PACIFIC POWER
A DIVISION OF PACIFICORP

2022 Washington Annual Report on Conservation Acquisition

Final 6/1/2023

Pacific Power
825 NE Multnomah St.
Portland, OR 97232

https://www.pacificorp.com/environment/demand-side-management.html

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EXECUTIVE SUMMARY

PacifiCorp is a multi-jurisdictional electric utility providing retail service to customers in Washington, California, Idaho, Oregon, Utah, and Wyoming. PacifiCorp dba Pacific Power & Light Company ("Pacific Power or Company") serves approximately 135,706 customers in Washington. The Company works with its customers to reduce the need for investment in supply side resources and infrastructure by reducing energy consumption and peak demand through a cost-effective energy efficiency program portfolio.

PacifiCorp is required to comply with the requirements of the Energy Independence Act (I-937) codified in RCW19.285 and WAC 480-109. This report outlines the activities and expenditures related to pursuing all conservation in accordance with the I-937 framework, including Washington Utilities and Transportation Commission ("Commission") orders and administrative rules.

In 2022, the Company offered four energy efficiency programs in Washington and received energy savings and market transformation benefits through its affiliation with the Northwest Energy Efficiency Alliance (NEEA). In addition to the energy efficiency programs, the Company, on behalf of customers, invested in outreach and education for the purpose of promoting the efficient use of electricity and improving program performance. The Company recovers expenditures associated with these programs through the System Benefits Charge Adjustment, Schedule 191.

Pacific Power uses outsourced program delivery implementers for its programs.[1] Evaluations for each of the programs are performed by independent external evaluators to validate energy savings derived from Pacific Power's energy efficiency programs.[2]

Pacific Power utilizes earned media, customer communications, education, outreach, and advertising as well as program specific marketing to communicate the value of energy efficiency, provide information regarding low-cost and no-cost energy efficiency measures and to educate customers on the availability of programs, services, and incentives.[3]

In 2022, to achieve Clean Energy Transformation Act (CETA) equity objectives, Pacific Power began implementing Demand-side Utility Actions outlined in the 2022-2023 Biennial Conservation Plan (in the DSM Business Plan appendix) and the Clean Energy Implementation Plan (both filed in 2021). See the CETA Utility Actions section for updates. Pacific Power's

[1] Program Administration can be found at https://www.pacificorp.com/environment/demand-side-management.html under the "Program Administration" section.

[2] Program Evaluation information for each program can be found at the following address: https://www.pacificorp.com/environment/demand-side-management.html under the "Reports and program evaluations by state" section.

[3] Communications, Outreach and Education can be found at https://www.pacificorp.com/environment/demand-side-management.html under the "Communications and Outreach" section.

customer benefit indicator metric results for energy efficiency programs will be reported in the Clean Energy Implementation Plan progress report due July 1, 2023.

This report provides details on program results, activities, expenditures, and System Benefits Charge ("Schedule 191") revenue as of the reporting period January 1, 2022, through December 31, 2022. Pacific Power, on behalf of its customers, invested $14.7 million in energy efficiency and peak reduction resource acquisitions during the reporting period. The investment yielded approximately 40 kilowatt-hours hours ("kWh") in first-year energy savings,[4] and approximately 6.73 gross megawatts ("MW') of savings from 2022 energy efficiency acquisition. Despite efforts to achieve targets, energy savings from Pacific Power programs (excluding NEEA) were 70% of 2022 savings projected in the 2022-2023 DSM Business Plan filed November 1, 2021. Total portfolio expenses (including NEEA and portfolio costs) in 2022 were 64% of the 2022 projection in the 2022-2023 DSM Business Plan.

For 2022, the company notes the lingering effects of the COVID-19 pandemic

1) Significantly impacted program performance and prevented the Company from being on track to meet its 2022-2023 conservation target,
2) Were beyond the reasonable control of the Company and could not have been reasonably anticipated, and
3) Meet the criteria of "natural disasters resulting in the issuance of extended emergency declarations" given Governor Jay Inslee declared a State of Emergency on February 29, 2020, and the State of Emergency was still in place until November 1, 2022. As of the end of 2022, the federal Public Health Emergency declaration remains in effect.

Several prevalent challenges persisted in 2022 due to the COVID-19 pandemic. Outlined below are some of the issues that contributed to lower-than-expected energy savings results:

- **Higher interest rates –** Interest rates increased in 2022, which changed the calculus for investment decisions and prompted some customers to delay the implementation of projects.
- **Labor Shortages** – Customers across all business sectors are experiencing a shortage of available workers and increased wages/benefits for those employed. Some businesses are reducing hours and limiting production as a stop gap measure. Many Trade Allies did not have enough staff to take on additional projects. Demand for skilled trade jobs outpaced the supply of qualified workers.
- **Delayed Shipments** – There was also a worker shortage and shipping capacity challenges in transportation, limiting the number of trucks on the road and trains hauling HVAC replacement parts.

[4] Reported ex-ante savings are gross at generation.

- **Product Availability** – Shortage of microprocessor chips caused additional equipment shortages.
- **General Uncertainty** – Customer uncertainty around staffing issues and labor and material costs, caused delays in project implementation.

In 2021, Northwest Energy Efficiency Alliance documented supply chain challenges resulting from the COVID-19 pandemic. They updated this memo for 2022 to document the continued challenges. Their memos are attached as an Appendix B to this report.

The Demand-side Management ("DSM") portfolio was cost effective based on the PacifiCorp Total Resource Cost Test (PTRC) and the Utility/Program Administrator Cost Test (UCT), which are the primary Cost Effectiveness tests used in Washington.[5] Cost-effectiveness results are provided in table 13, and Appendix A.

In 2022, Pacific Power's portfolio included the following programs:

- **Energy Efficiency Programs:**
  - Home Energy Savings (Schedule 118)
  - Home Energy Reports
  - Low Income Weatherization (Schedule 114)
  - Wattsmart Business (Schedule 140)

REGULATORY AND COMPLIANCE

An external conservation advisory group of stakeholders is required to be maintained and used by the Company to advise it about conservation issues including program designs, incentive levels, third party evaluations, program marketing, and pilots. WAC 480-109-110 provides the scope of issues for the advisory group. The Company refers to its conservation advisory group as the Washington DSM Advisory Group. Due to the COVID-19 pandemic, 2022 advisory group meetings continued to be virtual only and are listed below with meeting dates and summary of topics discussed.

In 2022, in addition to conservation/energy efficiency, the Company discussed plans for new Demand Response programs with the DSM Advisory Group. Demand Response is a resource in the Clean Energy Implementation Plan filed in 2021 in compliance with the Washington Clean Energy Transformation Act. While the scope for this 2022 annual report is energy efficiency, demand response regulatory activity is included in this section.

In compliance with I-937, the Company continuously reviews and updates, as appropriate, the conservation programs and portfolio to adapt to changing market conditions. Steps taken to

[5] Cost-effectiveness results include realization rates and Net-to-Gross (NTG) ratios.

adaptively manage the conservation programs during 2022 are included within program specific sections of this report.

Pilot projects are implemented when appropriate and are expected to be cost effective within the current or immediately subsequent biennium if the overall portfolio remains cost effective. The Company, after consultation with its DSM Advisory Group, offers initiatives or offers within two programs: *Home Energy Savings* and *Wattsmart Business*. This focus is administratively efficient and uses existing program awareness—both important considerations in the Company's rural territory. To further leverage other efforts, the Company has linked its pilot efforts with regional work supported by NEEA whenever possible. Pilot projects and 2022 results are outlined in the section, Pilot Projects.

Summary of DSM Advisory Group Meetings in 2022:

Date / Meeting #	**Key Topics**	**Updates**
#1, 2/28/2022	• All Source Request for Proposals • Review of the 2022 communications and outreach plan • Business Energy Reports • Future Non-Energy Impacts research	• Conservation Potential Assessment • Low-income Ductless Heat Pump (DHP) Conversion Measures • Washington Equity Advisory Group schedule/updates • Clean Energy Implementation Plan process/next steps • Clean Energy Implementation Plan utility actions • 2022-2023 DSM forecast indicating shortfall
#2, 4/28/2022	• 2020-2021 Biennial Conservation Report preview • 2022-2023 DSM forecast indicating shortfall • System Benefits Charge (Schedule 191) review, condition 12d – including options for proposed increase • Conservation Potential Assessment, Non-Energy Impacts (condition 11a) • Demand Response programs – preview of upcoming filings • Procurement update – Home Energy Reports / Business Energy Reports	• Follow-up from 2/28/2022 meeting • CETA: Equity Advisory Group, Clean Energy Implementation Plan • Clean Energy Implementation Plan utility actions • On-Bill Financing, Craft3 requested amendments to enable financing for critical repairs and unsecured loans (e.g., for homeowners residing on Tribal lands or manufactured home parks) • Upcoming drafts due to the DSM Advisory Group • DSM Advisory Group meetings for balance of 2022

Date / Meeting #	**Key Topics**	**Updates**
#3, 6/28/2022	• NEI and CPA updates • Demand Response • Adoption of air conditioning with low global warming potential refrigerants (condition 10b), including presentation by NEEA • Whether and how to research and evaluate opportunities for cool roof and tree planting conservation (condition 10c) • 2022-2023 DSM Forecast indicating shortfall • Energy Burden Assessment presentation by Empower Dataworks	• Follow-up from 2/28/2022 meeting on The Energy Project proposal • CETA: Equity Advisory Group • Clean Energy Implementation Plan utility actions – CBI metrics for 2022 YTD • Recent filings (EIA reports, SBC filing) – status and next steps • On-Bill Financing (Craft3) • Pilot: Clean Buildings Accelerator • Upcoming drafts for DSM Advisory Group review • DSM Advisory Group meetings for balance of 2022
#4, 9/8/2022	• 2023 Annual Conservation Plan, preview of planned program changes (condition 5b) • Conservation Potential Assessment updates • 2022-2023 DSM Forecast indicating shortfall • Other Conditions: adoption of low global warming potential refrigerants (condition 10b), tree planting conservation (condition 10c)	• Demand Response Update • CETA: Equity Advisory Group • Clean Energy Implementation Plan utility actions • Pilots - Non-residential Lighting Controls • Recent filings, upcoming drafts due to the DSM Advisory Group • 2022 DSM Advisory Group meetings
#5, 12/14/2022	• 2023 communications and outreach plan • Conservation Potential Assessment results • Home Energy Reports – measure life assumption change, procurement update • 2022-2023 DSM Forecast indicating shortfall, adaptive management	• Whether and how to research and evaluate opportunities for cool roof and tree planting conservation (condition 10c) • Demand Response, CETA, pilots • Recent filings, upcoming drafts due to the DSM Advisory Group • Proposed 2023 DSM Advisory Group meeting topics, schedule for drafts coming for review

Summary of DSM filings in 2022:

December 21, 2021 – Advice 21-13 (Docket UE-210973) to make changes to the energy efficiency program tariffs, Schedules 114, 118 and 140 including changes needed to implement utility actions in the Clean Energy Implementation Plan. This filing was approved effective February 4, 2022.

May 31, 2022 – Washington Annual Report on Conservation Acquisition for 2021 (Docket UE-190908). The report provides details on program results and activities. Revised report provided June 23, 2022.

June 1, 2022 – 2020-2021 Biennial Conservation Report (Docket UE-190908). Revised report provided June 20, 2022.

June 1, 2022 – 2020-2021 Conservation Report to Department of Commerce (Docket UE-190908). The report detailed the Company's results toward meeting the targets established in RCW 19.285.070 and WAC 194-37-060 (EIA requirements). Revised report provided June 23, 2022.

June 1, 2022 – System Benefits Charge filing, Advice 22-02, to increase the System Benefits Charge collection rate to better align the company's recovery of costs associated with its cost-effective portfolio of conservation programs. (Docket UE-220411). This filing was approved effective August 1, 2022. The customer notice was filed June 29, 2022, and a revised customer notice was filed July 12, 2022.

July 22, 2022 – Demand Response Programs filing, Advice 22-02 in Docket UE-220550. Included Schedule 106, a broadly enabling tariff for demand response programs, and introduction of an irrigation load control program with costs recovered through a deferral account. Replacement pages filed August 16, 2022.

November 15, 2022 – Pacific Power's 2023 Annual Conservation Plan in Docket UE-210830.

November 16, 2022 – Pacific Power filed a commercial/industrial demand response program and requested recovery of costs through a deferral account (Docket UE-220848).

December 16, 2022 – Pacific Power filed a petition for an accounting order to defer the costs associated with demand response programs (Docket UE-220848). A corrected petition was filed December 29, 2022.

In addition to the above DSM regulatory activity, there were Equity Advisory Group meetings and Clean Energy Transformation Act (CETA) regulatory activities in 2022.

The Company worked with its Equity Advisory Group, formed in 2021 and made up of key local community members, to help inform and advise the Company and met with them nine times in 2022. Input from the Equity Advisory Group informed the utility energy efficiency actions in the Company's 2022-2023 DSM Business Plan (the same actions are also in the Clean Energy Implementation Plan) and equity-related program changes for 2023.

PORTFOLIO OF PROGRAMS

The portfolio of Company programs (excluding Low Income Weatherization and without NEEA or NEIs) passed the PTRC with a benefit cost ratio of 1.86 and the UCT with a benefit cost ratio of 2.02. Information by program is available below followed by pilot results, utility action results, a full set of tables and cost-effectiveness.

RESIDENTIAL ENERGY EFFICIENCY PROGRAM

HOME ENERGY SAVINGS

Program Description

The Home Energy Saving program is designed to provide access and incentives for more efficient products and services installed or received in the following residential dwelling types.

- New Construction Homes
- Single Family Existing Homes
- Multi-family Housing Units
- Manufactured Homes

Measures eligible for incentives in 2022 included appliances, HVAC, water heating, weatherization, and retail lighting.

The Home Energy Savings program did not pass the PacifiCorp Total Resource Test (PTRC) with a benefit cost ratio of 0.58 without NEIs or 0.72 with NEIs or Utility Cost Test (UCT) with a benefit cost ratio of 0.77.

The Home Energy Savings program is administered by a third-party implementer working with subcontractors, retailers and trade allies who assist in delivering energy efficient products and services to customers. As the program delivery administrator, Resource Innovations, has responsibility of functional areas and associated goals including:

- Savings acquisition – achieving savings goals within budget and achieving metrics for Hard-to-Reach customers and Highly Impacted Communities.
- Outreach – engagement through all delivery channels including trade ally, retail, direct-install, and direct-to-customer. This includes recruitment, development, and support of contractors and retailers to increase the sale and installation of energy efficient appliances, electrical, plumbing and weatherization measures. Trade allies are provided with program materials, training, and regular updates that allow them to promote energy efficiency solutions.

- Marketing and communications – develop and manage content and messaging for program collateral, website, mailings, social media, retail point-of-purchase displays, and presentations.
- Project inspection and measure verification – maintain reporting accuracy through an ongoing post inspection process for measure installation verification.
- Incentive processing – performed by the program administer to manage application submittal through payment processing focusing on complete and accurate information to provide customer payments expeditiously.
- Program design and updates – provide program design and regulatory support including measure research, technical design and analysis, review of statewide workpapers and regulatory requirements (energy code/standard changes, Regional Technical Forum (RTF), California electronic Technical Reference Manual), cost effectiveness inputs, administration of program and software tools, measure library updates, and tariff compliance.
- Customer satisfaction – maintaining high customer satisfaction experience delivered across outreach, marketing, operations, and customer support teams.
- Continuous improvement – provide analysis and make recommendations to program based on new and emerging technologies, market and pricing trends, participation trends, and availability of high efficiency equipment options.

Program Performance and Major Achievements in 2022

- The Home Energy Saving Program achieved 2,625,379 kWh gross savings at site.
- Disbursed $1.7M in incentives.
- Program changes:
    - Planned changes went into effect January 1, 2022, and the following changes were made:
        - Align with the latest unit energy savings (UES) from the RTF.
        - Remove measures with deemed savings recently deactivated by the RTF.
        - Increased customer and trade ally incentives for HVAC, building shell and water heating measures.
        - Added new measures:
            - Direct install duct sealing measure for single family homes
            - Load or occupancy sensing advanced power strips (retail)
            - Multifamily attic insulation: R-0 to R-49
            - Multifamily floor insulation: R-19 to R-30
            - Multifamily windows (pre-condition baseline): U-22 or lower

Adaptive Management

In coordination with Pacific Power, program administrator Resource Innovations implemented the following key initiatives in 2022 to adaptively manage the Home Energy Savings program:

1. **Continued implementing and adaptively managing COVID-19 protocols** for in-person assessments, inspections, and direct install work to keep customers and program team members safe and compliant with State and County COVID-19 guidelines. This provided the program staff access to customers hesitant to participate in the program to safely provide them with support and services.
2. **Temporary Incentive Increase in Response to COVID-19 Pandemic** – Given the COVID-19 pandemic, incentives were increased by approximately 25% effective August 1, 2020. With ongoing supply chain issues and residential customer challenges implementing energy efficiency projects, this incentive increase was carried over and continued in 2022.
3. **Continued focus on supporting contractors.** Recruited and maintained a network of over 90 Home Energy Savings Wattsmart Vendors who promoted Pacific Power offerings to residential customers. Worked with trade allies to clarify program information and application procedures. Contractors were contacted in a variety of ways to adaptively manage the needs of the program, including engagement through in person meetings, phone, webinar and email. With the lifting of COVID restrictions, field reps were able to make multiple in-person visits to Wattsmart Vendors throughout the year. The continued effort to focus on and support contractors resulted in most of the HVAC savings results of nearly 2.4 million kWh in savings.
4. **Expanded and increased promotions for the instant validation coupon offer**. The instant validation coupon offer allows eligible residential customers to receive an instant point-of-purchase discount on eligible equipment in select in-store and online retail locations. The customer fills out an online application and receives a coupon code and scannable barcode that can be redeemed when they check out at participating retailers and online retailers. In 2022, the coupon offering expanded beyond Home Depot and Lowe's to include Ace Hardware retail locations offering an Amazon smart thermostat to customers for only $15 after the $100 Pacific Power incentive was applied. The online coupon option provided customers an alternative way to participate in the offer other than the traditional brick-and-mortar stores. The coupon offer was promoted directly to customers via the following efforts and achieved 37,880 kWh:
    a. Utility bills insert for residential customers focusing on smart thermostats and the instant coupon associated with it.
    b. Pacific Power staff hosted tables at numerous community events in 2022, promoting the instant coupons available both online and at participating Home Depot, Lowe's, and Ace Hardware locations.
    c. Point of purchase collateral at all retail locations offering instant coupons.
    d. Trade Ally newsletter to increase awareness of the coupon program. Informed customer through Pacific Power's Connect newsletter.
5. **Smart Thermostat Limited Time Promotions.** The program ran a limited time offer promotion for smart thermostats in November to align with Black Friday manufacturer discounts. This was an update to a previously run promotion with adaptive management improvements that included customer eligibility verification integration into the online

process. The price points for the thermostats began at $0.99 with free shipping and resulted in 438 eligible customer purchases from 27 different towns and cities in Pacific Power's service area. The November smart thermostat limited time promotion resulted in 190,092 kWh in annual energy savings and high satisfaction levels from participating customers.

6. **Expanded direct install programs and measures.**
    a. **Grew direct install lighting for multi-family renters and manufactured homes.** Expanding on a 2021 launch, direct install lighting campaigns continued to focus on tenant spaces in multifamily buildings and manufactured homes. The direct install lighting offer resulted in over 950 LED bulbs installed in manufactured homes and multifamily buildings, with savings of approximately 65,000 kWh. 510 LED bulbs were installed across four multi-family properties, including screw in LEDs in rental units as well as T8 LEDs in common areas. This direct install approach yielded more savings per bulb as compared to a retail upstream buy-down approach because program staff confirmed existing bulb types and only installed bulbs in eligible spaces as determined by the RTF (i.e., kitchen, living and dining rooms). Participants were also provided with targeted multi-family and manufactured home marketing collateral that cross-promoted other Pacific Power offerings. The direct install lighting approach helped offset a portion of lost kWh savings from measures removed due to higher RTF baselines.
    b. **Expanded direct install duct sealing to single family homes.** Initially the duct sealing direct-install offer was designed for manufactured homes, and in 2022 the program expanded to include single family homes. Manufactured homes accounted for 278,899 kWh savings and traditional single-family homes resulted in approximately 40,000 kWh savings from direct install duct sealing.
7. **Increased frequency of in-person retailer visits upon COVID restrictions lifting.** Outreach staff performed 305 in-person field visits to participating retail locations in Washington. Store visits included a review and replacement of point-of-purchase collateral and informing store staff and customers about Pacific Power offers on smart thermostats, heat pump water heaters, clothes washers, and lighting. Discounted lighting was available only at approved value retailers located in Highly Impacted Communities.
8. **Completed retail store shelf surveys to keep a pulse on the shifting nature of the lighting market**. In 2022, one round of lighting shelf surveys was conducted at major retailers in April. More than 1,700 individual products were surveyed across the three reporting periods, which produced nearly 20,000 data points to be analyzed. The report summarized findings related to LED market adoption levels, average retail pricing, and ENERGY STAR appliance purchasing data, as well as themes by retail chain and product type. The details of these surveys were used to recommend Pacific Power program adjustments and changes to adaptively managed the program throughout the 2022 calendar year, so that current program policy could keep in close step with quickly evolving market trends.

9. **Engaged with residential new construction but faced challenges.** Consistent contact has remained with five of the program's most engaged Energy Raters in the region, as well as four of the mid to large builders who participate. Developed a co-branded flyer for raters to promote the new multifamily incentive. Challenges impacting participation included a stricter Washington state energy code being in effect and continual supply chain issues, including high cost of construction materials. There were two single-family new home construction projects and five new manufactured home projects in 2022. Potential multifamily new construction projects were found to not meet the minimum 5% above code efficiency incentive eligibility requirement.

