PUGET SOUND ENERGY

Exhibit 2, Supplement 1

2023 Annual Report

Cost-Effectiveness Overview and Non-Energy Impacts

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I. Introduction

A. Background

Puget Sound Energy (PSE) has been providing energy efficiency services since the 1970s (then Puget Power) and will continue to deliver these services for the foreseeable future. With increasing customer demand for energy, PSE must continue to acquire new energy resources to meet the increasing energy needs of its customers. Every two years, PSE goes through a process of planning how it will meet expected customer demands over the next 20 years. Through this process, PSE compiles its Integrated Resource Plan (IRP). This plan provides guidance to assist PSE in selecting resources to meet expected energy demands.

Demand side resources (energy efficiency) are some of the most cost-effective ways for PSE to meet expected customer demand. When selecting which demand side resources to obtain, PSE conducts cost-effectiveness tests that assist PSE in determining which demand side resources to acquire compared to the alternative resources available.

Currently, PSE conducts two cost-effectiveness tests; the Utility Cost Test (UC) and the Total Resource Cost Test (TRC). These tests measure whether or not the benefits obtained by the demand side resource meet or exceed the costs to obtain the resource. This paper presents a broad overview of the cost-effectiveness tests PSE is required to conduct. The body of this paper is intended for audiences unfamiliar with cost-effectiveness tests.

The specific cost tests described in this paper are required of PSE to meet conditions agreed upon with the State of Washington in 2013, which indicate:

> (10) **Cost-Effectiveness Test is the Total Resource Cost (TRC) Test**
>
> (a) The Commission uses the TRC, as modified by the Council, as its primary cost-effectiveness test. PSE's portfolio must pass the TRC test. In general, each program shall be designed to be cost-effective as measured by this test. PSE must demonstrate that the cost-effectiveness tests presented in support of its programs and portfolio are in compliance with the cost-effectiveness definition (RCW 80.52.030(7)) and system cost definition (RCW 80.52.030(8)) and incorporate, quantifiable non-energy impacts, the 10 percent conservation benefit and a risk adder consistent with the Council's approach. An outline of the major elements of the Council's methodology for determining achievable conservation potential, including the Total Resource Cost test, is available on the Council's website at [https://www.nwcouncil.org/2021powerplan_cost-effective-methodology].
>
> (b) In addition to the Council-modified TRC, PSE must provide portfolio calculations of the Program Administrator Cost test (also called the Utility Cost test), Ratepayer Impact Measure test, and Participant Cost test described in the National Action Plan for Energy Efficiency's study "Understanding Cost-effectiveness of Energy Efficiency Programs." The study is available on the Web site of the United States Environmental Protection Agency at https://19january2017snapshot.epa.gov/sites/production/files/2015-08/documents/understanding_cost-

effectiveness_of_energy_efficiency_programs_best_practices_technical_methods_and_emerging_issues_for_policy-makers.pdf.

(c) Overall conservation cost-effectiveness must be evaluated at the portfolio level. Costs included in the portfolio level analysis include conservation-related administrative costs. For the additional cost-effectiveness tests identified in 10b - PSE must consult with the Conservation Resource Advisory Group (CRAG) to determine when it is appropriate to evaluate measure and program level cost-effectiveness. All cost-effectiveness calculations assume a Net-to-Gross ratio of 1.0, consistent with the Council's methodology.

II. Overview of Cost-Effectiveness Tests

The cost-effectiveness tests discussed in this chapter each provide a unique set of information to assist different interested parties in understanding if the investment in demand side resources is of an overall benefit to them.

At a very basic level, cost-effectiveness tests are performed by calculating the ratio of the net present value of benefits (in dollars) to the net present value of costs.

$NPV \sum benefits \div NPV \sum costs$

Holding all other factors constant, energy efficiency programs that have a benefit-cost ratio greater than one are in the best interest of the interested party for whom the ratio was calculated.

A. The Utility Cost Test

The Utility Cost Test (UC) views demand side resource acquisition from the utility's perspective. This test is required for both natural gas and electric conservation programs. This test determines, from the utility's perspective, whether it is cheaper to purchase the demand side resource than it is to acquire an alternative supply side resource, like building a power plant or purchasing energy on the open market.

Generally speaking, a benefit-cost ratio of one or greater in the UC is essential for a program to be considered in a demand side resource portfolio. However, there are some exceptions to this rule. State regulations currently allow PSE to run low-income weatherization programs that have a benefit-cost ratio as low as 0.6 when there are significant non-energy impacts (NEIs) that cannot be quantified.

