Exh. JBN-3
Docket UE-210795
Witness: Joel B. Nightingale

BEFORE THE WASHINGTON UTILITIES AND TRANSPORTATION COMMISSION

In the Matter of **PUGET SOUND ENERGY** **Clean Energy Implementation Plan Pursuant to WAC 480-100-640**	**DOCKET UE-210795**

EXHIBIT TO
TESTIMONY OF

JOEL B. NIGHTINGALE

STAFF OF
WASHINGTON UTILITIES AND
TRANSPORTATION COMMISSION

PSE Responses to UTC Staff Data Request Nos. 2, 4, 8, and 10

October 10, 2022

BEFORE THE WASHINGTON UTILITIES AND TRANSPORTATION COMMISSION

Docket UE-210795
Puget Sound Energy
PSE 2021 Clean Energy Implementation Plan

WUTC STAFF DATA Request No. 008:

Re: Interim Targets

a. In its comments filed on 3/2/22, the Alliance of Western Energy Consumers (AWEC) is generally critical of PSE's plan to increase interim targets during the 2022-25 timeframe faster than the Company's original linear glidepath discussed in PSE's 2021 IRP. AWEC infers PSE's proposed accelerated interim targets are likely not cost effective. However, the party suggests there may be "some economic value," if PSE were to "account for…[the] incremental avoided [cost of] carbon emissions" in "its resource portfolios." (*see* AWEC PSE CEIP Comments, pp. 3-4). Did PSE analyze what the incremental avoided cost of its carbon emissions would be if the Company meets its accelerated Final CEIP interim targets compared to the Company instead following the linear interim target glidepath, as laid out in PSE's 2021 IRP? If so, please provide this incremental avoided cost of carbon emissions analyses with a narrative explanation of the Company's results and/or conclusions.

b. If PSE did analyze the incremental avoided cost of its carbon emissions, please explain how this analyses is separate and distinct from the Company's incorporation of the social cost of greenhouse gas emissions (SCGHG) cost adder in selecting resources for its IRP preferred portfolio and, subsequently, CEIP portfolio, pursuant to RCW 19.280.030(3)(a).

c. If PSE did not analyze the incremental avoided cost of its carbon emissions, as discussed in subpart a. of this data request, why not? As part of this explanation, please explain how PSE can exclude such an analyses yet still maintain its CEIP portfolio meets Washington's clean energy transformation standards at the lowest reasonable cost, per WAC 480-100-610(5)?

Response:

a. Attached as Attachment A to Puget Sound Energy's ("PSE") Response to WUTC Staff Data Request No. 008, please find an incremental avoided costs analysis of the accelerated ramp rate. The results of the analysis show that over the Clean Energy Implementation Plan ("CEIP") period (2022-2025) accelerating the addition of renewable resources reduces emissions by about 1.4 million tons CO_{2eq} and can provide a cost benefit of about $64 million using current estimates for the cost of allowances under the Climate Commitment Act.

b. The Social Cost of Greenhouse Gases is applied as a fixed cost planning adder used in the long-term capacity expansion portion of PSE's planning process. The incremental avoided emission analysis discussed in PSE's Response to WUTC Staff Data Request No. 008(a) reflects approximate direct costs on greenhouse gas emissions using current estimates for the cost of allowances under the Climate Commitment Act.
c. Additional analysis was conducted as described in PSE's Response to WUTC Staff Data Request No. 008(a) and (b), above.

ATTACHMENT A to PSE's Response to WUTC Data Request No. 008

Emissions Cost Comparison
8/11/2022
Attachment A - 210795 PSE Resp DR 008

Climate Commitment Act Allowance Price Forecast is a composite forecast of:
2023 - 2029: Department of Ecology Linkage 2030 forecast (H8) from Preliminary Regulatory Analyses
2030 - 2045: California Energy Commission Integrated Energy Policy Report 2021, medium allowance price forecast

Preliminary Regulatory Analyses for Chapter173-446 WAC, Climate Commitment Act Program
2021 Integrated Energy Policy Report (ca.gov)

Emissions (million tons CO2eq)

