Test (TRC) No Adder	$0.1033	$3,523,718	$3,870,920	$347,202	1.10
Utility Cost Test (UCT)	$0.0712	$2,428,871	$3,851,642	$1,422,772	1.59
Participant Cost Test (PCT)		$2,179,276	$4,466,321	$2,287,045	2.05
Rate Impact Test (RIM)		$5,791,485	$3,851,642	($1,939,843)	0.67
Lifecycle Revenue Impacts ($/kWh)					$0.0001418
Discounted Participant Payback (years)					5.92

Table 18: Whole Home with NEIs Cost-Effectiveness Results - PY2020 and PY2021

Cost-Effectiveness Test	Levelized $/kWh	Costs	Benefits	Net Benefits	Benefit/Cost Ratio
Total Resource Cost Test (PTRC) + Conservation Adder	$0.1107	$492,565	$607,432	$114,867	1.23
Total Resource Cost Test (TRC) No Adder	$0.1107	$492,565	$552,703	$60,138	1.12
Utility Cost Test (UCT)	$0.0724	$322,341	$547,285	$224,944	1.70
Participant Cost Test (PCT)		$409,635	$746,560	$336,925	1.82
Rate Impact Test (RIM)		$824,071	$547,285	($276,786)	0.66
Lifecycle Revenue Impacts ($/kWh)					$0.0000158
Discounted Participant Payback (years)					19.09

Table 19: Building Shell with NEIs Cost-Effectiveness Results - PY2020 and PY2021

Cost-Effectiveness Test	Levelized $/kWh	Costs	Benefits	Net Benefits	Benefit/Cost Ratio
Total Resource Cost Test (PTRC) + Conservation Adder	$0.1852	$154,122	$337,081	$182,959	2.19
Total Resource Cost Test (TRC) No Adder	$0.1852	$154,122	$326,461	$172,338	2.12
Utility Cost Test (UCT)	$0.0642	$53,451	$106,200	$52,750	1.99
Participant Cost Test (PCT)		$138,459	$352,175	$213,715	2.54
Rate Impact Test (RIM)		$147,577	$106,200	($41,377)	0.72
Lifecycle Revenue Impacts ($/kWh)					$0.0000028
Discounted Participant Payback (years)					13.34

Table 20: Plumbing with NEIs Cost-Effectiveness Results - PY2020 and PY2021

Cost-Effectiveness Test	Levelized $/kWh	Costs	Benefits	Net Benefits	Benefit/Cost Ratio
Total Resource Cost Test (PTRC) + Conservation Adder	$0.0385	$2,139	$70,679	$68,540	33.04
Total Resource Cost Test (TRC) No Adder	$0.0385	$2,139	$70,084	$67,945	32.76
Utility Cost Test (UCT)	$0.0444	$2,468	$5,950	$3,482	2.41
Participant Cost Test (PCT)		$1	$69,727	$69,725	52,770.51
Rate Impact Test (RIM)		$7,731	$5,950	($1,780)	0.77
Lifecycle Revenue Impacts ($/kWh)					$0.0000003
Discounted Participant Payback (years)					0.00

Table 21: Home Energy Kit with NEIs Cost-Effectiveness Results - PY2020 and PY2021

Cost-Effectiveness Test	Levelized $/kWh	Costs	Benefits	Net Benefits	Benefit/Cost Ratio
Total Resource Cost Test (PTRC) + Conservation Adder	$0.0169	$364,865	$6,223,801	$5,858,936	17.06
Total Resource Cost Test (TRC) No Adder	$0.0169	$364,865	$5,996,726	$5,631,861	16.44
Utility Cost Test (UCT)	$0.0169	$365,522	$2,270,747	$1,905,225	6.21
Participant Cost Test (PCT)		$77,766	$5,826,233	$5,748,467	74.92
Rate Impact Test (RIM)		$2,387,353	$2,270,747	($116,605)	0.95
Lifecycle Revenue Impacts ($/kWh)					$0.0000863
Discounted Participant Payback (years)					0.12

Table 22: Lighting with NEIs Cost-Effectiveness Results - PY2020 and PY2021

Cost-Effectiveness Test	Levelized $/kWh	Costs	Benefits	Net Benefits	Benefit/Cost Ratio
Total Resource Cost Test (PTRC) + Conservation Adder	$0.0603	$1,229,537	$3,107,566	$1,878,028	2.53
Total Resource Cost Test (TRC) No Adder	$0.0603	$1,229,537	$2,892,521	$1,662,984	2.35
Utility Cost Test (UCT)	$0.0565	$1,150,971	$2,150,445	$999,474	1.87
Participant Cost Test (PCT)		$797,420	$3,330,817	$2,533,397	4.18
Rate Impact Test (RIM)		$3,020,858	$2,150,445	($870,413)	0.71
Lifecycle Revenue Impacts ($/kWh)					$0.0000965
Discounted Participant Payback (years)					1.44

Table 23: Home Energy Savings Non-Energy Impacts - PY2020 and PY2021

Measure	Annual Non-Energy Impacts per Measure	Total Installs	Measure Life	Total Present Value NEIs
Energy Savings Kit - Best - 2 Bathrooms - WA	$165,482.00	2	9	$2,089,527
Energy Savings Kit - Best - 1 Bathroom - WA	$101,845.50	2	9	$1,286,876
Energy Savings Kit - Water Feature 1 - WA	$1,178.00	2	10	$16,054
Energy Savings Kit - Water Feature 2 - WA	$24,491.48	2	10	$333,522
Fixture - Downlight - 4000 to 7999 Lumens - WA	$10,163.16	2	6	$93,934
Fixture - Downlight - 2000 to 3999 Lumens - WA	$13,041.90	2	6	$120,382
Fixture - Track - 1000 to 1999 Lumens - WA	$9,818.88	2	8	$113,534
Fixture - Track - 4000 to 7999 Lumens - WA	$7,074.84	2	8	$82,012
Fixture - Exterior Porch - 4000 to 7999 Lumens - WA	$4,904.13	2	5	$38,693
Fixture - Ceiling & Wall Flush Mount - 1000 to 1999 Lumens - WA	$5,041.84	2	7	$52,732
Fixture - Exterior Security - 4000 to 7999 Lumens - WA	$3,800.00	2	11	$55,366
LEDs - Reflectors & Outdoor - 250 to 1049 Lumens - WA	$918.22	2	3	$4,670
Fixture - Track - 2000 to 3999 Lumens - WA	$2,787.12	2	8	$32,308
Fixture - Exterior Porch - 500 to 999 Lumens - WA	$3,261.28	2	5	$25,934
Fixture - Ceiling & Wall Flush Mount - 250 to 499 Lumens - WA	$2,370.07	2	7	$24,788
Fixture - Bathroom Vanity - 2000 to 3999 Lumens - WA	$2,186.38	2	9	$27,662
LEDs - Reflectors & Outdoor - 1050 to 1489 Lumens - WA	$1,764.10	2	3	$8,973
LEDs - MR 250 to 499 Lumens (Pin Base) - WA	$1,822.48	2	2	$6,384
Fixture - Bathroom Vanity - 250 to 499 Lumens - WA	$1,605.03	2	9	$20,307
Fixture - Track - 250 to 499 Lumens - WA	$406.08	2	8	$4,704
LEDs - Non-MR Bi-Pin 250 to 499 Lumens (Pin Base) - WA	$274.23	2	10	$3,741
LEDs - Reflectors & Outdoor - 1490 to 2600 Lumens - WA	$464.64	2	4	$3,051
Fixture - Bathroom Vanity - 0 to 249 Lumens - WA	$1,147.23	2	9	$14,515
LEDs - Non-MR Bi-Pin 500 to 999 Lumens (Pin Base) - WA	$264.88	2	9	$3,351
LEDs - MR 500 to 999 Lumens (Pin Base) - WA	$165.66	2	2	$580
LEDs - Globe - 1490 to 2600 Lumens - WA	$560.28	2	5	$4,455
Manufactured Home - Duct Sealing - Contractor Install - eFAF - WA	$1,374.54	1	18	$13,907
Manufactured Home - Smart Thermostat - Heat Pump - WA	$262.95	1	5	$1,080
HPWH Tier 3 Ducted Gas Heat 0-55 Gallons - Self Install - WA	$982.87	1	13	$8,252
HPWH Tier 3 Garage 0-55 Gallons - Self Install - WA	$1,207.98	1	13	$10,142
HPWH Tier 3 Indoor Heat Pump 0-55 Gallons - Self Install - WA	$569.84	1	13	$4,784
HPWH Tier 4 Splits Any Size - WA	$655.56	1	13	$5,504
HPWH Tier 3 Ducted Electric Resistance Heat 0-55 Gallons - Self Install - WA	$474.36	1	13	$3,983
HPWH Tier 3 Indoor Electric Resistance Heat 0-55 Gallons - Self Install - WA	$574.25	1	13	$4,821

Measure	Annual Non-Energy Impacts per Measure	Total Installs	Measure Life	Total Present Value NEIs
Clothes Washers - CEE Tier 2 - Electric DHW & Electric Dryer - WA	$15,393.89	2	14	$261,538
Manufactured Home - Smart Thermostat - eFAF - WA	$358.47	1	5	$1,473
Clothes Dryer - Vented_UCEF 5.30 to 6.09 - WA	$338.25	1	12	$2,698
Clothes Dryer - Vented_UCEF 3.80 to 4.19 - WA	$272.37	1	12	$2,173
Clothes Dryer - Ventless_UCEF 5.30 to 6.09 - WA	$641.69	2	12	$9,730
Clothes Dryer - Ventless_UCEF 3.80 to 4.19 - WA	$752.77	2	12	$11,386
New Homes - Whole Home Performance Path - Electrically Heated - 20% and higher - Tier 2 - WA	$309.73	1	28	$3,788
Clothes Dryer - Ventless_UCEF 3.20 to 3.39 - WA	$362.31	2	12	$5,535
New Manufactured Home - Ecorated - Any Electric - WA	$120.00	1	42	$1,630
Multifamily - Evaporative Coolers - 2000-3499 CFM - WA	$160.55	1	9	$1,050
Clothes Washers - CEE Tier 3 - Electric DHW & Electric Dryer - WA	$4,040.73	2	14	$68,555
Clothes Washers - CEE Tier 3 - Electric DHW & Gas Dryer - WA	$5,385.60	2	14	$91,590
Evaporative Coolers - 2000-3499 CFM - WA	$158.34	1	9	$1,035
Clothes Washers - CEE Tier 2 - Electric DHW & Gas Dryer - WA	$4,288.94	2	14	$72,806
Manufactured Home - Heat Pump - Upgrade with Best Practice Install & Sizing - WA	$80.00	1	15	$732
Clothes Washers - CEE Tier 3 - Gas DHW & Electric Dryer - WA	$3,070.94	2	14	$52,144
Manufactured Home - Insulation - Attic - Electric Resistance - R0 to R22 - WA	$54.60	1	25	$641
Insulation - Wall - Zonal or DHP - R0 to R11 - WA	$40.00	1	45	$550
Clothes Washers - CEE Tier 2 - Gas DHW & Electric Dryer - WA	$2,039.31	2	14	$34,681
Insulation - Wall - Heat Pump - R0 to R11 - WA	$140.92	2	45	$3,650
Low Flow Showerheads - Retail - 1.75 GPM - WA	$4,370.46	2	10	$61,440
HPWH Tier 3 Basement 0-55 Gallons - WA	$26.22	1	13	$220
HPWH Tier 3 Ducted Electric Resistance Heat 0-55 Gallons - WA	$18.09	1	13	$152
Insulation - Floor - Heat Pump - R0 to R30 - WA	$10.00	1	48	$139
Low Flow Showerheads - Retail - 2.00 GPM - WA	$103.88	2	10	$1,417
Insulation - Wall - Electric Heat - CA	$4,440.00	1	45	$61,002
Low Flow Showerheads - Retail - 1.50 GPM - WA	$93.60	2	10	$1,277
Manufactured Home - Windows - Ufactor 30 to Ufactor 25 - Electric Resistance - WA	$87.06	2	25	$1,922
Insulation - Floor - Heat Pump - R0 to R19 - WA	$3.00	1	46	$41
Advanced Power Strips	$262.95	1	5	$1,011
Clothes Dryer - Vented_UCEF 4.70 to 5.29 - WA	$569.84	1	12	$4,251
Clothes Dryer - Ventless_UCEF 6.10 to 7.19 - WA	$655.56	1	12	$4,891

Measure	Annual Non-Energy Impacts per Measure	Total Installs	Measure Life	Total Present Value NEIs
Insulation - Attic - Zonal or DHP - R11 to R49 - WA	$120.00	1	45	$1,542
Windows - Ufactor 30 to Ufactor 25 - Zonal or DHP - WA	$158.34	1	45	$2,035
Clothes Dryer - Vented_UCEF 3.60 to 3.79 - WA	$338.25	1	12	$2,523
Clothes Dryer - Vented_UCEF 4.20 to 4.69 - WA	$272.37	1	12	$2,032
Clothes Dryer - Ventless_UCEF 3.60 to 3.79 - WA	$300.50	1	12	$2,242
Clothes Dryer - Ventless_UCEF 4.20 to 4.69 - WA	$297.56	1	12	$2,220
Clothes Dryer - Ventless_UCEF 7.20 to 8.00 - WA	$309.73	1	12	$2,311
Insulation - Attic - Gas Heated - R11 to R49 - WA	$80.00	1	45	$1,028
Insulation - Attic - Heat Pump - R11 to R49 - WA	$71.40	1	45	$917
Insulation - Attic - Zonal or DHP - R19 to R49 - WA	$54.60	1	45	$702
Insulation - Floor - eFAF - R0 to R19 - WA	$40.00	1	45	$514
Manufactured Home - Insulation - Attic - Heat Pump - R0 to R22 - WA	$31.59	1	25	$347
Manufactured Home - Insulation - Attic - Heat Pump - R11 to R30 - WA	$7,950.00	1	25	$87,278
Multifamily - Insulation - Attic - eFAF - R19 to R49 - WA	$26.22	1	45	$337
Multifamily - Insulation - Attic - Zonal - R19 to R49 - WA	$18.09	1	45	$232
Multifamily - Insulation - Floor - Ductless Heat Pump - R0 to R19 - WA	$9.00	1	49	$117
Multifamily - Insulation - Floor - eFAF - R0 to R19 - WA	$4,440.00	1	45	$57,054
Multifamily - Insulation - Floor - Zonal - R0 to R19 - WA	$13.57	1	45	$174
Multifamily - Insulation - Floor - Zonal - R0 to R30 - WA	$3.00	1	45	$39

Memorandum

To: Don Jones, Jr. and Nancy Goddard, Pacific Power

From: Kurtis Kolnowski and Brielle Bushong, AEG

Date: September 30, 2019

Re: Washington Home Energy Report Program Cost-Effectiveness Analysis – 2020-2021 Biennium

AEG estimated the cost-effectiveness of Pacific Power's Home Energy Report Program in the state of Washington based on Program Year (PY) 2020 and PY2021 costs and savings estimates provided by Pacific Power.[37] The memo provides analysis inputs and results in the following tables:

Table 1: Cost-Effectiveness Analysis Inputs

Table 2: Annual Program Costs, Nominal - PY2020 and 2021

Table 3: Annual Savings - PY2020 and 2021

Table 4: Home Energy Reports Cost-Effectiveness Results - PY2020 and 2021

The Home Energy Report Program will be implemented in PY2020 and PY2021, with savings persisting into PY2022. The program was analyzed jointly for the PY2020 and PY2021 period. The following assumptions were utilized in the analysis:

- Avoided Costs: developed from a draft run of Portfolio "P-18 v06292019" in PacifiCorp's 2019 Integrated Resource Plan IRP),[38] converted into annual values using load shapes from the same IRP.
- Modeling Inputs: measure savings, costs, non-energy impacts (NEIs), measure lives, incentive levels, program delivery, and portfolio costs were based on estimates provided by PacifiCorp.
- Net-to-Gross (NTG): ratios are assumed to be 1.0, consistent with condition (8)(a) to Order 01 in Docket UE-152-072.
- Retail Rates: 2018 rates provided by PacifiCorp and escalated by inflation for future years.

Tables 1 through 3 below summarize cost-effectiveness assumptions for the Washington Home Energy Report program.

[37] Consistent with Section 480-109-100 (10) (b) of the Washington Administrative Code, the Low-Income Weatherization program is excluded from this analysis.

[38] Proxy decrement study aligned with P-18 proxy portfolio.

Table 1: Cost-Effectiveness Analysis Inputs

Parameter	Value
Discount Rate[39]	6.920%
Residential Line Loss	9.670%
Residential Energy Rate ($/kWh)	$0.0836
Inflation Rate[40]	2.280%
Measure Life	2
Net-to-Gross	100%
Realization Rate	100%

Table 2: Annual Program Costs, Nominal - PY2020 and 2021

Program Year	Program Delivery	Utility Admin	Incentives	Total Utility Costs
2020	$260,000	$27,500	$0	$287,500
2021	$239,000	$27,500	$0	$266,500
Total Program	**$499,000**	**$55,000**	**$0**	**$554,000**

Table 3: Annual Savings - PY2020 and 2021

Program Year	Gross kWh Savings at Site	Net kWh Savings at Site	Gross kWh Savings at Generator	Net kWh Savings at Generator
2020	4,230,000	4,230,000	4,639,041	4,639,041
2021	8,260,000	8,260,000	9,058,742	9,058,742
2022	6,610,000	6,610,000	7,249,187	7,249,187

Table 4 presents the cost-effectiveness results. The program is cost-effective for the UCT, PCT, PacifiCorp TRC, and TRC tests. Costs and benefits are identical in the TRC and UCT tests because there is no customer cost to participate in the program.