As the name suggests, the UC only considers utility costs and utility benefits for the construction of the benefit-cost ratio. The basic costs and benefits included in the calculation of the test are listed below:

Costs:

1. Program overhead cost
    a. Marketing[1]
    b. Outside services[2]
    c. Internal labor & overhead[3]
    d. Miscellaneous expenses related to program activities[4]
2. Incentives provided to customers who purchase an energy efficient measure
3. Other program-specific costs[5]

Benefits:

1. Avoided cost of energy
    a. Market cost of energy
    b. Line losses
    c. Social Cost of Greenhouse Gases
    d. Renewable/zero-carbon generation to comply with state policy
2. Avoided costs of capacity
    a. Deferred transmission and distribution (T&D) expense
    b. Total annual fixed cost of generating capacity

B. The Total Resource Cost Test

The Total Resource Cost Test (TRC) views demand side resource acquisition from a total cost perspective. The test determines the benefit of the demand side resource given the total cost to all parties involved, not simply the acquisition cost to the utility. PSE is required to run the TRC for both natural gas and electric programs.

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[1] Marketing costs include all costs of advertising, bill inserts, campaigns, radio advertisements, etc. related to the program.

[2] Many of PSE programs are run, in part, by outside vendors. Outside services costs include all costs to contractors and vendors, who are not PSE employees, which are incurred by the energy efficiency program.

[3] Internal labor and overhead include all PSE employee expenses and PSE incurred overhead costs.

[4] Miscellaneous expenses include any incurred costs for event prizes, car rentals, PSE employee hotel rooms, etc. that are incurred as a result of operating the program.

[5] The costs listed above are standard for all program UC calculations with the exception of cost element three, "other program-specific costs." Some programs have additional costs associated with them, such as the additional cost of natural gas on an electric to natural gas fuel conversion program. These costs need to be included in the costs for the UC calculation.

As with the UC, a TRC benefit-cost ratio of one or greater is essential for programs to be considered for inclusion in a demand side resource portfolio. However, like the UC, there are also exceptions to this rule. State regulations allow PSE to run low-income weatherization programs that have a benefit cost-ratio as low as 0.6 when there are significant non-energy benefits that cannot be quantified.

The TRC considers all costs, including those incurred by the utility, by the customer, and by others who may have contributed. The costs and benefits included in the calculation of the TRC Test are listed below:

Costs:

1. Program overhead cost
    a. Marketing
    b. Outside services
    c. Internal labor & overhead
    d. Miscellaneous expenses related to program activities
2. Incentives provided to customers who purchase an energy efficient measure
3. Customer costs, either full or incremental, of acquiring the efficient equipment or services, net of any incentives provided by the utility
4. Other program-specific costs

Benefits:

1. Avoided cost of energy
    a. Market cost of energy
    b. Line losses
    c. Social Cost of Greenhouse Gases
    c. Renewable/zero-carbon generation to comply with state policy
2. Avoided costs of capacity
    a. Deferred T&D expense
    b. Total annual fixed cost of generating capacity
3. Conservation credit[6]
4. NEIs[7]

For the majority of programs, the benefit-cost ratio calculated through the TRC is smaller than the ratio developed through the UC. This is because of the addition of customer costs, which

[6] The conservation credit is a 10 percent adder provided by the Northwest Power Act to advantage energy conservation over generation resources.

[7] Non-energy impacts (NEIs) include savings on non-energy-related items. These include items like cost savings on water for low-flow showerheads.

typically are far greater than (and thus outweigh) the addition of the conservation credit to the benefits in the TRC.

The benefit-cost ratio in the TRC may be higher than the ratio developed in the UC for programs with little to no customer cost. In these cases, the conservation credit, which is added to the benefits in the TRC, outweighs the small contribution of customer costs.

In theory, programs where NEIs are significant and quantifiable, the benefit-cost ratio of the TRC can be far greater than the ratio developed though the UC. However, non-energy-related benefits can be difficult to quantify and include in the calculation of the TRC.

PSE recognizes that because NEIs are often difficult to estimate, cost-effectiveness calculations typically bias toward a conservative estimate of benefits, thereby undervaluing efficiency by excluding real benefits to customers. This is not usually the case in the Low Income Weatherization program, where the value of health and safety improvements is included as a non-energy benefit. In the 2020-2021 biennium, PSE invested time and resources into an investigation of NEIs used by other North American utility jurisdictions and adopting them for use in PSE measures. This effort resulted in additional NEIs in measures used for the 2022-2023 biennium, and ongoing research and analysis will add even more quantified NEIs.

III. Key Drivers of Cost-Effectiveness Calculations

A. Framework for Cost-Effectiveness Calculations

Cost-effectiveness calculations have several key drivers, which include:

1. the avoided cost of energy,
2. the avoided costs of capacity,
3. program overhead costs,
4. customer costs,
5. program incentives,
6. NEIs,
7. measure life,
8. the load shape used in the calculation of avoided costs, and
9. the discount rate used for calculating the present value of benefits and costs.

Each of the major drivers to the outcome of the cost-effectiveness calculations are discussed below.

B. Avoided Cost of Energy & Capacity

Avoided costs are those costs the utility does not incur when purchasing a demand side resource instead of a supply resource. Avoided costs of energy and capacity are the main driver of the benefits that are included in PSE's cost-effectiveness calculations for energy efficiency programs.

Higher avoided costs of energy and capacity make energy efficiency programs more attractive to PSE and more cost-effective for the utility, all other things being equal.