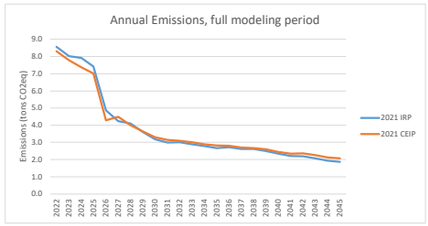
Year	2021 IRP	2021 CEIP
2022	8.6	8.3
2023	8.0	7.8
2024	7.9	7.4
2025	7.4	7.0
2026	4.9	4.3
2027	4.2	4.5
2028	4.1	4.0
2029	3.6	3.6
2030	3.2	3.3
2031	3.0	3.1
2032	3.0	3.1
2033	2.9	3.0
2034	2.8	2.9
2035	2.7	2.8
2036	2.7	2.8
2037	2.6	2.7
2038	2.6	2.7
2039	2.5	2.6
2040	2.3	2.5
2041	2.2	2.3
2042	2.2	2.4
2043	2.1	2.3
2044	1.9	2.1
2045	1.9	2.1

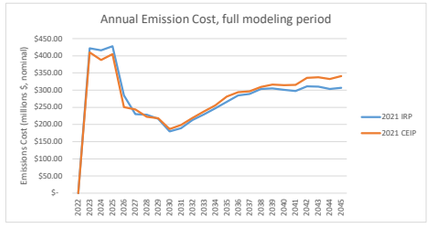
Emission cost forecast

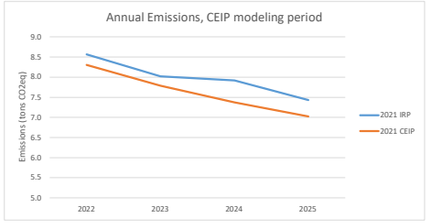
Year	Climate Commitment Act Allowance Price Forecast (nominal $/ton)
2022	$ -
2023	$ 52.62
2024	$ 52.54
2025	$ 57.60
2026	$ 58.45
2027	$ 54.31
2028	$ 55.49
2029	$ 60.00
2030	$ 56.29
2031	$ 63.09
2032	$ 70.71
2033	$ 79.26
2034	$ 88.83
2035	$ 99.56
2036	$ 104.72
2037	$ 110.15
2038	$ 115.86
2039	$ 121.87
2040	$ 128.19
2041	$ 134.84
2042	$ 141.83
2043	$ 149.18
2044	$ 156.92
2045	$ 165.06

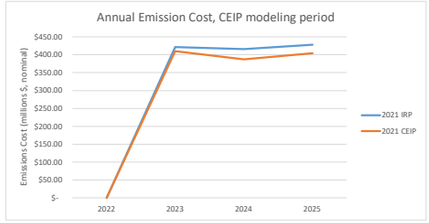
Emission Cost (million $, nominal)

Year	2021 IRP	2021 CEIP
2022	$ -	$ -
2023	$421.86	$409.68
2024	$416.03	$387.47
2025	$427.86	$404.43
2026	$284.43	$250.89
2027	$230.24	$243.90
2028	$227.80	$222.00
2029	$216.20	$218.45
2030	$179.36	$186.29
2031	$188.83	$198.33
2032	$213.04	$218.84
2033	$229.60	$237.58
2034	$247.03	$255.73
2035	$265.93	$281.62
2036	$284.29	$293.89
2037	$288.94	$296.72
2038	$303.65	$309.32
2039	$304.70	$315.97
2040	$300.53	$314.31
2041	$296.99	$315.19
2042	$311.41	$335.31
2043	$309.91	$337.52
2044	$303.06	$332.34
2045	$306.85	$340.53









Summary

Portfolio	Total Emissions, 2022-2045 (millions tons)	Total Emissions, 2022-2025 (milllions tons)	Total Emission Cost, 2022-2045 (millions $, nominal)	Total Emission Cost, 2022-2025 (millions $, nominal)
2021 IRP	89.3	31.9	$ 6,558.54	$ 1,265.74
2021 CEIP	89.5	30.5	$ 6,706.30	$ 1,201.58
Diff: IRP - CEIP	-0.2	1.4	$ (147.76)	$ 64.16

BEFORE THE WASHINGTON UTILITIES AND TRANSPORTATION COMMISSION

Docket UE-210795
Puget Sound Energy
PSE 2021 Clean Energy Implementation Plan

WUTC DATA Request No. 002:

DATA REQUESTS DIRECTED TO: Kara Durbin

REQUESTED BY: Jim Woodward

Re: Renewable Energy Target

a. How does PSE's renewable energy target (including Company's distributed energy resource, DER, sub-target) relate to the Company's interim target (PSE CEIP, p. 26)?