[39] Consistent with draft assumptions for PacifiCorp's 2019 Integrated Resource Plan.
[40] Future rates determined using a 2.28% annual escalator.

Table 4: Home Energy Reports Cost-Effectiveness Results - PY2020 and 2021 [41]

Cost-Effectiveness Test	Levelized $/kWh	Costs	Benefits	Net Benefits	Benefit/Cost Ratio
Total Resource Cost Test (PTRC) + Conservation Adder	$0.0303	$502,013	$1,752,343	$1,250,331	3.49
Total Resource Cost Test (TRC) No Adder	$0.0303	$502,013	$1,593,039	$1,091,027	3.17
Utility Cost Test (UCT)	$0.0303	$502,013	$1,593,039	$1,091,027	3.17
Participant Cost Test (PCT)		$0	$1,453,914	$1,453,914	n/a
Rate Impact Test (RIM)		$1,955,926	$1,593,039	($362,887)	0.81
Lifecycle Revenue Impacts ($/kWh)					$0.0001894
Discounted Participant Payback (years)					0.00

[41] Note that the values in the table have been discounted to 2020 dollars. Therefore, the program and administrative costs are slightly lower than shown in Table 2.

Memorandum

To: Don Jones, Jr. and Nancy Goddard, Pacific Power

From: Kurtis Kolnowski and Brielle Bushong, AEG

Date: September 30, 2019

Re: Washington NEEA Cost-Effectiveness – PY2020-2021 Biennium

AEG estimated the cost-effectiveness of Pacific Power's allocation of the Northwest Energy Efficiency Alliance's (NEEA's) Washington business plan in the state of Washington based on Program Year (PY) 2020 and PY2021 costs and savings estimates provided by Pacific Power. The memo provides analysis inputs and results in the following tables:

Table 1: Cost-Effectiveness Analysis Inputs

Table 2: Annual Program Costs, Nominal - PY2020 and PY2021

Table 3: Annual Savings - PY2020 and PY2021

Table 4: NEEA Cost-Effectiveness Results - PY2020 and PY2021

The NEEA business plan will be implemented in PY2020-2021. The following assumptions were utilized in the analysis:

- Avoided Costs: developed from a draft run of Portfolio "P-18 v06292019" in PacifiCorp's 2019 Integrated Resource Plan IRP)[42], converted into annual values using load shapes from the same IRP.
- Modeling Inputs: measure savings, costs, non-energy impacts (NEIs), measure lives, incentive levels, program delivery, and portfolio costs were based on estimates provided by PacifiCorp.
- Net-to-Gross (NTG): ratios are assumed to be 1.0, consistent with condition (8)(a) to Order 01 in Docket UE-152-072.
- Retail Rates: 2018 rates provided by PacifiCorp and escalated by inflation for future years.

Tables 1 through 3 below summarize cost-effectiveness assumptions and results for the PacifiCorp's allocation of NEEA's Washington business plan.

[42] Proxy decrement study aligned with P-18 proxy portfolio.

Table 1: Cost-Effectiveness Analysis Inputs

Parameter	Value
Discount Rate[43]	6.920%
Residential Line Loss	9.670%
Commercial Line Loss	9.531%
Industrial Line Loss	8.161%
Residential Energy Rate ($/kWh)	$0.0836
Commercial Energy Rate ($/kWh)	$0.0717
Industrial Energy Rate ($/kWh)	$0.0887
Inflation Rate[44]	2.280%
Net-to-Gross	100%
Realization Rate	100%

Table 2: Annual Program Costs, Nominal - PY2020 and PY2021

Parameter	Value
Program Delivery	$1,618,777
Utility Admin	$55,000
Incentives	$0
Total Utility Budget	$1,673,777
Gross Customer Costs	$0

Table 3: Annual Savings - PY2020 and PY2021

Parameter	Value
Gross kWh Savings at Site	6,198,000
Realization Rate	100%
Adjusted Gross kWh Savings at Site	6,198,000
Net to Gross Ratio	100%
Net kWh Savings at Site	6,198,000
Measure Life	14

Table 4 presents the Washington NEEA business plan cost-effectiveness; the program is cost-effective for the UCT, PCT, PacifiCorp TRC, and TRC tests. Note that since no gross customer costs have been analyzed, the PCT is cost-effective by default with an immediate participant payback. The TRC and UCT are also identical because all costs are assigned to the utility and there are no reported non-energy impacts (NEIs).

[43] Consistent with draft assumptions for PacifiCorp's 2019 Integrated Resource Plan.
[44] Future rates determined using a 2.28% annual escalator.

Table 4: NEEA Cost-Effectiveness Results - PY2020 and PY2021[45]

Cost-Effectiveness Test	Levelized $/kWh	Costs	Benefits	Net Benefits	Benefit/Cost Ratio
Total Resource Cost Test (PTRC) + Conservation Adder	$0.0300	$1,514,456	$6,617,092	$5,102,636	4.37
Total Resource Cost Test (TRC) No Adder	$0.0300	$1,514,456	$6,015,538	$4,501,082	3.97
Utility Cost Test (UCT)	$0.0300	$1,514,456	$6,015,538	$4,501,082	3.97
Participant Cost Test (PCT)		$0	$4,776,172	$4,776,172	n/a
Rate Impact Test (RIM)		$6,290,628	$6,015,538	($275,090)	0.96
Lifecycle Revenue Impacts ($/kWh)					$0.0001206
Discounted Participant Payback (years)					0.00

[45] Note that the values in the table have been discounted to 2020 dollars. Therefore, the program and administrative costs are slightly lower than shown in Table 2.

Memorandum

To: Don Jones, Jr. and Nancy Goddard, Pacific Power

From: Kurtis Kolnowski and Brielle Bushong, AEG

Date: September 30, 2019

Re: Washington Wattsmart Business Program Cost-Effectiveness Analysis – 2020-2021 Biennium

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AEG estimated the cost-effectiveness of Pacific Power's Wattsmart Business Program in the state of Washington based on Program Year (PY) 2020 and PY2021 costs and savings estimates provided by Pacific Power. The memo provides analysis inputs and results in the following tables:

Table 43: Project Manager / Trade Ally – Low pressure sprinkler replacing worn low pressure sprinkler with NEIs Cost-Effectiveness Results - PY2020 and PY2021
The following assumptions were utilized in the analysis:

- Avoided Costs: developed from a draft run of Portfolio "P-18 v06292019" in PacifiCorp's 2019 Integrated Resource Plan IRP),[46] converted into annual values using load shapes from the same IRP.
- Modeling Inputs: measure savings, costs, non-energy impacts (NEIs), measure lives, incentive levels, program delivery, and portfolio costs were based on estimates provided by PacifiCorp.
- Net-to-Gross (NTG): ratios are assumed to be 1.0, consistent with condition (8)(a) to Order 01 in Docket UE-152-072.
- Retail Rates: 2018 rates provided by PacifiCorp and escalated by inflation for future years.

The following tables summarize cost-effectiveness assumptions and results for the Washington Wattsmart Business Program. The cost-effectiveness analysis inputs are shown in Table 1 through Table 3 below:

Table 1: Cost-Effectiveness Analysis Inputs

Parameter	Value
Discount Rate[47]	6.920%
Commercial Line Loss	9.531%
Industrial Line Loss	8.161%
Irrigation Line Loss	9.670%
Commercial Energy Rate ($/kWh)	$0.0717
Industrial Energy Rate ($/kWh)	$0.0887
Irrigation Energy Rate ($/kWh)	$0.1327
Inflation Rate[48]	2.280%

[46] Proxy decrement study aligned with P-18 proxy portfolio.
[47] Consistent with draft assumptions for PacifiCorp's 2019 Integrated Resource Plan.
[48] Future rates determined using a 2.28% annual escalator.

Table 2: Annual Program Costs, Nominal - PY2020 and PY2021

Delivery Channel	Measure Category	Program Delivery	Utility Admin.	Vendor Incentive Pilot	Incentives	Total Utility Budget	Gross Customer Costs
Midstream	Lighting	$125,439	$32,154	$0	$162,963	$320,556	$452,675
Small Business	Lighting	$170,779	$33,927	$22,339	$529,220	$756,266	$754,400
Project Manager / Trade Ally	Lighting	$2,223,156	$495,843	$327,661	$2,786,728	$5,833,388	$8,846,112
Project Manager / Trade Ally	Building Shell	$6,534	$1,449	$0	$9,600	$17,583	$25,600
Project Manager / Trade Ally	Compressed Air	$337,120	$73,157	$0	$509,787	$920,064	$1,208,845
Project Manager / Trade Ally	Energy Management	$372,722	$109,836	$0	$490,631	$973,189	$793,495
Project Manager / Trade Ally	Farm & Dairy	$44,345	$6,521	$0	$39,600	$90,467	$75,600
Project Manager / Trade Ally	Food Service Equipment	$3,267	$725	$0	$4,800	$8,791	$12,800
Project Manager / Trade Ally	HVAC	$281,463	$74,329	$50,000	$434,161	$839,953	$921,662
Project Manager / Trade Ally	Commercial	$56,000	$0	$0	$0	$56,000	$0
Project Manager / Trade Ally	Motors	$249,408	$72,783	$0	$549,571	$871,761	$908,242
Project Manager / Trade Ally	Refrigeration	$239,607	$70,609	$0	$530,254	$840,470	$1,251,072
Project Manager / Trade Ally	Adaptive Refrigeration Control	$59,127	$8,695	$0	$57,600	$125,422	$105,600
Project Manager / Trade Ally	Fast Acting Doors	$177,382	$26,084	$0	$214,560	$418,026	$434,880

Project Manager / Trade Ally	Wastewater	$26,623	$7,845	$0	$36,058	$70,526	$139,008
Project Manager / Trade Ally	Additional Measures	$133,115	$39,227	$0	$321,941	$494,283	$673,320
Project Manager / Trade Ally	Custom Capital Projects	$354,764	$52,169	$0	$374,400	$781,333	$921,600
Project Manager / Trade Ally	Irrigation Pump VFD	$35,476	$5,217	$0	$43,200	$83,893	$92,160
Project Manager / Trade Ally	Irrigation Pump Upgrades, Custom	$44,345	$6,521	$0	$39,600	$90,467	$93,600
Project Manager / Trade Ally	Rotating sprinkler	$169	$25	$0	$200	$393	$5,920
Project Manager / Trade Ally	Impact sprinkler, New or Rebuilt	$675	$99	$0	$800	$1,573	$23,680
Project Manager / Trade Ally	Nozzle	$1,987	$290	$0	$300	$2,577	$1,752
Project Manager / Trade Ally	Gasket for wheel line, hand line, or portable main line	$1,657	$242	$0	$1,600	$3,499	$3,280
Project Manager / Trade Ally	Drain for wheel line, hand line, portable main line, pivot, or linear	$402	$59	$0	$600	$1,061	$1,773
Project Manager / Trade Ally	Pipe repair	$4,753	$694	$0	$6,400	$11,847	$14,360
Project Manager / Trade Ally	Wheel line leveler	$58	$9	$0	$100	$167	$759
Project Manager / Trade Ally	Pressure regulator	$871	$127	$0	$1,200	$2,198	$4,572
Project Manager / Trade Ally	Low pressure sprinkler	$871	$127	$0	$1,200	$2,198	$9,984

	replacing worn low pressure sprinkler						
Project Manager / Trade Ally	Low pressure sprinkler replacing impact sprinkler	$875	$128	$0	$960	$1,963	$4,502
Total Program		**$4,952,988**	**$1,118,891**	**$400,000**	**$7,148,034**	**$13,619,914**	**$17,781,254**

Table 3: Annual Savings - PY2020 and PY2021

Delivery Channel	Measure Category	Gross kWh Savings at Site	Realization Rate	Adjusted Gross kWh Savings at Site	Net to Gross Ratio	Net kWh Savings at Site	Average Measure Life
Midstream	Lighting	1,810,700	90%	1,629,630	100%	1,629,630	12
Small Business	Lighting	1,886,000	90%	1,697,400	100%	1,697,400	9
Project Manager / Trade Ally	Lighting	27,644,100	90%	24,879,690	100%	24,879,690	9
Project Manager / Trade Ally	Building Shell	80,000	94%	75,200	100%	75,200	15
Project Manager / Trade Ally	Compressed Air	4,046,400	96%	3,884,544	100%	3,884,544	13
Project Manager / Trade Ally	Energy Management	6,081,600	100%	6,081,600	100%	6,081,600	3
Project Manager / Trade Ally	Farm & Dairy	360,000	92%	332,280	100%	332,280	11
Project Manager / Trade Ally	Food Service Equipment	40,000	94%	37,600	100%	37,600	12
Project Manager / Trade Ally	HVAC	4,136,400	100%	4,136,400	100%	4,136,400	13
Project Manager / Trade Ally	Commercial	0	0%	0	0%	0	0
Project Manager / Trade Ally	Motors	4,029,600	94%	3,787,824	100%	3,787,824	15
Project Manager / Trade Ally	Refrigeration	3,909,600	100%	3,909,600	100%	3,909,600	14
Project Manager / Trade Ally	Adaptive Refrigeration Control	480,000	100%	480,000	100%	480,000	10
Project Manager / Trade Ally	Fast Acting Doors	1,440,000	100%	1,440,000	100%	1,440,000	8

Project Manager / Trade Ally	Wastewater	434,400	94%	408,336	100%	408,336	15
Project Manager / Trade Ally	Additional Measures	2,172,000	92%	2,004,756	100%	2,004,756	15
Project Manager / Trade Ally	Custom Capital Projects	2,880,000	92%	2,658,240	100%	2,658,240	15
Project Manager / Trade Ally	Irrigation Pump VFD	288,000	100%	288,000	100%	288,000	10
Project Manager / Trade Ally	Irrigation Pump Upgrades, Custom	360,000	100%	360,000	100%	360,000	15
Project Manager / Trade Ally	Rotating sprinkler	1,360	100%	1,360	100%	1,360	4
Project Manager / Trade Ally	Impact sprinkler, New or Rebuilt	5,440	100%	5,440	100%	5,440	4
Project Manager / Trade Ally	Nozzle	16,020	100%	16,020	100%	16,020	4
Project Manager / Trade Ally	Gasket for wheel line, hand line, or portable main line	13,360	100%	13,360	100%	13,360	5
Project Manager / Trade Ally	Drain for wheel line, hand line, portable main line, pivot, or linear	3,240	100%	3,240	100%	3,240	5
Project Manager / Trade Ally	Pipe repair	38,320	100%	38,320	100%	38,320	8
Project Manager / Trade Ally	Wheel line leveler	470	100%	470	100%	470	5
Project Manager / Trade Ally	Pressure regulator	7,020	100%	7,020	100%	7,020	5
Project Manager / Trade Ally	Low pressure sprinkler replacing	7,020	100%	7,020	100%	7,020	5

	worn low pressure sprinkler						
Project Manager / Trade Ally	Low pressure sprinkler replacing impact sprinkler	7,056	100%	7,056	100%	7,056	4
Total Program		**62,178,106**	**94%**	**58,190,406**	**100%**	**58,190,406**	**10**

Table 4 presents the cost-effectiveness results by delivery channel, measure category and the total program. Table 5 presents the Wattsmart Business Program cost-effectiveness; the program is cost-effective for the PacifiCorp TRC, TRC, UCT and PCT.