Because avoided costs are developed for individual end-use[8] types, each end-use is impacted differently by changes in energy costs.[9] In addition, changes in the avoided cost of capacity impact the cost-effectiveness of energy programs differently. Because PSE is a winter peaking utility, programs that save energy from heating-related efficiency upgrades are impacted significantly by changes in the avoided cost of capacity because they have a higher coincident savings (savings on peak) than programs that save energy in the summer.[10] Changes in the avoided cost of capacity have relatively little impact on energy efficiency programs that provide low savings in the peak hours.

Avoided energy costs also include the Social Cost of Greenhouse Gases, a measure of the cost per metric ton of carbon dioxide equivalent emissions associated with energy production. This lifetime cost is included in resource planning and cost-effectiveness calculations in compliance with RCW 19.280.030. In addition, avoided energy costs include the estimated cost of procuring renewable and low- or zero-carbon energy that will be necessary comply with Washington State's greenhouse gas reduction targets, RCW 70A.45.020.

Avoided costs of capacity are a function of the cost of building capacity resources for peak load and the load shape of the measure being assessed in the avoided cost calculation. PSE's peak load typically occurs during the weekday mornings or evenings during the month of December. For equipment where loads coincide with peak hours, capacity costs are included in the avoided costs.

Space heating measures have a higher coincidence with peak than non-heating-related measures, such as lighting. Therefore, the avoided costs of capacity have a much greater impact on space heat measures than they do on measures that are used at a fairly constant rate throughout the year. This is because a larger portion of the savings for space heat measures coincides with times where PSE is paying for peak resources.

[8] An end-use type is a category into which energy efficiency items are placed, such as water heating, space heating, or lighting.

[9] If, for example, winter prices of energy increase but summer prices remain the same, the avoided costs of space heat measures increase more dramatically than the avoided energy costs of water heating measures, and there would be no impact on residential air co nditioning avoided energy costs.

[10] For energy efficiency planning purposes, peak hours are considered to be the 5 hours in the morning and 5 hours in the evening when load is highest, every weekday in December.

C. Program Overhead Costs

Program overhead costs consist of all costs incurred to run an efficiency program, except those that are incentive-related. Program overhead costs consist of marketing costs, expenses incurred for outside services, internal labor and labor overhead costs, and miscellaneous expenses[11] related to other costs of program activity.

Program overhead costs have a direct impact on the cost-effectiveness of the related energy efficiency programs. All else being equal, an increase in program overhead costs decreases the cost-effectiveness of efficiency programs.

D. Measure Costs

Like program overhead costs, measure costs have a direct impact on the outcome of the cost-effectiveness calculations. To the extent that total measure costs influence the incentive provided by the utility, thus impacting the utility cost, the measure cost impacts all of the tests discussed in this document. All other things being equal, an increase in the cost of a measure can decrease the benefit-cost ratio in the cost-effectiveness tests.

1. Incremental Cost or Full Measure Cost

For the calculation of benefit-cost ratios, PSE defines measure cost as either the full measure cost or the incremental measure cost, depending on the item being offered though the energy efficiency programs and the delivery mechanism where the rebate occurs.

The majority of participants in PSE efficiency programs receive monetary incentives when they are replacing old, worn out equipment such as a furnace, water heater, or light bulbs. For these programs, PSE uses the incremental measure cost when calculating the benefit-cost ratios. The incremental measure cost is defined as the cost difference between equipment installed or incentivized though the PSE program and the cost of the equipment the customer would have installed without program intervention; e.g., the added cost of a more expensive high-efficiency furnace versus a lower-cost, standard-efficiency furnace that complies with the code minimum. Therefore, it's not prudent to include the entire cost of the efficient equipment in the cost-effectiveness test.

For programs where customers receive monetary incentives to make changes to existing items that are not yet at the end of their useful life, PSE utilizes the full measure cost when calculating

[11] Miscellaneous expenses refer to non-typical program expenses such as travel, gift cards for program participants, etc.

the benefit-cost ratios. Examples of measures for where the full measure costs are used include insulation, windows, and some early replacement programs.[12]

E. Incentives

The incentive amount provided by the utility has no impact on the TRC because this test uses the full or incremental measure cost, both of which include the incentive and customer cost when calculating the benefit-cost ratio. A change in the incentive changes the cost to the customer, but the total or incremental measure cost remains the same. From the TRC perspective, the incentive is just a transfer from the utility to the customer, with no impact on the overall cost.

However, the incentive provided by the utility has a direct impact on the outcome of the UC. When incentives are increased, all else remaining equal, the benefit-cost ratio of the UC decreases, since this increases the cost to the utility and/or ratepayers with no change in the level of benefits.

F. Customer Cost

Customer costs are those costs that the customer pays for the item being installed. For programs that use a full measure cost, the customer cost is the full measure cost minus the incentive provided to the customer. For programs that use the incremental measure cost, the customer cost is the incremental cost minus the incentive provided to the customer. There are a small number of programs that offer incentives greater than the incremental measure cost, where the incremental measure cost is used on the cost-effectiveness analyses. For these programs, customer costs are set to zero.