Program Performance Compared to the 2022-2023 DSM Business Plan

Overall, 2022 Home Energy Savings energy savings results were 27% of plan. Measure groups with the highest energy savings in the 2022-2023 DSM Business Plan were HVAC, Building Shell, Whole Home, Water Heating and Lighting. HVAC savings in 2022 were 35% of plan, Building Shell savings were 1% of plan, Whole Home savings were 6% of plan, Water Heating savings were 10% of plan and Lighting savings results in 2022 were 105% of plan. HVAC savings accounted for 92% of the overall savings for the year. Total incentives per kWh in 2022 were $0.64/kWh compared to $0.65/kWh in the plan. In addition to the general factors described in the executive summary, contributing factors are outlined below.

- **Non-Lighting:** non-lighting measures accounted for 95% of 2022 savings. Once the COVID-19 restrictions eased, outreach staff were able to re-enter retail stores to train staff in selling efficient products, interact with customers and host pop-up events to increase program participation in non-lighting measures. Outreach staff also worked with contractors who engaged with customers to sell/install projects. While non-lighting measures were the highest performing group, several post-pandemic economic challenges persisted including labor shortages, delayed shipments, product availability, higher interest rates and general economic uncertainty led to lower than planned savings for the year.

- **Lighting:** The lighting goals were greatly reduced in 2022. Retail lighting was offered only in discount stores located in Highly Impacted Communities. General service lamps were offered to customers in stores such as Dollar Tree, Goodwill Stores, Habitat for Humanity Stores, and select other retailers. The purchase price was bought down and included the program incentive.

- **Direct Install:** In 2022, direct install measures accounted for about 384,000 kWh in savings. Direct install measures included duct sealing and lighting and were installed by various partners including a partnership with the Sustainable Living Center based in Walla Walla.

- **New Single-Family Homes and Manufactured Homes:** Building material shortages and increased construction costs caused new home prices to soar, and new home construction experienced a decline in activity. An additional challenge in 2022 was interest rate volatility and the highest mortgage rates since 2001. According to the National Association of Home Builders (NAHB), "Rising mortgage rates combined with 35% to 45% growth in home prices since 2020 have priced many prospective buyers out of the market. According to new NAHB estimates 18 million households were priced out of the market as rates increased from 3% to 7% throughout 2022."

  Building materials such as lumber, concrete and gypsum continued to see cost volatility in 2022 with the overall pricing being much higher than in years prior to the pandemic. According to an article, "Pandemic Demand Causes Unprecedented Building Supply Shortage":

  > *A survey conducted in May 2021 by the NAHB found that more than 90% of builders reported shortages of appliances, 87% reported a shortage of windows and doors, and more than 50% of builders reported shortages of steel beams, insulation, roofing materials, vinyl siding, copper wiring, and plumber fixtures, among other materials. Since May 2020, the cost of steel mill products has risen over 75%, including a 59.4% increase in 2021 alone, and the cost of prepared asphalt and tar roofing and siding products has risen nearly 15%.*

  - Construction costs including labor, equipment, and fuel (gasoline) and building materials continued to place pressure on new construction activity in 2022. The producer price index for inputs to residential construction building materials rose 8.3% in 2022.
  - Manufactured home dealers reported that stock was extremely low.

- **Multifamily New Construction:** Several potential projects were reviewed at the beginning of 2022; however, none qualified as eligible based on not exceeding the energy code requirements.

Additional information on the program administration can be found on the Company's website under the Program administration section:
https://www.pacificorp.com/environment/demand-side-management.html

Direct Link to Home Energy Savings program administration:
https://www.pacificorp.com/content/dam/pcorp/documents/en/pacificorp/environment/dsm/washington/Washington_Program_Administration_Home_Energy_Savings_22.pdf

HOME ENERGY REPORTS

Program Description

The Home Energy Reports program is a behavioral program designed to decrease participant energy usage by providing comparative energy usage data for similar homes located in the same geographical area. Additionally, the report provides the participant with tips to decrease their energy usage.

The Home Energy Reports program passed the PTRC with a benefit cost ratio of 4.81 and the UCT with a benefit cost ratio of 4.37 for 2022.

Program Performance and Major Achievements in 2022

- Total savings for 2022 was 4,289,670 kWh savings at customer site
- Program introduced a new email cohort achieving 2790 MWh
- 565,000 emails sent in 2022 with positive open and click-through rates of more than 46% and more than 3% respectively
- Of the recipients that responded to the Like/Dislike question, more than 83% submitted a Like response and 95% of email feedback was positive

Program Performance Compared to the 2022-2023 DSM Business Plan

Estimated savings was 4,289,670 which was 105% of plan. Final savings are pending the results of a program evaluation. Expenditures for the program were $137,990 which was 37% of estimated expenditures.

Additional information on the program administration can be found on the Company's website under the Program administration section:
https://www.pacificorp.com/environment/demand-side-management.html

Direct Link to Home Energy Reporting (HER) program administration:
https://www.pacificorp.com/content/dam/pcorp/documents/en/pacificorp/environment/dsm/washington/Washington_Program_Administration_Home_Energy_Reports_22.pdf

LOW INCOME WEATHERIZATION

Program Description

The Low-Income Weatherization program provides energy efficiency services through a partnership between the Company and local non-profit agencies to residential customers who meet the income-eligible guidelines. Services are provided at no cost to the program participants.

These agencies include Blue Mountain Action Council located in Walla Walla, Northwest Community Action Center in Toppenish, and Opportunities Industrialization Center of Washington in Yakima. The Company entered into an agreement for these services with the Yakama Nation Housing Authority in July 2018.

The Low-Income Program did not pass the PTRC with a benefit cost ratio of 0.98 for 2022 (with NEIs) and 0.42 benefit cost ratio (without NEIs).

Program Performance and Major Achievements in 2022

- In 2022 the program achieved savings of 261,515 kWh at customer site
- Number of homes served was 142
- Six multi-family homes, a total of 69 units, received weatherization services
- The following program changes were approved by Washington Utilities and Transportation Commission and effective February 1, 2022
    - These changes included but were not limited to expanding tariff applicability for installation of ductless heat pumps and major measures (ceiling, wall and floor insulation) to include, in addition to permanently installed operable electric space heating, space heaters or any fuel source except natural gas with adequate combustion air as determined by agency.
    - Increase funds available for repairs from 15 percent to 30 percent of the annual reimbursement on energy efficient measures to help reduce number of dwellings that are deferred due to extent of critical repairs needed before energy efficiency work can be made and updated income guideline to be consistent with RCW 19.405.020(25).

Program Performance Compared to the 2022-2023 DSM Business Plan

The annual energy savings in 2022 was 261,515 kWh versus 169,130 in the plan. The annual energy savings per home was 1,842 kWh in 2022 versus 1,301 in the plan. The number of homes served was 142 in 2022 versus 130 in the plan. The 2022 actuals exceeded the projections in the plan primarily due to the lifting of COVID-19 pandemic restrictions, agencies eased agency-imposed restrictions and ramped up services, and the completion of six multi-family weatherization projects.

Additional information on the program administration can be found on the Company's website under the Program administration section:
https://www.pacificorp.com/environment/demand-side-management.html

Direct Link to Low Income Weatherization program administration:
https://www.pacificorp.com/content/dam/pcorp/documents/en/pacificorp/environment/dsm/washington/Washington_Program_Administration_Low_Income_22.pdf

NON-RESIDENTIAL ENERGY EFFICIENCY PROGRAM

WATTSMART BUSINESS

Program Description

The commercial, industrial, and irrigation energy efficiency program is consolidated into a Non-Residential Energy Efficiency program, Schedule A-140.[6] The Non-Residential Energy Efficiency program is promoted to the company's customers as Wattsmart Business.

Wattsmart Business is intended to influence new and existing non-residential customers to increase the efficiency of electricity usage through the installation of energy efficiency measures and adoption of improved energy management protocols. Qualifying measures include those which, when implemented in an eligible facility, produce verifiable electric energy efficiency improvements.

Incentives and services offered through Wattsmart Business include:

- Typical upgrades included in Incentive Lists: Incentives for listed lighting, HVAC, irrigation, compressed air, and other equipment upgrades that increase electrical energy efficiency and exceed energy code requirements.
- Custom analysis: Offers energy analysis studies, services, and incentives for more complex projects.
- Energy Management: Provides expert facility and process analysis and incentives to help lower energy costs by optimizing customer's energy use.
- Enhanced incentives for small businesses: Provide enhanced incentives for lighting upgrades installed by an approved Wattsmart Small Business Vendor at an eligible existing small business customer facility.
- Midstream/Lighting Instant Incentive: Provides instant, point-of-purchase incentive for qualifying LED lamps sold through participating distributors. Customers purchasing lamps from non-participating suppliers can apply for incentives after purchase.

[6] Program details such as incentive tables and program definitions are available on our website at WA_wattsmartBusiness_Incentive_tables_information.pdf (pacificpower.net)
Program details for the Lighting Instant Incentive (midstream) offer are available on our website at WA_Lighting_Instant_Incentive_Offer_9-4-2022.pdf (pacificpower.net)
The program brochure is available at https://www.pacificpower.net/content/dam/pcorp/documents/en/pacificpower/savings-energy-choices/wattsmart-business/washington/WA_wattsmartBusiness_Brochure.pdf

- Energy Project Manager Co-funding: Available to customers who commit to an annual goal of completing energy projects resulting in at least 1,000,000 kWh/year in energy savings
- Project Financing: PacifiCorp is teamed with National Energy Improvement Fund, an energy efficiency project financing firm, to provide customers with access to third party financing options for instances where funds for project implementation are not available from within the customer's organization.

The Wattsmart Business program passed the PTRC with a benefit cost ratio of 3.02 and the UCT with a benefit cost ratio of 2.70 (with NEIs) and PTRC of 2.69 and UCT of 2.70 (without NEIs).

Program Performance and Major Achievements in 2022

- In 2022, the program achieved 26,850,318 kWh gross savings at customer site.
- Disbursed incentives of $5.283M.
- Program changes effective January 1, 2022, were intended to:
    - Further adaptively manage the program in response to the pandemic with additional temporary incentive increases. With these incentive increases bringing the paybacks for more projects to between one and two years, the project cost incentive cap that was temporarily increased in 2021 was reset to the prior level (70 percent) for all but the small business lighting offer.
    - Expand the Small Business Lighting program to increase participation from very small businesses and small businesses located in Named Communities in alignment with CETA. Higher incentives will be offered for the smallest businesses using less than 30,000 kilowatt-hours per year and Named Community small businesses, and the incentive cap for this new offer will increase to 100 percent of project costs to reduce the customer out-of-pocket cost barrier. These changes were specifically called out as Utility Actions in the 2022-2023 DSM Business Plan and the Clean Energy Implementation Plan filings.
    - Expand HVAC participation by adding a new heating, ventilation, and air conditioning (HVAC) check-up offer performed by approved Wattsmart Business Vendors. This offering will encourage customers to maintain existing rooftop units (RTUs) to optimize equipment efficiency and install energy saving measures on existing HVAC equipment.
    - Align the program's measure offerings and incentives with the latest unit energy savings (UES) and Standard Protocols from the Regional Technical Forum (RTF).
- Program changes effective September 4, 2022, increased incentives for some midstream/Lighting Instant Incentive lamp measures to align with lamp pricing increases and to increase program participation.

Adaptive Management

The Company made substantial changes through an adaptive management approach and attempted to "leave no stone unturned" in terms of effort.

Vendor Incentives. As a key part of the adaptive management strategy to increase participation, vendor incentives introduced in April 2021 for lighting projects were updated and offered again in 2022. These vendor incentives helped keep lighting vendors focused on proposing projects in Pacific Power's Washington service area. Vendor incentives were also available again for interior Advanced Networked Lighting Controls and Advanced Rooftop Unit Controls in 2022. Vendor incentives piqued an interest from out-of-state lighting vendors to seek opportunities in the Washington service area. The additional vendor incentives allowed funds to help offset their salespersons' travel costs to the area, encouraging the vendors to work outside of their home state. Vendors also saw the value of proposing lighting controls for additional savings opportunities to obtain greater vendor incentives. Some vendors also successfully re-visited customers that they proposed projects to in the past and the additional vendor incentives gave them the ability to reduce their projects costs which helped to move projects forward. Total vendor incentives paid by category are listed below:

- Advanced Networked Lighting Controls Vendor Incentives
  - Four projects, $11K in vendor incentives
- Lighting Vendor Incentives:
  - Listed Incentive, 63 projects, $112.9K vendor incentives and 4.1 million in kWh savings
  - Lighting Instant Incentive, 4 projects, $5.0K vendor incentives and 30K in kWh savings
  - Small Business Lighting, 130 projects, $60.1K vendor incentives and 3.7 million in kWh savings

Small Business Lighting. With the program changes and CETA Utility Actions related to small business, the Small Business Lighting offer saw strong participation in 2022 with 156 projects completed and achieved 136% of plan with a total of 4,087,813 kWh. Overall, seven approved Vendors participated in 2022, including five new vendors. Continued the postcard campaign that focused on hard-to-reach small business customers. Small Business Vendors who signed a non-disclosure agreement were provided with customer lists (containing business name, address, phone number only) to allow them to connect with customers who received a postcard from Pacific Power containing an introduction to the program and an approved vendor. The intent is to improve efficiency of the approved vendors sales processes and boost small business participation. In addition, co-branded shirts are made available to vendors who participated in the postcard campaign. These shirts help in promoting vendor credibility with small business customers. In addition to the mailed postcards, the program also offered co-branded leave-

behind postcards to share with customers that included a QR Code for information in English and Spanish.

Energy Management. In response to equipment shortages and capital constraints due to ongoing supply chain issues, the team increased focus on energy management opportunities with refrigeration in tree fruit industry facilities. Pacific Power staff and Cascade Energy, an implementer for the custom offering, approached two large refrigeration fruit storage customers in Yakima about a refrigeration "find and fix" opportunity. These tune up events identified quick, low-cost controls setpoints changes that yielded large energy savings with minimum or no impact on fruit quality. These two projects resulted in 3,232,437 kWh. The success of these projects and the willingness of these customers to implement the recommendations, influenced a targeted effort in 2023 to do more tune-ups with similar customers.

Other Highlights

- **Program-Specific Field Outreach including Diversity, Equity, Inclusion Efforts**
  - The outsourced delivery implementation team's Diversity & Community Outreach Coordinator continued to focus on in-person outreach to named community/Highly Impacted Community customers and vendors.
  - Reached out to non-participating vendors and minority-owned vendors to share program opportunities and encourage them to participate.
  - Continued efforts to promote the Lighting Instant Incentive offer to distribution vendors by offering to meet in person, educate staff, and assist with program submittals.
  - Leveraged relationships with vendors from outlying territories and had program Outreach Specialists join them during project presentations to customers. This resulted in multiple large lighting projects.
  - Encouraged two active Vendors to complete NEEA's NXT Level courses, receive their training certification, and reach Premium Vendor status.
  - More program materials were translated from English into Spanish.
  - Followed up on past prospects that we are aware of who have not moved forward with their efficiency upgrade opportunities.
  - Performed joint presentations with vendors and customers to help customers understand benefits and program opportunities.
  - Program outreach staff succeeded in cultivating one-on-one relationships with vendors of irrigation equipment, adaptive refrigeration controls, and fast acting doors through repeat calls and visits, subject to COVID restrictions.
  - Reached out to over 200 customers within highly impacted communities.
  - Attended Central Washington Hispanic Chamber of Commerce Meet and Greets - July 29th, Aug 31st, Sept 28th, Oct 26th, Nov 30th, Dec 28th
  - Attended Central Washington Hispanic Chamber of Commerce Board of Directors Meeting - Aug 3rd, Sept 7th, Oct 5th, Nov 2nd, Dec 7th
  - Attended Walla Walla Sustainability Committee meetings (occurs every 2 months)

- **Clean Buildings Performance Standard –** Please see the Pilots section for additional updates.
- **Vendor eLearning Platform** - The eLearning Platform has a variety of courses for participating vendors that cover available incentives, measure requirements, and resources for applying. In 2022, the program added two new courses for Washington vendors: Pacific Power OnSite Online Lighting Tool Tutorial Videos and a DesignLights Consortium (DLC) Networked Lighting Controls training course.

Program Performance Compared to the 2022-2023 DSM Business Plan

Overall, 2022 Wattsmart Business energy savings results were 77% of plan. Measure categories with the highest energy savings for 2022 in the 2022-2023 DSM Business Plan were Lighting, Refrigeration, Energy Management and Compressed Air. Lighting savings results in 2022 were 98% of plan, Refrigeration savings were 77% of plan, Energy Management savings (including Strategic Energy Management) was 98% of plan and Compressed Air was 22% of plan. Total incentives were 85% of plan and incentives per kWh in 2022 were $0.197/kWh on average compared to $0.179/kWh in the plan mostly due to more small business lighting participation which has enhanced incentives. In addition to the general factors described in the executive summary, contributing factors are outlined below.

- Customers were wary about investing capital funds during an uncertain and unstable economic environment that has followed the pandemic.
- Many businesses were impacted by lingering pandemic related challenges. Staff shortages added pressure to already-scarce time availability for maintenance people and management. Supply chain issues delayed implementation for projects and some projects in the forecast for 2022 slipped to 2023 late in the year, including some large projects.
- Customers had trouble not only with supply chain delays, but cost increases required immediate action to secure pricing, giving customers limited time to engage with Pacific Power prior to purchase deadlines.
- Vendors experienced labor shortages and supply chain shortages which limited their ability to sell and install upgrades.
- Climate changes impacted the tree fruit industry significantly in 2022. A late spring snow and a very hot August resulted in a reduction in bloom counts and a small apple harvest both in size and volume. These weather-related impacts reduced profits for the fifth year in a row in the Yakima Valley. Low fruit yield limits the need for new construction storage projects and has a cascading effect on the support industry customers such as cardboard and plastic packaging.
- Program outreach activities with large customers were mostly done in-person and at similar levels to 2019. Due to more customer familiarity with virtual meetings because of the pandemic, program staff were able to rely on virtual follow-up meetings which lessens the impact on customer's time.

Additional information on the program administration can be found on the Company's website under the Program administration section:
https://www.pacificorp.com/environment/demand-side-management.html

Direct Link to Wattsmart Business program administration:[7]
https://www.pacificorp.com/content/dam/pcorp/documents/en/pacificorp/environment/dsm/washington/Washington_Program_Administration_NonResidential.pdf

DISTRIBUTION EFFICIENCY

Distribution efficiency is one of the six types of efficiency in the WAC 480-10-100 Energy Efficiency Resource Standard.

Projects Completed

The following distribution efficiency Voltage Optimization improvements were completed on Wiley Substation feeder 5Y380:

- Installed new line voltage regulator to address voltage concerns.
- Energy savings for the improvements (as built) is 24.6 MWh[8]
    - Note this energy savings is not included in the portfolio cost effectiveness analysis but is reported as company conservation against the Energy Independence Act Target.
- Total cost was $82,093.
    - Note in accordance with Docket UE-210830 Order O1 Attachment A, item 12c, recovery of costs associated with distribution and production efficiency initiatives are not funded through the Electric Conservation Tariff Rider because these programs are not customer conservation initiatives. They are company conservation programs. As such these costs are recovered in the general rate making process over time. These costs are not included in Tables 2 and 3 below.

Projects in Progress

There are two other projects in progress that may be completed in time for energy savings reporting in the 2023 DSM Annual Report (or possibly for 2024):

[7] The Wattsmart Business program is administered through a process that allows for program changes after any stakeholder comments are addressed. After consultation with Commission staff on the program changes, they are posted to the program website and become effective 45 days thereafter.
[8] Note this value is based on data collected on the feeder at the substation. For purposes of this report, this savings is considered "at site". The conversion from "at site" to "at generation" is based on the total system line loss factor of 0.07486. The savings "at generation" is 26,453 kWh.

Grandview Substation feeder 5Y303

- Replace existing capacitor banks with switched capacitor banks and install three additional switched capacitor banks.
- Project is designed, budget approvals being verified by local district, and tentatively scheduled to be complete end of year 2023. Total cost $33,097.
- The initial annual energy savings estimate was 244 MWh. This work will be revisited once the improvements are complete.

Wiley Substation feeder 5Y164 Reconductor and Voltage Optimization

- Replace 3,400 feet of #6 steel mainline with 4/0 AAC.
- Install voltage regulator bank.
- Project is designed, budget approvals being verified by local district, and tentatively scheduled to be complete end of year 2023. Total cost $366,500.
- The initial annual energy savings estimate was 227 MWh. This work will be revisited once the improvements are complete.

Program Performance Compared to the 2022-2023 DSM Business Plan

The estimated annual energy savings in the 2022-2023 DSM Business Plan for 2022 for Distribution Efficiency was 82,000 kWh (at the generator). The annual savings for 2022 is lower at 26,453 kWh (at the generator).

NORTHWEST ENERGY EFFICIENCY ALLIANCE

Description

The Northwest Energy Efficiency Alliance (NEEA) is a non-profit corporation that works collaboratively with its funders and other strategic market partners to accelerate the innovation and adoption of energy-efficient products, services, and practices. NEEA is supported by BPA, Energy Trust of Oregon, and more than 100 Northwest utilities, including Pacific Power.

Program performance for 2022 is being reported based on NEEA's results for Pacific Power of 3,329 MWh (at site). Consistent with the reporting convention approved in Docket UE-132047 the savings represent Pacific Power's portion of Total Regional Savings less the Company's local program savings.

In 2022, the Company had a representative on the NEEA board of directors as well as representatives on the coordinating committees.

Program Performance Compared to the 2022-2023 DSM Business Plan

NEEA savings for 2022 is 108% of plan. Expenditures for NEEA in 2022 were 105% of plan. Expenditures for the combination of NEEA, end use load research and RTF funding for 2022 are 99% of plan.