Table 4: Benefit/Cost Ratios by Delivery Channel and Measure Category - PY2020 and PY2021

Delivery Channel	Measure Category	PTRC	TRC	UCT	PCT	RIM
Midstream	Lighting	2.62	2.38	4.52	2.91	0.99
Small Business	Lighting	1.33	1.20	1.56	1.97	0.69
Project Manager / Trade Ally	Lighting	1.61	1.46	2.98	1.93	0.86
Project Manager / Trade Ally	Building Shell	3.49	3.17	6.05	2.81	1.33
Project Manager / Trade Ally	Compressed Air	2.53	2.30	4.05	3.40	0.82
Project Manager / Trade Ally	Energy Management	1.73	1.57	2.06	2.36	0.85
Project Manager / Trade Ally	Farm & Dairy	2.42	2.20	3.07	4.11	0.77
Project Manager / Trade Ally	Food Service Equipment	2.35	2.14	4.08	2.45	1.02
Project Manager / Trade Ally	HVAC	4.26	3.88	6.12	3.73	1.34
Project Manager / Trade Ally	Commercial	0.00	0.00	0.00	0.00	0.00
Project Manager / Trade Ally	Motors	3.58	3.25	4.59	4.75	0.86
Project Manager / Trade Ally	Refrigeration	2.87	2.61	4.83	2.96	1.01
Project Manager / Trade Ally	Adaptive Refrigeration Control	2.41	2.20	3.04	3.33	0.91
Project Manager / Trade Ally	Fast Acting Doors	1.61	1.47	2.24	2.18	0.81
Project Manager / Trade Ally	Wastewater	2.80	2.55	6.18	2.71	1.08
Project Manager / Trade Ally	Additional Measures	2.80	2.55	4.36	3.30	0.90
Project Manager / Trade Ally	Custom Capital Projects	2.35	2.14	3.63	3.37	0.81
Project Manager / Trade Ally	Irrigation Pump VFD	2.12	1.92	3.05	4.01	0.62
Project Manager / Trade Ally	Irrigation Pump Upgrades, Custom	3.34	3.03	4.84	6.33	0.68
Project Manager / Trade Ally	Rotating sprinkler	0.09	0.09	1.34	0.15	0.48
Project Manager / Trade Ally	Rotating sprinkler (with NEIs)	0.62	0.61	1.34	0.69	0.48
Project Manager / Trade Ally	Impact sprinkler, New or Rebuilt	0.09	0.09	1.34	0.15	0.48
Project Manager / Trade Ally	Impact sprinkler, New or Rebuilt (with NEIs)	0.62	0.61	1.34	0.69	0.48
Project Manager / Trade Ally	Nozzle	1.70	1.54	2.41	4.87	0.57
Project Manager / Trade Ally	Nozzle (with NEIs)	1.93	1.77	2.41	5.41	0.57
Project Manager / Trade Ally	Gasket for wheel line, hand line, or portable main line	1.34	1.22	1.80	3.05	0.53
Project Manager / Trade Ally	Gasket for wheel line, hand line, or portable main line (with NEIs)	1.68	1.56	1.80	3.59	0.53
Project Manager / Trade Ally	Drain for wheel line, hand line, portable main line, pivot, or linear	0.75	0.69	1.44	1.49	0.49

Project Manager / Trade Ally	Drain for wheel line, hand line, portable main line, pivot, or linear (with NEIs)	1.18	1.12	1.44	2.03	0.49
Project Manager / Trade Ally	Pipe repair	1.55	1.41	2.36	2.97	0.58
Project Manager / Trade Ally	Pipe repair (with NEIs)	1.95	1.81	2.36	3.52	0.58
Project Manager / Trade Ally	Wheel line leveler	0.30	0.27	1.33	0.52	0.48
Project Manager / Trade Ally	Wheel line leveler (with NEIs)	0.80	0.77	1.33	1.07	0.48
Project Manager / Trade Ally	Pressure regulator	0.66	0.60	1.51	1.23	0.50
Project Manager / Trade Ally	Pressure regulator (with NEIs)	1.37	1.31	1.51	2.09	0.50
Project Manager / Trade Ally	Low pressure sprinkler replacing worn low pressure sprinkler	0.33	0.30	1.51	0.56	0.50
Project Manager / Trade Ally	Low pressure sprinkler replacing worn low pressure sprinkler (with NEIs)	0.69	0.66	1.51	0.96	0.50
Project Manager / Trade Ally	Low pressure sprinkler replacing impact sprinkler	0.55	0.50	1.39	1.02	0.49
Total Program		**2.13**	**1.93**	**3.44**	**2.57**	**0.90**
Total Program (with NEIs)		**2.13**	**1.93**	**3.44**	**2.58**	**0.90**

Table 5: Wattsmart Business Program Cost-Effectiveness Results - PY2020 and PY2021[49]

Cost-Effectiveness Test	Levelized $/kWh	Costs	Benefits	Net Benefits	Benefit/Cost Ratio
Total Resource Cost Test (PTRC) + Conservation Adder	$0.0560	$21,895,394	$46,545,489	$24,650,095	2.13
Total Resource Cost Test (TRC) No Adder	$0.0560	$21,895,394	$42,314,081	$20,418,687	1.93
Utility Cost Test (UCT)	$0.0314	$12,300,476	$42,314,081	$30,013,605	3.44
Participant Cost Test (PCT)		$16,043,425	$41,300,629	$25,257,204	2.57
Rate Impact Test (RIM)		$47,152,598	$42,314,081	($4,838,517)	0.90
Lifecycle Revenue Impacts ($/kWh)					$0.0012646
Discounted Participant Payback (years)					3.86

Table 6 presents the PY2020 and PY2021 cost-effectiveness results for the Midstream Lighting delivery options.

[49] Note that the values in the table have been discounted to 2020 dollars. Therefore, the program and administrative costs are slightly lower than shown in Table 2.

Table 6: Midstream Lighting Cost-Effectiveness Results - PY2020 and PY2021

Cost-Effectiveness Test	Levelized $/kWh	Costs	Benefits	Net Benefits	Benefit/Cost Ratio
Total Resource Cost Test (PTRC) + Conservation Adder	$0.0440	$548,537	$1,436,027	$887,491	2.62
Total Resource Cost Test (TRC) No Adder	$0.0440	$548,537	$1,305,479	$756,943	2.38
Utility Cost Test (UCT)	$0.0231	$288,591	$1,305,479	$1,016,888	4.52
Participant Cost Test (PCT)		$406,165	$1,180,466	$774,301	2.91
Rate Impact Test (RIM)		$1,322,838	$1,305,479	($17,358)	0.99
Lifecycle Revenue Impacts ($/kWh)					$0.0000402
Discounted Participant Payback (years)					4.13

Table 7 presents the PY2020 and PY2021 cost-effectiveness results for the Small Business Lighting delivery options.

Table 7: Small Business Lighting Cost-Effectiveness Results - PY2020 and PY2021

Cost-Effectiveness Test	Levelized $/kWh	Costs	Benefits	Net Benefits	Benefit/Cost Ratio
Total Resource Cost Test (PTRC) + Conservation Adder	$0.0828	$886,280	$1,174,526	$288,246	1.33
Total Resource Cost Test (TRC) No Adder	$0.0828	$886,280	$1,067,751	$181,471	1.20
Utility Cost Test (UCT)	$0.0638	$682,553	$1,067,751	$385,198	1.56
Participant Cost Test (PCT)		$680,683	$1,339,248	$658,564	1.97
Rate Impact Test (RIM)		$1,544,845	$1,067,751	($477,093)	0.69
Lifecycle Revenue Impacts ($/kWh)					$0.0000559
Discounted Participant Payback (years)					4.57

Table 8 through Table 34 presents the PY2020 and PY2021 cost-effectiveness results for the Project Manager / Trade Ally delivery options without NEIs.

Table 8: Project Manager / Trade Ally – Lighting Cost-Effectiveness Results - PY2020 and PY2021

Cost-Effectiveness Test	Levelized $/kWh	Costs	Benefits	Net Benefits	Benefit/Cost Ratio
Total Resource Cost Test (PTRC) + Conservation Adder	$0.0684	$10,726,178	$17,231,310	$6,505,133	1.61
Total Resource Cost Test (TRC) No Adder	$0.0684	$10,726,178	$15,664,828	$4,938,650	1.46
Utility Cost Test (UCT)	$0.0336	$5,260,683	$15,664,828	$10,404,145	2.98
Participant Cost Test (PCT)		$7,971,655	$15,362,640	$7,390,985	1.93
Rate Impact Test (RIM)		$18,117,163	$15,664,828	($2,452,335)	0.86
Lifecycle Revenue Impacts ($/kWh)					$0.0006553
Discounted Participant Payback (years)					4.67

Table 9: Project Manager / Trade Ally – Building Shell Cost-Effectiveness Results - PY2020 and PY2021

Cost-Effectiveness Test	Levelized $/kWh	Costs	Benefits	Net Benefits	Benefit/Cost Ratio
Total Resource Cost Test (PTRC) + Conservation Adder	$0.0457	$30,420	$106,147	$75,727	3.49
Total Resource Cost Test (TRC) No Adder	$0.0457	$30,420	$96,497	$66,077	3.17
Utility Cost Test (UCT)	$0.0239	$15,940	$96,497	$80,558	6.05

Participant Cost Test (PCT)	$23,168	$65,195	$42,027	2.81
Rate Impact Test (RIM)	$72,447	$96,497	$24,050	1.33
Lifecycle Revenue Impacts ($/kWh)				$0.0000019
Discounted Participant Payback (years)				5.33

Table 10: Project Manager / Trade Ally – Compressed Air Cost-Effectiveness Results - PY2020 and PY2021

Cost-Effectiveness Test	Levelized $/kWh	Costs	Benefits	Net Benefits	Benefit/Cost Ratio
Total Resource Cost Test (PTRC) + Conservation Adder	$0.0464	$1,464,294	$3,703,698	$2,239,404	2.53
Total Resource Cost Test (TRC) No Adder	$0.0464	$1,464,294	$3,366,998	$1,902,704	2.30
Utility Cost Test (UCT)	$0.0264	$832,253	$3,366,998	$2,534,744	4.05
Participant Cost Test (PCT)		$1,093,009	$3,715,809	$2,622,799	3.40
Rate Impact Test (RIM)		$4,087,093	$3,366,998	($720,095)	0.82
Lifecycle Revenue Impacts ($/kWh)					$0.0001185
Discounted Participant Payback (years)					3.82

Table 11: Project Manager / Trade Ally – Energy Management Cost-Effectiveness Results - PY2020 and PY2021

Cost-Effectiveness Test	Levelized $/kWh	Costs	Benefits	Net Benefits	Benefit/Cost Ratio
Total Resource Cost Test (PTRC) + Conservation Adder	$0.0747	$1,153,724	$1,990,845	$837,122	1.73
Total Resource Cost Test (TRC) No Adder	$0.0747	$1,153,724	$1,809,859	$656,136	1.57
Utility Cost Test (UCT)	$0.0570	$879,982	$1,809,859	$929,877	2.06
Participant Cost Test (PCT)		$717,194	$1,693,635	$976,441	2.36
Rate Impact Test (RIM)		$2,130,165	$1,809,859	($320,305)	0.85
Lifecycle Revenue Impacts ($/kWh)					$0.0001599
Discounted Participant Payback (years)					1.27

Table 12: Project Manager / Trade Ally – Farm & Dairy Cost-Effectiveness Results - PY2020 and PY2021

Cost-Effectiveness Test	Levelized $/kWh	Costs	Benefits	Net Benefits	Benefit/Cost Ratio
Total Resource Cost Test (PTRC) + Conservation Adder	$0.0473	$114,469	$276,753	$162,284	2.42
Total Resource Cost Test (TRC) No Adder	$0.0473	$114,469	$251,594	$137,125	2.20
Utility Cost Test (UCT)	$0.0338	$81,889	$251,594	$169,705	3.07
Participant Cost Test (PCT)		$68,419	$281,281	$212,862	4.11
Rate Impact Test (RIM)		$327,331	$251,594	($75,737)	0.77
Lifecycle Revenue Impacts ($/kWh)					$0.0000105
Discounted Participant Payback (years)					2.68

Table 13: Project Manager / Trade Ally – Food Service Equipment Cost-Effectiveness Results - PY2020 and PY2021

Cost-Effectiveness Test	Levelized $/kWh	Costs	Benefits	Net Benefits	Benefit/Cost Ratio
Total Resource Cost Test (PTRC) + Conservation Adder	$0.0524	$15,210	$35,804	$20,594	2.35
Total Resource Cost Test (TRC) No Adder	$0.0524	$15,210	$32,549	$17,339	2.14
Utility Cost Test (UCT)	$0.0275	$7,970	$32,549	$24,579	4.08
Participant Cost Test (PCT)		$11,584	$28,343	$16,759	2.45
Rate Impact Test (RIM)		$31,969	$32,549	$580	1.02
Lifecycle Revenue Impacts ($/kWh)					$0.0000010
Discounted Participant Payback (years)					4.90

Table 14: Project Manager / Trade Ally – HVAC Cost-Effectiveness Results - PY2020 and PY2021

Cost-Effectiveness Test	Levelized $/kWh	Costs	Benefits	Net Benefits	Benefit/Cost Ratio
Total Resource Cost Test (PTRC) + Conservation Adder	$0.0368	$1,195,586	$5,097,524	$3,901,938	4.26
Total Resource Cost Test (TRC) No Adder	$0.0368	$1,195,586	$4,634,112	$3,438,526	3.88
Utility Cost Test (UCT)	$0.0233	$756,601	$4,634,112	$3,877,511	6.12
Participant Cost Test (PCT)		$830,414	$3,097,993	$2,267,579	3.73
Rate Impact Test (RIM)		$3,463,165	$4,634,112	$1,170,947	1.34
Lifecycle Revenue Impacts ($/kWh)					$0.0000964
Discounted Participant Payback (years)					3.32

Table 15: Project Manager / Trade Ally – Commercial Cost-Effectiveness Results - PY2020 and PY2021

Cost-Effectiveness Test	Levelized $/kWh	Costs	Benefits	Net Benefits	Benefit/Cost Ratio
Total Resource Cost Test (PTRC) + Conservation Adder	$0.0000	$50,681	$0	($50,681)	0.00
Total Resource Cost Test (TRC) No Adder	$0.0000	$50,681	$0	($50,681)	0.00
Utility Cost Test (UCT)	$0.0000	$50,681	$0	($50,681)	0.00
Participant Cost Test (PCT)		$0	$0	$0	n/a
Rate Impact Test (RIM)		$50,681	$0	($50,681)	0.00
Lifecycle Revenue Impacts ($/kWh)					$0.0000000
Discounted Participant Payback (years)					n/a

Table 16: Project Manager / Trade Ally – Motors Cost-Effectiveness Results - PY2020 and PY2021

Cost-Effectiveness Test	Levelized $/kWh	Costs	Benefits	Net Benefits	Benefit/Cost Ratio
Total Resource Cost Test (PTRC) + Conservation Adder	$0.0335	$1,112,456	$3,981,784	$2,869,328	3.58
Total Resource Cost Test (TRC) No Adder	$0.0335	$1,112,456	$3,619,803	$2,507,348	3.25
Utility Cost Test (UCT)	$0.0238	$788,246	$3,619,803	$2,831,558	4.59
Participant Cost Test (PCT)		$820,952	$3,901,853	$3,080,901	4.75
Rate Impact Test (RIM)		$4,193,357	$3,619,803	($573,553)	0.86
Lifecycle Revenue Impacts ($/kWh)					$0.0001125
Discounted Participant Payback (years)					3.10

Table 17: Project Manager / Trade Ally – Refrigeration Cost-Effectiveness Results - PY2020 and PY2021

Cost-Effectiveness Test	Levelized $/kWh	Costs	Benefits	Net Benefits	Benefit/Cost Ratio
Total Resource Cost Test (PTRC) + Conservation Adder	$0.0425	$1,411,398	$4,048,069	$2,636,671	2.87
Total Resource Cost Test (TRC) No Adder	$0.0425	$1,411,398	$3,680,063	$2,268,665	2.61
Utility Cost Test (UCT)	$0.0229	$761,741	$3,680,063	$2,918,321	4.83
Participant Cost Test (PCT)		$1,130,771	$3,349,150	$2,218,379	2.96
Rate Impact Test (RIM)		$3,629,776	$3,680,063	$50,286	1.01
Lifecycle Revenue Impacts ($/kWh)					$0.0001010
Discounted Participant Payback (years)					4.73

Table 18: Project Manager / Trade Ally – Adaptive Refrigeration Control Cost-Effectiveness Results - PY2020 and PY2021

Cost-Effectiveness Test	Levelized $/kWh	Costs	Benefits	Net Benefits	Benefit/Cost Ratio
Total Resource Cost Test (PTRC) + Conservation Adder	$0.0479	$156,969	$379,028	$222,058	2.41
Total Resource Cost Test (TRC) No Adder	$0.0479	$156,969	$344,571	$187,601	2.20
Utility Cost Test (UCT)	$0.0347	$113,529	$344,571	$231,042	3.04
Participant Cost Test (PCT)		$95,569	$318,065	$222,496	3.33
Rate Impact Test (RIM)		$379,466	$344,571	($34,895)	0.91
Lifecycle Revenue Impacts ($/kWh)					$0.0000128
Discounted Participant Payback (years)					3.00

Table 19: Project Manager / Trade Ally – Fast Acting Doors Cost-Effectiveness Results - PY2020 and PY2021

Cost-Effectiveness Test	Levelized $/kWh	Costs	Benefits	Net Benefits	Benefit/Cost Ratio
Total Resource Cost Test (PTRC) + Conservation Adder	$0.0692	$577,772	$932,854	$355,082	1.61
Total Resource Cost Test (TRC) No Adder	$0.0692	$577,772	$848,049	$270,277	1.47
Utility Cost Test (UCT)	$0.0453	$378,380	$848,049	$469,669	2.24
Participant Cost Test (PCT)		$393,572	$859,420	$465,849	2.18
Rate Impact Test (RIM)		$1,043,621	$848,049	($195,572)	0.81
Lifecycle Revenue Impacts ($/kWh)					$0.0000407
Discounted Participant Payback (years)					3.66

Table 20: Project Manager / Trade Ally – Wastewater Cost-Effectiveness Results - PY2020 and PY2021

Cost-Effectiveness Test	Levelized $/kWh	Costs	Benefits	Net Benefits	Benefit/Cost Ratio
Total Resource Cost Test (PTRC) + Conservation Adder	$0.0434	$156,822	$439,406	$282,584	2.80
Total Resource Cost Test (TRC) No Adder	$0.0434	$156,822	$399,460	$242,638	2.55
Utility Cost Test (UCT)	$0.0179	$64,618	$399,460	$334,842	6.18
Participant Cost Test (PCT)		$125,641	$340,009	$214,368	2.71
Rate Impact Test (RIM)		$371,190	$399,460	$28,271	1.08
Lifecycle Revenue Impacts ($/kWh)					$0.0000100
Discounted Participant Payback (years)					5.54

Table 21: Project Manager / Trade Ally – Additional Measures Cost-Effectiveness Results - PY2020 and PY2021