Assuming a constant incentive amount, the customer cost associated with a measure offered though PSE efficiency programs does not have an impact on the UC because customer costs are excluded from the test. In addition, the customer cost doesn't directly impact the TRC because that test uses either the full measure cost or the incremental cost, both of which include the customer cost, when calculating the benefit-cost ratio.

Customer costs indirectly impact the TRC in that they are a component of the total or incremental cost of the item being offered though the efficiency programs. For a given level of incentives, an increase in customer cost is a reflection of an increase in total or incremental measure cost. The increase in total or incremental measure cost decreases the benefit-cost ratios of the TRC.

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[12] In 2011, PSE launched an early refrigerator replacement program. This program removes older, working refrigerators from customer homes and replaces them with new, efficient refrigerators. Because the customer was not going to purchase a refrigerator without the help of this program, incremental measure costs is non-existent. Therefore, full measure cost is considered for cost-effectiveness analyses of this program.

G. Non-Energy Impacts

Non-energy impacts (NEIs or "non-energy benefits") are defined as the impacts (usually positive) from energy efficiency programs that are not directly attributed to energy savings. Examples of these benefits are: water and other resource savings, improved health and safety, fewer shutoff notices for the utility and improved quality of life or product quality. NEIs are only included in the TRC, but PSE typically only quantifies these for when there is documentation. NEIs can be positive or negative and are always included in the numerator of the test, regardless of the sign. Changes in NEIs are positively correlated with the benefit-cost ratio of the TRC Test, all else being equal.

NEIs have been a focus of PSE's research since the Washington State Utility and Transportation Commission proposed a set of conditions in accepting PSE's 2020-2021 Biennial Conservation Plan (Docket 19095; Attachment A). These conditions committed PSE to "demonstrate progress towards identifying, researching, and developing a plan to properly value nonenergy impacts that have not previously been quantified" and "[t]o the extent practicable … begin to identify the distribution of energy and nonenergy benefits in annual plans and reports." Progress in 2023 toward these conditions is described in Section V: *Non-Energy Impacts*.

H. Measure Life

The measure life is the rated useful life of the item(s) being incentivized though the program. Measure life is typically assessed using Regional Technical Forum (RTF)[13] guidance or from PSE engineers and program managers who have a significant level of knowledge regarding the item being assessed.

Measure life and the associated benefit-cost ratios are positively correlated for all four of the cost-effectiveness tests conducted by PSE, all else being equal.

I. End-Use Load Shape

The shape of the load for each measure being assessed in the cost-effectiveness calculations impacts the TRC and UC Tests. Because PSE generally does not offer time-of-use rates, the shape of the load for each measure being assessed does not impact the Participant Cost Test.

PSE calculates avoided costs using multiple inputs. The avoided costs are higher for those items that have a significant portion of their load occurring in the winter. Because winter savings typically coincide with the system peak, which increases the avoided capacity cost, items that save energy in the winter are assigned a higher value for avoided capacity costs.

[13] The Regional Technical Forum (RTF) is an advisory committee which was developed in 1999 to develop standards for the evaluation of conservation savings.

J. Discount Rate

For the 2023 program year, the discount rate for PSE efficiency program avoided costs was set at 6.8 percent. This discount rate was the approved rate of return on rate base ("ROR") by PSE's state regulators and was used in the development of the 2021 Integrated Resource Plan (IRP). As utility discount rates increase, the present value of avoided costs decreases. All else being equal, an increase in the discount rate decreases the benefit-cost ratios of PSE's cost effectiveness tests.

K. Summary of Key Cost Effectiveness Drivers

Key Driver	Direction of Key Driver	Direction of Benefit-Cost Ratios	
		TRC	UC
Avoided Energy and Capacity Costs	↓	↓	↓
	↑	↑	↑
Program Overhead Costs for the utility	↓	↑	↑
	↑	↓	↓
Measure Cost	↓	↑	N/A[14]
	↑	↓	N/A
Incentive	↓	N/A	↑
	↑	N/A	↓
Non Energy Benefits	↓	↓	N/A
	↑	↑	N/A
Measure Life	↓	↓	↓
	↑	↑	↑
Discount Rate	↓	↓	↓

[14] The Utility Cost and Ratepayer Impact Measure tests are not impacted.

	⬆	⬆	⬆

IV. Constructing Benefit-Cost Ratios

A. Using Benefit-Cost Ratios for Program Planning

Benefit-cost ratios (aka "cost-benefit ratios") provide useful information to PSE implementation teams. Programs with high benefit-cost ratios, and low free-ridership rates, are of primary interest for expansion should PSE need to acquire more demand side resources.

Before benefit-cost ratios can be used for program planning, the inputs into the ratios need to be accounted for correctly. This section provides clarification on what to include as NEIs, how to correctly account for additional operations and maintenance (O&M) costs (or cost savings) incurred by the customer, and how to select discount rates for O&M costs (or cost savings) incurred by the customer.