PILOT PROJECTS

The Company offers pilot projects to residential and nonresidential sectors. This section briefly describes the pilots underway in the 2022-2023 biennial period and key activities that occurred in 2022.

On-Bill Financing for owned manufactured homes located on rented space and homes on tribal trust lands in addition to current offer for owned homes

- **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 currently being offered Craft3. This additional offer is contingent on Craft3 being awarded a grant from the Energy Revolving Loan Fund administered by the Washington State Department of Commerce. Craft3 has submitted a proposal and a response is expected by the end of September 2021.
- **Costs**: No additional start-up costs or per application costs. 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.
- **History:** Builds on work from pilot in prior biennial 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 ensure 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.
- **2022 Update**:

- The expansion is made possible by a grant Craft3 was awarded by the Energy Revolving Loan Fund administered by the Washington State Department of Commerce. Craft3 was awarded and will match a $2 million award, for a total of up to $4 million. This is in addition to past awards Craft3 has received from Commerce to do similar work. This new infusion of capital will allow Craft3 to partner with Pacific Power to reach communities that did not have access to the financing previously.
- New eligible households include manufactured homes on leased land and homes in tribal communities where loans cannot be secured by a lien.
- Additionally, Craft3 increased the maximum loan amount to $50,000 ($25,000 for unsecured loans) to accommodate the inclusion of financing for critical repairs such as asbestos remediation, roof repair, mold abatement, electrical panel upgrades, etc. Critical repairs may only be financed in conjunction with, and in preparation for a rebate eligible project.
- Lower interest rate offered to households who earn equal to or less than 100% area median income (AMI).
- The expansion of the on-bill financing was implemented as of August 1, 2022.
- Craft3 worked jointly to update program marketing materials and presented at an in-person Home Energy Savings vendor event on August 24, 2022, in Kennewick, Washington.

- **2022 Update on Costs:**
  - In the 2022-2023 biennial conservation plan, it was stated that there would be no fees associated with this expansion. However, there will be up to $20,000 in start-up costs to perform website, application, system, training, underwriting, and marketing updates. Additionally, Craft3 will receive $200 per funded loan application, and $300 per application underwriting fee (regardless of loan funding) for unsecured loans. Craft3 reports that unsecured lending in manufactured home parks tends to be higher touch, requiring additional due diligence on the part of the lender, and this is the reason for the application fees.
  - Costs will be included as a residential program expense and recovered through the System Benefits Charge and are included in Home Energy Savings expenditures.
- **2022 activity:** Individual training conducted with trade allies and Craft3 through digital communications, phone outreach and in person training including the presentation and distribution of a bilingual brochures (Spanish). There were 169 applications received; 102 approved (funded and billing), 43 applications declined (all referred to regional community action agencies) and 24 applications withdrawn.

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.
- **History:** Builds on work from pilot in prior biennial period.
- **Implementation:** Build awareness and utilization of available customer incentives for manufactured home measures, including new manufactured homes and existing manufactured home duct sealing, direct install lighting, heat pumps, 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.
- **2022 activity:** Signed up five additional contractors focused on Manufactured Homes weatherization. Partnering with Energy Works NW to identify potential new construction homes that qualify for the program. Providing point of purchase signage and marketing materials for new homes retailers. Field staff also identified and conducted program kickoff visits to seven manufactured homes dealers in or near Pacific Power territory. 2022 also saw the team begin updating existing POP to reflect program changes for 2022 and beyond, including a rebate pad and a-frame piece, both of which call out available rebates and the benefits of upgrading to an ENERGY STAR or NEEM+ manufactured home.
    - In 2022, five manufactured new homes were incentivized accounting for nearly 12,000 kWh.
    - Heat pump measures in manufactured homes accounted for approximately 312,000 kWh and Direct Install Duct Sealing for 279,000 kWh. Savings were also accrued by way of smart thermostats, LED Lighting, water heating and appliances.

CTA-2045 enabled heat pumps for space heating

- **Purpose:** Increase deployment of CTA-2045 enabled heat pumps. This new approach to demand response greatly reduces the cost of controlling 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 pumps. In 2022-2023, the pilot will also focus on increasing sales of CTA-2045 equipped units by providing an additional incentive of $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:** 10 to 20 units.
- **History:** Builds on work from pilot in prior biennial period
- **Implementation:** Home Energy Savings program team will build new relationships with 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 manufacturers with existing relationships. Promote the additional incentive for CTA-2045 ready models through direct outreach email and phone communications. Create cobranded materials with manufacturers to increase visibility.
- **2022 Update:** The company and its program implementer initially researched and created the CTA-2045 incentives back in 2019. At the time, HB1444 in WA required that CTA-2045 capability be incorporated into all new heat pump water heaters starting 1/1/2021. The HPWH CTA-2045 incentive was to increase early adoption of equipment with this technology. For the heat pump (space heating) measure, the company wanted to promote the demand response capability in other potential equipment as well. It wasn't clear at the time if/how CTA-2045 enablement would apply outside of water heating, so the company wanted to get ahead of potential adoption. However, it now seems unlikely that demand response will be managed through CTA-2045 ports for space heating. Given that, this pilot will no longer be pursued and the CTA-2045 incentive for heat pumps will be removed from Home Energy Savings. The Company is exploring including electric water heating devices, which may or may not be CTA-2045 enabled, for a future residential demand response program.

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 in prior periods which, while successful, did not eliminate or defer the traditional construction solution. Two circuits (5Y164 and 5Y380) in the Yakima area with summer constraints (approximately 2 MW for each circuit) and multi-year construction lead time have been identified and in 2022 program implementers will begin targeting efficiency installations on these circuits.
- **Costs:** Costs are included in the existing program delivery and incentive budgets for the biennial period.
- **Size:** to be determined.
- **History:** Concept of pilot is a continuation of prior work, but any target areas defined for this biennial period would be new.
- **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.
- **2022 activity:** The customer list for the two circuits was provided to the delivery team in mid-June 2022. Approximately 2,500 residential customers on the specified feeders were sent a postcard and email promoting insulation measures in November of 2022. On the business side, approximately 250 customers received a postcard and email on “Starting a Project”, which outlined how to contact an approved contractor and apply for Pacific Power incentives online. Another round of postcards/emails is planned for early 2023. In

2022, residential customers on the targeted feeders completed 74 Home Energy Savings projects totaling 67,896 kWh (18.9 KW). One business customer on the targeted feeders completed a Wattsmart Business lighting project totaling 24,647 kWh (5.3 KW). In addition, 2 homes on the targeted feeders received services from the Low-Income Weatherization program with savings totaling 2,423 kWh/yr.

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.
- **History:** Continuation of pilot from the last biennial period as part of an overall effort in the region to build momentum and market support for advanced lighting controls.
- **Implementation:** Leverage NEEA'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.
- **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.
- **2022 Activity:** `
    - Encouraged savvy vendors (including from out-of-state) that promote lighting controls to participate in the program.
    - During meetings and pre-inspections, the Outreach Team recommends the use of lighting controls opportunities where applicable.
    - Partnered with NEEA and BPA to host an in-person hands-on Luminaire Level Lighting Controls training course in Kennewick, WA on October 4, 2022. Eleven vendors attended. Representatives from Northwest Energy Efficiency Alliance (NEEA) Luminaire Level Controls Initiative and Evergreen's outreach team presented. Participants learned about the variety of lighting controls and how to appropriately apply controls to lighting projects. After the presentations, there was an opportunity for hands-on learning with three local lighting manufacturer representatives in attendance. They conducted live demonstrations with their control products and answered questions from the audience.
    - Outreach Team sent personal ANLC incentive offer reminder emails to vendors and continued to encourage them to consider lighting controls during one-on-one meetings.
    - Highlighted lighting controls during March 2022 in-person vendor trainings.
    - Increased customer incentives in 2022.
    - In 2022, added new DesignLights Consortium (DLC) Networked Lighting Controls training course for Washington vendors on the Wattsmart eLearning platform.

- Vendor Incentive: In 2022, Pacific Power continued the $/fixture Vendor Incentive for advanced networked lighting controls that was promoted and offered since 2019. Contractors/vendors face up-front costs of time and money to obtain manufacturer certification(s) to install advanced lighting controls products. A vendor incentive (focused on the vendor's first three projects) along with the vendor support provided by the program is intended to boost participation. In 2022, vendors received the lighting controls vendor incentive for each of the four projects with interior Advanced Networked Lighting Controls.
- Energy savings results: Lighting controls were present in approximately 80 completed projects; savings associated with controls totaled approximately 4.5 million kWh per year. There were ten projects with Advanced Exterior Dimming, and four projects with interior Advanced Networked Lighting Controls.

Clean Buildings Accelerator

- **Purpose:** Help commercial building owners who must comply with the Clean Buildings law (House Bill 1257) get a jump start while also identifying savings opportunities and achieving savings results (reported in the Wattsmart Business program).
- **Costs:** Costs are included in the Wattsmart Business program delivery and incentive budgets for the biennial period.
- **Size:** Up to 40 commercial buildings over 50,000 square feet (approximately 10-20 buildings per year in 2022 and 2023).
- **History:** New pilot
- **Implementation**: Leverage Puget Sound Energy development work to offer similar services for commercial buildings located in Pacific Power's service area. Outreach for the offer will include customers in Highly Impacted Communities and other customers who may lack resources to get started with Clean Buildings. Services and incentives will be offered as part of the Wattsmart Business Strategic Energy Management offer. Services include
  - Coffee chats to provide general information and enroll customers
  - Sprints including monthly virtual workshops for 4 months
  - Virtual energy scans to identify energy savings opportunities
  - Cohort elevate workshops (quarterly for graduates)
  - Coaching calls
  - Energy Star Portfolio Manager training
- **2022 activities**:
  - Hosted four coffee chats in April and May to recruit the first Clean Buildings Accelerator cohort. Of the 22 coffee chat attendees representing 15 different businesses/organizations, 7 were businesses/organizations with buildings in a Highly Impacted Community.

- The first cohort includes nine businesses/organizations with 41 buildings. Of these, five businesses/organizations have buildings located in a Highly Impacted Community.
- For the first cohort, provided four monthly workshops for the "sprint" from May through August 2022, and coaching calls and virtual energy scans. Some participants have a mix of buildings over and under 50,000 square feet. While the focus of this pilot is on buildings over 50,000 square feet, energy scans can be completed for smaller buildings if requested. Although there was 1 million kWh in energy management savings projected for 2022 in the 2022-2023 DSM Business plan, there was no energy management savings reported in 2022.
- Began recruiting and hosted "coffee chats" (11/1/2022, 12/7/2022 plus one on 1/12/2023) for a second cohort that will begin in early 2023. Recruiting included a direct mail (834 letters sent) and email (306 sent) in October 2022 to larger customers likely to have commercial buildings over 50,000 square feet.

CLEAN ENERGY IMPLEMENTATION PLAN – UTILITY ACTIONS

The Utility Actions in the 2022-2023 DSM Business Plan and the Clean Energy Implementation Plan (both filed in 2021) are listed below with status updates for 2022 in bold font. All are either completed in 2022 and/or are ongoing.

Communications:

The following utility actions defined in the 2022-2023 Demand-side Management Business Plan and Clean Energy Implementation Plan (both filed in 2021) are either complete or continuing:

Utility Actions from the 2022-2023 DSM Business Plan filed in 2021:

Through the programs identified in the 2021 IRP preferred portfolio – including energy efficiency and demand response – PacifiCorp can deliver programs with an increased equity focus utilizing more effective communication strategies to reach its Named Communities.

- Improve culturally and linguistically responsive outreach and marketing to increase awareness of energy and conservation programs.
- Expand in-language services across written, spoken, and visual services.
    - As appropriate, include Spanish versions of collateral and/or posters at community events where Pacific Power is sponsoring. Have interpreters and translated materials at public meetings.

The above utility actions are ongoing. PacifiCorp is working to address cultural barriers and embrace cultural differences by obtaining a deeper understanding of the communities within its service area. PacifiCorp's EAG has advised that the company needs to further its

understanding of different communities so that we can refine and enhance our mechanisms for outreach and communication, which is why we are exploring new advertising channels to better reach Spanish-speaking customers more directly in their communities. For example, PacifiCorp is launching a pilot program to increase awareness and participation in Pacific Power's Wattsmart energy efficiency programs. For this initiative, the Company is working closely with a multi-cultural marketing agency to develop an earned media plan that will connect, resonate and strengthen media and customer relationships to reach the Hispanic community using culturally relevant messaging and content. Through contacts with community organizations, we are continually learning and working toward accommodating cultural differences. Along with continuing to nurture relationships with local chambers of commerce to better reach communities.

Residential:

Home Energy Savings:

The following utility actions defined in the 2022-2023 Demand-side Management Business Plan and Clean Energy Implementation Plan (both filed in 2021) are either complete or continuing:

Utility Actions from the 2022-2023 DSM Business Plan filed in 2021:

- Enhanced incentives for windows in multi-family units were added to the program in 2022. Initial focus will be on buildings in Highly Impacted Communities. ***(The enhanced incentives were added to the program effective 1/1/2022; there were no incentives paid in 2022. This utility action is ongoing.)***
- Continue direct install residential lighting in multi-family units. Continue focus on Highly Impacted Communities. ***(The direct-install lighting implementer installed 510 screw-in LED bulbs and LED T-8 lamps to upgrade the lighting of apartment units and common areas of four apartment buildings achieving 15,960 kWh in savings. This utility action is ongoing with changes for 2023.)***
- Maintain and expand if possible general-purpose lamp buydown in "dollar stores" in Highly Impacted Communities. This will be the only retail lighting buy down offer. ***(Ongoing: Discounted lighting was available only at approved value retailers located in Highly Impacted Communities. Retailers at 20 locations who participated in the lamp buydown included True Value, Ace Hardware, Dollar Store, Goodwill, and Habitat for Humanity.)***
- Continue manufactured home direct install duct sealing and lighting. Continue focus on Highly Impacted Communities. ***(Ongoing efforts to provide direct install duct sealing and lighting to manufactured homes with a focus on Highly Impacted Communities. In 2022, served 415 customers with duct sealing achieving 278,899 kWh in energy efficiency savings through this program offering. Direct install lighting accounted for 46,222 kWh in energy savings.)***
- Continue promoting new construction offerings for multifamily and single-family units. Continue focus on Highly Impacted Communities. ***(Ongoing effort to recruit and***

engage builders and raters with a focus on Highly Impacted Communities. Program had two new home projects but they were not located in Highly Impacted Communities.)

- Non-Electric, Non-Natural Gas Upgrades in Named Communities. ***(Ongoing with changes for 2023.)***
    - Serve named community residential customers who use non-electric and non-natural gas fuel sources in their primary heating systems by decommissioning these systems and installing ductless heat pumps. This measure will be offered at the same incentive rate as the typical ductless heat pumps measure, and will be available in single family, manufactured homes, and multi-family residences. Customers in Highly Impacted Communities will be eligible for this incentive and customer eligibility criteria will be available on the program website. The standard ductless heat pump measure replacing electric forced air furnace or zonal electric primary heating systems is still available for all residential customers. ***(There were no completed ductless heat pump projects in 2022 involving decommissioning of non-electric or non-natural gas heating. Incentives for 2023 will be higher for this measure for residential customers located in highly impacted communities than for customers who do not reside in a highly impacted community.)***
    - The program will use RTF deemed values for ductless heat pump installations that assume a zonal electric resistance baseline since RTF does not have any measures for alternative fuel source replacement or conversions. Highly impacted community determination will be included in customer data provided by Pacific Power.

Low Income Weatherization:

The following utility actions defined in the 2022-2023 Demand-side Management Business Plan and Clean Energy Implementation Plan (both filed in 2021) are either complete or continuing:

Utility Actions from the 2022-2023 DSM Business Plan filed in 2021:

- Increase funds available for repairs from 15 percent to 30 percent.
- Permit installation of electric heat to replace permanently installed electric heat, space heaters or any fuel source except natural gas with adequate combustion air as determined by the Agency. The changes are designed to promote the installation of electric heat and minimize use of wood heat, solid fuels or natural draft equipment in specific applications where combustion safety (and indoor air quality) cannot be maintained.
- Changes to Schedule 114 are required to implement these changes. Amended tariff sheets will be filed with the Commission to enable these changes.

To implement the above utility actions, the company submitted a filing with the Commission on December 21, 2021, to make changes to Schedule 114 and received approval for the following effective February 1, 2022:

- ***Increase funds available for repairs from 15 percent to 30 percent.***
- ***Permit installation of electric heat to replace permanently installed electric heat, space heaters or any fuel source except natural gas with adequate combustion air as determined by the Agency. The changes are designed to promote the installation of electric heat and minimize use of wood heat, solid fuels, or natural draft equipment in specific applications where combustion safety (and indoor air quality) cannot be maintained.***

In 2022, the combined total annual reimbursement on repair cost was 5 percent of the annual reimbursement on energy efficient measures installed by the four weatherization partner agencies. There were no installations of ductless heat pumps to replace any non-electric fuel source.

Non-residential:

Wattsmart Business

The following utility actions defined in the 2022-2023 Demand-side Management Business Plan and Clean Energy Implementation Plan (both filed in 2021) are either complete or continuing:

Utility Actions from the 2022-2023 DSM Business Plan filed in 2021:

Increase outreach and participation for small businesses and named community small businesses identified by census tract and rate schedule.

- Create a new offer within the current small business enhanced incentive offer targeting the smallest businesses using less than 30,000 kilowatt-hours per year and Named Community small businesses on Schedule 24. ***(This was implemented with the program changes effective January 1, 2022.)***
    - Offer a higher incentive and increase the incentive cap for this new offer from 90 percent to 100 percent of project costs to reduce the customer out-of-pocket cost barrier. ***(This was implemented with the program changes effective January 1, 2022. Incentives for very small businesses and small businesses located in highly impacted communities were set higher than the regular small business lighting incentives. The incentive cap for very small businesses and small businesses located in Highly Impacted Communities is 100% of project costs rather than the 90% cap for the regular small business offer. This reduced the out-of-pocket cost for lighting retrofits and made it easier for customers to move forward with vendor project proposals.)***
- Target a portion of company initiated proactive outreach to small businesses located in Highly Impacted Communities. Continue to tie proactive outreach to approved

small business vendor capacity to respond to customer inquiries. ***(Continued the postcard campaign in 2022 that focused on hard-to-reach small business customers. Approved Small Business Lighting Vendors who signed a non-disclosure agreement were provided with customer lists (containing business name, address, phone number only) to allow them to connect with customers who received a postcard from Pacific Power containing an introduction to the program and an approved vendor. Of the 108 postcards sent in 2022, 85 went to customers located in a highly impacted community. The intent is to improve efficiency of the approved vendors sales processes and boost small business participation. In addition, co-branded shirts are made available to vendors who participated in the postcard campaign. These shirts help in promoting vendor credibility with small business customers. In addition to the mailed postcards, the program also offered co-branded leave-behind postcards to share with customers that included a QR Code for information in English and Spanish.)***

- Offer approved small business lighting vendors a higher vendor incentive for completed lighting retrofit projects with small businesses located in Highly Impacted Communities. ***(This was implemented in 2022. Vendor incentives of $500 per project were paid in 2022 for 63 completed small business lighting retrofits for small businesses located in Highly Impacted Communities. The $500 per project vendor incentive was also available for completed lighting projects for very small businesses. The vendor incentive for completed lighting projects for other small businesses (not very small and not in a Highly Impacted Community) was $300 per completed project.)***

Participation Tracking and Reporting:

The participation tracking improvements have been implemented and will continue. In addition, the Highly Impacted Community tracking will also include tracking for participants located on Tribal Lands (based on census tract data).

Utility Actions from the 2022-2023 DSM Business Plan filed in 2021:

Track program participation for the following and include in annual reports starting in 2022 (noting 2022 will be a transition year as applications are revised to collect additional information).

- Low Income Weatherization
    - Participants located in a Highly Impacted Community
    - Participants whose primary language spoken is other than English (question asked of the contact person completing the incentive application)
    - Participants who rent or lease rather than own
    - Participants living in a manufactured home

- Home Energy Savings

    - Participants located in a Highly Impacted Community
    - Participants whose primary language spoken is other than English (question asked of the contact person completing the incentive application)
    - Participants who rent or lease rather than own
    - Participants living in a manufactured home
    - Participants living in a multi-family unit

- Wattsmart Business (except midstream)
    - Participants located in a Highly Impacted Community
    - Participants whose primary language spoken is other than English (question asked of the contact person completing the incentive application)
    - Participants who rent or lease rather than own
    - Participants who are smaller businesses (e.g., account associated with project receives electric service on Schedule 24)

EXPENDITURES AND SAVINGS RESULTS

TOTAL PORTFOLIO BUDGET AND EXPENDITURES

Table 1: DSM Balancing Account[9]

Month	Expenditure[10]	S-191 Revenue[11]	Cash Basis Accumulative Balance[12]	Net Cost Accrual[13]	Accrual Basis Accumulative Balance[14]
21-Dec			$ (4,355,762)		
22-Jan	$ 1,218,611	$ (1,169,025)	$ (4,306,176)	$ (175,748)	$ (3,441,698)
22-Feb	$ 474,721	$ (1,018,030)	$ (4,849,485)	$ 332,430	$ (3,652,577)
22-Mar	$ 1,051,513	$ (865,600)	$ (4,663,573)	$ 245,747	$ (3,220,917)
22-Apr	$ 1,044,018	$ (783,995)	$ (4,403,550)	$ (435,759)	$ (3,396,653)
22-May	$ 1,364,413	$ (842,006)	$ (3,881,143)	$ 1,901	$ (2,872,345)
22-Jun	$ 1,234,250	$ (651,245)	$ (3,298,138)	$ 247,254	$ (2,042,085)
22-Jul	$ 1,064,738	$ (954,899)	$ (3,188,299)	$ (352,284)	$ (2,284,531)
22-Aug	$ 1,254,329	$ (1,259,056)	$ (3,193,026)	$ (28,509)	$ (2,317,767)
22-Sep	$ 626,687	$ (1,640,391)	$ (4,206,730)	$ 621,535	$ (2,709,937)
22-Oct	$ 1,557,646	$ (1,269,935)	$ (3,919,019)	$ (441,795)	$ (2,864,020)
22-Nov	$ 1,057,043	$ (1,553,265)	$ (4,415,241)	$ 220,723	$ (3,139,520)
22-Dec	$ 1,438,571	$ (2,033,571)	$ (5,010,241)	$ 92,490	$ (3,642,029)
2022 Total	$ 13,386,541	$ (14,041,019)		$ 327,985	

[9] The DSM balancing account is the mechanism used for managing the DSM Tariff Rider revenues and actual DSM-incurred expenditures.
[10] Monthly expenditures for approved energy efficiency programs.
[11] Revenue collected through the DSM Tariff Rider.
[12] Current balance of the account; a running total of account activities, excluding the accrued cost. A positive balance means cumulative expenditures exceeds cumulative revenue; a negative balance means cumulative revenue exceeds cumulative expenditures.
[13] Two accrual entries are made each month for expenditures of energy efficiency programs. One estimates the incurred cost not yet processed, and the other reverses the estimate from the previous month. The amount shown here is the net of the two entries. This accounting principle was applied to the balancing account but would not be included when calculating the carrying charges.
[14] Current balance of the account including accrued costs. A positive balance means cumulative expenditures exceeds cumulative revenue; a negative balance means cumulative revenue exceeds cumulative expenditures.