Cost-Effectiveness Test	Levelized $/kWh	Costs	Benefits	Net Benefits	Benefit/Cost Ratio
Total Resource Cost Test (PTRC) + Conservation Adder	$0.0431	$764,478	$2,141,107	$1,376,629	2.80
Total Resource Cost Test (TRC) No Adder	$0.0431	$764,478	$1,946,461	$1,181,983	2.55
Utility Cost Test (UCT)	$0.0252	$446,887	$1,946,461	$1,499,574	4.36
Participant Cost Test (PCT)		$608,575	$2,010,239	$1,401,664	3.30
Rate Impact Test (RIM)		$2,166,142	$1,946,461	($219,681)	0.90
Lifecycle Revenue Impacts ($/kWh)					$0.0000581
Discounted Participant Payback (years)					4.54

Table 22: Project Manager / Trade Ally – Custom Capital Projects Cost-Effectiveness Results - PY2020 and PY2021

Cost-Effectiveness Test	Levelized $/kWh	Costs	Benefits	Net Benefits	Benefit/Cost Ratio
Total Resource Cost Test (PTRC) + Conservation Adder	$0.0511	$1,202,460	$2,825,671	$1,623,211	2.35
Total Resource Cost Test (TRC) No Adder	$0.0511	$1,202,460	$2,568,792	$1,366,332	2.14
Utility Cost Test (UCT)	$0.0300	$707,237	$2,568,792	$1,861,555	3.63
Participant Cost Test (PCT)		$834,060	$2,809,908	$1,975,849	3.37
Rate Impact Test (RIM)		$3,178,309	$2,568,792	($609,517)	0.81
Lifecycle Revenue Impacts ($/kWh)					$0.0000852
Discounted Participant Payback (years)					4.45

Table 23: Project Manager / Trade Ally – Irrigation Pump VFD Cost-Effectiveness Results - PY2020 and PY2021

Cost-Effectiveness Test	Levelized $/kWh	Costs	Benefits	Net Benefits	Benefit/Cost Ratio
Total Resource Cost Test (PTRC) + Conservation Adder	$0.0612	$120,246	$254,567	$134,322	2.12
Total Resource Cost Test (TRC) No Adder	$0.0612	$120,246	$231,425	$111,179	1.92
Utility Cost Test (UCT)	$0.0387	$75,936	$231,425	$155,489	3.05
Participant Cost Test (PCT)		$83,406	$334,409	$251,003	4.01
Rate Impact Test (RIM)		$371,248	$231,425	($139,824)	0.62
Lifecycle Revenue Impacts ($/kWh)					$0.0000126
Discounted Participant Payback (years)					2.49

Table 24: Project Manager / Trade Ally – Irrigation Pump Upgrades, Custom Cost-Effectiveness Results - PY2020 and PY2021

Cost-Effectiveness Test	Levelized $/kWh	Costs	Benefits	Net Benefits	Benefit/Cost Ratio
Total Resource Cost Test (PTRC) + Conservation Adder	$0.0410	$130,759	$436,338	$305,579	3.34
Total Resource Cost Test (TRC) No Adder	$0.0410	$130,759	$396,671	$265,912	3.03
Utility Cost Test (UCT)	$0.0257	$81,889	$396,671	$314,783	4.84
Participant Cost Test (PCT)		$84,709	$536,496	$451,787	6.33
Rate Impact Test (RIM)		$582,546	$396,671	($185,875)	0.68
Lifecycle Revenue Impacts ($/kWh)					$0.0000156
Discounted Participant Payback (years)					2.37

Table 25: Project Manager / Trade Ally – Rotating sprinkler Cost-Effectiveness Results - PY2020 and PY2021

Cost-Effectiveness Test	Levelized $/kWh	Costs	Benefits	Net Benefits	Benefit/Cost Ratio
Total Resource Cost Test (PTRC) + Conservation Adder	$1.2390	$5,533	$525	($5,008)	0.09
Total Resource Cost Test (TRC) No Adder	$1.2390	$5,533	$477	($5,055)	0.09
Utility Cost Test (UCT)	$0.0797	$356	$477	$121	1.34
Participant Cost Test (PCT)		$5,358	$814	($4,544)	0.15
Rate Impact Test (RIM)		$989	$477	($512)	0.48
Lifecycle Revenue Impacts ($/kWh)					$0.0000001
Discounted Participant Payback (years)					26.33

Table 26: Project Manager / Trade Ally – Impact sprinkler, New or Rebuilt Cost-Effectiveness Results - PY2020 and PY2021

Cost-Effectiveness Test	Levelized $/kWh	Costs	Benefits	Net Benefits	Benefit/Cost Ratio
Total Resource Cost Test (PTRC) + Conservation Adder	$1.2390	$22,131	$2,100	($20,031)	0.09
Total Resource Cost Test (TRC) No Adder	$1.2390	$22,131	$1,909	($20,222)	0.09
Utility Cost Test (UCT)	$0.0797	$1,424	$1,909	$485	1.34
Participant Cost Test (PCT)		$21,431	$3,255	($18,175)	0.15
Rate Impact Test (RIM)		$3,955	$1,909	($2,047)	0.48
Lifecycle Revenue Impacts ($/kWh)					$0.0000002
Discounted Participant Payback (years)					26.33

Table 27: Project Manager / Trade Ally – Nozzle Cost-Effectiveness Results - PY2020 and PY2021

Cost-Effectiveness Test	Levelized $/kWh	Costs	Benefits	Net Benefits	Benefit/Cost Ratio
Total Resource Cost Test (PTRC) + Conservation Adder	$0.0693	$3,647	$6,183	$2,536	1.70
Total Resource Cost Test (TRC) No Adder	$0.0693	$3,647	$5,621	$1,974	1.54
Utility Cost Test (UCT)	$0.0444	$2,333	$5,621	$3,288	2.41
Participant Cost Test (PCT)		$1,586	$7,726	$6,141	4.87
Rate Impact Test (RIM)		$9,788	$5,621	($4,166)	0.57
Lifecycle Revenue Impacts ($/kWh)					$0.0000006
Discounted Participant Payback (years)					0.82

Table 28: Project Manager / Trade Ally – Gasket for wheel line, hand line, or portable main line Cost-Effectiveness Results - PY2020 and PY2021

Cost-Effectiveness Test	Levelized $/kWh	Costs	Benefits	Net Benefits	Benefit/Cost Ratio
Total Resource Cost Test (PTRC) + Conservation Adder	$0.0882	$4,688	$6,286	$1,598	1.34
Total Resource Cost Test (TRC) No Adder	$0.0882	$4,688	$5,714	$1,027	1.22
Utility Cost Test (UCT)	$0.0596	$3,167	$5,714	$2,547	1.80
Participant Cost Test (PCT)		$2,968	$9,054	$6,086	3.05
Rate Impact Test (RIM)		$10,773	$5,714	($5,059)	0.53
Lifecycle Revenue Impacts ($/kWh)					$0.0000006
Discounted Participant Payback (years)					1.64

Table 29: Project Manager / Trade Ally – Drain for wheel line, portable main line, pivot, or linear Cost-Effectiveness Results - PY2020 and PY2021

Cost-Effectiveness Test	Levelized $/kWh	Costs	Benefits	Net Benefits	Benefit/Cost Ratio
Total Resource Cost Test (PTRC) + Conservation Adder	$0.1569	$2,022	$1,524	($497)	0.75
Total Resource Cost Test (TRC) No Adder	$0.1569	$2,022	$1,386	($636)	0.69
Utility Cost Test (UCT)	$0.0745	$960	$1,386	$426	1.44
Participant Cost Test (PCT)		$1,605	$2,388	$783	1.49
Rate Impact Test (RIM)		$2,805	$1,386	($1,419)	0.49
Lifecycle Revenue Impacts ($/kWh)					$0.0000001
Discounted Participant Payback (years)					3.36

Table 30: Project Manager / Trade Ally – Pipe repair Cost-Effectiveness Results - PY2020 and PY2021

Cost-Effectiveness Test	Levelized $/kWh	Costs	Benefits	Net Benefits	Benefit/Cost Ratio
Total Resource Cost Test (PTRC) + Conservation Adder	$0.0807	$17,927	$27,861	$9,934	1.55
Total Resource Cost Test (TRC) No Adder	$0.0807	$17,927	$25,328	$7,401	1.41
Utility Cost Test (UCT)	$0.0483	$10,723	$25,328	$14,605	2.36
Participant Cost Test (PCT)		$12,996	$38,556	$25,560	2.97
Rate Impact Test (RIM)		$43,487	$25,328	($18,159)	0.58
Lifecycle Revenue Impacts ($/kWh)					$0.0000017
Discounted Participant Payback (years)					2.70

Table 31: Project Manager / Trade Ally – Wheel line leveler Cost-Effectiveness Results - PY2020 and PY2021

Cost-Effectiveness Test	Levelized $/kWh	Costs	Benefits	Net Benefits	Benefit/Cost Ratio
Total Resource Cost Test (PTRC) + Conservation Adder	$0.3999	$747	$221	($526)	0.30
Total Resource Cost Test (TRC) No Adder	$0.3999	$747	$201	($546)	0.27
Utility Cost Test (UCT)	$0.0808	$151	$201	$50	1.33
Participant Cost Test (PCT)		$687	$358	($329)	0.52
Rate Impact Test (RIM)		$419	$201	($218)	0.48
Lifecycle Revenue Impacts ($/kWh)					$0.0000000
Discounted Participant Payback (years)					9.59

Table 32: Project Manager / Trade Ally – Pressure regulator Cost-Effectiveness Results - PY2020 and PY2021

Cost-Effectiveness Test	Levelized $/kWh	Costs	Benefits	Net Benefits	Benefit/Cost Ratio
Total Resource Cost Test (PTRC) + Conservation Adder	$0.1806	$5,041	$3,303	($1,738)	0.66
Total Resource Cost Test (TRC) No Adder	$0.1806	$5,041	$3,003	($2,038)	0.60
Utility Cost Test (UCT)	$0.0713	$1,989	$3,003	$1,013	1.51
Participant Cost Test (PCT)		$4,138	$5,083	$945	1.23
Rate Impact Test (RIM)		$5,986	$3,003	($2,983)	0.50
Lifecycle Revenue Impacts ($/kWh)					$0.0000003
Discounted Participant Payback (years)					4.07

Table 33: Project Manager / Trade Ally – Low pressure sprinkler replacing worn low pressure sprinkler Cost-Effectiveness Results - PY2020 and PY2021

Cost-Effectiveness Test	Levelized $/kWh	Costs	Benefits	Net Benefits	Benefit/Cost Ratio
Total Resource Cost Test (PTRC) + Conservation Adder	$0.3561	$9,939	$3,303	($6,636)	0.33
Total Resource Cost Test (TRC) No Adder	$0.3561	$9,939	$3,003	($6,936)	0.30
Utility Cost Test (UCT)	$0.0713	$1,989	$3,003	$1,013	1.51
Participant Cost Test (PCT)		$9,036	$5,083	($3,953)	0.56
Rate Impact Test (RIM)		$5,986	$3,003	($2,983)	0.50
Lifecycle Revenue Impacts ($/kWh)					$0.0000003
Discounted Participant Payback (years)					8.89

Table 34: Project Manager / Trade Ally – Low pressure sprinkler replacing impact sprinkler Cost-Effectiveness Results - PY2020 and PY2021

Cost-Effectiveness Test	Levelized $/kWh	Costs	Benefits	Net Benefits	Benefit/Cost Ratio
Total Resource Cost Test (PTRC) + Conservation Adder	$0.2151	$4,983	$2,724	($2,259)	0.55
Total Resource Cost Test (TRC) No Adder	$0.2151	$4,983	$2,476	($2,507)	0.50
Utility Cost Test (UCT)	$0.0767	$1,777	$2,476	$699	1.39
Participant Cost Test (PCT)		$4,075	$4,152	$77	1.02
Rate Impact Test (RIM)		$5,060	$2,476	($2,584)	0.49
Lifecycle Revenue Impacts ($/kWh)					$0.0000003
Discounted Participant Payback (years)					3.93

Table 35 through Table 43 presents the PY2020 and PY2021 cost-effectiveness results for the Project Manager / Trade Ally delivery options with NEIs. Table 44 details the non-energy benefits included in this analysis.

Table 35: Project Manager / Trade Ally – Rotating sprinkler with NEIs Cost-Effectiveness Results - PY2020 and PY2021

Cost-Effectiveness Test	Levelized $/kWh	Costs	Benefits	Net Benefits	Benefit/Cost Ratio
Total Resource Cost Test (PTRC) + Conservation Adder	$1.2390	$5,533	$3,414	($2,118)	0.62
Total Resource Cost Test (TRC) No Adder	$1.2390	$5,533	$3,367	($2,166)	0.61
Utility Cost Test (UCT)	$0.0797	$356	$477	$121	1.34
Participant Cost Test (PCT)		$5,358	$3,703	($1,654)	0.69
Rate Impact Test (RIM)		$989	$477	($512)	0.48
Lifecycle Revenue Impacts ($/kWh)					$0.0000001
Discounted Participant Payback (years)					5.79

Table 36: Project Manager / Trade Ally – Impact sprinkler, New or Rebuilt with NEIs Cost-Effectiveness Results - PY2020 and PY2021

Cost-Effectiveness Test	Levelized $/kWh	Costs	Benefits	Net Benefits	Benefit/Cost Ratio
Total Resource Cost Test (PTRC) + Conservation Adder	$1.2390	$22,131	$13,658	($8,473)	0.62
Total Resource Cost Test (TRC) No Adder	$1.2390	$22,131	$13,467	($8,664)	0.61
Utility Cost Test (UCT)	$0.0797	$1,424	$1,909	$485	1.34
Participant Cost Test (PCT)		$21,431	$14,813	($6,617)	0.69
Rate Impact Test (RIM)		$3,955	$1,909	($2,047)	0.48
Lifecycle Revenue Impacts ($/kWh)					$0.0000002
Discounted Participant Payback (years)					5.79

Table 37: Project Manager / Trade Ally – Nozzle with NEIs Cost-Effectiveness Results - PY2020 and PY2021

Cost-Effectiveness Test	Levelized $/kWh	Costs	Benefits	Net Benefits	Benefit/Cost Ratio
Total Resource Cost Test (PTRC) + Conservation Adder	$0.0693	$3,647	$7,031	$3,384	1.93
Total Resource Cost Test (TRC) No Adder	$0.0693	$3,647	$6,468	$2,821	1.77
Utility Cost Test (UCT)	$0.0444	$2,333	$5,621	$3,288	2.41
Participant Cost Test (PCT)		$1,586	$8,573	$6,988	5.41
Rate Impact Test (RIM)		$9,788	$5,621	($4,166)	0.57
Lifecycle Revenue Impacts ($/kWh)					$0.0000006
Discounted Participant Payback (years)					0.74

Table 38: Project Manager / Trade Ally – Gasket for wheel line, hand line, or portable main line with NEIs Cost-Effectiveness Results - PY2020 and PY2021

Cost-Effectiveness Test	Levelized $/kWh	Costs	Benefits	Net Benefits	Benefit/Cost Ratio
Total Resource Cost Test (PTRC) + Conservation Adder	$0.0882	$4,688	$7,876	$3,189	1.68
Total Resource Cost Test (TRC) No Adder	$0.0882	$4,688	$7,305	$2,617	1.56
Utility Cost Test (UCT)	$0.0596	$3,167	$5,714	$2,547	1.80
Participant Cost Test (PCT)		$2,968	$10,645	$7,676	3.59
Rate Impact Test (RIM)		$10,773	$5,714	($5,059)	0.53
Lifecycle Revenue Impacts ($/kWh)					$0.0000006
Discounted Participant Payback (years)					1.39

Table 39: Project Manager / Trade Ally –Drain for wheel line, portable main line, pivot, or linear with NEIs Cost-Effectiveness Results - PY2020 and PY2021

Cost-Effectiveness Test	Levelized $/kWh	Costs	Benefits	Net Benefits	Benefit/Cost Ratio
Total Resource Cost Test (PTRC) + Conservation Adder	$0.1569	$2,022	$2,395	$374	1.18
Total Resource Cost Test (TRC) No Adder	$0.1569	$2,022	$2,257	$235	1.12
Utility Cost Test (UCT)	$0.0745	$960	$1,386	$426	1.44
Participant Cost Test (PCT)		$1,605	$3,258	$1,654	2.03
Rate Impact Test (RIM)		$2,805	$1,386	($1,419)	0.49
Lifecycle Revenue Impacts ($/kWh)					$0.0000001
Discounted Participant Payback (years)					2.46

Table 40: Project Manager / Trade Ally – Pipe repair with NEIs Cost-Effectiveness Results - PY2020 and PY2021

Cost-Effectiveness Test	Levelized $/kWh	Costs	Benefits	Net Benefits	Benefit/Cost Ratio
Total Resource Cost Test (PTRC) + Conservation Adder	$0.0807	$17,927	$35,002	$17,075	1.95
Total Resource Cost Test (TRC) No Adder	$0.0807	$17,927	$32,469	$14,542	1.81
Utility Cost Test (UCT)	$0.0483	$10,723	$25,328	$14,605	2.36
Participant Cost Test (PCT)		$12,996	$45,697	$32,701	3.52
Rate Impact Test (RIM)		$43,487	$25,328	($18,159)	0.58
Lifecycle Revenue Impacts ($/kWh)					$0.0000017
Discounted Participant Payback (years)					2.28

Table 41: Project Manager / Trade Ally – Wheel line leveler with NEIs Cost-Effectiveness Results - PY2020 and PY2021