B. Accounting for Non-Energy Impacts

When including NEIs in the benefit-cost ratios, always include the benefit in the numerator of the benefit-cost ratio. These benefits are not included in the UC. All NEIs that are quantifiable are included in the TRC. NEIs that cannot be supported with adequate documentation are not included in the TRC. Moreover, NEIs that are included in the TRC are accompanied with supporting documentation and calculations.

C. Incorporating Additional Customer Costs

Additional customer incurred costs, which are not included in the cost of the measure being purchased through the efficiency program, can be negative (cost savings) or positive. If the cost is negative (cost savings), the absolute value of the cost savings is included in the numerator (non-energy benefit) of the benefit-cost ratio. The cost is included in the denominator of the benefit-cost ratio whenever the cost is positive (representing an additional cost).

The UC ignores customer costs, which would exclude the additional cost of natural gas if counted as a customer cost. Therefore, the additional cost of natural gas is counted as a utility cost in the UC and placed in the denominator of the benefit-cost ratio. Similarly, because the TRC is a function of the UC, with added customer costs and NEIs, the additional cost of natural gas for fuel conversion programs is also included as a utility cost and placed in the denominator of the benefit-cost ratio.

D. Applying the Correct Discount Rate

The rate used to discount costs or benefits for energy efficiency programs can impact the outcome of the benefit-cost ratios of PSE's cost-effectiveness tests.

When discounting additional costs, nominal discount rates are used. For additional costs (or savings) faced by the utility, program teams used PSE's rate of return (ROR) approved in its General Rate Case (GRC) as the nominal discount rate.

E. Summary of Benefits and Costs to Include in Each Test

TEST	Benefits (Numerator)	Costs (Denominator)
Perspective of Puget Sound Energy		
Utility Cost Test	1. Avoided Energy	1. Program Overhead Costs
	2. Avoided Capacity Costs	2. Incentives
Perspective of All PSE Customers		
Total Resource Cost Test	1. Avoided Energy	1. Program Overhead Costs
	2. Avoided Capacity Costs	2. Incentives
	3. Non-energy Impacts	3. Customer Costs (incremental or full measure cost-incentive)
	4. Additional Cost Savings From Non-program Related Items	

V. 2023 Cost Effectiveness Results

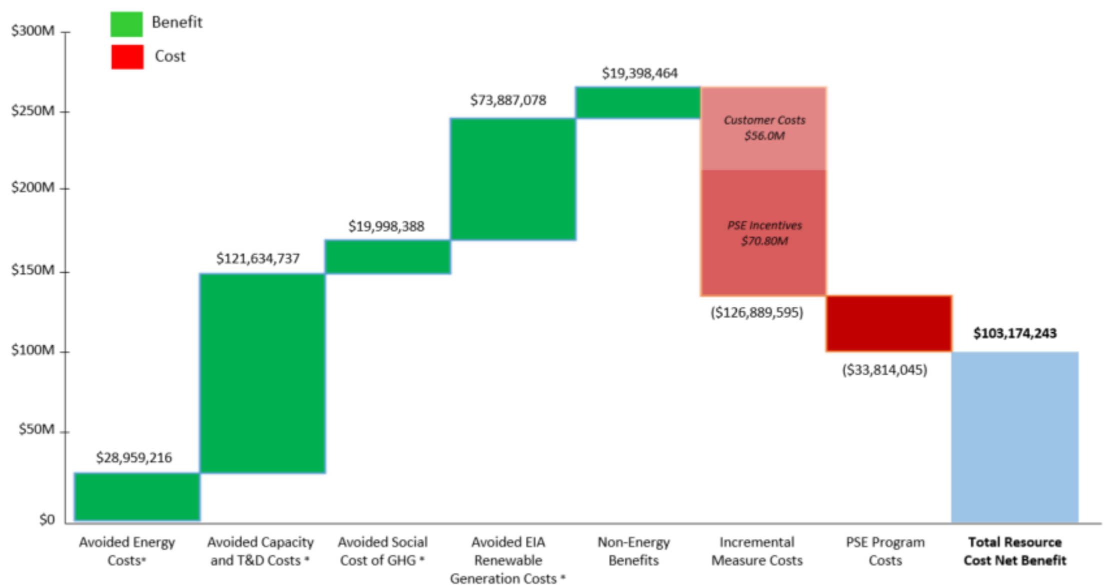
A. Utility Cost Test and Total Resource Cost Test Results

As shown in the summary page of Exhibit 2: *Cost-Effectiveness Results*, PSE's electric portfolios achieved a **2.25** UC score and a **1.83** TRC test score, and the natural gas portfolio achieved a **1.42** UC and **1.77** TRC. Both portfolios score well above 1.0 and are cost-effective. The lower UC score for the natural gas portfolio reflects the fact that PSE must spend more in program administration and incentive costs to achieve natural gas savings than electric savings. Both portfolios' scores were bolstered by increased use of NEIs in the calculations, discussed in Section VI below.