Table 2: Washington Results January 1, 2022 – December 31, 2022[15]

Energy Efficiency Program	kWh Savings (at site)	kWh Savings (at gen)	Estimated Systems Benefit Expenditures
Low Income Weatherization (114)	261,515	281,589	$ 747,702
Home Energy Savings (118)	2,625,379	2,826,903	$ 3,629,851
Home Energy Reports (N/A)	4,289,670	4,618,945	$ 137,990
Total Residential Programs	**7,176,564**	**7,727,437**	**$ 4,515,543**
Wattsmart Business (140) Commercial	21,570,220	23,209,989	$ 6,779,816
Wattsmart Business (140) Industrial	4,727,777	5,049,975	$ 1,486,005
Wattsmart Business (140) Irrigation	552,321	594,717	$ 173,602
Total Business Program	**26,850,318**	**28,854,680**	**$ 8,439,423**
Northwest Energy Efficiency Alliance	3,328,800	3,582,421	$ 905,984
Distribution Efficiency Savings	24,611	26,453	$ -
Total Other Conservation Initiatives	**3,353,411**	**3,608,875**	**$ 905,984**
Be Wattsmart, Begin at Home			$ 64,523
Customer outreach/communication			$ 217,121
Program Evaluations (& savings verification)			$ 276,541
Potential study update / analysis			$ 117,239
System Support			$ 70,863
End use load research & RTF Funding			$ 58,090
Total Portfolio -Level Expenses			**$ 804 378**
Total PacifiCorp Conservation	**34,051,493**	**36,608,571**	**$ 13,759 344**
Total System Benefits Charge Conservation	**37,380,293**	**40,190,992**	**$ 14,665 328**
Total Conservation	**37,380,293**	**40,190,992**	**$ 14,665 328**

[15] Gross Savings

Table 3: Washington Gross Results January 1, 2022 – December 31, 2022[16]

Energy Efficiency Program	2022 from 2022-2023 PacifiCorp Washington DSM Business Plan			2022 PacifiCorp Washington DSM Actual		
	kWh Savings (at site)	kWh Savings (at gen)	Estimated Systems Benefit Expenditures	kWh Savings (at site)	kWh Savings (at gen)	Estimated Systems Benefit Expenditures
Low Income Weatherization (114)	169,130	182,112	$ 937,500	261,515	281,589	$ 747,702
Home Energy Savings (118)	9,610,833	10,348,560	$ 9,274,502	2,625,379	2,826,903	$ 3,629,851
Home Energy Reports (N/A)	4,099,518	4,414,197	$ 372,430	4,289,670	4,618,945	$ 137,990
Total Residential Programs	**13,879,481**	**14,944,869**	**$ 10,584,432**	**7,176,564**	**7,727,437**	**$ 4,515,543**
Wattsmart Commercial (140)	21,044,900	22,644,733	$ 6,469,109	21,570,220	23,209,989	$ 6,779,816
Wattsmart Industrial (140)	13,046,890	13,936,036	$ 3,359,433	4,727,777	5,049,975	$ 1,486,005
Wattsmart Irrigation (140)	868,229	934,874	$ 272,733	552,321	594,717	$ 173,602
Total Business Program	**34,960,019**	**37,515,643**	**$ 10,101,275**	**26,850,318**	**28,854,680**	**$ 8,439,423**
Northwest Energy Efficiency Alliance	3,078,115	3,313,583	$ 862,100	3,328,800	3,582,421	$ 905,984
Distribution Efficiency		82,000		24,611	26,453	
Total Other Conservation Initiatives	**3,078,115**	**3,395,583**	**$ 862,100**	**3,353,411**	**3,608,875**	**$ 905,684**
Be Wattsmart, Begin at Home			$ 64,523			$ 64,523
Customer outreach/communication			$ 250,000			$ 217,121
Program Evaluations (& savings verification)			$ 549,524			$ 276,541
Potential study update / analysis			$ 120,115			$ 117,239
System Support			$ 166,735			$ 70,863
End use load research & RTF Funding			$ 109,500			$ 58,090
Total Portfolio – Level Expenses			**$ 1,260,397**			**$ 804.378**
Total PacifiCorp Conservation	**48,839,500**	**52,542,512**	**$ 21,946,104**	**34,051,493**	**36,608,571**	**$ 13,759,344**
Total System Benefits Charge Conservation	**51,917,615**	**55,856,095**	**$ 22,808,204**	**37,380,293**	**40,190,992**	**$ 14,665,328**
Total Conservation	**51,917,615**	**55,856,095**	**$ 22,808,204**	**37,380,293**	**40,190,992**	**$ 14,665,328**

[16] Consistent with requirements under WAC 480-109-120 (3)(b)(ii) and (iii), provides a comparison of the Company's business plan to actual program performance.

Table 4: Estimated Peak Contribution

Description	Value
First year Energy Efficiency program MWh savings acquired during 2022 (@ Generator)	40,191
Conversion factor: Coincident MW/MWh	0.000167664
Estimated coincident peak MW contribution of 2022 Energy Efficiency acquisitions	6.74
Estimated Lifecycle Energy Efficiency program MWh savings from savings acquired in 2022 (@ Generator)	426,632

Table 5: Direct Benefit to Customers[17]

Program or Initiative	Expenditures	Direct Benefits to Customers	% Direct Benefit to Customers
Low Income Weatherization (114)[18]	$ 747,702	$ 637,517	85%
Home Energy Savings (118)[19]	$ 3,629,851	$ 1,692,287	47%
Home Energy Reports	$ 137,990	$ -	0%
Total Residential Programs	**$ 4,515,543**	**$ 2,329,804**	52%
Wattsmart Business (140) Commercial	$ 6,779,816	$ 4,619,681	
Wattsmart Business (140) Industrial	$ 1,486,005	$ 879,589	
Wattsmart Business (140) Irrigation	$ 173,602	$ 123,881	
Total Business Programs[20]	**$ 8,439,423**	**$ 5,623,151**	**67%**
Northwest Energy Efficiency Alliance (NEEA)[21]	**$ 905,984**	**$ 625,355**	**69%**
Be Wattsmart, Begin at Home	$ 64,523		
Customer outreach/communication	$ 217,121		
Program Evaluations (& savings verification)	$ 276,541		
Potential study update / analysis	$ 117,239		
System Support	$ 70,863		
End use load research & RTF Funding	$ 58,090		
Total Portfolio – Level Expenses	**$ 804,378**		
Total PacifiCorp Conservation	$ 13,759,344		
Total System benefits Charge Conservation	$ 14,665,328		
Total Conservation	**$ 14,665,328**	**$ 8,578,310**	**58%**

[17] 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.

[18] Low Income Weatherization: Payments to community action agencies for measure installation were classified as incentives

[19] Home Energy Savings: Customer and partner incentives are included in the direct benefit to customer calculation.

[20] Wattsmart Business: Customer and vendor incentives ($5,283,169) and expenditures for customer site specific energy engineering ($339,982) are included in the direct benefit to customer calculation.

[21] NEEA: Company subtracted for NEEA program administration. Calculation utilized the assumption provided by WUTC staff that 70% of the NEEA expenditures are a direct benefit to customers.

GROSS SAVINGS BY MEASURE CATEGORY

Table 6: 2022 Annual Savings by Home Energy Savings

Measure Category	Total kWh (at Site)	Total Incentive	Total Measure Quantity
Appliances	13,282	$ 9,720	68
Building Shell	25,645	$ 32,497	95,653 sq ft
HVAC	2,411,270	$ 1,532,927	2,350
Lighting	115,669	$ 75,343	49,708
Water Heating	34,559	$ 22,350	25
Whole Home	24,954	$ 19,450	7
Grand Total	**2,625,379**	**$ 1,692,287**	

Table 7: Participation by Manufactured Home Residents

Program	2015	2016	2017	2018	2019	2020	2021	2022
Low Income Weatherization Homes	44	49	45	41	7	12	8	12
Home Energy Savings Participants	1,028	403	954	872	648	169	813	781
Appliances	10	10	4	8	2	11	6	2
Duct Sealing	187	12	795	492	488	9	618	433
Heat Pump	26	18	79	90	67	99	121	114
Heat Pump Water Heater	0	1	3	0	0	0	0	1
Smart Thermostat	0	0	0	0	0	0	0	4
Kits	817	362	73	282	42	0	0	0
Lighting	17	1	0	0	0	0	244	222
Lighting Buy Down	86,318	54,508	50,953	33,936	34,791	19,400	0	0
Weatherization [FK3]	8	3	1	4	2	1	2	0
Whole Home	0	0	0	0	0	0	10	5

Table 9: Low Income Homes Served and Measures Installed

Measure Type	Installed
Air Sealed/Infiltration	144
Insulation	298
Attic Ventilation	58
Lighting CFL/LED	67
Weather Strip Doors	10
Duct Sealing and/or Insulation	41
Ductless Heat Pump	30
Thermal Doors and/or Window Replacement	10
Water Heater Replacement	7
Low Flow Shower Heads and Faucet Aerators	75
Ground Cover	81
Thermostat	8
Refrigerator Replacement	3
Total Number of Homes Served	**142**
Total kWh Savings @ Site	**261,515**

Table 11: Wattsmart Business Savings by Sector

Sector	Total kWh (at Site)	Total Incentive
Commercial	21,570,220	$ 4,343,192
Industrial	4,727,777	$ 823,931
Irrigation	552,321	$ 116,046
Grand Total	**26,850,318**	**$ 5,283,169**

Table 12: 2022 Annual Savings by Wattsmart Business

Measure Category	Total kWh (at Site)	Total Incentive	Total Projects
Additional Measures	199,583	$ 47,125	3
Compressed Air	791,351	$ 130,517	12
Energy Management	4,303,543	$ 106,794	37
Food Service Equipment	30,854	$ 4,464	4
HVAC	483,636	$ 80,197	34
Irrigation	552,321	$ 116,046	38
Lighting	15,448,934	$ 3,960,659	847
Motors	1,200,827	$ 202,249	5
Refrigeration	3,834,555	$ 633,738	35
Building Shell	4,715	$ 1,380	1
Grand Total	**26,850,318**	**$ 5,283,169**	

COST EFFECTIVENESS

Program cost effectiveness is performed using a Company specific modeling tool, created by a third-party consultant. The tool is designed to incorporate PacifiCorp data and values such as avoided costs, and generally follows the methodology specified in California's Standard Practice Manual. The analysis assesses the costs and benefits of DSM resource programs from different stakeholder perspectives, including participants and non-participants, based on four tests described in the Standard Practice Manual (TRC, UCT, PCT and RIM) as well as an additional fifth test, PTRC.

Each of the cost-effectiveness tests for Pacific Power's programs is outlined below.

- PacifiCorp Total Resource Test (PTRC) is the total resource cost test with an additional 10% added to the net benefit side of the benefit/cost formula to account for non-quantified environmental and non-energy benefits of conservation resources over supply side alternatives.
- Total Resource Cost (TRC) Test considers the benefits and costs from the perspective of all utility customers, comparing the total costs and benefits from both the utility and utility customer perspectives.
- Utility Cost (UCT) Test also called the program administrator cost test, provides a benefit to cost perspective from the utility only. The test compares the total utility cost incurred to the benefit/value of the energy and capacity saved and contains no customer costs or benefits in calculation of the ratio.
- Participant Cost Test (PCT) compares the portion of the resource paid directly by participants to the savings realized by the participants.
- Ratepayer Impact Cost Test (RIM) examines the impact of energy efficiency expenditures on non-participating ratepayers overall. Unlike supply-side investments, energy efficiency programs reduce energy sales. Reduced sales typically lower revenue requirements while putting near-term upward pressure on the rates remaining fixed costs are spread over fewer kilowatt-hours.

All cost effectiveness calculations assume a net-to-gross (NTG) of 1.0, consistent with the Northwest Power and Conservation Council's methodology. Portfolio level cost effectiveness includes portfolio costs such as the Process and Impact Evaluations, Class 2 demand-side management (DSM) Potential Assessment, End Use Load Research, and the DSM system database. Consistent with the Northwest Power and Conservation Council's methodology, the Company includes quantifiable non-energy benefits at the portfolio and program level. *Low Income Weatherization* is not included in the portfolio or sector-level cost effectiveness analysis per WAC 480-109-100(10)(b). Appendix A provides 2021 cost effectiveness performance

Table 13: 2022 Cost-Effectiveness Results by Program

Program	Benefit/Cost Test				
	PTRC	TRC	UCT	PCT	RIM
Total Portfolio (not inc. NEI or NEEA)	1.86	1.69	2.02	3.01	0.76
Residential (not inc. NEI or NEEA)	0.69	0.63	0.91	1.32	0.53
Home Energy Savings (not inc. NEI)	0.58	0.53	0.77	1.21	0.47
Home Energy Reports	4.81	4.37	4.37	n/a	1.17
Low Income Weatherization (not inc. NEI)	0.42	0.38	0.41	n/a	0.32
Wattsmart Business (not inc. NEI)	2.69	2.44	2.70	3.92	0.83

EVALUATIONS

Evaluations are performed by independent external evaluators to validate energy and demand savings derived from the Company's energy efficiency programs. Industry best practices are adopted by the Company with regards to principles of operation, methodologies, evaluation methods, and protocols including those outlined in the National Action Plan for Energy Efficiency Program Impact Evaluation and the California Evaluation Framework guides.

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. The Company 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.

Evaluation, measurement, and verification tasks are segregated within the Company organization to ensure they are performed and managed by personnel who are not directly responsible for program management.

Information on evaluation activities completed or in progress during 2022 are summarized in the chart below. Completed evaluation reports are available at the following link, under the "Reports and program evaluations by state" section:

https://www.pacificorp.com/environment/demand-side-management.html

Table 14: 2022 Evaluation Activities

Evaluation	Responsible Consultant	Status	Published
Wattsmart Business Evaluation 2020-2021	Cadmus	Complete	2023
Home Energy Reports 2020-2021	ADM	Complete	2023

APPENDIX A – COST-EFFECTIVENESS

APPENDIX B – NEEA SUPPLY CHAIN MEMOS

APPENDIX C – NEEA 2022 SAVINGS REPORT MEMO

APPENDIX

Appendix A: Cost-effectiveness Results[1]

[1] Cost-effectiveness results were generated by Applied Energy Group (AEG) using the approved Cost-effectiveness methodologies.

MEMORANDUM

To: Alesha Mander, PacifiCorp

From: Andrew Cottrell, Andy Hudson, Stephanie Chen, Elizabeth Applegate AEG

Date: May 31, 2023

Re: PacifiCorp Washington Portfolio and Sector Level Cost-Effectiveness Results – PY2022

AEG estimated the cost-effectiveness of PacifiCorp's overall energy efficiency portfolio in the state of Washington based on Program Year (PY) 2022 costs and savings[1] estimates provided by PacifiCorp. This memo provides cost-effectiveness results at the portfolio and sector levels. The portfolio passes the following cost effectiveness tests: Total Resource Cost Test (TRC), the PacifiCorp Total Resource Cost Test (PTRC), the Utility Cost Test (UCT), and the Participant Cost Test (PCT).

This memo provides analysis inputs and results in the following tables:

- Table 1: Cost-Effectiveness Analysis Inputs
- Table 2: Portfolio Level Costs, Nominal - PY2022
- Table 3: Annual Program Costs, Nominal - PY2022
- Table 4: Annual Savings and NEIs by Program - PY2022
- Table 5: Benefit/Cost Ratios by Portfolio Type
- Table 6: 2022 Total Portfolio Cost-Effectiveness Results
- Table 7: 2022 Total Portfolio Cost-Effectiveness Results (Including NEEA)
- Table 8: 2022 Total Portfolio Cost-Effectiveness Results (Including NEIs)
- Table 9: 2022 Total Portfolio Cost-Effectiveness Results (Including NEEA & NEIs)
- Table 10: Benefit/Cost Ratios by Program - PY2022 and PY2023
- Table 11: 2022 Wattsmart Business Energy Efficiency Sector Cost-Effectiveness Results
- Table 12: 2022 Wattsmart Business Energy Efficiency Sector Cost-Effectiveness Results (Including NEIs)
- Table 13: 2022 Residential Energy Efficiency Sector Cost-Effectiveness Results

[1] The commercial line loss factor was used for all Wattsmart Business savings; commercial sector savings represent approximately 74% of total program savings.

- Table 14: 2022 Residential Energy Efficiency Sector Cost-Effectiveness Results (Including NEIs)
- Table 15: 2022 Residential Non-Energy Impacts by Measure Category
- Table 16: 2022 Wattsmart Business Non-Energy Impacts by Measure

The following assumptions were utilized in the analysis:

- Avoided Costs: derived from PacifiCorp's 2021 Integrated Resource Plan (IRP) Preferred Portfolio "P02-MM-CETA", 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-152072.
- Retail Rates: 2021 rates provided by PacifiCorp and escalated by inflation for future years.

Tables 1 and 2 below summarize cost-effectiveness assumptions for the PacifiCorp Washington energy efficiency portfolio. All costs and impacts are presented at the portfolio level. Table 3 provides the savings and costs assumptions for NEEA.

Table 1: Cost-Effectiveness Analysis Inputs

Parameter	PY2022
Discount Rate	6.88%
Residential Line Loss	7.68%
Commercial Line Loss	7.60%
Industrial Line Loss	6.82%
Irrigation Line Loss	7.68%
Residential Energy Rate ($/kWh)	$0.09
Commercial Energy Rate ($/kWh)	$0.08
Industrial Energy Rate ($/kWh)	$0.07
Irrigation Energy Rate ($/kWh)	$0.07
Inflation Rate	2.16%

Table 2: Portfolio Level Costs, Nominal - PY2022

Category	PY2022
Be Wattsmart, Begin at Home	$64,523
Outreach and Communication	$217,121
Program Evaluations	$276,541
Potential Study	$117,239
System Support	$70,863
End Use Research	$58,090
Total	$804,378

Table 3: Annual Program Costs, Nominal - PY2022

Program	Program Delivery	Utility Admin	Eval, Marketing, Program Development	Engineering Costs	Incentives	Total Utility Budget	Gross Customer Costs
Home Energy Savings	$1,904,039	$26,299	$7,227	$0	$1,692,287	$3,629,851	$3,354,823
Home Energy Reports	$134,668	$3,127	$195	$0	$0	$137,990	$0
Wattsmart Business	$2,218,863	$482,387	$115,022	$339,982	$5,283,169	$8,439,423	$6,160,943
NEEA	$905,984	$0	$0	$0	$0	$905,984	$0
Total (excluding Portfolio-Level)	$5,163,554	$511,812	$122,444	$339,982	$6,975,456	$13,113,248	$9,515,766

Table 4: Annual Savings and NEIs by Program - PY2022

Program	Gross kWh Savings at Site	Realization Rate	Adjusted Gross kWh Savings at Site	Net to Gross Ratio	Net kWh Savings at Site	NEIs	Measure Life
Home Energy Savings	2,625,379	92%	2,421,101	100%	2,421,101	$76,052	15
Home Energy Reports	4,289,670	100%	4,289,670	100%	4,289,670	$0	1
Wattsmart Business	26,850,318	99%	26,534,508	100%	26,534,508	$444,307	11
NEEA	3,328,800	100%	3,328,800	100%	3,328,800	$0	18
Total Program	37,094,167	99%	36,574,079	100%	36,574,079	$520,359	11

Tables 5 through 14 present the cost-effectiveness results at the portfolio and sector levels. Tables 15 and 16 present the NEI impacts for the residential and commercial sectors by measure category.