Cost-Effectiveness Test	Levelized $/kWh	Costs	Benefits	Net Benefits	Benefit/Cost Ratio
Total Resource Cost Test (PTRC) + Conservation Adder	$0.3999	$747	$595	($153)	0.80
Total Resource Cost Test (TRC) No Adder	$0.3999	$747	$575	($173)	0.77
Utility Cost Test (UCT)	$0.0808	$151	$201	$50	1.33
Participant Cost Test (PCT)		$687	$732	$45	1.07
Rate Impact Test (RIM)		$419	$201	($218)	0.48
Lifecycle Revenue Impacts ($/kWh)					$0.0000000
Discounted Participant Payback (years)					4.69

Table 42: Project Manager / Trade Ally – Pressure regulator with NEIs Cost-Effectiveness Results - PY2020 and PY2021

Cost-Effectiveness Test	Levelized $/kWh	Costs	Benefits	Net Benefits	Benefit/Cost Ratio
Total Resource Cost Test (PTRC) + Conservation Adder	$0.1806	$5,041	$6,881	$1,840	1.37
Total Resource Cost Test (TRC) No Adder	$0.1806	$5,041	$6,581	$1,540	1.31
Utility Cost Test (UCT)	$0.0713	$1,989	$3,003	$1,013	1.51
Participant Cost Test (PCT)		$4,138	$8,661	$4,523	2.09
Rate Impact Test (RIM)		$5,986	$3,003	($2,983)	0.50
Lifecycle Revenue Impacts ($/kWh)					$0.0000003
Discounted Participant Payback (years)					2.39

Table 43: Project Manager / Trade Ally – Low pressure sprinkler replacing worn low pressure sprinkler with NEIs Cost-Effectiveness Results - PY2020 and PY2021

Cost-Effectiveness Test	Levelized $/kWh	Costs	Benefits	Net Benefits	Benefit/Cost Ratio
Total Resource Cost Test (PTRC) + Conservation Adder	$0.3561	$9,939	$6,857	($3,081)	0.69
Total Resource Cost Test (TRC) No Adder	$0.3561	$9,939	$6,557	($3,382)	0.66
Utility Cost Test (UCT)	$0.0713	$1,989	$3,003	$1,013	1.51
Participant Cost Test (PCT)		$9,036	$8,637	($398)	0.96
Rate Impact Test (RIM)		$5,986	$3,003	($2,983)	0.50
Lifecycle Revenue Impacts ($/kWh)					$0.0000003
Discounted Participant Payback (years)					5.23

Table 44: Wattsmart Business Savings Non-Energy Impacts - PY2020 and PY2021

Measure	Annual Non-Energy Impacts per Measure	Total Installs	Measure Life	Total Present Value NEIs
Rotating sprinkler	$440.00	2	4	$2,890
Impact sprinkler, New or Rebuilt	$1,760.00	2	4	$11,558
Nozzle	$129.00	2	4	$847
Gasket for wheel line, hand line, or portable main line	$200.00	2	5	$1,590
Drain for wheel line, hand line, portable main line, pivot, or linear	$109.50	2	5	$871
Pipe repair	$616.00	2	8	$7,141
Wheel line leveler	$47.00	2	5	$374
Pressure regulator	$450.00	2	5	$3,578
Low pressure sprinkler replacing worn low pressure sprinkler	$447.00	2	5	$3,555

Attachment 2 - Program Tariffs

Schedule 114
RESIDENTIAL ENERGY EFFICIENCY RIDER – OPTIONAL FOR QUALIFYING LOW INCOME CUSTOMERS

PURPOSE:

Service under this schedule is intended to maximize the efficient utilization of the electricity requirement of existing residential dwellings inhabited by customers that meet income guidelines through the installation of permanent energy efficient materials.

APPLICABLE:

To residential Customers residing in single family, multi-family and manufactured home dwellings billed under Schedule 16 or Schedule 17 in all territory served by the Company in the State of Washington. This schedule is applicable to existing dwellings with permanently installed operable electric space heating designed to heat the living space of the dwelling, except as noted under the energy efficient measures section of this tariff.

DESCRIPTION:

Service under this program is available to improve the energy efficiency of applicable residential dwellings connected to Company's system. The decision to extend service under this schedule shall be based on eligibility requirements contained herein.

DEFINITIONS:

(1) "Dwelling" means real or personal property within the state inhabited as the principal residence of a dwelling owner or a tenant. "Dwelling" includes a manufactured home, a single-family home, duplex or multi-unit residential housing. "Dwelling" does not include a recreational vehicle.

(a) Duplexes and fourplexes are eligible if at least one half of the dwelling is occupied by low income tenants.

(b) Triplexes and multi-family dwellings are eligible if at least 66% of the units are occupied by low income tenants.

(2) "Agency" means a non-profit group, Municipality or County authorized to receive funds for installation of weatherization materials in low income properties.

(3) "Energy Audit" means a service provided by the Agency that includes the measurement and analysis of the energy efficiency of a dwelling including energy savings potential that would result from installing energy efficient measures that are determined to be cost effective.

(4) “Low Income” means households qualifying under the federal low income guidelines and certified for eligibility according to agency procedure.

(5) “Major Measures” means ceiling insulation, wall insulation and floor insulation applicable in dwellings with permanently installed electric space heating systems. If physical barriers exist that prohibit the installation of a measure, then the measure is not required as a condition for financial assistance under this schedule.

(continued)

Schedule 114
RESIDENTIAL ENERGY EFFICIENCY RIDER – OPTIONAL FOR QUALIFYING LOW INCOME CUSTOMERS

DEFINITIONS: (Continued)

(6) "Supplemental Measures" are not required measures under this schedule, but may qualify for a Company reimbursement based on audit results or a U.S. Department of Energy approved priority list.

(7) The "Energy Matchmaker Program" in the State of Washington is designed to increase resources for low-income weatherization by leveraging local matching dollars. A community based agency can access the Energy Matchmaker funds by providing a dollar-for-dollar match. Anticipated match providers include utilities, local governments, service organizations and rental housing owners. All measures installed under the Pacific Power Program must also be eligible under the Energy Matchmaker Program.

FINANCIAL ASSISTANCE:

(1) The Company will reimburse the "Agency" 50% of the installed cost of all eligible Energy Efficient Measures listed in this tariff. If Matchmaker Program participating Agencies exhaust Matchmaker Funds, Company will fund "Agency" 100% of costs associated with the installation of eligible Energy Efficient Measures. Measures will be determined to be cost effective (Savings to Investment Ratio of 1.0 or greater) through the results of an U.S. Department of Energy (DOE) approved audit or priority list. Financial assistance will be provided one time only on any individual major or supplemental measure, and up to two times per dwelling.

(2) The Company will reimburse the "Agency" for administrative costs when all major measures determined to be cost effective have been installed. The administrative reimbursement will be calculated as: 15% of the Pacific Power rebate.

(3) The Company will reimburse the "Agency" 50% of the installed cost of repairs necessary to make the installation of the energy efficient measures included in this effective tariff. When matching funds are exhausted funding will be at 100%. The total reimbursement on repairs available to the "Agency" is limited to 15% of the annual reimbursement on energy efficient measures received.

(4) Agencies must notify Company when matching funds are depleted, no less than 30 days prior to billing at 100% funding levels.

(5) Agencies must invoice the Company within ninety days of job completion.

(continued)

Schedule 114
RESIDENTIAL ENERGY EFFICIENCY RIDER – OPTIONAL FOR QUALIFYING LOW INCOME CUSTOMERS

ENERGY EFFICIENT MEASURES:

Financial assistance will be provided based on the results of a cost-effective analysis (Savings to Investment Ratio of 1.0 or greater) through the use of a U.S Department of Energy approved energy audit or priority list. The energy efficient measures eligible for funding must be installed in dwellings with permanently installed operable electric space heat except where noted. Each measure life used in the cost-effective analysis is included in the Washington Department of Commerce's Weatherization Manual. The energy efficient measures that may be eligible for funding are listed as follows:

Major Measures:

(1) Ceiling insulation up to R-49 for ceilings with less than R-30 in place, and vapor barrier materials required when installed with ceiling insulation. R-30 or better attics will not be further insulated.

(2) Floor insulation over unheated spaces up to R-30, and ground cover and other vapor barrier materials as required when installed with floor insulation.

(3) Wall insulation or exterior insulation sheathing up to R-26 for walls with no insulation installed (financing will not be available for the installation of urea-formaldehyde wall insulation).

Nothing shall preclude the Company from providing a reimbursement for the installation of a greater R value of insulation for the above items that are determined to be cost effective (Savings to Investment Ratio of 1.0 or greater) through the audit process.

Supplemental Measures:

(1) Attic ventilation, excluding power ventilators when installed with ceiling insulation (required if needed at the time ceiling insulation is installed). Whole house mechanical ventilation, and spot ventilation for kitchen and baths.

(2) Forced air electric space heating duct insulation and sealing in unheated spaces.

(3) Weather stripping and/or caulking, including blower door assisted air sealing.

(4) Thermal doors.

(continued)

Schedule 114
RESIDENTIAL ENERGY EFFICIENCY RIDER – OPTIONAL FOR QUALIFYING LOW INCOME CUSTOMERS

ENERGY EFFICIENT MEASURES: (continued)
Supplemental Measures:

(5) Dehumidifiers.

(6) Timed thermostats on centrally controlled multi-room heating systems except when used with heat pumps. Heat anticipating type thermostats for zonal electric resistance heating systems. Zonal thermostats must be separate from the heating unit and must be calibrated at the site to within 2°F of actual room temperature in the range of 65°F-75°F.

(7) Energy efficient showerheads, aerators and water pipe wrap where electric water heaters are present. Showerheads with a visible flow rating greater than 2.5 gallons per minute (gpm) will be replaced, and showerheads without a gpm marking may be replaced at the discretion of agency staff.

(8) Water heater blankets: Installed where tank is located in an unconditioned space and in compliance with the Washington Department of Commerce Weatherization Manual.

(9) Water heaters: Tank replacement of existing electric water heaters. Replacement will be a model with an EF rating as follows: <= 55 gallon capacity = 0.94 or greater, > 55 gallon capacity = 2.2 EF or greater. Heat pump water heaters meeting Northwest Energy Efficiency Alliance Northern Climate Specifications replacing an existing electric water heater.

(10) Light emitting diode (LED) and/or fluorescent light fixtures applicable in all homes.

(11) Compact fluorescent light and/or light emitting diode (LED) bulbs applicable in all homes. Energy Star certified bulbs placed in fixtures that are on 2 or more hours per day.

(12) Refrigerators applicable in all homes: Refrigerators with monitored results or listed in the Weatherization Assistance Program Technical Assistance Center database may be replaced with a model with an estimated annual consumption of 600 kWh or less when a SIR of 1.0 or greater is indicated. Replaced refrigerators must be removed and recycled in accordance with EPA guidelines.

(13) Ductless heat pumps may be installed to replace permanently installed electric heat.

(14) Replacement windows with a U-value of 0.30 or less.

(continued)

Schedule 114
RESIDENTIAL ENERGY EFFICIENCY RIDER – OPTIONAL FOR QUALIFYING LOW INCOME CUSTOMERS

PROVISIONS OF SERVICE:

(1) A Department of Energy approved Energy Audit must be completed or an approved priority list used by the Agency prior to installation of the measures by the Agency.

(2) Agency must qualify residential customers for assistance using the Federal Low Income Guidelines.

(3) Measures installed under this schedule shall not receive financial incentives from other Company programs.

(4) Agency shall inspect the installation to ensure that the weatherization meets or exceeds required specifications.

(5) Company may audit Agency weatherization and financial records and inspect the installations in dwellings of customers receiving weatherization under this program. Records will include audit and/or priority list results.

(6) Company shall pay the Agency the amount established under the terms of their contract when provisions of this schedule have been met.

RULES AND REGULATIONS:

Service under this schedule is subject to the General Rules and Regulations contained in the tariff of which this schedule is a part, and to those prescribed by regulatory authorities.

Schedule 118
HOME ENERGY SAVINGS INCENTIVE PROGRAM

PURPOSE:

Service under this tariff is intended to maximize the efficient utilization of the electricity requirements of new and existing loads in new and existing residences including manufactured housing and multi-family dwellings.

APPLICABLE:

To new and existing residential customers in all territory served by the Company in the state of Washington billed on Schedules 16, 17 and 18. Landlords who own rental properties served by the company in the state of Washington where the tenant is billed on Schedules 16, 17 and 18 also qualify for this program.

CUSTOMER PARTICIPATION:

Customer participation is voluntary and is initiated by following the participation procedures listed on the program web site.

DESCRIPTION:

On-going program to deliver incentives for a variety of equipment and services intended for and located in residential dwellings. Home Energy Savings Incentive Program will be delivered by the Program Administrator and periodic changes will be made to insure or enhance program cost effectiveness as defined by the Company.

QUALIFYING EQUIPMENT OR SERVICES:

Equipment or services for residential dwellings, which when correctly installed or performed, result in verifiable electric energy usage reductions where such usage is compared to the existing equipment or baseline equipment as determined by the Company.

PROGRAM ADMINISTRATOR:

Qualified person or entity hired by the Company to administer this program.

PROVISIONS OF SERVICE**:**

1. Qualifying Equipment or Services, incentive amounts, and participation procedures will be listed on the program Web site.

2. Incentive delivery may vary by technology and may include any or all of the following; post purchase mail-in, point-of-purchase buy-down, manufacturer buy-down or pre- purchase offer and approval.

3. Incentives may be offered for year-round or for selected time periods.

4. Incentive offer availability, incentive levels and Qualifying Equipment or Services may be changed by the Program Administrator after consultation with the Company to reflect changing codes and standards, sales volumes, quality assurance data or to enhance program cost effectiveness.

(continued)

Schedule 118
HOME ENERGY SAVINGS INCENTIVE PROGRAM

PROVISIONS OF SERVICE**:** (continued)

5. All changes will occur with a minimum of 45 days notice, be prominently displayed as a change, include a minimum 45 day grace period for processing prior offers (except for manufacturer buy-down incentive delivery) and be communicated at least once to retailers who have participated within the last year.

6. Except for manufacturer buy-downs, incentives paid directly to participants will be in the form of a check issued within 45 days of Program Administrator's receipt of a complete and approved incentive application.

7. Equipment and services receiving an incentive under this program are not eligible for incentives under other Company programs.

8. Company and/or Program Administrator will employ a variety of quality assurance techniques during the delivery of the program. They may differ by equipment or service type and may include, but are not limited to, pre and post installation inspections, phone surveys, retailer invoice reconciliations and confirmation of customer and equipment eligibility.

9. Company may verify or evaluate the energy savings of installed equipment or services. Verification or evaluation may include, but are not limited to, telephone survey, site visit, billing analysis, pre- and post-installation of monitoring equipment as necessary to quantify actual energy savings.

ELECTRIC SERVICE REGULATIONS:

Service under this schedule will be in accordance with the terms of the electric service Agreement between the Customer and the Company. The Electric Service Regulations of the Company on file with and approved by the Washington Utilities and Transportation Commission, including future applicable amendments, will be considered as forming a part of and incorporated in said Agreement.

Schedule 140
NON-RESIDENTIAL ENERGY EFFICIENCY

PURPOSE:

Service under this Schedule is intended to maximize the efficient utilization of the electricity of new and existing non-residential loads through the installation of energy efficiency measures and energy management protocols.

APPLICABLE:

To service under the Company's General Service Schedules 24, 33, 36, 40, 47T, 48T, 51, 52, 53, 54 and 57 in all territory served by the Company in the State of Washington. This Schedule is applicable to new and existing non-residential facilities.

CUSTOMER PARTICIPATION:

Customer participation is voluntary and is initiated by following the participation procedures on the Washington energy efficiency program section of the Company website. The Company shall have the right to qualify participants, at its discretion, based on criteria the Company considers necessary to ensure the effective operation of the measures and utility system. Criteria may include, but will not be limited to cost effectiveness.

DESCRIPTION:

Ongoing program to provide incentives for a variety of equipment and operational improvements located in non-residential facilities. Periodic program changes will be made to insure or enhance program cost effectiveness as defined by the Company.

QUALIFYING MEASURE:

Measures which when installed in an eligible facility result in verifiable electric energy efficiency improvement compared to existing equipment or baseline equipment as determined by the Company. The baseline will be determined with reference to existing equipment, applicable state or federal energy codes, industry standard practice and other relevant factors.

QUALIFYING ENERGY MANAGEMENT:

Operational improvements which when implemented in an eligible facility result in verifiable electric energy savings compared to standard operations as determined by the Company.

PROVISIONS OF SERVICE:

(1) Qualifying equipment or services, incentive amounts, and other terms and conditions will be listed on the Washington energy efficiency program section of the Company website and may be changed by the Company with at least 45 days notice. Such changes will be prominently displayed on the Washington energy efficiency program section of the Company website and include a minimum 45 day grace period for processing prior offers.

(continued)

Schedule 140
NON-RESIDENTIAL ENERGY EFFICIENCY

PROVISIONS OF SERVICE: (continued)

(2) Company may elect to offer incentives through different channels and at different points in the sales process other than individual Energy Efficiency Incentive Agreement/Offer Letter(s) prior to equipment purchase. The differences will depend on and will be consistent for all equipment of similar type.

(3) Incentives may be offered year-round or for selected time periods.

(4) Equipment or services receiving an incentive under this program are not eligible for incentives under other Company programs.

(5) Company will employ a variety of quality assurance techniques during the delivery of the program. They will differ by measure and may include pre and post installation inspections, phone surveys, and confirmation of Owner/Customer and equipment eligibility.

(6) Company may verify or evaluate the energy savings of installed/implemented measures. This verification may include a telephone survey, site visit, review of facility operation characteristics, and pre- and post-installation of monitoring equipment and as necessary to quantify actual energy savings.