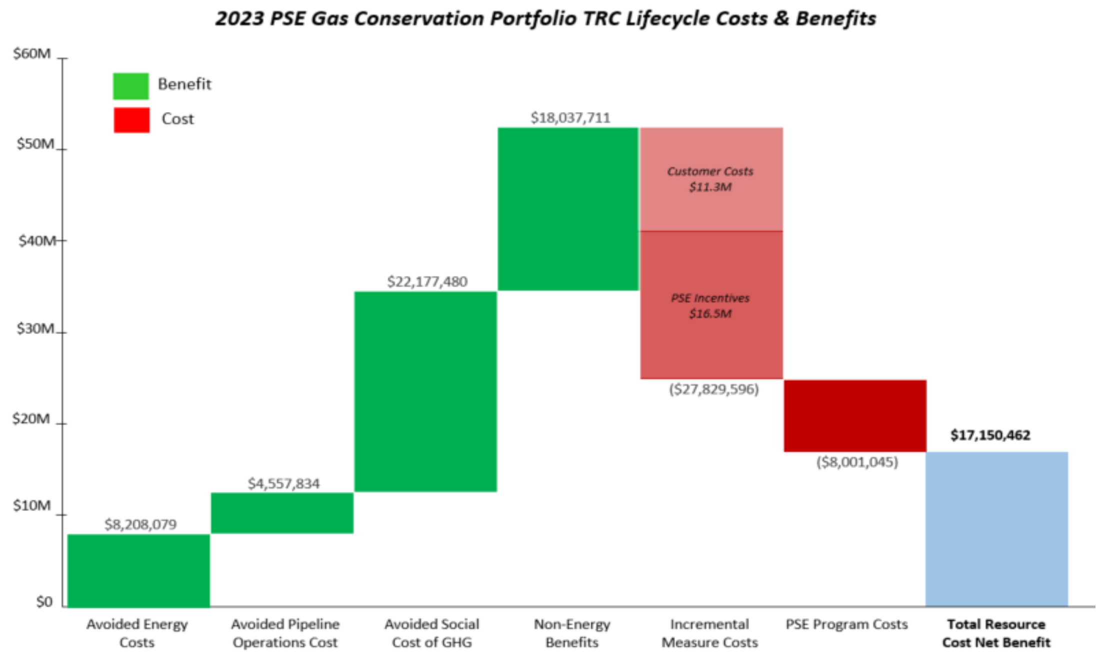
Another way to visualize the cost-effectiveness of the portfolios is through the use of a "waterfall chart." A waterfall chart shows the individual costs and benefits in the cost-effectiveness equation and provides a number for the "net benefits" of the programs, taking into account all lifetime benefits and subtracting out costs. The three charts that follow show the costs and benefits as a cascade, with benefits arising out of the x-axis (which is set to $0), and costs falling back toward the x-axis. The charts represent the costs and benefits calculated in the TRC test. For additional clarity, the measure costs shown are broken out into the share of those costs covered by PSE incentives and the share assumed by the customer. The benefit and cost components are explained in earlier sections of this report.

The following waterfall charts shows the costs and benefits of PSE's 2023 Electric and Natural Gas conservation portfolios, respectively:

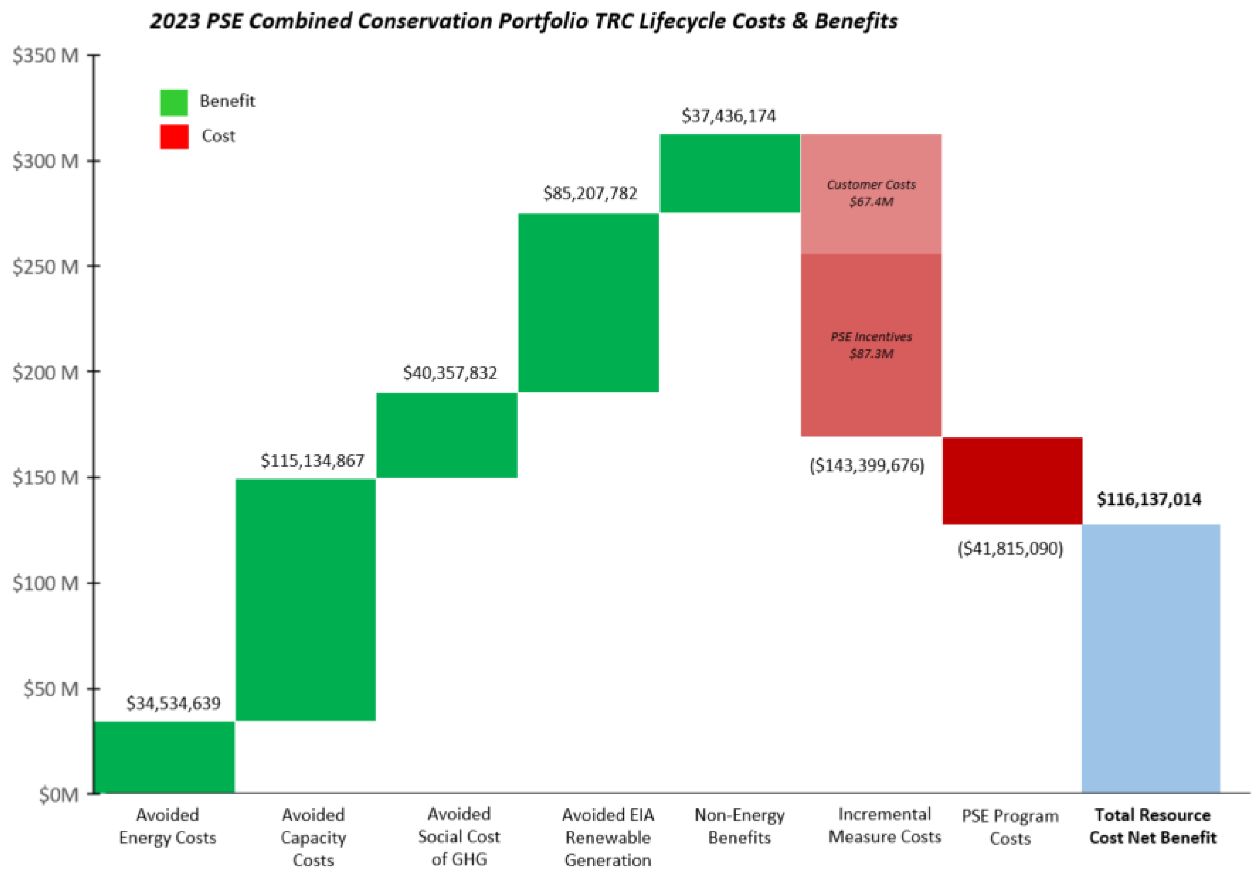
2023 PSE Electric Conservation Portfolio TRC Lifecycle Costs & Benefits



**The Northwest Power Act assigns a 10% cost advantage to conservation when compared to other resources. This 10% adder has been applied to all energy benefits.*



Finally, the following chart shows the total portfolio cost and benefits, calculated by adding the monetized benefits from both the natural gas and electric portfolios:



VI. Non-Energy Impacts

A. Requirements

In accepting PSE' 2022-2023 Biennial Conservation Plan, the Washington State Utility and Transportation Commission proposed a set of conditions (Docket 210822). These conditions included the following:

> **"10) Equitable Distribution of Nonenergy Benefits**
>
> a) During this biennium, PSE must continue to demonstrate progress towards identifying, researching, and properly valuing nonenergy impacts. The nonenergy impacts considered must include the costs and risks of long-term and short-term public health benefits, environmental benefits, energy security, and other applicable nonenergy impacts. In consultation with the Company's conservation, equity, and resource planning advisory groups, nonenergy impacts and risks must be included in the next Biennial Conservation Plan and Conservation Potential Assessment.

b) Puget Sound Energy must identify the discrete nonenergy impacts and the monetized value used in cost-effectiveness testing for each electric conservation program. This must be provided in a detailed format with a summary page and subsequent supporting spreadsheets, in native format with formulas intact, providing further detail for each program and line item shown in the summary sheet in annual plans and reports.

c) Puget Sound Energy must begin to identify the forecasted distribution of energy and nonenergy benefits in annual plans and reports. This reporting must use currently quantified nonenergy impacts as well as values and estimates of additional impacts as they become available."

In addition, the conditions further directed PSE to "explore the feasibility of determining and incorporating of the avoided emissions associated with replacing refrigerants exceeding 750 GWP in its cost-effectiveness calculations and discuss the results with its Advisory Group as necessary." This section details the progress and results of those efforts.

B. Progress in 2023

In 2023, PSE explored the feasibility of creating a NEI based on the value of low-Global Warming Potential (GWP) refrigerants. PSE's evaluation contractor, DNV, had developed a GWP calculator in partnership with the American Council for an Energy Efficiency Economy (ACEEE) and the California Public Utility Commission, so PSE had good resources at its disposal. After conducting its research, PSE ultimately decided that developing an NEI and incorporating it into its conservation programs would not likely yield results commensurate with the effort. PSE reached this conclusion based on the following factors:

a) Washington State has adopted a law (RCW 70A.60.020) that sets a maximum threshold for GWP of 750 for refrigerants used in air conditioning and refrigeration equipment. The implementation of this law occurs in a short timeframe, beginning in 2025. It's expected that refrigerants above that threshold will phase out quickly, which means that the NEI benefit that PSE programs may receive would be short-lived.

b) Calculating the benefit would likely be practical only in custom measures, typically commercial, where PSE engineers have insight into the volume and type of refrigerants involved. This means that the NEI benefits to our programs' cost-effectiveness may not meaningfully scale.

c) Accurately accounting for the GWP benefits of refrigeration change-outs depends on knowing the old refrigerants are removed and disposed of properly, which requires additional verification steps further down the supply chain than is necessary for verification of energy savings. It isn't impossible to do this of course, but PSE's assessment is that this additional work may not merit the potential NEI benefits to cost-effectiveness calculations.