Table 5: Benefit/Cost Ratios by Portfolio Type

Program	PTRC	TRC	UCT	PCT	RIM
Total Portfolio	1.86	1.69	2.02	3.01	0.76
Total Portfolio with NEEA	2.06	1.87	2.22	3.38	0.79
Total Portfolio with NEIs	2.10	1.93	2.02	3.40	0.76
Total Portfolio with NEEA and NEIs	2.29	2.10	2.22	3.78	0.79

Table 6: 2022 Total Portfolio Cost-Effectiveness Results

Cost-Effectiveness Test	Levelized $/kWh	NPV Costs	NPV Benefits	Net Benefits	Benefit/Cost Ratio
Total Resource Cost Test (PTRC) + Conservation Adder	$0.06	$15,493,861	$28,803,258	$13,309,397	1.86
Total Resource Cost Test (TRC) No Adder	$0.06	$15,493,861	$26,184,780	$10,690,919	1.69
Utility Cost Test (UCT)	$0.05	$12,953,552	$26,184,780	$13,231,228	2.02
Participant Cost Test (PCT)		$9,515,766	$28,595,772	$19,080,007	3.01
Rate Impact Test (RIM)		$34,573,868	$26,184,780	($8,389,088)	0.76
Lifecycle Revenue Impacts ($/kWh)					0.00053
Discounted Participant Payback (years)					2.82

Table 7: 2022 Total Portfolio Cost-Effectiveness Results (Including NEEA)

Cost-Effectiveness Test	Levelized $/kWh	NPV Costs	NPV Benefits	Net Benefits	Benefit/Cost Ratio
Total Resource Cost Test (PTRC) + Conservation Adder	$0.06	$16,399,845	$33,796,189	$17,396,344	2.06
Total Resource Cost Test (TRC) No Adder	$0.06	$16,399,845	$30,723,808	$14,323,963	1.87
Utility Cost Test (UCT)	$0.05	$13,859,535	$30,723,808	$16,864,273	2.22
Participant Cost Test (PCT)		$9,515,766	$32,209,024	$22,693,258	3.38
Rate Impact Test (RIM)		$39,093,103	$30,723,808	($8,369,295)	0.79
Lifecycle Revenue Impacts ($/kWh)					0.00060
Discounted Participant Payback (years)					2.66

Table 8: 2022 Total Portfolio Cost-Effectiveness Results (Including NEIs)

Cost-Effectiveness Test	Levelized $/kWh	NPV Costs	NPV Benefits	Net Benefits	Benefit/Cost Ratio
Total Resource Cost Test (PTRC) + Conservation Adder	$0.06	$15,493,861	$32,567,815	$17,073,954	2.10
Total Resource Cost Test (TRC) No Adder	$0.06	$15,493,861	$29,949,337	$14,455,476	1.93
Utility Cost Test (UCT)	$0.05	$12,953,552	$26,184,780	$13,231,228	2.02
Participant Cost Test (PCT)		$9,515,766	$32,360,330	$22,844,564	3.40
Rate Impact Test (RIM)		$34,573,868	$26,184,780	($8,389,088)	0.76
Lifecycle Revenue Impacts ($/kWh)					0.00053
Discounted Participant Payback (years)					2.82

Table 9: 2022 Total Portfolio Cost-Effectiveness Results (Including NEEA & NEIs)

Cost-Effectiveness Test	Levelized $/kWh	NPV Costs	NPV Benefits	Net Benefits	Benefit/Cost Ratio
Total Resource Cost Test (PTRC) + Conservation Adder	$0.06	$16,399,845	$37,560,746	$21,160,901	2.29
Total Resource Cost Test (TRC) No Adder	$0.06	$16,399,845	$34,488,365	$18,088,520	2.10
Utility Cost Test (UCT)	$0.05	$13,859,535	$30,723,808	$16,864,273	2.22
Participant Cost Test (PCT)		$9,515,766	$35,973,581	$26,457,816	3.78
Rate Impact Test (RIM)		$39,093,103	$30,723,808	($8,369,295)	0.79
Lifecycle Revenue Impacts ($/kWh)					0.00060
Discounted Participant Payback (years)					2.66

Table 10: Benefit/Cost Ratios by Program - PY2022 and PY2023

Program	PTRC	UCT	PCT	RIM
Wattsmart Business	2.69	2.70	3.92	0.83
Wattsmart Business with NEEA	2.71	2.71	4.00	0.84
Wattsmart Business with NEIs	3.02	2.70	4.42	0.83
Wattsmart Business with NEEA and NEIs	3.03	2.71	4.50	0.84
Residential	0.69	0.91	1.32	0.53
Residential with NEEA	1.31	1.63	2.25	0.71
Residential with NEIs	0.82	0.91	1.53	0.53
Residential with NEEA and NEIs	1.43	1.63	2.46	0.71

Table 11: 2022 Wattsmart Business Energy Efficiency Sector Cost-Effectiveness Results

Cost-Effectiveness Test	Levelized $/kWh	NPV Costs	NPV Benefits	Net Benefits	Benefit/Cost Ratio
Total Resource Cost Test (PTRC) + Conservation Adder	$0.04	$9,317,197	$25,048,567	$15,731,370	2.69
Total Resource Cost Test (TRC) No Adder	$0.04	$9,317,197	$22,771,425	$13,454,228	2.44
Utility Cost Test (UCT)	$0.04	$8,439,423	$22,771,425	$14,332,001	2.70
Participant Cost Test (PCT)		$6,160,943	$24,171,678	$18,010,735	3.92
Rate Impact Test (RIM)		$27,327,932	$22,771,425	($4,556,507)	0.83
Lifecycle Revenue Impacts ($/kWh)					0.00060
Discounted Participant Payback (years)					2.32

Table 12: 2022 Wattsmart Business Energy Efficiency Sector Cost-Effectiveness Results (Including NEIs)

Cost-Effectiveness Test	Levelized $/kWh	NPV Costs	NPV Benefits	Net Benefits	Benefit/Cost Ratio
Total Resource Cost Test (PTRC) + Conservation Adder	$0.04	$9,317,197	$28,095,816	$18,778,619	3.02
Total Resource Cost Test (TRC) No Adder	$0.04	$9,317,197	$25,818,674	$16,501,477	2.77
Utility Cost Test (UCT)	$0.04	$8,439,423	$22,771,425	$14,332,001	2.70
Participant Cost Test (PCT)		$6,160,943	$27,218,927	$21,057,984	4.42
Rate Impact Test (RIM)		$27,327,932	$22,771,425	($4,556,507)	0.83
Lifecycle Revenue Impacts ($/kWh)					0.00060
Discounted Participant Payback (years)					2.32

Table 13: 2022 Residential Energy Efficiency Sector Cost-Effectiveness Results

Cost-Effectiveness Test	Levelized $/kWh	NPV Costs	NPV Benefits	Net Benefits	Benefit/Cost Ratio
Total Resource Cost Test (PTRC) + Conservation Adder	$0.18	$5,430,376	$3,754,691	($1,675,686)	0.69
Total Resource Cost Test (TRC) No Adder	$0.18	$5,430,376	$3,413,355	($2,017,021)	0.63
Utility Cost Test (UCT)	$0.13	$3,767,841	$3,413,355	($354,486)	0.91
Participant Cost Test (PCT)		$3,354,823	$4,424,094	$1,069,272	1.32
Rate Impact Test (RIM)		$6,499,648	$3,413,355	($3,086,293)	0.53
Lifecycle Revenue Impacts ($/kWh)					0.00010
Discounted Participant Payback (years)					4.69

Table 14: 2022 Residential Energy Efficiency Sector Cost-Effectiveness Results (Including NEIs)

Cost-Effectiveness Test	Levelized $/kWh	NPV Costs	NPV Benefits	Net Benefits	Benefit/Cost Ratio
Total Resource Cost Test (PTRC) + Conservation Adder	$0.18	$5,430,376	$4,471,999	($958,377)	0.82
Total Resource Cost Test (TRC) No Adder	$0.18	$5,430,376	$4,130,663	($1,299,713)	0.76
Utility Cost Test (UCT)	$0.13	$3,767,841	$3,413,355	($354,486)	0.91
Participant Cost Test (PCT)		$3,354,823	$5,141,403	$1,786,580	1.53
Rate Impact Test (RIM)		$6,499,648	$3,413,355	($3,086,293)	0.53
Lifecycle Revenue Impacts ($/kWh)					0.00030
Discounted Participant Payback (years)					4.69

Table 15: 2022 Residential Non-Energy Impacts by Measure Category

Measure	Annual Non-Energy Impacts	Quantity	Measure Life	Total Present Value NEIs
Appliances	$1,243	68	13	$11,707
Building Shell	$183	95,653	45	$2,700
HVAC	$69,154	2,307	15	$678,316
Lighting	$5,375	49,708	5	$23,632
Water Heating	$79	25	13	$707
Whole Home	$18	7	35	$248
Coupons	$0	0	0	$0
Total	$76,052	147,768	15	$717,308

Table 16: 2022 Wattsmart Business Non-Energy Impacts by Measure

Measure	Annual Non-Energy Impacts	Quantity	Measure Life	Total Present Value NEIs
Additional Measures	$458	3	15	$4,490
Compressed Air	$2,620	12	14	$25,703
Energy Management	$139,579	141,152	3	$392,359
HVAC	$139	91	16	$0
Irrigation	$7,456	2,413	9	$1,465
Lighting	$236,616	22,732	11	$56,281
Motors	$11,665	5	15	$2,021,577
Refrigeration	$45,775	36	13	$114,416
Total	$444,307	166,444	11	$2,616,291

MEMORANDUM

To: Alesha Mander, PacifiCorp

From: Andrew Cottrell, Andy Hudson, Stephanie Chen, Elizabeth Applegate AEG

Date: May 30, 2023

Re: PacifiCorp Washington Home Energy Savings Cost-Effectiveness Results – PY2022

AEG estimated the cost-effectiveness of PacifiCorp's overall energy efficiency portfolio in the state of Washington based on Program Year (PY) 2022 costs and savings estimates provided by PacifiCorp. This memo provides cost-effectiveness results for the Home Energy Savings (HES) program. The program passes the Participant Cost Test (PCT).

This memo provides analysis inputs and results in the following tables:

- Table 1: Cost-Effectiveness Analysis Inputs
- Table 2: Annual Program Level Costs, Nominal - PY2022
- Table 3: Annual Savings - PY2022
- Table 4: 2022 Benefit/Cost Ratios by Measure Category
- Table 5: 2022 Home Energy Savings Program Cost-Effectiveness Results
- Table 6: 2022 Home Energy Savings Appliances Cost-Effectiveness Results (Load Shape - Residential_ERWH_7P)
- Table 7: 2022 Home Energy Savings Building Shell Cost-Effectiveness Results (Load Shape - WA_Single_Family_Heat_pump)
- Table 8: 2022 Home Energy Savings HVAC Cost-Effectiveness Results (Load Shape - WA_Single_Family_Heat_pump)
- Table 9: 2022 Home Energy Savings Lighting Cost-Effectiveness Results (Load Shape - Residential_LIGHTING_7P)
- Table 10: 2022 Home Energy Savings Water Heating Cost-Effectiveness Results (Load Shape - Residential_HPWH_7P)
- Table 11: 2022 Home Energy Savings Whole Home Cost-Effectiveness Results (Load Shape - WA_Single_Family_Heat_pump)
- Table 12: 2022 Home Energy Savings Non-Energy Impacts by Measure Category
- Table 13: 2022 Home Energy Savings Program Cost-Effectiveness Results (Including NEIs)
- Table 14: 2022 Home Energy Savings Appliances Cost-Effectiveness Results (Including NEIs) (Load Shape - Residential_ERWH_7P)

- Table 15: 2022 Home Energy Savings Building Shell Cost-Effectiveness Results (Including NEIs) (Load Shape - WA_Single_Family_Heat_pump)
- Table 16: 2022 Home Energy Savings HVAC Cost-Effectiveness Results (Including NEIs) (Load Shape - WA_Single_Family_Heat_pump)
- Table 17: 2022 Home Energy Savings Lighting Cost-Effectiveness Results (Including NEIs) (Load Shape - Residential_LIGHTING_7P)
- Table 18: 2022 Home Energy Savings Water Heating Cost-Effectiveness Results (Including NEIs) (Load Shape - Residential_HPWH_7P)
- Table 19: 2022 Home Energy Savings Whole Home Cost-Effectiveness Results (Including NEIs) (Load Shape - WA_Single_Family_Heat_pump)

The following assumptions were utilized in the analysis:

- Avoided Costs: derived from PacifiCorp's 2021 Integrated Resource Plan (IRP) Preferred Portfolio "P02-MM-CETA", 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-152072.
- Retail Rates: 2021 rates provided by PacifiCorp and escalated by inflation for future years.

Tables 1 and 2 below summarize cost-effectiveness assumptions for the PacifiCorp Washington Home Energy Savings program. All costs and impacts are presented at the program level. Table 3 provides the annual savings for the program.

Table 1: Cost-Effectiveness Analysis Inputs

Parameter	PY2022
Discount Rate	6.88%
Residential Line Loss	7.68%
Residential Energy Rate ($/kWh)	$0.0881
Inflation Rate	2.16%
Net-to-Gross	100%
Realization Rate	100%

Table 2: Annual Program Level Costs, Nominal - PY2022[1]

Measure Category	Program Delivery	Utility Admin	Program Development	Incentives	Total Utility Budget	Gross Customer Costs
Appliances	$9,633	$133	$37	$9,720	$19,522	$7,562
Building Shell	$18,599	$257	$71	$32,497	$51,423	$144,561

[1] To align with annual budget expectations, cost-effectiveness inputs are presented in nominal dollars.

HVAC	$1,748,758	$24,154	$6,638	$1,532,927	$3,312,476	$3,138,112
Lighting	$83,888	$1,159	$318	$75,343	$160,709	$16,588
Water Heating	$25,064	$346	$95	$22,350	$47,855	$21,499
Whole Home	$18,098	$250	$69	$19,450	$37,866	$26,500
Coupons	$0	$0	$0	$0	$0	$0
Total Program	**$1,904,039**	**$26,299**	**$7,227**	**$1,692,287**	**$3,629,851**	**$3,354,823**

Table 3: Annual Savings - PY2022

Measure Category	Gross kWh Savings at Site	Realization Rate	Adjusted Gross kWh Savings at Site	Net to Gross Ratio	Net kWh Savings at Site	Measure Life
Appliances	13,282	100%	13,282	100%	13,282	13
Building Shell	25,645	88%	22,657	100%	22,657	45
HVAC	2,411,270	93%	2,237,724	100%	2,237,724	15
Lighting	115,669	76%	87,926	100%	87,926	5
Water Heating	34,559	100%	34,559	100%	34,559	13
Whole Home	24,954	100%	24,954	100%	24,954	35
Coupons	0	0%	0	0%	0	0
Total Program	**2,625,379**	**92%**	**2,421,101**	**100%**	**2,421,101**	**15**

Tables 4 through 12 present the cost-effectiveness results at the program and measure category levels. Tables 13 through 20 present the NEI impacts for the program and the cost-effectiveness results with NEIs at the program and measure category levels.

Table 4: 2022 Benefit/Cost Ratios by Measure Category

Measure Category	PTRC	TRC	UCT	PCT	RIM
Appliances	0.87	0.79	0.70	2.93	0.43
Appliances (with NEIs)	1.55	1.47	0.70	4.48	0.43
Building Shell	0.36	0.33	1.05	0.50	0.60
Building Shell (with NEIs)	0.38	0.35	1.05	0.51	0.60
HVAC	0.58	0.53	0.79	1.19	0.47
HVAC (with NEIs)	0.72	0.67	0.79	1.40	0.47
Lighting	0.50	0.46	0.29	6.68	0.24

Lighting (with NEIs)	0.73	0.69	0.29	8.10	0.24
Water Heating	0.75	0.68	0.67	2.46	0.41
Water Heating (with NEIs)	0.77	0.70	0.67	2.50	0.41
Whole Home	1.35	1.23	1.46	2.24	0.71
Whole Home (with NEIs)	1.36	1.23	1.46	2.25	0.71
Total Program	**0.58**	**0.53**	**0.77**	**1.21**	**0.47**
Total Program (with NEIs)	**0.72**	**0.67**	**0.77**	**1.42**	**0.47**

Table 5: 2022 Home Energy Savings Program Cost-Effectiveness Results

Cost-Effectiveness Test	Levelized $/kWh	NPV Costs	NPV Benefits	Net Benefits	Benefit/Cost Ratio
Total Resource Cost Test (PTRC) + Conservation Adder	$0.2095	$5,292,387	$3,090,726	-$2,201,661	0.58
Total Resource Cost Test (TRC) No Adder	$0.2095	$5,292,387	$2,809,751	-$2,482,636	0.53
Utility Cost Test (UCT)	$0.1437	$3,629,851	$2,809,751	-$820,100	0.77
Participant Cost Test (PCT)		$3,354,823	$4,046,175	$691,352	1.21
Rate Impact Test (RIM)		$5,983,739	$2,809,751	-$3,173,988	0.47
Lifecycle Revenue Impacts ($/kWh)					$0.0000914
Discounted Participant Payback (years)					9.94

Table 6: 2022 Home Energy Savings Appliances Cost-Effectiveness Results (Load Shape - Residential_ERWH_7P)

Cost-Effectiveness Test	Levelized $/kWh	NPV Costs	NPV Benefits	Net Benefits	Benefit/Cost Ratio
Total Resource Cost Test (PTRC) + Conservation Adder	$0.1290	$17,364	$15,121	-$2,243	0.87
Total Resource Cost Test (TRC) No Adder	$0.1290	$17,364	$13,747	-$3,617	0.79
Utility Cost Test (UCT)	$0.1450	$19,522	$13,747	-$5,776	0.70
Participant Cost Test (PCT)		$7,562	$22,134	$14,572	2.93
Rate Impact Test (RIM)		$31,936	$13,747	-$18,190	0.43
Lifecycle Revenue Impacts ($/kWh)					$0.0000008
Discounted Participant Payback (years)					2.98

Table 7: 2022 Home Energy Savings Building Shell Cost-Effectiveness Results (Load Shape - WA_Single_Family_Heat_pump)

Cost-Effectiveness Test	Levelized $/kWh	NPV Costs	NPV Benefits	Net Benefits	Benefit/Cost Ratio
Total Resource Cost Test (PTRC) + Conservation Adder	$0.4541	$163,488	$59,414	-$104,074	0.36
Total Resource Cost Test (TRC) No Adder	$0.4541	$163,488	$54,013	-$109,475	0.33
Utility Cost Test (UCT)	$0.1428	$51,423	$54,013	$2,590	1.05
Participant Cost Test (PCT)		$144,561	$71,746	-$72,816	0.50
Rate Impact Test (RIM)		$90,672	$54,013	-$36,659	0.60
Lifecycle Revenue Impacts ($/kWh)					$0.0000014
Discounted Participant Payback (years)					87.38

Table 8: 2022 Home Energy Savings HVAC Cost-Effectiveness Results (Load Shape - WA_Single_Family_Heat_pump)

Cost-Effectiveness Test	Levelized $/kWh	NPV Costs	NPV Benefits	Net Benefits	Benefit/Cost Ratio
Total Resource Cost Test (PTRC) + Conservation Adder	$0.2081	$4,917,661	$2,869,018	-$2,048,643	0.58
Total Resource Cost Test (TRC) No Adder	$0.2081	$4,917,661	$2,608,198	-$2,309,463	0.53
Utility Cost Test (UCT)	$0.1402	$3,312,476	$2,608,198	-$704,278	0.79
Participant Cost Test (PCT)		$3,138,112	$3,729,123	$591,011	1.19
Rate Impact Test (RIM)		$5,508,673	$2,608,198	-$2,900,474	0.47
Lifecycle Revenue Impacts ($/kWh)					$0.0001308
Discounted Participant Payback (years)					10.47

Table 9: 2022 Home Energy Savings Lighting Cost-Effectiveness Results (Load Shape - Residential_LIGHTING_7P)

Cost-Effectiveness Test	Levelized $/kWh	NPV Costs	NPV Benefits	Net Benefits	Benefit/Cost Ratio
Total Resource Cost Test (PTRC) + Conservation Adder	$0.2449	$101,953	$51,101	-$50,852	0.50
Total Resource Cost Test (TRC) No Adder	$0.2449	$101,953	$46,455	-$55,498	0.46
Utility Cost Test (UCT)	$0.3861	$160,709	$46,455	-$114,253	0.29
Participant Cost Test (PCT)		$16,588	$110,798	$94,211	6.68
Rate Impact Test (RIM)		$196,164	$46,455	-$149,708	0.24
Lifecycle Revenue Impacts ($/kWh)					$0.0000106
Discounted Participant Payback (years)					0.60

Table 10: 2022 Home Energy Savings Water Heating Cost-Effectiveness Results (Load Shape - Residential_HPWH_7P)

Cost-Effectiveness Test	Levelized $/kWh	NPV Costs	NPV Benefits	Net Benefits	Benefit/Cost Ratio
Total Resource Cost Test (PTRC) + Conservation Adder	$0.1404	$47,004	$35,346	-$11,659	0.75
Total Resource Cost Test (TRC) No Adder	$0.1404	$47,004	$32,133	-$14,872	0.68
Utility Cost Test (UCT)	$0.1430	$47,855	$32,133	-$15,722	0.67
Participant Cost Test (PCT)		$21,499	$52,960	$31,460	2.46
Rate Impact Test (RIM)		$78,465	$32,133	-$46,332	0.41
Lifecycle Revenue Impacts ($/kWh)					$0.0000020
Discounted Participant Payback (years)					5.21

Table 11: 2022 Home Energy Savings Whole Home Cost-Effectiveness Results (Load Shape - WA_Single_Family_Heat_pump)

Cost-Effectiveness Test	Levelized $/kWh	NPV Costs	NPV Benefits	Net Benefits	Benefit/Cost Ratio
Total Resource Cost Test (PTRC) + Conservation Adder	$0.1184	$44,916	$60,726	$15,810	1.35
Total Resource Cost Test (TRC) No Adder	$0.1184	$44,916	$55,205	$10,289	1.23
Utility Cost Test (UCT)	$0.0998	$37,866	$55,205	$17,339	1.46
Participant Cost Test (PCT)		$26,500	$59,413	$32,913	2.24
Rate Impact Test (RIM)		$77,830	$55,205	-$22,624	0.71
Lifecycle Revenue Impacts ($/kWh)					$0.0000013
Discounted Participant Payback (years)					15.71

Table 12: 2022 Home Energy Savings Non-Energy Impacts by Measure Category

Measure	Annual Non-Energy Impacts	Quantity	Measure Life	Total Present Value NEIs
Appliances	$1,243	68	13	$11,707
Building Shell	$183	95,653	45	$2,700
HVAC	$69,154	2,307	15	$678,316
Lighting	$5,375	49,708	5	$23,632
Water Heating	$79	25	13	$707
Whole Home	$18	7	35	$248
Coupons	$0	-	-	$0
Total	**$76,052**	**$147,768**	**15**	**$717,308**