(7) Energy Project Manager co-funding is available according to the terms posted on the Washington Energy Efficiency program page of the Company website.

(8) Incentives will not be made available for fuel switching by Owner/Customer.

MINIMUM EQUIPMENT EFFICIENCY:

Retrofit energy efficiency projects must meet minimum equipment efficiency levels and equipment eligibility requirements of qualifying equipment that are listed on the Washington energy efficiency program section of the Company website.

ELECTRIC SERVICE REGULATIONS:

Service under this Schedule will be in accordance with the terms of the Electric Service Agreement between the Customer and the Company. The Electric Service Regulations of the Company on file with and approved by the Utilities & Transportation Commission of the State of Washington, including future applicable amendments, will be considered as forming a part of and incorporated in said Agreement.

Attachment 3 – Evaluation Measurement & Verification Framework

Evaluation, Measurement & Verification Framework For Washington

Updated October 25, 2019

SOURCE DOCUMENTS

Information used in the development of this document came from PacifiCorp practices and experience, and knowledge gained from numerous guides, protocols, papers and reports. References that were used in the development of this framework are:

- Uniform Methods Project: Determining Energy Efficiency Savings for Specific Measures and Uniform Methods Project for Determining Energy Efficiency Program Savings.
- National Action Plan for Energy Efficiency (2007). Model Energy Efficiency Program Impact Evaluation Guide. Prepared by Steven R. Schiller, Schiller Consulting, Inc. www.epa.gov/eeactionplan
- SEE Action (2012) Energy Efficiency Program Impact Evaluation Guide December 2012
- California Evaluation Framework (January 24, 2006) Consortium for Energy Efficiency (2008): "Metering the Unmetered Resource: Evaluation Methods for Achieving Diverse Energy-Efficiency Policy Objectives"
- Efficiency Valuation Organization (2010): "International Performance Measurement and Verification Protocol"
- American Evaluation Association: Guiding Principles for Evaluators
- SEE Action (2012): "EM&V of Residential Behavior-Based Energy Efficiency Programs: Issues and Recommendations" by Lawrence Berkeley National Laboratory
- Roadmap for the Assessment of Energy Efficiency Measures. Regional Technical Forum. December 8, 2015
- Avista Utilities (April 2017): "Evaluation, Measurement and Verification (EM&V) Framework"
- Puget Sound Utilities (March 29, 2011): "Evaluation, Measurement and Verification (EM&V) Framework"
- PacifiCorp's Washington Demand-side Management Advisory Group
- Ethan Goldman, 2018. Your Guidebook to Adoption of M&V 2.0. Prepared by VEIC for the Missouri Department of Economics, Division of Energy under a U.S. Department of Energy, State Energy Program grant-funded project.
- Franconi, Ellen, Matt Gee, Miriam Goldberg, Jessica Granderson, Tim Guiterman, Michael Li, and Brian A. Smith. The Status and Promise of Advanced M&V: An Overview of "M&V 2.0" Methods, Tools, and Applications. Rocky Mountain Institute, 2017 and Lawrence Berkeley National Laboratory, 2017. LBNL report number #LBNL-1007125.
-

Several of the Source Documents include Glossary's which have informed this updated framework. These Glossary's, including the California Evaluation Framework and the Model Energy Efficiency Program Impact Evaluation Guide, are extensive, subject to updates and not replicated in this version of the framework. PacifiCorp would like to extend special acknowledgments to Avista Utilities, Puget Sound Energy, and PacifiCorp's Washington Demand-side Management Advisory Group for their assistance in the documentation of this framework.

TABLE OF CONTENTS

LIST OF ABBREVIATIONS AND ACRONYMS

Advisory Group	PacifiCorp's Demand-side Management Advisory Group
CEE	Consortium for Energy Efficiency
DSMC	DSM Central
DEER	California Database for Energy Efficiency Resources
ECM	Energy conservation measure
EM&V	Evaluation, Measurement & Verification
EUL	Effective Useful Life (measure life)
IPMVP	International Performance Measurement and Verification Protocol
IRP	Integrated Resource Plan
kWh	Kilowatt-hour
M&V	Measurement and Verification
M&V 2.0	Measurement & Verification 2.0
NEEA	Northwest Energy Efficiency Alliance
Portfolio	Energy Efficiency Programs and Market Transformation Efforts
PCT	Participant Cost Test
PacifiCorp Total Resource Cost (recognizes Northwest Region 10 percent Conservation Adder)	
RFP	Request for Proposal
RIM	Ratepayer Impact Measure
Regional Technical Forum of the Northwest Power and Conservation Council	
TRC	Total Resource Cost
UCT	Utility Cost Test
WUTC	Washington Utilities and Transportation Commission
TRL	Technical Reference Library

PREFACE

Purpose and Scope

The purpose of this document is to describe the framework by which PacifiCorp ("the Company") conducts the evaluation, measurement and verification (EM&V) of its energy efficiency programs, incorporating industry best practices with regards to principles of operation, methodologies, evaluation methods, definitions of terms, and protocols. The framework serves as a guide for PacifiCorp and external evaluators in the EM&V of savings acquired through Company energy efficiency programs.

This EM&V Framework document was originally prepared in response to Order 02 in Docket UE-100170 before the Washington Utilities and Transportation Commission ("WUTC"), and updated in response to additional requirements noted in WUTC Docket UE-132047 Order 01 and Docket UE-131723 General Order R-578. The intent of the Framework is to provide clarity, transparency, and a common understanding of methods and assumptions to consider in determining energy and demand savings of energy efficiency program activities. The document provides an overarching and transparent approach to EM&V processes including principles, objectives, metrics, methods, and reporting. The Framework is considered to be a "living document" that will undergo modifications as appropriate.

Background

PacifiCorp works with its customers to reduce the need for investment in supply-side resources and infrastructure by reducing energy and peak consumption through cost-effective energy efficiency programs and market transformation efforts.

The Company currently offers a comprehensive portfolio of customer-focused energy efficiency incentives, services, and a robust communication plan. In addition, the Company receives energy savings and market transformation benefits through its affiliation with the Northwest Energy Efficiency Alliance (NEEA). In the acquisition of cost-effective energy efficiency savings, the Company aspires to best practices in planning, program design, program implementation, customer outreach, and measurement, verification and evaluations.

The Company provides monetary incentives directly to customers and technical assistance to commercial, industrial and agricultural customers in the form of engineering analyses. Customers use the incentives to offset the cost of energy efficient equipment and weatherization. Company programs also provide incentives to retailers or distributors to reduce the cost of energy efficiency equipment sold to customers. Trade allies who install qualifying equipment may also be eligible to receive incentives. The Home Energy Report program provides comparative energy usage data for similar homes within a geographic area. The Low Income Weatherization program provides weatherization services at no cost to income qualified customers. Measures and programs must have an objective analysis to describe whether the investment in electrical energy savings is expected to be cost-effective and how the savings will be achieved.

PacifiCorp maintains and utilizes an external group (the "Advisory Group") to advise the Company on, among other items, the development and modification of a written framework to evaluate, measure, and verify energy savings, and to provide guidance to PacifiCorp regarding

EM&V methodology and measure assumptions used in the assessment of program cost effectiveness. The Advisory Group meets a minimum of four times per year and provides non-binding external oversight of PacifiCorp's EM&V activities.

OVERVIEW OF EM&V FRAMEWORK

This document describes PacifiCorp's approach to evaluating its energy efficiency measures, programs, and portfolio. Evaluations are planned, conducted and reported in a transparent manner recognizing that sound evaluation of energy efficiency programs requires transparency and independence as outlined and documented in this EM&V Framework. Evaluations are conducted using best-practice approaches and techniques including those outlined in the Source Documents section of this Framework.

New technological advances in data collection are pushing traditional EM&V into a relatively new paradigm, collectively referred to as M&V 2.0.[5051] While M&V 2.0 is not intended to replace traditional EM&V activities, it may serve as a useful tool to and provide quicker programmatic feedback to PacifiCorp. Much of the opportunity is available with granular data from advanced meter infrastructure (AMI), but the literature is clear that the techniques also work in non-AMI environments such as PacifiCorp's Washington territory. PacifiCorp's efforts to date have been focused on assessing whether M&V 2.0 tools provide accurate identification of major end use(s) utilizing only monthly billing data.

PacifiCorp has implemented a database ("Technical Reference Library") that is used to catalog measures, the methods and assumptions and data sources used for those assumptions. The database is updated as necessary to reflect updates to program offerings and measure-level assumptions. The Company has also implemented a tracking system ("DSM Central") that tracks project- and/or program-specific information at a more granular and process-centric level. This functionality helps automate the application of business rules associated with each program and system control of claimed savings using an interface with the Technical Reference Library. The cost of developing and maintaining these systems for the benefit of all programs is considered a portfolio-level expense, and depending on the magnitude of the costs in any given year, may be allocated across two years (50/50 allocation) for calculation of cost-effectiveness of the portfolio. EM&V tasks are segregated within PacifiCorp's organization to ensure they are performed and managed by personnel who have a neutral interest in the benefits associated with anticipated savings. While the Company's standard operating procedure for performing EM&V activities is to use external independent evaluators selected through a competitive bid, the Company reserves the right, as appropriate, provided in Docket UE-132047 Order 01 to conduct internal evaluations.
Evaluations are planned, conducted and reported in a transparent manner, affording opportunities for review and comment by the Advisory Group.

[50]EFX16 Session: The Evolution of Evaluation: Revolution or Resolution? EM&V 2.0 New Approaches vs. Traditional Methods. Presentation is available at: https://conduitnw.org/Pages/File.aspx?rid=3436

[51] Your Guidebook to Adoption of M&V 2.0. Definition from page 5. M&V 2.0 refers to the increasing granularity of available energy consumption data, and the enabling of automated M&V methods that continuously analyze the data and provide early, accurate and valuable insights to various stakeholders about energy savings estimates.

- Priorities for evaluation activities, including budgets and schedules, will be provided to the Commission annually as part of the Company's Annual Conservation Plan or Biennial Conservation Plan, depending on the year. . These plans will include a summary of each scheduled evaluation activity, whether the activity will be performed by an external evaluator or internal by PacifiCorp, including summary of work to be completed and budgets.

- Other documents including project scopes, requests for proposals, detailed evaluation plans, and draft and final reports will be prepared for each major EM&V activity and elements can be shared with the Advisory Group upon request.

Reports from EM&V activities including evaluation of energy and demand savings and cost-effectiveness will be available to the Advisory Group, WUTC and other interested stakeholders, consistent with the reporting schedules summarized in Table 3.

EVALUATION PRINCIPLES, OBJECTIVES AND METRICS

EM&V is a catch-all term used in energy efficiency literature to represent the determination of program and project impacts. Evaluation includes "the performance of studies and activities aimed at determining the effects of a program."[52] By definition, Measurement and Verification refers to "Data collection, monitoring, and analysis associated with the calculation of gross energy and demand savings from individual sites or projects. M&V can be a subset of program impact evaluation." [53]

Evaluations should be based on credible and transparent methods and efforts to be successful in capturing the savings that energy efficiency programs offer. Energy efficiency evaluations will develop retrospective estimates of energy savings attributable to a program. Evaluations should also go beyond simply documenting savings to actually improving programs and providing a basis for future savings estimates. While energy efficiency evaluations will be retrospective in nature, the information obtained will be used to inform future conservation potential assessments, conservation plans, forecasts and targets.

Evaluations fall into two major categories, Formative and Outcomes. Formative evaluations are used to develop or improve program designs, and include evaluation types of market characterization studies, potential assessments and process evaluations. Outcomes evaluations help in determining program results, and include evaluation types of impact evaluation and cost-effectiveness analysis.[54] Table 1 provides a summary of the evaluation categories and types of energy efficiency program evaluations.

[52] National Action Plan for Energy Efficiency (2007). Model Energy Efficiency Program Impact Evaluation Guide. Prepared by Steven R. Schiller, Schiller Consulting, Inc. www.epa.gov/eeactionplan
[53] Ibid.
[54] Consortium for Energy Efficiency (2008): "Metering the Unmetered Resource: Evaluation Methods for Achieving Diverse Energy-Efficiency Policy Objectives"

Table 1: Categories and Types of Energy Efficiency Program Evaluation

Evaluation Category	Phase at which Implemented	Evaluation Type	Assessment Level
Formative	Planning and design phase	Market characterization study	Market and/or Program
		Potential Studies	Market and/or Program
	Implementation phase	Process evaluation	Program
Outcomes	Implementation and/or post implementation (ex-post)	Impact evaluation	Program
		Cost effectiveness analysis	Program or Portfolio

- **Process Evaluations** assess program delivery, from design to implementation, in order to identify bottlenecks, efficiencies, what worked, what did not work, constraints, and potential improvements. Timeliness in identifying opportunities for improvement is essential to making corrections along the way.

- **Impact Evaluations** determine the impacts (e.g. energy and demand savings) and co-benefits (e.g. job creation, water savings) that directly result from a program. Impact evaluations also support cost effectiveness analyses aimed at identifying relative program costs and benefits.

- **Cost-Effectiveness Analysis** is the exercise to determine the cost-effectiveness of programs and measures from various viewpoints including Total Resource Cost as modified by the Northwest Power and Conservation Council, Total Resource Cost, Utility Cost, Ratepayer Impact Measure and Participant Cost tests.

- **Market Characterization and Potential Studies** are described in PLANNING AND DESIGN STUDIES section.

This framework, and the industry as a whole, focuses on impact evaluations and the measurement and verification of demand and energy savings associated with specific programs. The results of impact evaluations will inform prospective cost-effectiveness analysis with regards to future program planning.

Guiding Principles and Ethics – Outcomes Evaluations

Evaluation principles for energy efficiency programs are defined by completeness and transparency; relevance and balance in risk management, uncertainty, and cost; and consistency.[55] Consistently applying these principles results in high quality information on which business decisions can be made.

1. *Completeness and transparency*. Results and calculations are coherently and completely compiled. Calculations are well documented in a transparent manner.

[55]National Action Plan for Energy Efficiency (2007). Model Energy Efficiency Program Impact Evaluation Guide. Prepared by Steven R. Schiller, Schiller Consulting, Inc. www.epa.gov/eeactionplan

2. *Relevance and balance in risk management, uncertainty, and costs*. The data, methods, and assumptions are appropriate for the evaluated program. The level of effort expended in the evaluation process is balanced with respect to the value of the savings, the uncertainty of their magnitude, and the risk of overestimated or underestimated savings levels.
3. *Consistency*. Evaluators working with the same data and using the same methods and assumptions will reach the same conclusion.

As outlined in the Evaluation Cycle section below, PacifiCorp will perform EM&V activities on a rotation schedule such that, over the EM&V cycle, all major programs are covered.
When using external evaluators, vendor credibility is essential for providing credible findings and results for the program and for providing recommendations impacting program and investment decisions. See Impact Evaluation Methods and Key Assumptions below for more information.

Evaluation Planning

PacifiCorp plans and scopes its evaluation activities in order to provide the greatest value from its evaluation resources and to ensure transparency in methods and results. The criteria will assist the Company in 1) measuring the effects of the program as a reliable energy resource, 2) evaluating the cost-effectiveness of the program for purpose of program design, 3) identifying recommendations to improve the program, and 4) meeting the requirements of completing timely evaluations. The Company intends to consider the following criteria to assist in prioritizing evaluation activities:

- Size of the program – larger programs, in terms of budget and/or savings, are prioritized above smaller programs.
- Uncertainty regarding the results (e.g. maturity of program, magnitude of changes in the program market, related evaluation results available, etc.) – higher level of uncertainty would increase prioritization, all else equal.
- Combining evaluations of the same programs in other states to leverage economies of scale and reduce the cost to Washington customers.[56]
- Impact on regulatory processes or regulatory oversight: information necessary for regulatory oversight will receive a higher EM&V priority than information that is not necessary for that purpose, all else being equal.
- Cost of evaluation. Alternative approaches should be considered when the value of incrementally better data is less than the cost of that data.
- Timeliness in providing important information for regulatory reporting, program planning, program improvements and other needs.

The following guiding principles will be taken into consideration when planning evaluations:

- Leveraging secondary research as appropriate with modifications as deemed necessary and useful.
- Expert review of program operation and design.
- Key assumptions will be verified in evaluations.

[56] In addition to Washington, PacifiCorp delivers and evaluates energy efficiency programs in California, Idaho, Utah, and Wyoming.

- Over time, evaluations are used to refine input assumptions used in savings estimation and resource analysis in order to improve program delivery.

Verification

A component of the overall evaluation efforts is aimed at the reasonable verification of installations of energy efficient measures and associated documentation through review of documentation, surveys and/or ongoing onsite inspections. Verification of the potential to achieve savings involves regular inspection and commissioning of equipment. However, such verification of the potential to generate savings is considered a program cost and should not be confused with M&V.

PacifiCorp engages in programmatic verification activities, including inspections, quality assurance reviews, and tracking checks and balances as part of routine program implementation and may rely upon these practices in the verification of installation information for the purposes of savings verifications in advance of more formal impact evaluation results. See Exhibit 1 for Measure of Installation Verifications.

In addition, an independent third-party evaluator will be contracted through a competitive bid process to verify calculations of total portfolio MWh savings and review EM&V activities for best practices is memorialized in WAC 480-109-120(4)(b)(v) as a component of utility biennial conservation reports due June 1 of each even-numbered year.

Budget

The budget includes reasonable EM&V activity costs associated with, but not limited to, market studies, process and impact evaluations, cost effectiveness analyses, , and costs associated with EM&V adherence and modifications of framework conducted by both internal PacifiCorp staff and external evaluators.