1. Starting with PSE's 2020 renewable energy with median water conditions (i.e., 7,639,163 MWh, *see* Table 2-1, PSE CEIP p. 15), Staff divides by 8,760 hours to yield 872 aMW. Staff assumes that PSE reaches 1,379 aMW of renewable energy in 2025 (*see* Table 2-6, PSE CEIP p. 24) by adding the Company's renewable energy target (i.e., 880 MW) of planned new renewables (utility-scale + DER nameplate capacity) by 2025 (*see* PSE CEIP p. 26) to PSE's 2020 position shown in Table 2-1. Is Staff's understanding, as described here, correct?

2. If Staff's understanding is correct, what is the average capacity factor PSE is applying to its renewable energy target (i.e., 880 MW) to appropriately move from its 2020 position to 1,379 aMW of renewable energy in 2025 (*see* Table 2-6, PSE CEIP, p. 24)?

3. If Staff's understanding is <u>not</u> correct, please provide a step-by-step explanation showing how PSE's renewable energy target (i.e., 880 MW) gets the Company from its 2020 position (Table 2-1, PSE CEIP, p. 15) to its 2025 interim target of 63% (Table 2-2, PSE CEIP, p. 17).

b. Company witness Durbin states, "approval of a CEIP would provide assurance that the <u>scope, scale and pace of</u> PSE's specific and interim targets are reasonable and that the Company should begin implementation of its plan."[1]

[1] *In the Matter of Puget Sound Energy's Clean Energy Implementation Plan Pursuant to WAC 480- 100-640*, Docket UE-210795, Kara K. Durbin Direct Testimony, at 38:21-39:1 (July 11, 2022) (Exh. KKD-1T). *Underlined for emphasis*.

Additionally, witness Durbin states the following regarding PSE's proposed renewable energy target of 63 percent by the end of the CEIP period (i.e., 2025): "if PSE were to propose the midway point between 34 percent [PSE's CETA-eligible energy position in 2020] and 80 percent [the 2030 GHG neutral target,] by the end of its first CEIP period, the Company would need to meet a standard of 57 percent."[2]

1. Witness Durbin asks the Commission whether "the scope, scale and pace of PSE's specific and interim targets are reasonable," and the Company is proposing a 2025 renewable energy target that is 6 percent higher than the 2025 renewable energy target "midway point." Is PSE effectively asking the Commission to support the Company's proposed early acquisition of clean energy resources?

2. If yes, has PSE reviewed the Commission's *Policy Statement Concerning Acquisition of Renewable Resources by Investor Owned Utilities*?[3] If so, does PSE agree that Section B of this policy statement[4] provides sufficient guidance for how the Company should proceed acquiring renewables in advance of a statutory deadline?

3. If PSE either disagrees that it is effectively asking the Commission to support early acquisition of clean energy resources or that the Company claims the Commission's *Renewable Resource Acquisition Policy Statement* does <u>not</u> provide sufficient guidance for how PSE should proceed, please explain how PSE's request for guidance is <u>different and/or additional to</u> the early acquisition of renewables guidance the Commission already provided in its policy statement.

[2] *Id*. at 12:12-14.

[3] *In the Matter of the Washington Utilities and Transportation Commission's Inquiry on Regulatory Treatment for Renewable Energy Resources*, Docket UE-100849, Report and Policy Statement Concerning Acquisition of Renewable Resources by Investor-owned Utilities (Renewable Resource Acquisition Policy Statement) (Dec. 30, 2010).

[4] *Id*., pp. 24-26, ¶¶ 51-57.

Response:

a) Puget Sound Energy's ("PSE") interim target encompasses the overall renewable energy target, including the utility-scale and distributed energy resource ("DER") sub-target.

PSE's renewable energy target is 800 Megawatts ("MW") of new utility-scale renewables and 80 MW of new distributed energy resources, as listed on page 26 of PSE's Clean Energy Implementation Plan ("CEIP"). PSE's Interim Target, also listed on page 26 of its CEIP, is 63 percent of retail sales by 2025, totaling approximately 11,381,593 Megawatt hours ("MWh"). The MWh used to calculate the interim target are derived from the MW in the renewable energy target.

PSE's sub-target of 80 MW of distributed solar capacity in 2025 is based on PSE's Integrated Resource Plan ("IRP") preferred portfolio.