Table 13: 2022 Home Energy Savings Program Cost-Effectiveness Results (Including NEIs)

Cost-Effectiveness Test	Levelized $/kWh	Levelized $/kW	NPV Costs	NPV Benefits	Net Benefits	Benefit/Cost Ratio
Total Resource Cost Test (PTRC) + Conservation Adder	$0.2095	$1,249.67	$5,292,387	$3,808,034	-$1,484,353	0.72
Total Resource Cost Test (TRC) No Adder	$0.2095	$1,249.67	$5,292,387	$3,527,059	-$1,765,328	0.67
Utility Cost Test (UCT)	$0.1437	$857.10	$3,629,851	$2,809,751	-$820,100	0.77
Participant Cost Test (PCT)			$3,354,823	$4,763,483	$1,408,660	1.42
Rate Impact Test (RIM)			$5,983,739	$2,809,751	-$3,173,988	0.47
Lifecycle Revenue Impacts ($/kWh)						$0.0000914
Discounted Participant Payback (years)						9.94

Table 14: 2022 Home Energy Savings Appliances Cost-Effectiveness Results (Including NEIs) (Load Shape - Residential_ERWH_7P)

Cost-Effectiveness Test	Levelized $/kWh	Levelized $/kW	NPV Costs	NPV Benefits	Net Benefits	Benefit/Cost Ratio
Total Resource Cost Test (PTRC) + Conservation Adder	$0.1290	$769.17	$17,364	$26,828	$9,464	1.55
Total Resource Cost Test (TRC) No Adder	$0.1290	$769.17	$17,364	$25,453	$8,089	1.47
Utility Cost Test (UCT)	$0.1450	$864.77	$19,522	$13,747	-$5,776	0.70
Participant Cost Test (PCT)			$7,562	$33,841	$26,279	4.48
Rate Impact Test (RIM)			$31,936	$13,747	-$18,190	0.43
Lifecycle Revenue Impacts ($/kWh)						$0.0000008
Discounted Participant Payback (years)						2.98

Table 15: 2022 Home Energy Savings Building Shell Cost-Effectiveness Results (Including NEIs) (Load Shape - WA_Single_Family_Heat_pump)

Cost-Effectiveness Test	Levelized $/kWh	Levelized $/kW	NPV Costs	NPV Benefits	Net Benefits	Benefit/Cost Ratio
Total Resource Cost Test (PTRC) + Conservation Adder	$0.4541	$2,708.54	$163,488	$62,114	-$101,374	0.38
Total Resource Cost Test (TRC) No Adder	$0.4541	$2,708.54	$163,488	$56,712	-$106,775	0.35
Utility Cost Test (UCT)	$0.1428	$851.94	$51,423	$54,013	$2,590	1.05
Participant Cost Test (PCT)			$144,561	$74,445	-$70,116	0.51
Rate Impact Test (RIM)			$90,672	$54,013	-$36,659	0.60
Lifecycle Revenue Impacts ($/kWh)						$0.0000014

Discounted Participant Payback (years)	87.38

Table 16: 2022 Home Energy Savings HVAC Cost-Effectiveness Results (Including NEIs) (Load Shape - WA_Single_Family_Heat_pump)

Cost-Effectiveness Test	Levelized $/kWh	Levelized $/kW	NPV Costs	NPV Benefits	Net Benefits	Benefit/Cost Ratio
Total Resource Cost Test (PTRC) + Conservation Adder	$0.2081	$1,241.03	$4,917,661	$3,547,334	-$1,370,327	0.72
Total Resource Cost Test (TRC) No Adder	$0.2081	$1,241.03	$4,917,661	$3,286,514	-$1,631,147	0.67
Utility Cost Test (UCT)	$0.1402	$835.94	$3,312,476	$2,608,198	-$704,278	0.79
Participant Cost Test (PCT)			$3,138,112	$4,407,440	$1,269,327	1.40
Rate Impact Test (RIM)			$5,508,673	$2,608,198	-$2,900,474	0.47
Lifecycle Revenue Impacts ($/kWh)						$0.0001308
Discounted Participant Payback (years)						10.47

Table 17: 2022 Home Energy Savings Lighting Cost-Effectiveness Results (Including NEIs) (Load Shape - Residential_LIGHTING_7P)

Cost-Effectiveness Test	Levelized $/kWh	Levelized $/kW	NPV Costs	NPV Benefits	Net Benefits	Benefit/Cost Ratio
Total Resource Cost Test (PTRC) + Conservation Adder	$0.2449	$1,460.92	$101,953	$74,732	-$27,221	0.73
Total Resource Cost Test (TRC) No Adder	$0.2449	$1,460.92	$101,953	$70,087	-$31,866	0.69
Utility Cost Test (UCT)	$0.3861	$2,302.85	$160,709	$46,455	-$114,253	0.29
Participant Cost Test (PCT)			$16,588	$134,430	$117,842	8.10
Rate Impact Test (RIM)			$196,164	$46,455	-$149,708	0.24
Lifecycle Revenue Impacts ($/kWh)						$0.0000106
Discounted Participant Payback (years)						0.60

Table 18: 2022 Home Energy Savings Water Heating Cost-Effectiveness Results (Including NEIs) (Load Shape - Residential_HPWH_7P)

Cost-Effectiveness Test	Levelized $/kWh	Levelized $/kW	NPV Costs	NPV Benefits	Net Benefits	Benefit/Cost Ratio
Total Resource Cost Test (PTRC) + Conservation Adder	$0.1404	$837.68	$47,004	$36,052	-$10,952	0.77
Total Resource Cost Test (TRC) No Adder	$0.1404	$837.68	$47,004	$32,839	-$14,165	0.70
Utility Cost Test (UCT)	$0.1430	$852.84	$47,855	$32,133	-$15,722	0.67
Participant Cost Test (PCT)			$21,499	$53,666	$32,167	2.50
Rate Impact Test (RIM)			$78,465	$32,133	-$46,332	0.41
Lifecycle Revenue Impacts ($/kWh)						$0.0000020
Discounted Participant Payback (years)						5.21

Table 19: 2022 Home Energy Savings Whole Home Cost-Effectiveness Results (Including NEIs) (Load Shape - WA_Single_Family_Heat_pump)

Cost-Effectiveness Test	Levelized $/kWh	Levelized $/kW	NPV Costs	NPV Benefits	Net Benefits	Benefit/Cost Ratio
Total Resource Cost Test (PTRC) + Conservation Adder	$0.1184	$706.17	$44,916	$60,973	$16,057	1.36
Total Resource Cost Test (TRC) No Adder	$0.1184	$706.17	$44,916	$55,453	$10,536	1.23
Utility Cost Test (UCT)	$0.0998	$595.33	$37,866	$55,205	$17,339	1.46
Participant Cost Test (PCT)			$26,500	$59,661	$33,161	2.25
Rate Impact Test (RIM)			$77,830	$55,205	-$22,624	0.71
Lifecycle Revenue Impacts ($/kWh)						$0.0000013
Discounted Participant Payback (years)						15.71

MEMORANDUM

To: Alesha Mander, PacifiCorp

From: Andrew Cottrell, Andy Hudson, Stephanie Chen, Elizabeth Applegate, AEG

Date: May 24, 2023

Re: PacifiCorp Washington Home Energy Reporting Program Cost-Effectiveness Results – PY2022

AEG estimated the cost-effectiveness of PacifiCorp's overall energy efficiency portfolio in the state of Washington based on Program Year (PY) 2022 costs and savings estimates provided by PacifiCorp. This memo provides cost-effectiveness results for the Home Energy Reporting program. The program passes the Total Resource Cost Test (TRC), the PacifiCorp Total Resource Cost Test (PTRC), the Utility Cost Test (UCT), and the Rate Impact Measure (RIM) test. The Participant Cost Test (PCT) cannot be calculated as there are no costs to the participant.

This memo provides analysis inputs and results in the following tables:

- Table 1: Cost-Effectiveness Analysis Inputs
- Table 2: Annual Program Level Costs, Nominal - PY2022
- Table 3: Annual Savings - PY2022
- Table 4: 2022 Home Energy Reports Cost-Effectiveness Results (Load Shape - WA_Single_Family_Heat_pump)

The following assumptions were utilized in the analysis:

- Avoided Costs: derived from PacifiCorp's 2021 Integrated Resource Plan (IRP) Preferred Portfolio "P02-MM-CETA", 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-152072.
- Retail Rates: 2021 rates provided by PacifiCorp and escalated by inflation for future years.

Tables 1 and 2 below summarize cost-effectiveness assumptions for the PacifiCorp Washington Home Energy Reporting program. All costs and impacts are presented at the program level. Tables 3 and 4 provide the annual savings and cost effectiveness for the program.

Table 1: Cost-Effectiveness Analysis Inputs

Parameter	Value
Discount Rate	6.88%
Residential Line Loss	7.68%
Residential Energy Rate ($/kWh)	$0.09
Inflation Rate[1]	2.16%
Measure Life	1
NTG	100%
Realization Rate	100%

Table 2: Annual Program Level Costs, Nominal - PY2022[1]

Program Year	Program Delivery	Utility Admin	Engineering Costs	Program Development	Inspection Costs	Incentives	Total Utility Budget
2022	$134,668	$3,127	$0	$195	$0	$0	$137,990
Total	**$134,668**	**$3,127**	**$0**	**$195**	**$0**	**$0**	**$137,990**

Table 3: Annual Savings - PY2022

Program Year	Gross kWh Savings at Site	Realization Rate	Adjusted Gross kWh Savings at Site	NTG Ratio	Net kWh Savings at Site	Measure Life
2022	4,289,670	100%	4,289,670	100%	4,289,670	1
Total Program	**4,289,670**	**100%**	**4,289,670**	**100%**	**4,289,670**	**1**

Table 4: 2022 Home Energy Reports Cost-Effectiveness Results (Load Shape - WA_Single_Family_Heat_pump)

Cost-Effectiveness Test	Levelized $/kWh	Levelized $/kW	NPV Costs	NPV Benefits	Net Benefits	Benefit/Cost Ratio
Total Resource Cost Test (PTRC) + Conservation Adder	$0.0299	$178.18	$137,990	$663,965	$525,975	4.81
Total Resource Cost Test (TRC) No Adder	$0.0299	$178.18	$137,990	$603,604	$465,615	4.37
Utility Cost Test (UCT)	$0.0299	$178.18	$137,990	$603,604	$465,615	4.37
Participant Cost Test (PCT)			$0	$377,920	$377,920	n/a
Rate Impact Test (RIM)			$515,909	$603,604	$87,695	1.17
Lifecycle Revenue Impacts ($/kWh)						$0.0001238
Discounted Participant Payback (years)						0.00

[1] To align with annual budget expectations, cost-effectiveness inputs are presented in nominal dollars.

MEMORANDUM

To: Alesha Mander, PacifiCorp

From: Andrew Cottrell, Andy Hudson, Stephanie Chen, Elizabeth Applegate, AEG

Date: May 24, 2023

Re: PacifiCorp Washington Low Income Weatherization Program Cost-Effectiveness Results – PY2022

AEG estimated the cost-effectiveness of PacifiCorp's overall energy efficiency portfolio in the state of Washington based on Program Year (PY) 2022 costs and savings estimates provided by PacifiCorp. This memo provides cost-effectiveness results for the Low Income Weatherization program.

This memo provides analysis inputs and results in the following tables:

- Table 1: Cost-Effectiveness Analysis Inputs
- Table 2: Annual Program Level Costs, Nominal - PY2022
- Table 3: Annual Savings - PY2022
- Table 4: 2022 Low Income Weatherization Program Cost-Effectiveness Results
- Table 5: 2022 Low Income Weatherization Program Non-Energy Impacts
- Table 6: 2022 Low Income Weatherization Program Cost-Effectiveness Results (Including NEIs)

The following assumptions were utilized in the analysis:

- Avoided Costs: derived from PacifiCorp's 2021 Integrated Resource Plan (IRP) Preferred Portfolio "P02-MM-CETA", 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-152072.
- Retail Rates: 2021 rates provided by PacifiCorp and escalated by inflation for future years.

Tables 1 and 2 below summarize cost-effectiveness assumptions for the PacifiCorp Washington Low Income Weatherization program. All costs and impacts are presented at the program level. Table 3 provides the annual savings for the program.

Table 1: Cost-Effectiveness Analysis Inputs

Parameter	Value
Discount Rate	6.88%
Residential Line Loss	7.68%
Residential Energy Rate ($/kWh)	$0.09
Inflation Rate	2.16%
Net-to-Gross	100%
Realization Rate	59%

Table 2: Annual Program Level Costs, Nominal - PY2022[1]

Program Year	Program Delivery	Utility Admin	Engineering Costs	Program Development	Inspection Costs	Incentives	Total Utility Budget
2022	$90,766	$12,931	$0	$0	$6,488	$637,517	$747,702
Total	**$90,766**	**$12,931**	**$0**	**$0**	**$6,488**	**$637,517**	**$747,702**

Table 3: Annual Savings - PY2022

Program Year	Gross kWh Savings at Site	Realization Rate	Adjusted Gross kWh Savings at Site	NTG Ratio	Net kWh Savings at Site	Measure Life
2022	261,515	59%	154,294	100%	154,294	25
Total Program	**261,515**	**59%**	**154,294**	**100%**	**154,294**	**25**

Table 4 below presents the cost-effectiveness results at the program level. Tables 5 and 6 present the NEI impacts for the program and the cost-effectiveness results with NEIs at the program level.

Table 4: 2022 Low Income Weatherization Program Cost-Effectiveness Results

Cost-Effectiveness Test	Levelized $/kWh	NPV Costs	NPV Benefits	Net Benefits	Benefit/Cost Ratio
Total Resource Cost Test (PTRC) + Conservation Adder	$0.3521	$747,702	$314,360	-$433,343	0.42
Total Resource Cost Test (TRC) No Adder	$0.3521	$747,702	$285,781	-$461,921	0.38
Utility Cost Test (UCT)	$0.3521	$747,702	$304,492	-$443,210	0.41
Participant Cost Test (PCT)		$0	$850,100	$850,100	n/a
Rate Impact Test (RIM)		$960,285	$304,492	-$655,792	0.32
Lifecycle Revenue Impacts ($/kWh)					$0.0000172
Discounted Participant Payback (years)					0.00

[1] To align with annual budget expectations, cost-effectiveness inputs are presented in nominal dollars.

Table 5: 2022 Low Income Weatherization Program Non-Energy Impacts

Non-Energy Impact	Program Impact	Perspective Adjusted
Home Repair Costs paid by Company	$32,411	PTRC, TRC
Economic Benefit	$304,781	PTRC, TRC
Arrearage	$18,711	PTRC, TRC, UCT, RIM
Payment Assistance	$64,522	PTRC, TRC
Total	**$420,425**	**N/A**

Table 6: 2022 Low Income Weatherization Program Cost-Effectiveness Results (Including NEIs)

Cost-Effectiveness Test	Levelized $/kWh	NPV Costs	NPV Benefits	Net Benefits	Benefit/Cost Ratio
Total Resource Cost Test (PTRC) + Conservation Adder	$0.3521	$747,702	$734,785	-$12,918	0.98
Total Resource Cost Test (TRC) No Adder	$0.3521	$747,702	$706,207	-$41,496	0.94
Utility Cost Test (UCT)	$0.3521	$747,702	304,492	-$443,210	0.41
Participant Cost Test (PCT)		$0	$850,100	$850,100	n/a
Rate Impact Test (RIM)		$960,285	$304,492	-$655,792	0.32
Lifecycle Revenue Impacts ($/kWh)					$0.0000172
Discounted Participant Payback (years)					0.00

MEMORANDUM

To: Alesha Mander, PacifiCorp

From: Andrew Cottrell, Andy Hudson, Stephanie Chen, Elizabeth Applegate, AEG

Date: May 30, 2023

Re: PacifiCorp Washington Wattsmart Business Program Cost-Effectiveness Results – PY2022

AEG estimated the cost-effectiveness of PacifiCorp's overall energy efficiency portfolio in the state of Washington based on Program Year (PY) 2022 costs and savings[1] estimates provided by PacifiCorp. This memo provides cost-effectiveness results for the Wattsmart Business program. The program passes the following cost effectiveness tests: Total Resource Cost Test (TRC), the PacifiCorp Total Resource Cost Test (PTRC), the Utility Cost Test (UCT), and the Participant Cost Test (PCT).

This memo provides analysis inputs and results in the following tables:

- Table 1: Cost-Effectiveness Analysis Inputs
- Table 2: Annual Program Level Costs, Nominal - PY2022
- Table 3: Annual Savings - PY2022
- Table 4: 2022 Benefit/Cost Ratios by Measure Category
- Table 5: 2022 Wattsmart Business Program Cost-Effectiveness Results
- Table 6: 2022 Wattsmart Business Additional Measures Cost-Effectiveness Results (Load Shape - WA_Industrial_Machinery_General)
- Table 7: 2022 Wattsmart Business Compressed Air Cost-Effectiveness Results (Load Shape - WA_Industrial_Machinery_General)
- Table 8: 2022 Wattsmart Business Energy Management Cost-Effectiveness Results (Load Shape - WA_Miscellaneous_Mfg_General)
- Table 9: 2022 Wattsmart Business Food Service Equipment Cost-Effectiveness Results (Load Shape - WA_School_Cooking)
- Table 10: 2022 Wattsmart Business HVAC Cost-Effectiveness Results (Load Shape - WA_Large_Retail_Space_Cool)

[1] The commercial line loss factor was used for all Wattsmart Business savings; commercial sector savings represent approximately 74% of total program savings.

- Table 11: 2022 Wattsmart Business Irrigation Cost-Effectiveness Results (Load Shape - WA_Irrigation_General)
- Table 12: 2022 Wattsmart Business Lighting Cost-Effectiveness Results (Load Shape - WA_Miscellaneous_Lighting)
- Table 13: 2022 Wattsmart Business Motors Cost-Effectiveness Results (Load Shape - WA_Industrial_Machinery_General)
- Table 14: 2022 Wattsmart Business Refrigeration Cost-Effectiveness Results (Load Shape - WA_Warehouse_Refrigeration)
- Table 15: 2022 Wattsmart Business Building Shell Cost-Effectiveness Results (Load Shape - WA_Industrial_Machinery_General)
- Table 16: 2022 Wattsmart Business Non-Energy Impacts by Measure Category
- Table 17: 2022 Wattsmart Business Program Cost-Effectiveness Results (Including NEIs)
- Table 18: 2022 Wattsmart Business Additional Measures (with NEIs) Cost-Effectiveness Results - PY2022
- Table 19: 2022 Wattsmart Business Compressed Air (with NEIs) Cost-Effectiveness Results - PY2022
- Table 20: 2022 Wattsmart Business Energy Management (with NEIs) Cost-Effectiveness Results - PY2022
- Table 21: 2022 Wattsmart Business HVAC (with NEIs) Cost-Effectiveness Results - PY2022
- Table 22: 2022 Wattsmart Business Irrigation (with NEIs) Cost-Effectiveness Results - PY2022
- Table 23: 2022 Wattsmart Business Lighting (with NEIs) Cost-Effectiveness Results - PY2022
- Table 24: 2022 Wattsmart Business Motors (with NEIs) Cost-Effectiveness Results - PY2022
- Table 25: 2022 Wattsmart Business Refrigeration (with NEIs) Cost-Effectiveness Results - PY2022

The following assumptions were utilized in the analysis:

- Avoided Costs: derived from PacifiCorp's 2021 Integrated Resource Plan (IRP) Preferred Portfolio "P02-MM-CETA", 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-152072.
- Retail Rates: 2021 rates provided by PacifiCorp and escalated by inflation for future years.

Tables 1 and 2 below summarize cost-effectiveness assumptions for the PacifiCorp Washington Wattsmart Business program. All costs and impacts are presented at the program level. Table 3 provides the annual savings for the program.

Table 1: Cost-Effectiveness Analysis Inputs

Parameter	Value
Discount Rate	6.88%
Commercial Line Loss	7.60%
Industrial Line Loss	6.82%
Irrigation Line Loss	7.68%
Commercial Energy Rate ($/kWh)	$0.08
Industrial Energy Rate ($/kWh)	$0.07
Irrigation Energy Rate ($/kWh)	$0.07
Inflation Rate	2.16%

Table 2: Annual Program Level Costs, Nominal - PY2022[2]

Measure Category	Program Delivery	Utility Admin	Engineering Costs	Program Development	Incentives
Additional Measures	$7,172	$2,357	$5,951	$855	$47,125
Compressed Air	$51,101	$12,077	$23,598	$3,390	$130,517
Energy Management	$158,863	$70,595	$128,329	$18,436	$106,794
Food Service Equipment	$3,297	$329	$920	$132	$4,464
HVAC	$27,516	$8,017	$14,422	$2,072	$80,197
Irrigation	$104,694	$8,555	$16,470	$2,366	$116,046
Lighting	$1,502,784	$310,449	$0	$66,180	$3,960,659
Motors	$46,293	$28,926	$35,808	$5,144	$202,249
Refrigeration	$316,640	$41,031	$114,344	$16,427	$633,738
Building Shell	$504	$50	$141	$20	$1,380
Total:	**$2,218,863**	**$482,387**	**$339,982**	**$115,022**	**$5,283,169**

[2] To align with annual budget expectations, cost-effectiveness inputs are presented in nominal dollars.