In WUTC Docket UE-171092, Order 01, spending requirements were set for EM&V activities to ensure adequate attention and resources are expended to verify conservation program results. Consistent with the requirements of Order 01, PacifiCorp must spend a reasonable amount of its conservation budget on EM&V, including a reasonable proportion on independent, third-party EM&V. These costs will be treated as portfolio costs and will not be assigned to programs for purpose of determining the cost effectiveness.

Table 2 outlines the different activities including EM&V, tracking/reporting planning and how the cost of each will be captured in program- and portfolio-level reporting.

Table 2: Treatment of Costs for EM&V Activities

Activity	Cost type	Portfolio-or Program-Specific Cost	Included in EM&V Budget
Program Impact Evaluations	Third Party	Portfolio	Yes
	Internal	Portfolio	Yes
Program Process Evaluations	Third Party	Portfolio	Yes
	Internal	Portfolio	Yes
Annual Performance Reporting, including cost effectiveness	Internal and third party	Portfolio	Yes
Cost Effectiveness Analysis	Internal and third party	Program	No
Potential Studies	Third party and internal	Portfolio	No
Market Characterization Studies	Third party and internal	Program	No
Field/site inspection as part of ongoing program quality control process	Third party	Program	No
	Internal	Program	No
Compliance with tariff and contract	Internal	Program	No
Development and Maintenance of tracking systems	Third party and licensing	Portfolio	No
	Internal	Portfolio	No

A summary report on Washington System Benefits Charge expenditures incurred by the Company in complying with Docket UE-171092 Order 01 will be incorporated into the Annual Report on Conservation Acquisition. The Annual Report will also include a description of the EM&V studies completed and/or underway during the reporting period with reporting of the type of evaluations, whether they were conducted by internal staff or external evaluators, and the program or programs studied.. In addition, a URL link will be provided on completed evaluations with the submission of the annual report.

Evaluation Cycle

PacifiCorp will perform evaluations on a rotation schedule of selected programs such that, over the EM&V cycle, all major programs are covered. Evaluations are scheduled to be performed on all major programs every two years, however, new or changing programs or external influences that may impact the proposed schedule of EM&V activities.

When using external evaluators, the evaluation will be competitively bid through a Request for Proposals ("RFP") process. The rotation schedule will, when appropriate, combine programs from other states in the RFP process, allowing the Company to take advantage of potential cost reductions due to economies of scale. The DSM Business Plan contains information on evaluation specific to reach program.

Captured Data

Critical data to be evaluated are as follows:

- Annual energy acquisition gross savings)
- Cost and benefit data for cost-effectiveness analysis including total project cost, measure cost, measure life, avoided costs, quantifiable non-energy impacts, etc.

- Program quality assurance and compliance to regulatory requirements

- Information on benefits accruing to highly impacted populations or underserved communities as defined in the CETA rules.
- Other information necessary for program and portfolio management
    - Market characterization attributes for measures and programs that may include, but are not limited to, product price and availability, market saturation, customer participation and satisfaction, incremental costs, and effects of codes, standards and prices
    - Other information that may include lost opportunities, demographics, budget targets and other useful information for system planning

EVALUATION PLANNING CYCLE

The hierarchy of documents outlining the planning steps for each evaluation cycle is made up of the following:

1. EM&V Framework – This document is considered a "living document" that will be updated as needed and will remain in place until superseded by regulatory modifications or changed through Advisory Group process.
2. Biennial Business Plan and Annual Conservation Plan – These documents include program-level detail that shows planned expenses and resulting projected energy savings. Program detail will include program descriptions, program measure data, measure incentives and customer and measure eligibility requirements. The plan will also include information on planned EM&V, including summaries of scheduled evaluation activities, whether the activity will be performed by an external evaluator or internally by PacifiCorp staff (see section on Roles and Responsibilities) and information regarding the evaluation activities.
3. Evaluation Plan – New energy efficiency programs will include an evaluation plan at program launch. . The evaluation plan will address issues related to evaluation metrics, baselines, level of effort, estimated budget, tracking and reporting expectations.

Table 3 below illustrates the EM&V planning cycles and documents.

Table 3: Hierarchy of EM&V Planning Cycles / Documents

	EM&V Framework	EM&V Activities	Other Specific EM&V Activities
Document(s)	EM&V Framework	Included in Annual Conservation Plan or the Biennial Business Plan	• Technical Reference Library (TRL) • Statement of Work for significant EM&V projects • Evaluation Plan for new programs • Key issues requiring oversight • Final reports
Contents	The overarching structure and process for EM&V	EM&V major activities proposed for a given cycle: • High level description of major activity • Estimated budgets • Schedule	Details regarding specific EM&V activities including impact and process evaluations, market characterization studies, potential assessments. The TRL contains measures, savings assumptions and data sources used for estimating energy savings.
Schedule	The Framework remains in place as a "living document" that can be updated as needed	Reviewed no less frequently than every two years as part of biennial process and updated as needed	As needed
Reviewers	Advisory Group	Advisory Group	Share with the Advisory Group upon request.

IMPACT EVALUATION METHODS AND KEY ASSUMPTIONS

Evaluation Standards

The key objective of impact evaluations is to produce the most accurate and unbiased estimate of energy and demand savings. PacifiCorp's evaluation methods are founded on industry best practice, based on applicable industry reference documents and guidelines including, but not limited to: NAPEE Guide, IPMVP, California Evaluation Framework and SEE Action (LBNL). The Company observes the following principles in its oversight of impact evaluations:

1. Evaluators will be impartial in their work and will not have compensation, performance appraisal or goals tied to evaluation results.
2. Evaluators are expected to follow the Guiding Principles for Evaluators as documented by the American Evaluation Association, which are:
    - Systematic inquiry
    - Competence
    - Integrity/Honesty
    - Respect for people
    - Responsibilities for general and public welfare
3. Transparent methods to estimate savings and impacts will be reviewed in various forums to increase quality and reliability.
4. Majority of evaluation dollars and efforts are spent in areas of greatest importance or uncertainty.

The Company may expend resources up to ten (10) percent of its conservation budget on programs whose savings impact has not yet been measured, as long as the overall portfolio of conservation passes the modified TRC test. These programs may include certain information-only, education, marketing, outreach, pilot projects and similar efforts to effect behavioral changes under provision 7 of Docket UE-171092 Order 01. These efforts will not be subject to evaluation.

Projected Energy Savings Estimates (Ex-Ante) versus After Impact Evaluations (Ex-Post)

Impact evaluations focus on estimating the amount of energy and demand savings a program delivered. The initial design and review of prospective programs will be based upon ex-ante savings; savings that are expected to be delivered by the program. Estimates of actual savings are ex-post savings; program savings analyzed over a specific period of time.

The results of the impact evaluations or ex-post savings, will be used to inform the Company's 10-year conservation plan, two-year biennial targets and future program design. This information will not be used to retrospectively report the Company's performance to target within a current biennial period except as agreed upon with the Advisory Group and/or Commission.

Approaches for Determining Gross Savings

Gross impact savings are determined using one of the following approaches:

1. One or more measurement and verification (M&V) methods from IPMVP, are used to determine the savings from a representative sample of projects. These savings are then applied to the entire population of projects in the program. The four IPMVP options are:[57]

[57] Efficiency Valuation Organization (2010): "International Performance Measurement and Verification Protocol"

a. Option A: Key Parameter Measurement – field measurement of the key performance parameter(s) which define the energy use of the ECM's affected system(s) and/or the success of the project.
b. Option B: All Parameter Measurement – field measurement of the energy use of the ECM affected system.
c. Option C: Whole facility – measuring energy use at the whole facility or sub-facility level.
d. Option D: Calibrated Simulation – simulation of the energy use of the whole facility, or of a sub-facility.

2. Deemed savings based on generally accepted impact evaluation data and/or other reliable and relevant source data that has verified savings levels. Examples of documented sources include but are not limited to the RTF or historical evaluations specific to a demographic area (e.g. DEER, CEE, impact evaluations).
3. Statistical analyses of large volumes of metered energy usage data typically collected from billing analyses.

If field inspections on specific measures are a necessity, they will be performed by third parties. In some cases, measures will be inspected to confirm that they were not only installed, but also installed per specification and that they are properly operating, and on large-scale custom measures/projects, baseline inspections may be conducted.

Home Energy Reports

Evaluations of Home Energy Reports will reflect identified evaluation challenges and accepted methods such as those outlined in the Uniform Methods Project: Chapter 17: Residential Behavior Protocol.

Baseline

Energy savings are determined by comparing energy use and demand after a program is implemented (the reporting period) with what would have occurred had the program not been implemented (the baseline). The baseline and reporting period energy use and demand are compared using a common set of conditions such as weather, operating hours, building occupancy, and demographics. These conditions are then adjusted so that only program effects are considered when determining savings.[58]

1. In Washington, evaluators will use or determine baselines utilizing baselines defined in the RTF Guidelines, : Current Practice and Pre-Conditions[59]

> A CURRENT PRACTICE BASELINE IS USED IF THE MEASURE AFFECTS SYSTEMS, EQUIPMENT OR PRACTICES THAT ARE AT THE END OF THEIR USEFUL LIFE OR FOR MEASURES DELIVERING NEW SYSTEMS, EQUIPMENT OR PRACTICES, E.G., ENERGY STAR ® SPECIFICATIONS FOR NEW HOMES. FOR THESE MEASURES, THE BASELINE IS DEFINED BY THE TYPICAL CHOICES OF ELIGIBLE END USERS IN PURCHASING NEW EQUIPMENT AND SERVICES AT THE TIME OF RTF APPROVAL. THE RTF ESTIMATES THIS BASELINE BASED ON RECENT CHOICES OF ELIGIBLE END USERS IN PURCHASING

[58] National Action Plan for Energy Efficiency (2007) Model Energy Efficiency Program Impact Evaluation Guide. Prepared by Steven R. Schiller, Schiller Consulting, Inc. www.epa.gov/eeactionplan

[59] Regional Technical Forum, Roadmap for the Assessment of Energy Efficiency Measures p. 10-11 (December 8, 2015)

NEW EQUIPMENT AND SERVICES. THESE CHOICES MAY BE INFERRED FROM DATA ON SHIPMENTS, PURCHASES (EQUIPMENT OR SERVICES) OR SELECTED DESIGN / CONSTRUCTION FEATURES.
A PRE-CONDITIONS BASELINE IS USED WHEN THE MEASURE -AFFECTED SYSTEM, EQUIPMENT OR PRACTICE STILL HAS REMAINING USEFUL LIFE (RUL). THE BASELINE IS DEFINED BY THE TYPICAL CONDITIONS OF THE AFFECTED SYSTEM, EQUIPMENT OR PRACTICE AT THE TIME OF RTF APPROVAL. THE RTF ESTIMATES THIS BASELINE BASED ON DATA FROM RECENT ADOPTERS, OR IF THERE HAS BEEN NO SIGNIFICANT ADOPTION, IT USES DATA FROM THE TYPICAL CONDITIONS FOUND AMONG ELIGIBLE END USERS

Persistence or Measure Life

Persistence is how long the energy savings are expected to last once an energy efficiency measure or activity has taken place. In certain instances, impact evaluation may consider whether the savings from the project change over time. These changes are primarily due to retention and performance degradation, changes to energy codes or equipment efficiency standards or the impact of market progression.

In most cases, persistence of savings will be determined using historical and documented persistence data, such as manufacturer's studies or values provided in relevant databases such as the Regional Technical Form (RTF) and others. However, if deemed necessary, PacifiCorp may also utilize the following basic approaches for assessing persistence:

- Laboratory and field testing of the performance of energy efficient and baseline equipment
- Field inspections, over multiple years
- Other non-site methods such as telephone surveys and interviews, analysis of consumption data, or use of other data (e.g., data from a facility's energy management system)

Uncertainty – Expectations for Savings Determination

Program evaluations will seek to reliably and accurately determine energy and demand savings by deploying the most appropriate EM&V approaches. . While additional investment in the estimation process can reduce uncertainty, the tradeoffs between evaluation costs and reductions in uncertainty need to be considered. Evaluation results will be reported as expected values including some level of variability or uncertainty defined and explained.

Uncertainty of savings level estimates is a result of two types of errors, systematic and random.

1. Systematic errors are those that are subject to decisions and procedures developed by the evaluator and are not subject to chance. These include:
    a. Measurement errors, arising from meter inaccuracy or errors in recording an evaluator's observation.
    b. Non-coverage errors, which occur when the evaluator's choice of a sampling frame excludes part of the population.
    c. Non-response errors, which occur when some refuse to participate in the data collection effort.
    d. Modeling errors, due to the evaluator's selection of models and adjustments to the data to take into account differences between the baseline and the test period.
2. Random errors (also known as sampling errors), those occurring by chance, arise due to sampling rather than taking a census of the population. In other words, even if the

systematic errors are all negligible, the fact that only a portion of the population is measured will lead to some amount of error.[60]

Evaluators are expected to control for systematic error through best practices and control random error by striving to follow industry standards which is designed to achieve a 90 percent confidence level and ±10 percent precision. If this sampling requirement can be shown to be unrealistic, an 80/20 confidence level [61]will be required in those instances. Deviations from these specifications may be permitted provided the circumstances warrant it and it is not expected to materially impact the validity of the evaluation results. The evaluation report will discuss aspects of uncertainty and the decision process that determined sample size and confidence/precision level achieved.

Net Savings

Net savings attempts to separate out the influence of a particular energy efficiency program from all other influences that determine participant and non-participant behavior and decisions of whether, when, and to what degree to adopt efficiency actions offered by a program. Two primary factors that will differentiate gross and net savings are free-ridership and spillover. Free riders are customers who would have installed the efficient measure or changed a behavior without program intervention (e.g., incentives). Free riders can be full or partial. Spillover occurs when reductions in energy consumption are caused by the presence of the energy efficiency program, but even though the customer does not receive an incentive for the energy saving measure or practice through the program. Spillover falls into two categories:

- Participant spillover is defined as additional energy efficiency actions that program participants take outside the program as a result of having participated.
- Non-Participant spillover is defined as savings from efficiency projects implemented by those who did not directly participate in a program, but that occurred due to that influence of the program.

PacifiCorp will use the Net-to-Gross ratio of 1.0, consistent with the Council's methodology, for each program or portfolio for the purpose of cost effectiveness analysis per Order 01 (8) (a) in Docket UE-171092. The Company may assess program free-ridership since high percentage of savings that would have occurred in the program's absence is not desirable for managing costs of a program. Spillover may be a valid adjustment to evaluated savings and in consideration of program economics if there is a verifiable causal link to the program and doing so does not result in the double counting of savings or impact another program's economics.

Cost Effectiveness

PacifiCorp's cost effectiveness evaluations compare program benefits and costs, showing the relationship between the value of a program's outcomes and the costs incurred to achieve those benefits. The findings help in judging whether to retain, revise, or eliminate program elements and provide feedback on whether efficiency is a wise investment as compared to energy generation and/or procurement options.

[60] Ibid.

[61] Confidence refers to the probability the estimated outcome will fall within some level of precision.

As required by WAC 480-109-100(8): "[a] utility's conservation portfolio must pass a cost-effectiveness test consistent with that used in the Northwest Conservation and Electric Power Plan." As clarified in Order 01 (8) in Docket UE-171092, the primary test for the WUTC is the TRC test, as modified by the Northwest Power and Conservation Council, including quantifiable non-energy benefits, a risk adder, and a 10 percent conservation benefit adder.
As allowed by WAC 480-109-100(10) (a) a utility may fully fund low-income conservation measures that are determined by the implementing agency to be cost-effective consistent with the Weatherization Manual maintained by the department.
As allowed by WAC 480-109-100(10) (b) A utility may exclude low-income conservation from portfolio-level cost-effectiveness calculations.
In addition to the modified TRC test, PacifiCorp's programs and portfolios will be analyzed using cost-effectiveness tests described in the National Action Plan for Energy Efficiency "Understanding Cost- Effectiveness of Energy Efficiency Programs"[62]. These tests are described as follows:

1. Utility Cost Test (UCT): From the Company's perspective, benefits are avoided energy costs, capacity costs and line losses. Costs include any program administration, implementation or incentive costs associated with funding the program.
2. Ratepayer Impact (RIM): All ratepayers (participants and non-participants) may experience an increase in rates to recover lost revenue. Benefits are the avoided energy costs capacity costs and line losses. Costs include all program costs and lost revenue due to reduced energy bills.
3. Participant Cost Test (PCT): From this perspective, program benefits include bill reductions and program incentives. Costs include any customer contribution to the measure cost, before program incentives.

MEASURE DATA
PacifiCorp has implemented a technical reference library (TRL) that is a repository for all measures, assumptions, and data sources. The TRL is a web accessible database and is integrated with the Company's project tracking system (DSM Central) to verify the appropriateness of reported savings and incentives issued to customers. This information will be updated as needed. The Advisory Group reviews and may provide comments on program changes that may drive some of the TRL updates.
The TRL includes, but is not limited to, the following measure data:

- Description of ex ante savings estimates, considering the following categorization:
    - RTF Deemed – prescriptive savings whose values have been evaluated and deemed by the Regional Technical Forum, or
    - PacifiCorp Deemed – prescriptive savings based on:
        - Project specific engineering analysis
        - Program specific impact evaluation results
        - RTF values adjusted for the Company's service territory
        - Other verifiable sources
    - PacifiCorp Calculation – project-specific savings based on hours of operation, etc.