PSE's interim target is calculated based on PSE's load forecast, PSE's current power supply portfolio, and the forecast of specific actions in its 2021 CEIP, effective the date of the drafting of PSE's CEIP. To calculate the interim target, the Clean Energy Transformation Act ("CETA")-eligible energy amount is divided by the CETA retail electric load and calculated as a percentage. CETA-eligible energy includes existing wind, existing solar, existing hydro, existing biomass, new wind, new DER/non-wires solar, DER Solar – CETA eligible, and new utility scale solar resources. CETA retail electric load is calculated by determining the PSE sales after subtracting energy efficiency, Public Utility Regulatory Policies Act of 1978, any new Demand Response programs, Distributed Energy Resources Solar – load reduction, and Green Direct.

1. No, Staff's understanding is not fully correct. PSE reaches the 1,379 Average MW ("aMW") by summing the MWh for new and existing CETA eligible resources and dividing by 8,760 hours. The calculation of 1,379 aMW was reached using one of PSE's redacted models to its CEIP filing, specifically the AURORA model output in 210795-PSE CEIP HR_2021 CEIP_Preferred Portfolio_Archive (R).pdf. Generally speaking, though, the total MWh for energy efficiency (new demand-side resource), new wind, new utility solar, new DER/Non-wires solar, DER solar – CETA Eligible, existing wind/solar/biomass and existing hydro are summed and then divided by 8,760 hours, which equals 1,379 aMW. Please see Table 2-2 in the CEIP. However, please note that the energy efficiency MWh associated with the aMW in Table 2-6 for demand-side resources are reflected in the redacted AURORA model 210795-PSE CEIP HR_2021 CEIP_Preferred Portfolio_Archive (R).pdf. The MWh in the redacted AURORA model for energy efficiency does not match the MWh shown in Table 2-2, which comes from the Biennial Conservation Plan ("BCP"). The aMW

in Table 2-6 are not reflective of the MWh shown in the BCP. The reason these values are different is because of the methodology used to convert the AURORA output for Energy Efficiency MWh to the MWh used in the BCP. An explanation of this methodology is described in Chapter 2 of the CEIP, page 21.

2. Not applicable; see PSE's response to (a)(1)

3. The 800 MW of utility-scale resources and 80 MW of DER's in the renewable target, is derived from our AURORA modeling, which uses the capacity factors and shapes of the resources as inputs to the model. The MWh for each resource is derived from the output of the AURORA model and was used to calculate the MWh contribution towards the interim target. Please see Table 2-2 in PSE's CEIP for the interim target calculation. The sum of New Wind, New Utility-scale Solar, New DER/Non-Wires Solar, DER Solar – CETA Eligible, Existing Wind/Solar/Biomass (includes signed contracts), and Existing Hydro has a total sum of CETA-eligible Energy of 11,381,593 MWh. This amount is then divided by PSE's CETA Retail Electric load of 17,997,487 MWh in 2025, which equates to 63 percent.

   PSE's AURORA modeling includes capacity factor analysis. Please see Appendix H of the 2021 IRP for the capacity factor data used in PSE's Aurora model. The IRP also includes a description of how those shapes were created in Appendix D of the 2021 IRP. To view the annual capacity factor, please see Chapter 5 of the 2021 IRP for a summary.

b)

1. Not necessarily; PSE is asking the Commission to approve its CEIP, including the proposed targets therein. The CETA requires PSE to establish specific and interim targets in its CEIP that demonstrate progress towards meeting the greenhouse gas neutral standard prior to 2030. CETA does not define what progress means, outside of saying that progress must be reasonable. PSE has proposed that progress for the first CEIP period is reaching a renewable energy target of 63 percent. PSE's statement that 57 percent is the midway point between its current CETA-eligible energy position in 2020 of 34 percent and the 2030 80 percent standard was intended as a reference point only, to demonstrate that PSE is making considerable progress with the targets that it is proposing.

2. See PSE's response to (b)(1).

3. PSE appreciates the guidance already provided in Section B of the Commission's *Renewable Resource Acquisition Policy Statement* and believes it still has value, particularly under the Energy Independence Act. While additional guidance on how the Commission is interpreting many elements of CETA would be helpful, PSE is not requesting Commission guidance on its proposed targets. Rather, consistent with RCW 19.405.060(1)(c), PSE is requesting Commission *approval* of the proposed targets in its CEIP. Approval by the Commission of the targets should establish the "need" for the company to prudently acquire resources to meet those targets.