Table 3: Annual Savings - PY2022

Measure Category	Gross kWh Savings at Site	Realization Rate	Adjusted Gross kWh Savings at Site	Net to Gross Ratio	Net kWh Savings at Site	Measure Life
Additional Measures	199,583	83%	164,856	100%	164,856	15
Compressed Air	791,351	99%	783,438	100%	783,438	14
Energy Management	4,303,543	100%	4,303,543	100%	4,303,543	3
Food Service Equipment	30,854	83%	25,485	100%	25,485	16
HVAC	483,636	88%	425,599	100%	425,599	16
Irrigation	552,321	100%	552,321	100%	552,321	9
Lighting	15,448,934	100%	15,448,934	100%	15,448,934	11
Motors	1,200,827	83%	991,883	100%	991,883	15
Refrigeration	3,834,555	100%	3,834,555	100%	3,834,555	13
Building Shell	4,715	83%	3,895	100%	3,895	15
Total:	**26,850,318**	**99%**	**26,534,508**	**100%**	**26,534,508**	11

Tables 4 through 16 present the cost-effectiveness results at the program and measure category levels. Tables 17 through 19 present the NEI impacts for the program and the cost-effectiveness results with NEIs at the program and measure category levels.

Table 4: 2022 Benefit/Cost Ratios by Measure Category

Measure Category	PTRC	TRC	UCT	PCT	RIM
Additional Measures	2.91	2.65	2.81	3.31	0.96
Compressed Air	3.21	2.92	3.85	3.54	1.06
Energy Management	3.31	3.01	3.08	9.65	0.98
Food Service Equipment	1.63	1.48	2.38	2.91	0.64
HVAC	2.52	2.29	4.45	2.51	1.04
Irrigation	1.68	1.53	2.31	1.80	1.00
Lighting	2.61	2.37	2.36	4.10	0.76
Motors	2.55	2.32	3.37	2.69	1.02
Refrigeration	3.03	2.76	3.73	3.92	0.93
Building Shell	0.72	0.65	2.74	0.62	1.00
Total Program	**2.69**	**2.44**	**2.70**	**3.92**	**0.83**
Total Program (with NEIs)	**3.02**	**2.77**	**2.70**	**4.42**	**0.83**

Table 5: 2022 Wattsmart Business Program Cost-Effectiveness Results

Cost-Effectiveness Test	Levelized $/kWh	NPV Costs	NPV Benefits	Net Benefits	Benefit/Cost Ratio
Total Resource Cost Test (PTRC) + Conservation Adder	$0.0419	$9,317,197	$25,048,567	$15,731,370	2.69
Total Resource Cost Test (TRC) No Adder	$0.0419	$9,317,197	$22,771,425	$13,454,228	2.44
Utility Cost Test (UCT)	$0.0380	$8,439,423	$22,771,425	$14,332,001	2.70
Participant Cost Test (PCT)		$6,160,943	$24,171,678	$18,010,735	3.92
Rate Impact Test (RIM)		$27,327,932	$22,771,425	-$4,556,507	0.83
Lifecycle Revenue Impacts ($/kWh)					$0.0006028
Discounted Participant Payback (years)					2.32

Table 6: 2022 Wattsmart Business Additional Measures Cost-Effectiveness Results (Load Shape - WA_Industrial_Machinery_General)

Cost-Effectiveness Test	Levelized $/kWh	NPV Costs	NPV Benefits	Net Benefits	Benefit/Cost Ratio
Total Resource Cost Test (PTRC) + Conservation Adder	$0.0391	$67,479	$196,476	$128,997	2.91
Total Resource Cost Test (TRC) No Adder	$0.0391	$67,479	$178,615	$111,135	2.65
Utility Cost Test (UCT)	$0.0367	$63,461	$178,615	$115,154	2.81
Participant Cost Test (PCT)		$51,144	$169,253	$118,109	3.31
Rate Impact Test (RIM)		$185,588	$178,615	-$6,974	0.96
Lifecycle Revenue Impacts ($/kWh)					$0.0000044
Discounted Participant Payback (years)					4.42

Table 7: 2022 Wattsmart Business Compressed Air Cost-Effectiveness Results (Load Shape - WA_Industrial_Machinery_General)

Cost-Effectiveness Test	Levelized $/kWh	NPV Costs	NPV Benefits	Net Benefits	Benefit/Cost Ratio
Total Resource Cost Test (PTRC) + Conservation Adder	$0.0355	$291,107	$933,707	$642,600	3.21
Total Resource Cost Test (TRC) No Adder	$0.0355	$291,107	$848,824	$557,717	2.92
Utility Cost Test (UCT)	$0.0269	$220,682	$848,824	$628,143	3.85
Participant Cost Test (PCT)		$200,942	$710,900	$509,958	3.54
Rate Impact Test (RIM)		$801,065	$848,824	$47,759	1.06
Lifecycle Revenue Impacts ($/kWh)					$0.0000190
Discounted Participant Payback (years)					3.83

Table 8: 2022 Wattsmart Business Energy Management Cost-Effectiveness Results (Load Shape - WA_Miscellaneous_Mfg_General)

Cost-Effectiveness Test	Levelized $/kWh	NPV Costs	NPV Benefits	Net Benefits	Benefit/Cost Ratio
Total Resource Cost Test (PTRC) + Conservation Adder	$0.0383	$494,268	$1,638,116	$1,143,848	3.31
Total Resource Cost Test (TRC) No Adder	$0.0383	$494,268	$1,489,196	$994,928	3.01
Utility Cost Test (UCT)	$0.0374	$483,017	$1,489,196	$1,006,179	3.08
Participant Cost Test (PCT)		$118,046	$1,139,111	$1,021,065	9.65
Rate Impact Test (RIM)		$1,515,333	$1,489,196	-$26,137	0.98
Lifecycle Revenue Impacts ($/kWh)					$0.0001287
Discounted Participant Payback (years)					0.23

Table 9: 2022 Wattsmart Business Food Service Equipment Cost-Effectiveness Results (Load Shape - WA_School_Cooking)

Cost-Effectiveness Test	Levelized $/kWh	NPV Costs	NPV Benefits	Net Benefits	Benefit/Cost Ratio
Total Resource Cost Test (PTRC) + Conservation Adder	$0.0532	$14,742	$23,959	$9,217	1.63
Total Resource Cost Test (TRC) No Adder	$0.0532	$14,742	$21,781	$7,039	1.48
Utility Cost Test (UCT)	$0.0330	$9,142	$21,781	$12,639	2.38
Participant Cost Test (PCT)		$10,064	$29,280	$19,217	2.91
Rate Impact Test (RIM)		$33,958	$21,781	-$12,177	0.64
Lifecycle Revenue Impacts ($/kWh)					$0.0000008
Discounted Participant Payback (years)					5.45

Table 10: 2022 Wattsmart Business HVAC Cost-Effectiveness Results (Load Shape - WA_Large_Retail_Space_Cool)

Cost-Effectiveness Test	Levelized $/kWh	NPV Costs	NPV Benefits	Net Benefits	Benefit/Cost Ratio
Total Resource Cost Test (PTRC) + Conservation Adder	$0.0536	$256,324	$646,665	$390,341	2.52
Total Resource Cost Test (TRC) No Adder	$0.0536	$256,324	$587,878	$331,553	2.29
Utility Cost Test (UCT)	$0.0276	$132,224	$587,878	$455,654	4.45
Participant Cost Test (PCT)		$204,297	$511,879	$307,582	2.51
Rate Impact Test (RIM)		$563,906	$587,878	$23,972	1.04
Lifecycle Revenue Impacts ($/kWh)					$0.0000124
Discounted Participant Payback (years)					6.46

Table 11: 2022 Wattsmart Business Irrigation Cost-Effectiveness Results (Load Shape - WA_Irrigation_General)

Cost-Effectiveness Test	Levelized $/kWh	NPV Costs	NPV Benefits	Net Benefits	Benefit/Cost Ratio
Total Resource Cost Test (PTRC) + Conservation Adder	$0.0844	$376,061	$631,056	$254,995	1.68
Total Resource Cost Test (TRC) No Adder	$0.0844	$376,061	$573,687	$197,626	1.53
Utility Cost Test (UCT)	$0.0557	$248,131	$573,687	$325,556	2.31
Participant Cost Test (PCT)		$243,976	$440,066	$196,090	1.80
Rate Impact Test (RIM)		$572,151	$573,687	$1,536	1.00
Lifecycle Revenue Impacts ($/kWh)					$0.0000178
Discounted Participant Payback (years)					4.58

Table 12: 2022 Wattsmart Business Lighting Cost-Effectiveness Results (Load Shape - WA_Miscellaneous_Lighting)

Cost-Effectiveness Test	Levelized $/kWh	NPV Costs	NPV Benefits	Net Benefits	Benefit/Cost Ratio
Total Resource Cost Test (PTRC) + Conservation Adder	$0.0413	$5,825,697	$15,180,867	$9,355,170	2.61
Total Resource Cost Test (TRC) No Adder	$0.0413	$5,825,697	$13,800,788	$7,975,091	2.37
Utility Cost Test (UCT)	$0.0414	$5,840,072	$13,800,788	$7,960,716	2.36
Participant Cost Test (PCT)		$3,946,284	$16,194,445	$12,248,161	4.10
Rate Impact Test (RIM)		$18,073,858	$13,800,788	-$4,273,070	0.76
Lifecycle Revenue Impacts ($/kWh)					$0.0004953
Discounted Participant Payback (years)					2.48

Table 13: 2022 Wattsmart Business Motors Cost-Effectiveness Results (Load Shape - WA_Industrial_Machinery_General)

Cost-Effectiveness Test	Levelized $/kWh	NPV Costs	NPV Benefits	Net Benefits	Benefit/Cost Ratio
Total Resource Cost Test (PTRC) + Conservation Adder	$0.0446	$463,883	$1,182,134	$718,251	2.55
Total Resource Cost Test (TRC) No Adder	$0.0446	$463,883	$1,074,667	$610,784	2.32
Utility Cost Test (UCT)	$0.0306	$318,420	$1,074,667	$756,247	3.37
Participant Cost Test (PCT)		$347,712	$937,052	$589,341	2.69
Rate Impact Test (RIM)		$1,053,223	$1,074,667	$21,444	1.02
Lifecycle Revenue Impacts ($/kWh)					$0.0000250
Discounted Participant Payback (years)					4.96

Table 14: 2022 Wattsmart Business Refrigeration Cost-Effectiveness Results (Load Shape - WA_Warehouse_Refrigeration)

Cost-Effectiveness Test	Levelized $/kWh	NPV Costs	NPV Benefits	Net Benefits	Benefit/Cost Ratio
Total Resource Cost Test (PTRC) + Conservation Adder	$0.0394	$1,518,871	$4,609,275	$3,090,403	3.03
Total Resource Cost Test (TRC) No Adder	$0.0394	$1,518,871	$4,190,250	$2,671,378	2.76
Utility Cost Test (UCT)	$0.0291	$1,122,179	$4,190,250	$3,068,070	3.73
Participant Cost Test (PCT)		$1,030,430	$4,034,686	$3,004,256	3.92
Rate Impact Test (RIM)		$4,523,127	$4,190,250	-$332,878	0.93
Lifecycle Revenue Impacts ($/kWh)					$0.0001121
Discounted Participant Payback (years)					3.09

Table 15: 2022 Wattsmart Business Building Shell Cost-Effectiveness Results (Load Shape - WA_Industrial_Machinery_General)

Cost-Effectiveness Test	Levelized $/kWh	NPV Costs	NPV Benefits	Net Benefits	Benefit/Cost Ratio
Total Resource Cost Test (PTRC) + Conservation Adder	$0.2148	$8,765	$6,313	-$2,452	0.72
Total Resource Cost Test (TRC) No Adder	$0.2148	$8,765	$5,739	-$3,026	0.65
Utility Cost Test (UCT)	$0.0513	$2,095	$5,739	$3,644	2.74
Participant Cost Test (PCT)		$8,050	$5,007	-$3,043	0.62
Rate Impact Test (RIM)		$5,722	$5,739	$17	1.00
Lifecycle Revenue Impacts ($/kWh)					$0.0000001
Discounted Participant Payback (years)					24.12

Table 16: 2022 Wattsmart Business Non-Energy Impacts by Measure Category

Measure	Annual Non-Energy Impacts	Quantity	Measure Life	Discount Rate	Total Present Value NEIs
Irrigation	$458	3	15	6.88%	$2,616,291
Total	**$458**	**3**	**15**	**6.88%**	**$2,616,291**

Table 17: 2022 Wattsmart Business Program Cost-Effectiveness Results (Including NEIs)

Cost-Effectiveness Test	Levelized $/kWh	NPV Costs	NPV Benefits	Net Benefits	Benefit/Cost Ratio
Total Resource Cost Test (PTRC) + Conservation Adder	$0.0419	$9,317,197	$28,095,816	$18,778,619	3.02
Total Resource Cost Test (TRC) No Adder	$0.0419	$9,317,197	$25,818,674	$16,501,477	2.77
Utility Cost Test (UCT)	$0.0380	$8,439,423	$22,771,425	$14,332,001	2.70
Participant Cost Test (PCT)		$6,160,943	$27,218,927	$21,057,984	4.42
Rate Impact Test (RIM)		$27,327,932	$22,771,425	-$4,556,507	0.83
Lifecycle Revenue Impacts ($/kWh)					$0.0006028
Discounted Participant Payback (years)					2.32

Table 18: 2022 Wattsmart Business Additional Measures (with NEIs) Cost-Effectiveness Results - PY2022

Cost-Effectiveness Test	Levelized $/kWh	NPV Costs	NPV Benefits	Net Benefits	Benefit/Cost Ratio
Total Resource Cost Test (PTRC) + Conservation Adder	$0.04	$67,479	$200,966	$133,486	2.98
Total Resource Cost Test (TRC) No Adder	$0.04	$67,479	$183,104	$115,625	2.71
Utility Cost Test (UCT)	$0.04	$63,461	$178,615	$115,154	2.81
Participant Cost Test (PCT)		$51,144	$173,743	$122,599	3.40
Rate Impact Test (RIM)		$185,588	$178,615	($6,974)	0.96
Lifecycle Revenue Impacts ($/kWh)					$0.000004
Discounted Participant Payback (years)					4.42

Table 19: 2022 Wattsmart Business Compressed Air (with NEIs) Cost-Effectiveness Results - PY2022

Cost-Effectiveness Test	Levelized $/kWh	NPV Costs	NPV Benefits	Net Benefits	Benefit/Cost Ratio
Total Resource Cost Test (PTRC) + Conservation Adder	$0.04	$291,107	$959,410	$668,302	3.30
Total Resource Cost Test (TRC) No Adder	$0.04	$291,107	$874,527	$583,420	3.00
Utility Cost Test (UCT)	$0.03	$220,682	$848,824	$628,143	3.85
Participant Cost Test (PCT)		$200,942	$736,603	$535,661	3.67
Rate Impact Test (RIM)		$801,065	$848,824	$47,759	1.06
Lifecycle Revenue Impacts ($/kWh)					$0.000019
Discounted Participant Payback (years)					3.83

Table 20: 2022 Wattsmart Business Energy Management (with NEIs) Cost-Effectiveness Results - PY2022

Cost-Effectiveness Test	Levelized $/kWh	NPV Costs	NPV Benefits	Net Benefits	Benefit/Cost Ratio
Total Resource Cost Test (PTRC) + Conservation Adder	$0.04	$494,268	$2,030,475	$1,536,207	4.11
Total Resource Cost Test (TRC) No Adder	$0.04	$494,268	$1,881,556	$1,387,288	3.81
Utility Cost Test (UCT)	$0.04	$483,017	$1,489,196	$1,006,179	3.08
Participant Cost Test (PCT)		$118,046	$1,531,470	$1,413,424	12.97
Rate Impact Test (RIM)		$1,515,333	$1,489,196	($26,137)	0.98
Lifecycle Revenue Impacts ($/kWh)					$0.000129
Discounted Participant Payback (years)					0.23

Table 21: 2022 Wattsmart Business HVAC (with NEIs) Cost-Effectiveness Results - PY2022

Cost-Effectiveness Test	Levelized $/kWh	NPV Costs	NPV Benefits	Net Benefits	Benefit/Cost Ratio
Total Resource Cost Test (PTRC) + Conservation Adder	$0.05	$256,324	$648,131	$391,806	2.53
Total Resource Cost Test (TRC) No Adder	$0.05	$256,324	$589,343	$333,019	2.30
Utility Cost Test (UCT)	$0.03	$132,224	$587,878	$455,654	4.45
Participant Cost Test (PCT)		$204,297	$513,344	$309,047	2.51
Rate Impact Test (RIM)		$563,906	$587,878	$23,972	1.04
Lifecycle Revenue Impacts ($/kWh)					$0.000012
Discounted Participant Payback (years)					6.46

Table 22: 2022 Wattsmart Business Irrigation (with NEIs) Cost-Effectiveness Results - PY2022

Cost-Effectiveness Test	Levelized $/kWh	NPV Costs	NPV Benefits	Net Benefits	Benefit/Cost Ratio
Total Resource Cost Test (PTRC) + Conservation Adder	$0.08	$376,061	$687,336	$311,275	1.83
Total Resource Cost Test (TRC) No Adder	$0.08	$376,061	$629,967	$253,907	1.68
Utility Cost Test (UCT)	$0.06	$248,131	$573,687	$325,556	2.31
Participant Cost Test (PCT)		$243,976	$496,346	$252,370	2.03
Rate Impact Test (RIM)		$572,151	$573,687	$1,536	1.00
Lifecycle Revenue Impacts ($/kWh)					$0.000018
Discounted Participant Payback (years)					4.58

Table 23: 2022 Wattsmart Business Lighting (with NEIs) Cost-Effectiveness Results - PY2022

Cost-Effectiveness Test	Levelized $/kWh	NPV Costs	NPV Benefits	Net Benefits	Benefit/Cost Ratio
Total Resource Cost Test (PTRC) + Conservation Adder	$0.04	$5,825,697	$17,202,444	$11,376,747	2.95
Total Resource Cost Test (TRC) No Adder	$0.04	$5,825,697	$15,822,365	$9,996,669	2.72
Utility Cost Test (UCT)	$0.04	$5,840,072	$13,800,788	$7,960,716	2.36
Participant Cost Test (PCT)		$3,946,284	$18,216,022	$14,269,738	4.62
Rate Impact Test (RIM)		$18,073,858	$13,800,788	($4,273,070)	0.76
Lifecycle Revenue Impacts ($/kWh)					$0.000495
Discounted Participant Payback (years)					2.48

Table 24: 2022 Wattsmart Business Motors (with NEIs) Cost-Effectiveness Results - PY2022

Cost-Effectiveness Test	Levelized $/kWh	NPV Costs	NPV Benefits	Net Benefits	Benefit/Cost Ratio
Total Resource Cost Test (PTRC) + Conservation Adder	$0.04	$463,883	$1,296,550	$832,667	2.79
Total Resource Cost Test (TRC) No Adder	$0.04	$463,883	$1,189,083	$725,201	2.56
Utility Cost Test (UCT)	$0.03	$318,420	$1,074,667	$756,247	3.37
Participant Cost Test (PCT)		$347,712	$1,051,469	$703,757	3.02
Rate Impact Test (RIM)		$1,053,223	$1,074,667	$21,444	1.02
Lifecycle Revenue Impacts ($/kWh)					$0.000025
Discounted Participant Payback (years)					4.96

Table 25: 2022 Wattsmart Business Refrigeration (with NEIs) Cost-Effectiveness Results - PY2022

Cost-Effectiveness Test	Levelized $/kWh	NPV Costs	NPV Benefits	Net Benefits	Benefit/Cost Ratio
Total Resource Cost Test (PTRC) + Conservation Adder	$0.04	$1,518,871	$5,040,232	$3,521,361	3.32
Total Resource Cost Test (TRC) No Adder	$0.04	$1,518,871	$4,621,207	$3,102,336	3.04
Utility Cost Test (UCT)	$0.03	$1,122,179	$4,190,250	$3,068,070	3.73
Participant Cost Test (PCT)		$1,030,430	$4,465,644	$3,435,214	4.33
Rate Impact Test (RIM)		$4,523,127	$4,190,250	($332,878)	0.93
Lifecycle Revenue Impacts ($/kWh)					$0.000112
Discounted Participant Payback (years)					3.09

APPENDIX

Appendix B: 2021-2022 NEEA Supply Chain Memo

Memorandum

December 21, 2021

TO: NEEA Coordinating and Advisory Committee Members

FROM: Jon Clark, Market Channel Manager

SUBJECT: 2021 Supply Chain Challenges: Market Evidence & Impact on Energy Efficiency Technologies

Brief Context:

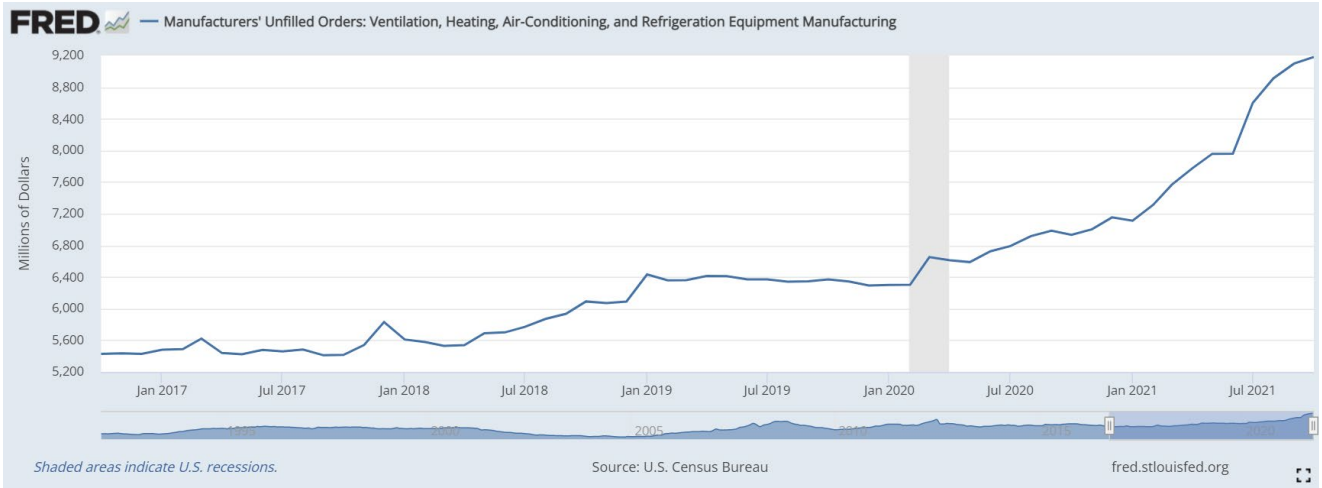
The Covid-19 pandemic has caused disruptions across every link in the global supply/demand chain resulting in product shortages and increasing prices in many industries. An example of this disruption occurred in early 2020 when panic-buying depleted the supply of toilet paper. Similar disruptions are being felt in product categories that are often part of utility energy-efficiency programs including HVAC, water heaters, and consumer electronics/appliances, resulting in increasing prices and limited availability.