      If PacifiCorp uses prescriptive savings amounts other than those established by the RTF, such estimates will be based on impact evaluation data and/or other

[62] https://www.epa.gov/sites/production/files/2015-08/documents/cost-effectiveness.pdf

reliable and relevant source data that has verified savings levels, and will be presented to the Advisory Group for comment.

- Reference source of assumption for information used in cost effectiveness analysis (e.g. measure costs)
- Measure life

PROCESS EVALUATIONS

Process evaluations of PacifiCorp's programs involves systematic assessments of programs and internal operations. The purpose of the process evaluation is to document program operations at the time of the evaluation, and identify and recommend improvements to increase program efficiency or effectiveness in acquiring energy resources. The primary mechanisms used for process evaluations are data collection via surveys and interviews to gather information and feedback from administrators, designers, participants, implementation staff and key policy makers. Other elements of a process evaluation can include workflow and productivity measures, reviews, assessments and testing of records, databases, program-related materials and tools.

ROLES AND RESPONSIBLITITES FOR CONDUCTING AND MANAGING EM&V ACTIVITIES

EM&V tasks will be segregated within PacifiCorp's organization to ensure evaluation tasks are performed and managed by personnel who are neutral to the anticipated savings results. While the Company's standard operating procedure for performing EM&V activities is using external evaluators selected through a competed bid, the Company may conduct some evaluations internally if the approach can be shown to meet the principals outlined in the Evaluation Standards section of this Framework. External work is defined as work performed by entities outside of PacifiCorp. Evaluations performed by the Company's staff will be performed by personnel who have no part of their performance assessment or goals tied to energy efficiency acquisition targets and results.

Roles of PacifiCorp Staff and External Evaluators

Work within PacifiCorp EM&V will generally fall into four categories:

- Planning Staff (pre implementation design)
  -
  - Establish estimated EM&V budget (joint with P&C)
  - Establish EM&V plans and processes (joint with P&C)
- Process and Compliance (P&C) Staff (post implementation assessment)
  - Preparation and management of post-implementation impact evaluations to determine ex-post evaluated savings, prepare cost-effectiveness analysis, and determine realization rates
  - Process tracking and performance data management
  - Maintenance of TRL data measure assumptions and sources
  - Design and administration of RFP for external evaluation firms for EM&V activities
  - Administration and management of external firm(s) performing EM&V
  - Preparation of performance reports
  - Establish pre-implementation estimated EM&V budget (joint with P&D)
  - Establish pre-implementation EM&V plans and processes (joint with P&D)
- Program Delivery Staff (implementation of programs)
  - Administration of program to ensure goals and targets are achieved
  - Program quality assurance and compliance to regulatory requirements
  - Oversee data collection for program
  - Implement evaluation recommendations related to program implementation

    - Provide recommendations to P&D on program improvements including but not limited to market adoption, advancing codes, new technologies, and market changes
- Evaluators (external and/or PacifiCorp staff)
    - Perform process and impact evaluations to determine ex-post evaluated savings, prepare cost effectiveness analysis, determine realization rates, and improve program adoption and processes
    - Conduct verification activities
    - Conduct market characterization studies
- Advisory Group
    - Review and provide advice as defined in WUTC Docket UE-152072 , Order 01 on:
        - EM&V Framework
        - EM&V Activities
        - Third-party review of portfolio savings report

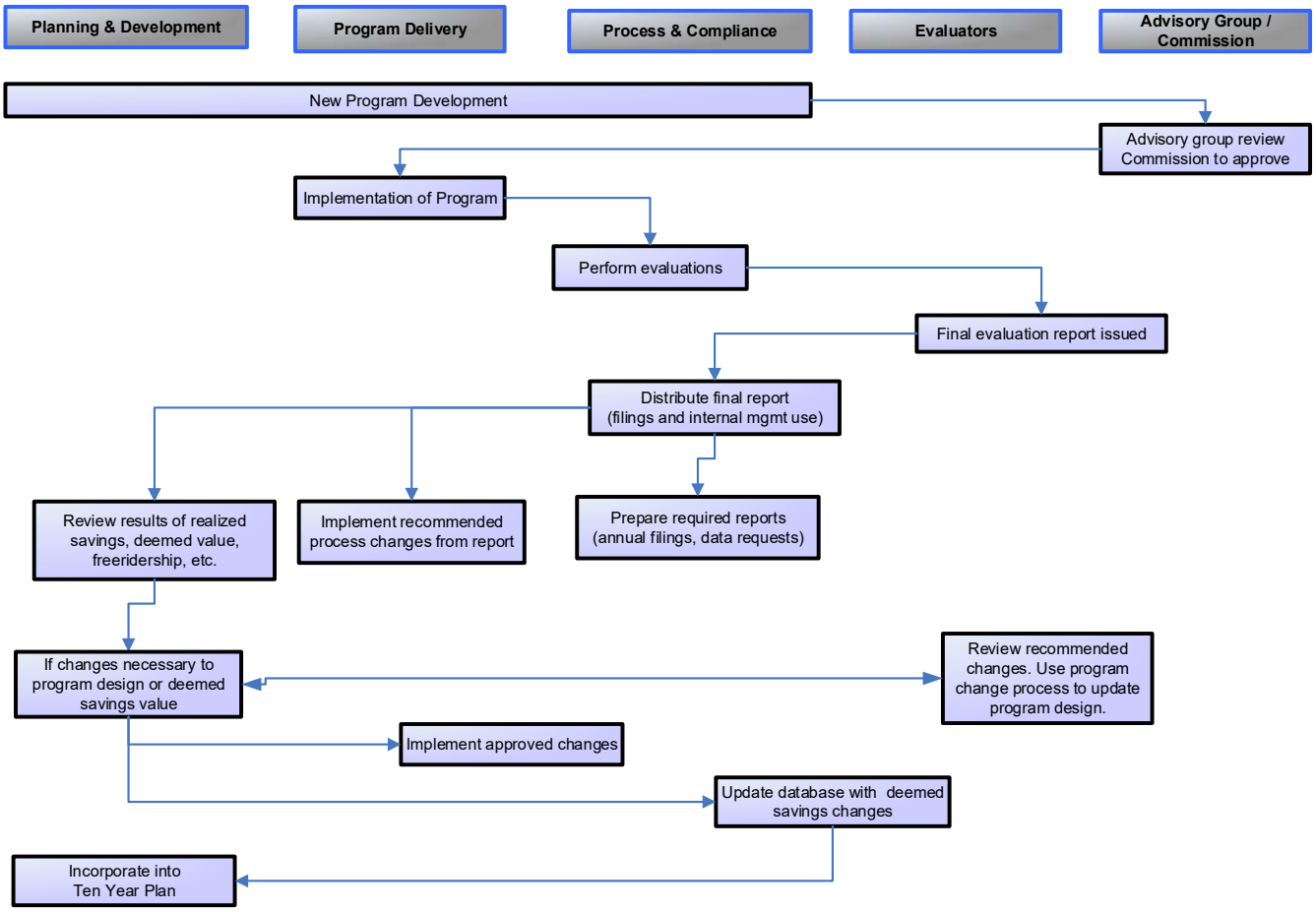
Managing Selection of External Evaluators

External evaluators will be selected using a competitive bid process consistent with PacifiCorp's Procurement procedures. Qualified firms who have demonstrated competency and experience in performing such EM&V activities will be given the opportunity to bid on a proposed RFP where the Statement of Work outlines the EM&V activity being requested.
External evaluator reports will be available to the Advisory Group upon completion and referenced in the Annual Report on Conservation Acquisition.

External Oversight and Review

External review ensures that the EM&V process is thorough, transparent and conducted according to proper standards. As required by WAC 480-109-110(1)(b), (c) and (d) the Advisory Group will be relied upon to advise PacifiCorp concerning the EM&V plans and framework outlined in this document.
Inserted below is a functional chart showing the EM&V activities and how they flow through the different responsible parties.

EM&V Functional Chart



DATA MANAGEMENT

PacifiCorp's data management systems used to maintain, track and report for the management of energy efficiency programs is a combination of proprietary and licensed software applications. There are three active data sources, outside of the program administrators databases, used to maintain customer-related data associated to energy efficiency programs for PacifiCorp. All of the databases within the Company are managed with restricted access capabilities. These systems are as follows:

1. CSS – PacifiCorp's major customer database containing all data related to the delivery and billing of customers.
2. SAP – Used to track detail payment information, program costs, contract terms and approval, and general accounting functionality.
3. DSM Central (DSMC) – Web enabled application that is used to track information for project, program and customer specific information for residential, commercial or industrial projects. The application is integrated with the TRL to verify the appropriateness of reported savings and incentives issued to customers.
4. Third-party program administrator's database – Program administration outsourced to contractors will utilize their own database that will capture the details of program specifics identified by the Company and needed by the program administrator including application processing, measure specifics, associated cost, and other relevant information required to manage the program.
5. Technical Reference Library – Repository for all measures, their assumptions and data sources.

REPORTING CYCLES AND SCHEDULE

The program implementation cycle operates on a calendar year basis, from January 1 through December 31 of each year. Table 4 below lists the preliminary schedule of the activities associated with EM&V reporting.

Table 4: Reporting Schedule

Report	Description	Distribution Date *	Distribution List
Annual Conservation Plan	Forward looking. Proposed revisions including program-level expected savings, expenditures, adjustments, major changes. Filed first year of biennial period.	November 15th (every even numbered year)	WUTC, Advisory Group
Annual Conservation Report**	Backward looking. Program-level savings, expenditures, adjustment, changes, EM&V activities, cost effectiveness analyses and budget variance report	Draft report due May 1st	WUTC, Advisory Group
	. Backward looking. Program-level savings, expenditures, adjustment, changes, EM&V activities, cost effectiveness analyses and budget variance report.	Final report due June 1st	
Cost Recovery Tariff Changes	Revisions to Cost Recovery Tariff with requested effective date of August 1st	June 1st	WUTC, Advisory Group
	If no adjustment is required, request for exception will be filed.	May 1st	
Biennial Conservation Plan	Forward looking. A Biennial Conservation Plan including revised program details and program tariffs, together with identification of the 10 year achievable conservation potential and 2-year biennial target.	November 1st (every odd year)	WUTC, Advisory Group
Biennial Conservation Report**	Backward looking. A two-year report on the prior two calendar year Biennial Conservation Plan achievements, including savings and cost effectiveness, third-party evaluation of portfolio-level savings, actions taken to adaptively manage, etc.	June 1st (each even numbered year)	WUTC Advisory Group

* Dates as listed in Chapter 480-109 WAC, effective April 12, 2015. Drafts, except as noted for the cost recovery tariff are to be provided to the DSM Advisory Group, the minimum of 30 days ahead of the filing date.

** Reports can be filed as one report in even numbered year, provided all information is included.

APPLICATION OF EM&V RESULTS

Performance results will be reported on the basis of gross savings, without taking into consideration adjustments for free-ridership. Program results will be filed annually on June 1st, using the estimates for measure and/or program savings utilized in the development of the conservation plan forecast and biannual targets and will not reflect the results of evaluation conducted during the biennium, unless otherwise agreed to with the Commission or Advisory Group.

EM&V efforts that result in changes to savings estimates made prior to program implementation, saving calculations (for custom measures), and/or algorithms used to calculate savings for custom measures will in most cases be applied prospectively, taking effect in subsequent evaluation or update cycle as appropriate. Such changes will be documented in the measure data information maintained by the Company.

EXHIBITS

Exhibit 1 – Measure Installation Verifications summary

Exhibit 1
Measure Installation Verifications

Home Energy Savings

Site inspections by Program Administrator staff for the following retrofit and/or new homes measures. Inspections are performed on >=5 percent of single family homes, >=5 percent of manufactured homes, 100 percent of multifamily projects, and 20 percent of new homes projects. Single family homes inspection rates will be applied to the total aggregate of downstream mechanical and weatherization measures.

- Central air conditioning best practices installation and sizing
- Duct sealing
- Duct sealing and insulation
- Heat pump commissioning, controls, and sizing
- Heat pump water heaters
- Insulation
- Windows

No site inspections are conducted for the following measures. However, all post-purchase incented measures undergo a quality assurance review prior to the issuance of the customer/dealer incentive and recording of savings (e.g. proof of purchase receipt review) and eligible equipment review. Additionally, customer account and customer address are checked to ensure the program administrator does not double pay for the same measure or double count measure savings.

- Central air conditioners
- Clothes washers
- Evaporative cooler
- Heat pumps
- Hybrid/heat pump clothes dryers
- Line voltage thermostats
- Low flow showerheads
- Low flow aerators
- New manufactured homes
- Smart thermostats

No site inspections are conducted for the following measures, which are delivered via an upstream, manufacturer buy-down model. Promotion agreement contracts are signed with

manufacturers and retailers to set incentive levels, final product prices, and limits to the total number of units that can be purchased per customer. Program Administrator verifies measures for product eligibility and correct pricing. Pricing is also verified by Program Administrator field visits to retail locations.

- LED bulbs
- Light fixtures (upstream)

Customer eligibility for wattsmart Starter Kits is verified using the customer's account number and last name and cross-verifying with the current PacifiCorp customer database.

Low Income Weatherization

All projects

- All measures are qualified through US Department of Energy approved audit tool or priority list.
- 100 percent inspection by agency inspector of all homes treated, reconciling work completed and quality (corrective action includes measure verification) prior to invoicing Company.
- State inspector follows with random inspections.

The Company hires independent inspector to inspect between 5-10 percent of homes treated (post treatment and payment).

Wattsmart Business (effective 5/15/2018)

Lighting projects (typical upgrades)

Inspection requirements vary depending on the amount of the incentive and the type of project.

- Incentive above high threshold
    - Retrofits - 100 percent pre- and post-installation site inspections of all projects with incentives over a specified dollar amount. Project cost documentation reviewed for all projects.
    - New construction - 100 percent post-installation site inspections of all projects with incentives over a specified dollar amount.
- Incentive between low and high thresholds
    - Retrofits - 100 percent pre-installation site inspections of all projects with incentives between the low and high threshold amounts. A percent of post-installation site inspections by program administrator of projects with incentives between the low and high threshold amounts. Project cost documentation

reviewed for all projects. For lighting controls only retrofit projects, 100 percent post-installation site inspections.
    - New construction – 100 percent post-installation site inspections of projects with incentives between the low and high threshold amounts.
- Incentive below low threshold
    - A percent of post-installation site inspections by program administrator of projects with incentives under a specified dollar amount.

Lighting – small business
On-site post-incentive inspections will be performed by third party program administrator on a minimum of x percent of approved projects for each approved Small Business Vendor based on project count per calendar year. On-site or phone surveys will be conducted with participating customers to ensure documentation accuracy, installation and product quality, and customer satisfaction.

Lighting – midmarket/instant incentives
Third party program administrator will conduct regular spot checks on a sampling of approved projects after incentive processing. Inspections will include both phone and on-site inspections.

- All projects with customer incentives over $y will receive an on-site inspection.
- A minimum of x percent sampling of all remaining projects will be selected for phone inspections. An additional x percent sampling will be selected for on-site inspections.

For typical upgrades, required inspections are performed by a third party consultant. For the small business and instant incentive offers, required inspections are performed by the program administrator.

Non-lighting projects (typical upgrades/listed measures where savings is deemed)

- 100 percent of applications with an incentive that exceeds a specified dollar amount will be inspected (via site inspection) (typically by program administrator).
- A minimum of a specified percent of remaining non-lighting applications will be inspected, either in person or via telephone interview, (typically by program administrator).

Non-lighting projects (typical upgrades/listed measures where savings is determined using a simplified analysis tool)

- 100 percent of applications with project savings that exceeds a specified threshold will be inspected (via site inspection) (typically by program administrator).
- A minimum of a specified percent of remaining non-lighting applications will be inspected, either in person or via telephone interview, (typically by program administrator).

Custom projects

- 100 percent pre/post-installation inspections, invoice reconciled to inspection results. On-site pre/post inspections are required for projects with savings over a specified threshold. For projects with savings below the threshold, inspection information may be collected by phone or email.
- No pre-inspection for new construction.
- Inspections are conducted by third party energy engineering firms for the in-house project manager/consultant delivery channel.
- Inspections are conducted by outsourced delivery team for projects delivered by third party outsourced program delivery teams.

All Programs

As part of the third-party program evaluations (two-year cycle) process, the Company has implemented semi-annual customer surveys to collect evaluation-relevant data more frequently to help compensate for customer difficulty remembering details about past projects and other detractors such as customers moving and data not be readily available at evaluation time). This will serve as a further check verifying customer participation and measures installed.

Additional record reviews and site inspections (including metering/data logging) is conducted as part of the process and impact evaluations, a final verification of measure installations.

The company also hires a third party to provide a summary report that will be submitted as an appendix to PacifiCorp's Biennial Conservation Report (BCR), which will be filed by June 1 of even numbered years. This review is not meant to duplicate already-completed impact evaluations of the individual energy efficiency programs, but rather to assess field verification practices and tracking, and the reporting processes helping validate the accuracy of the savings being reported. It also provides an assessment of PacifiCorp's evaluation, measurement, and verification (EM&V) procedures and third-party evaluation methodologies, and whether they meet reasonable industry best practice standards.

This review relies on multiple approaches. The review team examines selected overarching documents, databases, and calculations underpinning the PacifiCorp biennial portfolio claims. In addition, the review team is selecting random samples of project-level documentation for each program, and subjecting these samples to careful scrutiny and analysis, including field verification. Examining the portfolio claims at both summary and detail levels helps identify problems and potential improvements that can strengthen PacifiCorp's future claims.