PUGET SOUND ENERGY

Exhibit 2, Supplement 2

2021 Annual Report

Non-Energy Impact Developments

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I. Introduction

A. Background

In accepting Puget Sound Energy's (PSE) 2020-2021 Biennial Conservation Plan, the Washington State Utility and Transportation Commission proposed a set of conditions (Docket 190905; Attachment A). These conditions included the following (Section 10):

> **"10) Equitable Distribution of Nonenergy Benefits**
>
> a) During this biennium, Puget Sound Energy must demonstrate progress towards identifying, researching, and developing a plan to properly value nonenergy impacts that have not previously been quantified. 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. These impacts and risks must be included in the 2022-2023 Biennial Conservation Plan.
>
> 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) To the extent practicable, Puget Sound Energy must begin to identify the 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."

This Supplement to Exhibit 2 of PSE's 2021 Annual Conservation Report is intended to report on PSE's progress toward fulfilling these conditions.

II. Progress Toward Valuing Non-Energy Impacts

A. Non-energy impacts

Non-energy impacts (NEIs; often called "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. Non-energy impacts are only included in the Total Resource Cost test (TRC), but PSE typically only quantifies these for when there is documentation. Non-energy impacts can be positive or negative and are always included in the numerator of the test, regardless of the sign. Changes in non-energy impacts are positively correlated with the benefit-cost ratio of the TRC Test, all else being equal.

In prior years, PSE quantified NEIs in a conservative manner. Our NEIs primarily consisted of sewer and water savings, which are relatively easy to measure and calculate, NEIs developed by the Regional Technical Forum, or NEIs developed through primary research. While this conservative approach guarded against overestimation, it also risks omitting real and tangible value that customers enjoy from energy efficiency, thereby undervaluing energy efficiency and producing a TRC that presents something less than the true value of our programs.

The Conditions quoted above provided PSE with the guidance needed to expand the range of NEIs it incorporates into its cost-effectiveness calculations. But conducting primary research on NEIs, particularly those that attempt to quantify non-monetary benefits like comfort and environmental risk, can be notoriously difficult and expensive.

B. Incorporating NEIs from other Jurisdictions

In 2020, PSE learned that its evaluation contractor, DNV, had developed a methodology whereby NEIs researched in one utility jurisdiction could be transferred to another. Based on the guidance published by the Lawrence Berkeley National Laboratory (LBNL)[1], DNV's methodology included a database of NEIs produced by several North American utility districts, a standard measure taxonomy that allows for "matching" the NEIs from one jurisdiction to another, and a method of adjusting NEI values based on the fit of the original research as well as the economic conditions from one jurisdiction to the next.

PSE viewed DNV's methodology as a potentially cost-effective way to produce new NEIs without the time and cost of primary research. PSE contacted Avista and Pacificorp, two of Washington's other investor-owned utilities, and formed a working group to reviewed the DNV methodology, share experiences from the project, and ensure outputs from the project were defensible and cost-effective. Using the DNV database and methodology saved considerable time and effort that would have been required to research and verify these NEIs independently. Further discussion of the NEI project origins can be found in PSE's 2020 Annual Conservation Report, Exhibit 2, Supplement 1, and a summary of the DNV's methodology was provided in PSE's 2022-2023 Biennial Conservation Plan, Exhibit 2, Supplement 2.

C. NEI Project Outcomes

After several iterations of review and comment, in August 2021 PSE received NEI values for 860 different measures. These NEIs were provided on a $ per kWh or therm basis, allowing PSE to incorporate NEIs using existing unit energy savings (UES) values, and enabling PSE to update the NEIs as UES values change.

[1] https://eta-publications.lbl.gov/sites/default/files/nei_report_20200414_final.pdf

The NEIs provided by DNV's methodology include impacts across categories not previously considered viable through PSE's traditionally conservative approach, including:

- Administrative overhead cost for commercial customers.
- Improved ease of selling or leasing properties based on improved performance or desirability.
- Benefits from avoided product spoilage or defects due to malfunctioning equipment.
- Increased thermal comfort due to reduced drafts and variable temperatures in living spaces.
- Avoided waste and landfill costs.
- Reported values of reduced exterior noise heard inside living areas.
- Avoided cost of fire risk based on insurance estimates.
- Reduced carrying costs to the utility from arrearages or bad debt write-offs.
- Avoided illnesses from PM2.5 air particulate matter.

The new set of NEIs capture a more thorough and likely more accurate economic benefit to customers who participate in energy efficiency programs. In addition, they improve the overall cost-effectiveness of energy efficiency measures. PSE's 2021 electric portfolio Total Resource Cost test score is 1.64 and the gas portfolio score is 1.50. Without the NEIs as part of the benefit-cost test (see Section III for discussion on use of new NEIs in 2021), the scores would have been 1.61 and 1.32, respectively.