PSE supports the adoption of low-GWP standards for refrigerants and would welcome further discussions on this topic. PSE will continue to monitor progress with regional organizations such as the RTF, and should measures or standards be adopted that make the implementation of a low-GWP calculator feasible for programs, PSE will reassess.

Additional researching and valuation of NEIs conducted during 2023 focused primarily on the development of NEIs for new measures, with a couple of exceptions. The Commercial Foodservice Program added NEIs to account for the value of avoided cooking oil waste, drawn from a study conducted in California. For the rest of PSE's programs, new measures added to the program portfolio were assessed for inclusion based on the matching criteria developed in the 2021 study conducted by DNV. PSE is pleased to report that as a result, the lifecycle monetized value of NEIs doubled in the last year, from $18.6 million in 2022 to $37.4 million in 2023.

C. 2023 Reporting

Following the reporting provided in PSE's 2022 Annual Conservation Report, this section provides an overview of the NEIs reported in PSE's cost-effectiveness test in 2023. The summaries below provide an overview to the data reported in the 2023 Exhibit 2 Cost-Effectiveness Test.

The table below shows electric and natural gas savings reported in 2023, along with the total net present value of NEIs included in the cost-effectiveness tests. The table demonstrates that the use of NEIs increased dramatically in 2023, doubling the total value reported in 2022. The increase comes despite the fact that electric and natural gas savings slightly declined from 2022 to 2023. Given that the NEIs are based on per-unit savings, this represents an even greater increase in incorporating and valuing NEIs in our programs.

Comparison of Reported Savings and NEIs, 2022 and 2023

2022		2023	
Electric Savings	242,997,108 kWh	Electric Savings	233,267,335 kWh
Natural Gas Savings	4,670,005 therms	Natural Gas Savings	4,555,198 therms
Total Present Value of NEIs.	$18,580,227	Total Present Value of NEIs.	$37,436,174

The breakdown of NEIs across programs is shown in the table below. Note that in order to prevent double-counting, in cases where dual-fuel homes with both electric and natural gas energy efficiency measures, NEIs might be distributed to one fuel over another. For example, in the table below the NEI benefits of the Low-Income Weatherization program are reported primarily to the electric side, which partially accounts for the lower number on the natural gas side.

2023 Non-Energy Benefits Reported Across PSE Programs

Electric				Gas			
Program Name	**Present Value of Non-Energy Benefits**		**% of Total Electric NEIs**	**Program Name**	**Present Value of Non-Energy Benefits**		**% of Total Gas NEIs**
Low Income Weatherization	$	2,518,413	13.0%	Low Income Weatherization	$	447,048	2.5%
Residential Lighting	$	325,345	1.7%	Single Family Existing Space Heat	$	2,041,204	11.3%
Single Family Existing Space Heat	$	1,636,651	8.4%	Single Family Existing Water Heat	$	213,695	1.2%
Single Family Existing Water Heat	$	16,123	0.1%	Smart Thermostats	$	347,570	1.9%
Home Appliances	$	844,927	4.4%	Single Family Existing Weatherization	$	1,413,602	7.8%
Smart Thermostats	$	362,398	1.9%	Single Family New Construction	$	3,196	0.0%
Single Family Existing Weatherization	$	166,905	0.9%	Multi-Family Retrofit	$	161,450	0.9%
Residential Midstream HVAC & Water Heat	$	9	0.0%	Commercial Foodservice	$	13,398,519	74.3%
Manufactured Home New Construction	$	88,468	0.5%	Commercial Midstream HVAC and Water Heat	$	1,747	0.0%
Multi-Family Retrofit	$	912,440	4.7%	Small Business Direct Install	$	9,679	0.1%
Business Lighting Grants	$	103,506	0.5%	**Total**		**18,037,711**	
Lighting to Go	$	7,209,343	37.2%				
Commercial Foodservice	$	771,475	4.0%				
Commercial Midstream HVAC and Water Heat	$	5	0.0%				
Small Business Direct Install	$	4,442,457	22.9%				
Total	***$***	***19,398,464***					

D. Identifying the Distribution of Impacts

PSE is working to identify disparities in current programs and in its efforts to serve customers with clean energy resources. PSE is reviewing its programs to determine the rates of burdens and benefits between the PSE customer base and Named Communities, and it is researching best practices to address these discrepancies. Condition 10 quoted above requires PSE to begin to "identify the distribution of energy and nonenergy benefits in annual plans and reports."

In a change from last year, PSE has now incorporated the distribution of impacts across Named Communities and Vulnerable Populations (VPs) in the main body of the Annual Report of Energy Conservation Achievements. For a discussion on the impacts of energy and non-energy benefits, please refer to Section *B. Equity Focus* in the Executive Summary of the 2023 Annual Report of Energy Conservation Achievements.