Overview:

NEEA market partners involved in the manufacture and distribution of HVAC, water heaters, and consumer electronics/appliances have all indicated that they are experiencing supply chain disruptions. While the disruptions vary across industries – a shortage of microchips used in electronics/appliances; a shortage of compressors used in HVAC; a shortage of steel used in the manufacture of water heaters – the result of these disruptions are similar - higher prices, reduced selection, delayed shipments, and overall reduced product availability.

NEEA partners involved in the sale of these products have indicated that they have had to pass along the price increases to purchasers and that availability issues are causing a shift in what is being purchased. Oddly, increased prices and limited availability haven't reduced sales as many of these partners are reporting record sales volumes in 2021.

The results of reduced availability from suppliers and increased sales can be seen in this Federal Reserve graph of manufacturers of HVAC and refrigeration equipment that shows unfulfilled orders at a 5-year high.



Impact Example:

The water heater industry is being impacted by many of the global disruptions. AOSmith, the largest manufacturer of water heaters in the U.S., recently reported that they have passed along five price increases in 2021 primarily due to increases in the price of steel and logistics. AOSmith's heat pump water heater (HPWH) business is being further interrupted due to a shortage of microprocessor chips that are required for general control of the unit, and for CTA-2045 connectivity significantly reducing the number of units that can be manufactured. This is happening at the same time that states like Washington are implementing administrative codes that require electric storage water heaters to be CTA-2045 enabled.

Wholesalers of HPWHs that work with NEEA indicate that their builder customers aren't slowing construction, and due to the lack of product, they are asking for alternative products including tankless water heaters. Wholesalers are concerned because it has taken a great deal of effort, in some cases years, to get their customers used to and comfortable with HPWHs. While product shortages have the potential to impact near-term HPWH unit goals, the shortages may have longer-term impacts on the view of HPWHs in the market resulting in challenges in achieving energy-efficiency goals.

In an effort to keep HPWHs top of mind, NEEA worked with water heater manufacturers that represent over 90% of unit sales to provide comments to the State of Washington supporting a delay on CTA2045 implementation requirements (click HERE to read the comments letter). While the document outlines how supply chain disruptions are impacting our work in the HPWH arena, they can easily be applied to our collective HVAC and consumer electronics/appliance energy-efficiency efforts.

Please contact **Jon Clark** (JClark@neea.org) or **Jeff Mitchell** (JMitchell@neea.org) if you have questions about this memo.

Memorandum

April 13, 2023

TO: NEEA Coordinating and Advisory Committee Members

FROM: Jon Clark, Strategic Accounts Manager, Retail and Wholesale

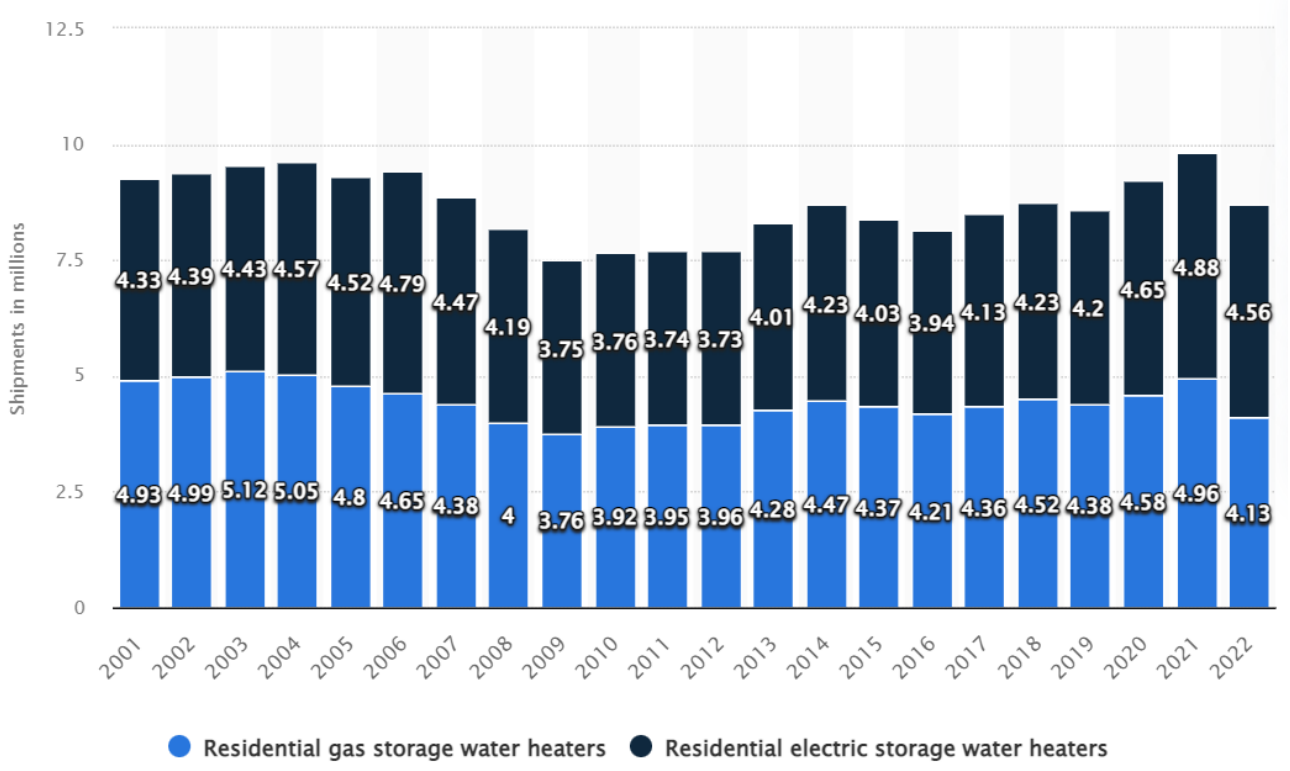
SUBJECT: Supply Chain Challenges: Market Evidence & Impact on Energy Efficiency Technologies

Brief Context:

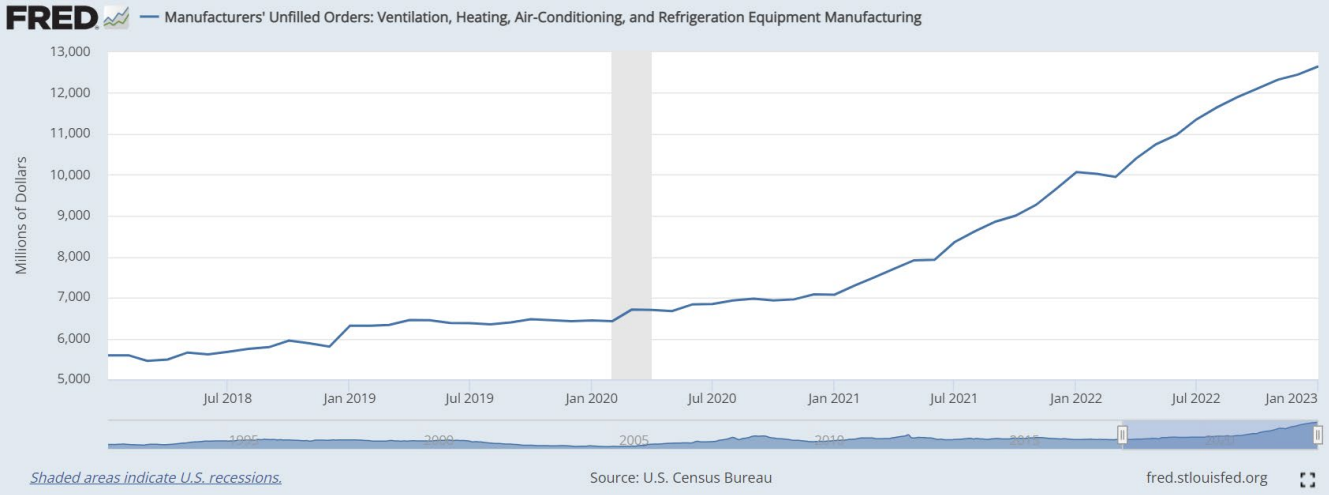
This is an update to a similar memo provided to NEEA funders in Dec 2021. The Covid-19 global pandemic caused numerous disruptions to the supply chain resulting in the lack of product availability described in the December 2021 memo, and in particular, increased prices and lower volume of water heating and HVAC units shipped/sold in North America in 2022. While product availability is improving, these pandemic-driven shortages are forecasted to continue causing challenges to availability.

Overview:

Supply chain constraints caused shortage in raw materials and components resulting in fewer units built with higher price tags. In their Q4 2022 financial filings, AO Smith, one of the world's leading manufacturers of water heating solutions and the largest seller of residential water heaters in the U.S. reported record sales for the year. They provide additional clarity on the performance: "*Higher North American sales due to pricing actions partially offset by lower residential water heating volumes.*". Higher prices, lower volumes. In a report AO Smith forecast the U.S. residential water heater business to range +2% to -5% for 2023. Price increases for water heaters have been well documented by NEEA's market partners and the following graph from the Air Conditioning, Heating, & Refrigeration Institute (AHRI), the trade association representing manufacturers of heating, ventilation, air conditioning, commercial refrigeration (HVACR), and water heating supports the unit decline.



The HVAC industry is seeing similar results to the water heating industry. The results of reduced availability from suppliers continues and can be seen in this Federal Reserve graph of manufacturers of HVAC and refrigeration equipment that shows unfulfilled orders continuing to grow and at a 5 year high.



In an effort to keep HPWHs top of mind, NEEA worked with water heater manufacturers that represent over 90% of unit sales to provide comments to the State of Washington supporting a delay on CTA2045 implementation requirements (click HERE to read the comments letter). While the document outlines how supply chain disruptions are impacting our work in the HPWH arena, they can easily be applied to our collective HVAC and consumer electronics/appliance energy-efficiency efforts.

Please contact **Jon Clark** (JClark@neea.org) if you have questions about this memo.

APPENDIX

Appendix C: NEEA Report Memo

Memorandum

3/17/2023

TO: Cory Scott, Sr. Director of Customer Solutions, Pacific Power; Nancy Goddard, Senior Program Manager, Pacific Power; Peter Schaffer, Senior Planner, Pacific Power

FROM: Christina Steinhoff, NEEA Principal Planning Analyst

CC: Stephanie Rider, Director, NEEA Data, Planning, and Analytics; Susan Hermenet, Vice President, Research, Evaluation and Analytics, NEEA; Virginia Mersereau, Senior Manager of Strategy, NEEA Corporate Strategy

SUBJECT: 2022 Annual Savings Report (Washington)

NEEA is an alliance of utilities that pools resources and shares risks to transform markets toward energy efficiency for the benefit of consumers in the Northwest. NEEA's role is to establish technology and market conditions that advance energy efficiency in markets in a sustainable way.

Energy savings are enabled by the alliance's market transformation programs, codes and standards work, and investment in tools, training, resources, data and research to support greater efficiency. The programs seek to affect sustainable changes in markets, which then result in energy savings.

The Washington investor-owned utilities (WA IOUs) have asked NEEA to establish a savings forecast for each biennium as one benefit from the alliance's work. This memo reports these savings against the two-year forecast sent to Pacific Power in August 2021.

NEEA allocates the savings based on Pacific Power's funding share[1] of its regional investment. The savings are above a common baseline established by the WA IOUs and are net of savings claimed through regional utility programs[2]. Appendix A documents NEEA's methodology to estimate savings. Details about baseline and technical assumptions are in the attached Excel spreadsheet.

Please contact Christina Steinhoff at csteinhoff@neea.org with any questions about this report.

[1] Funding share is the portion of NEEA budget provided by each stakeholder. NEEA calculates the shares using each electric funding utility's regional customer count and retail sales.

[2] Regional utility programs are the Bonneville Power Administration, Energy Trust of Oregon and local utility programs. These programs provide NEEA an estimate of their annual incented units. NEEA multiplies savings rate and baseline saturation assumptions by the units to estimate local program savings. NEEA subtract these values prior to reporting savings to its funders to avoid double counting.

2022 Savings Estimate

NEEA estimates that Pacific Power's savings are **0.30 aMW** for Program Measures. The results are greater than the original target (Table 1) estimated in August 2021. Program Measures do not include savings from NEEA's work on codes and standards. Standard savings provide an additional 0.02 aMW and codes provides and an additional 0.06 aMW for a total of **0.38 aMW.** The attached spreadsheet shows how the savings varied by program.

Table 1: aMW Savings in Comparison to the Targets

	Targets	Actuals
Total	**0.35**	**0.38**
Program Measures	*0.27*	*0.30*
Residential	*0.22*	*0.25*
Commercial	*0.04*	*0.04*
Industrial/Agricultural	*0.01*	*0.01*
Codes	*0.08*	*0.06*
Residential	*0.07*	*0.05*
Commercial	*0.01*	*0.01*
Standards	*0.00*	*0.02*
Residential	*0.00*	*0.00*
Non Residential	*0.00*	*0.01*

These are site-based, first-year savings. NEEA allocates the regional savings (Idaho, Montana, Oregon, and Washington) using funder shares. To avoid double counting savings, these values net out an estimate of savings the Bonneville Power Administration, the Energy Trust of Oregon and local utilities claim through their local programs.

Program Measures: savings from energy efficiency measures NEEA worked on.

Codes and Standards: savings from codes and standards NEEA worked on. Program Measures can result in a code or standard. As requested by the Washington investor-owned utilities, these savings are reported separately as codes and standards.

Highlights

The 2022 savings are above the target primarily because of the three programs described below. More information about the variance by program is available in the attached spreadsheet.

Heat Pump Water Heaters

Regional sales of Heat Pump Water Heater in 2022 increased by approximately 16% over the prior year while incentives by local utilities decreased. The net effect is an increase the share of the regional savings NEEA reports back to utilities.

In 2022, NEEA completed the 'Boring but Efficient' awareness campaign, which led to an increase in awareness and drove successful conversions to heat pump water heaters for customers inside the NEEA's service territory. At a national level, we saw the introduction of Demand Response Testing to achieve Energy STAR and ANSI/CTA-2045 standards, both of which are met by heat pump water heaters currently on the market. Additionally, NEEA participated in the development of a joint recommendation to DOE alongside industry and consumer advocates which will affect the upcoming national water heater standard. NEEA will continue to work in the water heating market to sustain the momentum. HPWHs are also an option that builders commonly use to meet the Washington residential building codes.

Retail Products Portfolio

Adoption of ENERGY STAR Most Efficient refrigerators increased significantly since NEEA set the targets in 2021. NEEA supported this efficiency level through midstream incentives and through promoting advancements in the ENERGY STAR test procedure to better differentiate efficient products.

Over time, NEEA expects savings from its Retail Products Portfolio to increase as a share of the portfolio savings. In 2022, manufacturer shipments of appliances decreased for refrigerators and laundry equipment. ENERGY STAR and ENERGY STAR Most Efficient product market share remained strong across all categories in 2022, but is showing some signs of slowed growth, especially for laundry equipment.

Looking forward, NEEA is anticipating Televisions savings could bring significant savings in 2023. NEEA's television efforts began several years ago, resulting in a NEEA-developed test procedure to better estimate energy usage. The test procedure was adopted by ENERGY STAR and the Consumer Technology Association (CTA-2045-C and D) and is scheduled for adoption by the U.S. DOE in 2023. Additionally, as part of NEEA's work on TVs, major manufacturers have agreed to a voluntary agreement to provide their TV energy performance, which will provide consumers with more transparent information on TV energy consumption and inform future midstream incentives through the program. The voluntary agreement will also provide energy use estimates to provide more accurate tracking of energy savings from the new ENERGY STAR specification. We expect to begin reporting market progress for ENERGY STAR Televisions in 2023, which has been a large focus for the program in recent years.

XMP Pumps

Market adoption of efficient pumps in commercial applications is meeting expectations. Moreover, NEEA continues to improve its data collection effort, compiling more detailed information about the pumps, which has helped increase the savings NEEA can report. One aspect of the program is to differentiate efficient pumps and circulators through the usage of energy rating labels. NEEA interviewed market actors in 2022 to develop this market transformation strategy and increase adoption of energy efficient pumps and circulators.

Appendix A: Methodology

Background

Pacific Power, Avista Washington, and Puget Sound Energy developed a joint approach[3] to calculate savings from NEEA initiatives. As part of the utilities' biennium savings updates, NEEA provides a two-year electric energy savings forecast. The utilities subtract the savings from their conservation forecast to develop their Biennium Conservation Target.

Unit Energy Savings (UES)

This report uses:

- Savings rates and technical assumptions from the Regional Technical Forum (RTF) approved prior to September 1, 2021.
- If RTF savings rates are not available, the report uses savings rates from the 2021 Power Plan.
- If those rates are not available, NEEA calculates savings rates an approximation of the 2021 Power Plan baseline assumptions.

Table 2Table 1 sources the savings rates.

[3] The utilities agreed that NEEA would develop a Total Regional Savings estimate using baseline and technical assumptions from the most recent Power Plan. NEEA would remove estimated savings counted by the utilities, the Bonneville Power Administration and the Energy Trust of Oregon. NEEA would allocate the remaining savings to the utilities based on their NEEA funder share percentage.

Table 2: Savings Rate Sources for 2022-2023 Savings Report

Product	Savings Rate Source
Ductless Heat Pumps	The 2023 assumptions for FAF come from version 3.1 updated in September 2021. The 2022 assumptions come from version v2 updated in 2018. The assumptions for single-family zonal-heated homes come from version 5.1 updated in 2020.
Extended Motor Products	RTF. Jun 14, 2017. Efficient Pumps v 1.1 RTF. Aug 10, 2020. Circulator Pumps v 2.1
Heat Pump Water Heaters	The 2023 assumptions come from version 6.2 updated in June 2022. The 2022 assumptions come from version 4.2 updated in June 2019.
Manufactured Homes	RTF. 2020. ResMHNewHomesandHVAC_v4_1.xlsm. RTF. 2022. ResMHNewHomesandHVAC_v5_0.xlsm.
Refrigerators	NEEA calculates the savings rate using the same methodology as the RTF (RTF. January 2019. Residential Refrigerators and Freezers v5.1). However, NEEA includes savings from ENERGY STAR's Emerging Tech Award in the ENERGY STAR Most Efficient category. NEEA updated the baseline efficiency mix to match the 2021 sales weighted average efficiency mix. For more information go to neea.org→Portal Login→Savings Reports→Consumer Products.
Clothes Washers	RTF. 2020. ResClothesWashers_v7_1.xlsm.
Clothes Dryers	RTF. 2020. ResClothesDryers_v4.0.xlsm
Room Air Conditioners	NEEA calculation the savings using the sales weighted efficiency mix in 2021 as the baseline. For more information go to neea.org→Portal Login→Savings Reports→Consumer Products.
High Performance HVAC	Savings are based on pilot products. Red Car Analytics. 2022. Analysis of Expanded Efficiency Parameters for Very High Efficiency DOAS For more information go to neea.org→Portal Login→Savings Reports→HVAC
Luminaire Level Lighting Controls	NEEA uses the RTF Non-Residential Lighting Standard Protocol and assume a 10% baseline to align with the 2021 Power Plan.
Reduced Wattage Lamp Replacement	NEEA sources the Draft 2021 Power Plan. The final plan assumes 28W & 25W T8 Linear Fluorescent Lamps are part of the baseline. NEEA will still report the savings from these lamps because they were included in the targets set in August 2021.

Note: The RTF updated all its workbooks in 2022 with the new ProCost tool. This table references the prior version to better show the date of the decision.

For comparison against the targets, NEEA updates the savings rates if:

- The RTF makes an update after Sept. 1 of the year prior to the Biennium (e.g. 2021) and before Oct. 1 of the first year of the biennium (e.g. 2022); then, NEEA will update the forecast for the second year (e.g. 2023) with the new RTF UES;
- The UES is weighted based on tracked units (e.g. commercial building type, installs by climate zone, etc.);
- Or, NEEA finalized savings analysis for a code or standard.

The attached spreadsheet contains sources and additional information regarding the savings rate calculations.

New Measures

NEEA adds new measures to the savings analysis if:

1. NEEA worked on the measure.
2. NEEA did not have enough data to include the measure in the original target.

NEEA added some savings from its High-Performance HVAC program, which began after the original targets were set, to the current 2022 savings estimates.

Avoiding Double Counting

NEEA avoids double counting by surveying the Bonneville Power Administration, Energy Trust of Oregon and local utilities about their local programs. This report has a forecast of local program units that it uses to avoid over-reporting savings. NEEA multiplies the savings rate and baseline saturation assumptions by the units to forecast local program savings. The regional savings minus the local program savings are the savings NEEA reports to the Washington Investor Own Utilities.

Allocation

NEEA allocates the savings using funder shares. The shares vary based on the funding cycle. Savings from previous investments receive the previous funder share. Savings from current investments receive the current funder share. Table 2 shows the funder shares.

Table 2: Funder Share

Business Plan	Funding Share
2020-2024	2.55%
2015-2019	2.55%