An example that demonstrates how the value of PSE's measures will change by the inclusion of the NEIs is given below. In this example is a PSE measure for whole-building home incentive for an all-electric home built 20% above the Washington State energy code. In the past, the NEI assumed in this measure was $4.54 per home incentive, based on the conservative approach previously used.

PSE Measure	UES Value	Old NEI	New NEI
SFNC: Built Green - 4 Star or Eqv - 20pc above WSEC - ESH - EWH - EO	2883 kWh	$4.54	**0.00296 per kWh** ($73.79 per measure)

NEI Category	Value (per kWh)
Avoided pollution	$0.00002242
Ease of selling or leasing	$0.00059986
Fire/Insurance loss mitigation	$0.00195235
Participant O&M	$0.00038314
Total	**0.0029577**

In this example, the DNV NEI project has estimated values from a number of different studies that price in impacts such as home value, fire and insurance loss mitigation, and home maintenance. These values are estimated to total $0.0029577 per kWh, or $73.79 per home, which is a value likely closer to the true impact of energy saving features of a new, efficient home.

III. Identifying the Monetized Impacts

In the 2021 Annual Report, NEIs are calculated and enumerated in Exhibit 2: Cost-Effectiveness. Note that because the NEIs came late in the year, most projects implemented in 2021 had not incorporated the new NEIs into their measure cases, which are documents that calculate and record the measure's savings. Some programs that use engineering calculations to estimate savings were able to include new values into projects later in the year, but this is not the case for the majority of projects. PSE measure cases are updated once a year, and the final set of DNV NEIs came too late for inclusion into the most recent measure cases, especially for those projects installed prior to the completion of the NEI project. For that reason, the full impact of the NEI project does not show up in the 2021 Annual Report, but will be noticeable in future reports.

Not all programs reported non-energy impacts in 2021. This is mostly due to the timing issue described above. Even given the timing, however, the amount of NEI value to customers increased in 2021. The table below demonstrates how, even though electric and gas savings decreased from 2020 to 2021, the monetized value of NEIs increased.

Comparison of Reported Savings and NEIs, 2020 and 2021

2020		2021	
Electric Savings	221,000,658 kWh	Electric Savings	168,743,359 kWh
Gas Savings	4,102,808 therms	Gas Savings	2,355,062 therms
Total Present Value of NEIs	$7,240,599	Total Present Value of NEIs	$7,437,663

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 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 gas side.

2021 Non-Energy Benefits Reported Across PSE Programs

Electric			Gas		
Program Name	Present Value of Non-Energy	% of Total Electric	Program Name	Present Value of Non-Energy	% of Total Gas
Low Income Weatherization	$ 383,978.17	12.6%	Low Income Weatherization	$ 1,276.80	0.0%
Single Family Existing Space Heat	$ 399,709.92	13.1%	Single Family Existing Water Heat	$ 195,502.33	4.5%
Home Appliances	$ 1,159,524.50	38.1%	Home Appliances	$ 1,047,044.71	23.8%
Residential Water Use Reducers	$ 92,553.65	3.0%	Residential Water Use Reducers	$ 92,553.65	2.1%
Single Family Existing Weatherization	$ 64,669.81	2.1%	Single Family Existing Weatherization	$ 122.47	0.0%
Single Family New Construction	$ 2,719.76	0.1%	Single Family New Construction	$ 906.00	0.0%
Manufactured Home New Construction	$ 7,256.61	0.2%	Multi-Family Retrofit	$ 11,452.96	0.3%
Multi-Family Retrofit	$ 137,627.20	4.5%	Commercial Kitchen & Laundry	$ 3,035,219.22	69.1%
Commercial Kitchen & Laundry	$ 794,480.05	26.1%	Small Business Direct Install	$ 7,466.02	0.2%
Small Business Direct Install	$ 3,599.41	0.1%			
Total	***$ 3,046,119.09***		***Total***	***$ 4,391,544.18***	

IV. Identifying the Distribution of Impacts

PSE is working to identify disparities in current PSE programs and in our efforts to serve customers with clean energy resources. We are reviewing our programs to determine the rates of burdens and benefits between the PSE customer base and named communities, and we are 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."

Chapter 3 of PSE's Clean Energy Implementation Plan, required under Washington's Clean Energy Transformation Act (CETA) and filed in December, provides a deeper look into how PSE is addressing the impacts of its service delivery[2]. Rather than duplicate work already done, this supplement will describe the steps PSE has taken to identify the distributional impacts of our energy saving programs and NEIs as required in Condition 10.

In 2021, PSE began an effort with stakeholder and advisory group collaboration to integrate data from several different resources to identify named communities. Named communities are defined by the CEIP as:

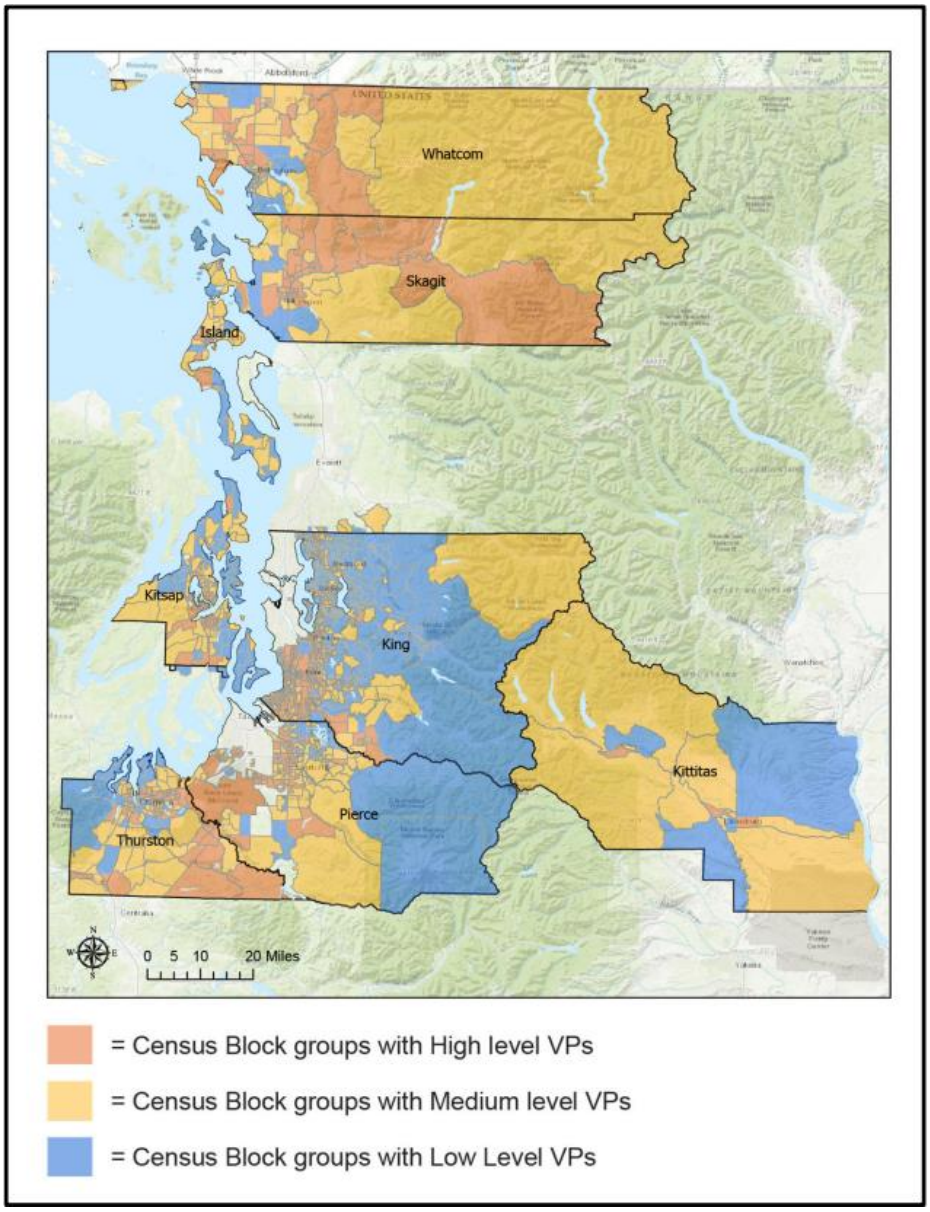
Highly Impacted Communities – A community designated by the Department of Health based on the cumulative impact analysis required by RCW 19.405.140 or a community located in census tracts that are fully or partially on "Indian country," and;

Vulnerable Populations - Communities that experience a disproportionate cumulative risk from environmental burdens due to: Adverse socioeconomic factors, including unemployment, high housing and transportation costs relative to income, access to food and health care, linguistic isolation, and sensitivity factors, such as low birth weight and higher rates of hospitalization.

PSE has analyzed its service territory using census tracts that define the population based on multiple factors defined in CETA. The map below presents a visualization of vulnerable populations by census block groups within PSE's Electric Service Area. The map illuminates the areas where high, medium, and low levels of vulnerability are experienced by customers within PSE's service area. This geographic representation gives PSE an indication of where we should focus efforts for outreach or program implementation.

[2] https://irp.cdn-website.com/dc0dca78/files/uploaded/2022_0201_Chapter3.pdf

Vulnerable Populations by Census Block Groups within PSE Electric Service Area



One of the efforts ongoing by PSE is mapping energy efficiency data onto the customer census tracts. This can be challenging, given that it requires every energy efficiency intervention to be mapped to an address. In upstream or instant rebate programs, PSE does not always collect customer data, trying to strike the balance between encouraging participation by making it easy and seamless while collecting sufficient data to verify savings. In some cases, multi-family efficiency measures may apply to common areas, and data collected may not easily distinguish between resident customers and building owner customers. These are issues PSE will continue to address in 2022, with the goal of being able to track all kWh and therm savings to specific areas.

The tables that follow demonstrate PSE's developing ability to report on the equitable distribution of energy and non-energy impacts. The first set of tables show the distribution of energy benefits across PSE's service territory in 2021, including incentive dollars allocated and savings achieved. Note that the totals below will not match the totals reported in the 2021 Annual Conservation Report, due to the data issues described above.

Distribution of Energy Benefits

Highly Impacted Communities

HIC	Service Type	Incentive Grants Allocated	Percent of Total Grants	Electric Savings (kWh)	Percent	Gas Savings (therms)	Percent	Number of unique customers served
No	Dual-Fuel	$ 11,373,300.20	25%	37,958,628.40	30%	399,846.46	23%	5,227
	Gas	$ 3,767,504.56	8%	-		1,021,572.12	59%	16,743
	Electric	$ 13,099,991.30	29%	37,008,606.19	30%	-		16,099
Yes	Dual-Fuel	$ 10,849,819.02	24%	35,692,759.22	28%	67,878.32	4%	1,495
	Gas	$ 1,068,873.74	2%	-		246,299.95	14%	3,931
	Electric	$ 5,128,438.23	11%	14,737,468.17	12%	-		5,161

Vulnerable Populations

VP	Service Type	Incentive Grants Allocated	Percent	Electric Savings (kWh)	Percent	Gas Savings (therms)	Percent	Number of unique customers served
high	Dual-Fuel	$ 10,400,989.28	23%	37,458,210.32	30%	135,541.83	8%	1,715
	Gas	$ 1,291,345.28	3%	-		302,184.65	17%	4,501
	Electric	$ 8,228,034.42	18%	21,500,217.43	17%	-		6,516
medium	Dual-Fuel	$ 5,743,175.14	13%	18,427,239.38	15%	225,733.27	13%	2,979
	Gas	$ 2,021,047.83	4%	-		554,277.38	32%	9,417
	Electric	$ 4,282,299.33	9%	13,771,203.96	11%	-		7,064
low	Dual-Fuel	$ 6,078,954.80	13%	17,765,937.91	14%	106,449.68	6%	2,048
	Gas	$ 1,523,985.19	3%	-		411,410.04	24%	6,776
	Electric	$ 5,718,095.78	13%	16,474,652.96	13%	-		7,716

The next table shows the distribution of NEIs in 2021. The limitations with including the new NEIs has already been discussed earlier in this report; therefore the table that follows can be considered a demonstration of our developing ability to identify these distributions. The table uses the NEIs that comprise PSE's Customer Benefit Indicators (CBIs) described in Chapter 3 of the CEIP, retroactively calculated onto measures implemented in 2021. The total present value of NEIs below will therefore not match the NEIs as reported in Exhibit 2: Cost Effectiveness Results.

Distribution of Non-Energy Benefits

Highly-Impacted Communities

HIC	NEI Value Units	Net Present Value of Non-Energy Benefits	Percent of total NEI value
No	$ / Therm	$ 371,988.30	21%
	$ / kWh	$ 942,587.24	54%
Yes	$ / Therm	$ 99,828.88	6%
	$ / kWh	$ 318,665.14	18%

Vulnerable Populations

VP	NEI Value Units	Net Present Value of Non-Energy Benefits	Percent of total NEI value
high	$ / Therm	$ 111,037.04	6%
	$ / kWh	$ 565,308.95	33%
medium	$ / Therm	$ 215,071.35	12%
	$ / kWh	$ 269,992.44	16%
low	$ / Therm	$ 145,708.78	8%
	$ / kWh	$ 425,950.99	25%

Based on the progress made in 2021, PSE has a high degree of confidence that its data integration efforts will enable it to provide accurate distributional analysis in the future. In upcoming reports and plans, tables such as these will align with our reported energy savings and non-energy benefits.