BEFORE THE WASHINGTON UTILITIES AND TRANSPORTATION COMMISSION

Docket UE-210795
Puget Sound Energy
PSE 2021 Clean Energy Implementation Plan

WUTC STAFF DATA Request No. 010:

DATA REQUESTS DIRECTED TO: Kara Durbin

REQUESTED BY: Byron Harmon

Re: Distributed Energy Resources

a. Refer to PSE's final CEIP, Appendix D-1, page 7 "Phase 2". Explain how PSE weighted between CBI scores, SCT, and lowest cost. How were these different metrics compared to one another? Please provide any documents that record or indicate PSE's weighting and/or comparison of these metrics during the CEIP process (prior to filing the final CEIP), or confirm that there is no documentation.
b. Refer to PSE's final CEIP (Docket UE-200304, filed page 37, figure 2-5. What is PSE's methodology for "maximizing" customer benefit indicators? Are CBIs being prioritized over cost and access?
c. Refer to PSE's 2021 Final IRP, Docket UE-200304, page 98, figure 3-14 (filed April 1, 2021). How was "overall Rank" determined for the purposes of ranking in the color-coded column? Please use the data from sensitivities 1 Mid, M Alternative Fuel for Peakers – Biodiesel, W Preferred Portfolio (BP with Biodiesel), and K AR5 Upstream Emissions to demonstrate which metrics were considered, and how those metrics translated into rankings.
d. Refer to PSE's final CEIP, pages 32 and 33. PSE states "Rent-to-own distributed solar had a similar market potential as the rooftop solar leasing program but had lower returns for customers." Please provide the data relied upon for this statement. Does the word "customers", here, refer to program participants or ratepayers? In calculating the "lower returns for customers" does this include a time horizon where the program participant owns the previously rented solar? Does this conclusion hold across all time horizons?
e. Refer to PSE's final CEIP, pages 33 and 34, Table 2-9, items 11 and 11a. Does PSE have estimates of how much customers might pay for "backup power services"? If yes, please provide any documents or calculations PSE used to reach those estimates. How would PSE ensure those services are available while "PSE uses battery to manage system/local peaks."? Would PSE's "Capacity $/Watt Cost ($/Watt)" calculations change substantially if these batteries were used solely to "manage system/local peaks" instead of "backup power services"? If yes, how much? How would an income eligible customer who rents their home interact with #11a?

f. Refer to PSE's final CEIP, page 35, Table 2-10, item 20. How much would a typical monthly roof lease payment be? How does that payment compare to a similarly sited/sized net-metering arrangement?
g. Refer to PSE's final CEIP, page 38, table 2-12. Please explain the "Capacity $/Watt Cost ($/Watt)" difference between C&I Rooftop Solar Incentive, Multi-family Community Solar, and Multi-family Rooftop Solar Incentive.
h. Refer to PSE's final CEIP, page 39, table 2-13. Please explain the "Capacity $/Watt Cost ($/Watt)" and SCT differences between Residential Rooftop Solar Leasing and Residential Rooftop Solar Leasing — Income eligible.
i. Refer to PSE's final CEIP, pages 41, 42, table 2-15. It appears 6.2% of "Cumulative (MW)" are from Income Eligible DER programs. What percent of PSE's customers are income eligible for these programs?
j. Refer to Appendix D-1, page 11, subheading "Use Cases and Benefits". Please describe any material deviations from the NSPM made by PSE in the Social Cost Test (SCT).
k. Refer to Appendix D-1, page 3, table D-1. What is the difference between Suite 2 and 4's methodology?
l. Refer to PSE's final CEIP, page 90, Figure 3-8 and the paragraph immediately below. The figure states "Strongly addresses all five (5) CBI areas" but the paragraph states "PSE will go through the plan, denoting how and to what degree bidders address the customer benefit indicator categories and how the proposals may affect highly impacted communities and vulnerable populations." Why doesn't the rubric include how the proposals may affect highly impacted communities and vulnerable populations? If the 0-5 score does include effects on highly impacted communities and vulnerable populations, provide a detailed explanation how.
m. Refer to PSE's final CEIP, page 90. PSE states "score from 0–5 will be applied based on this evaluation and represents 35 percent of the qualitative portion of the evaluation." What is the other 65 percent of the evaluation? Why are CBIs considered qualitative? Is a score of "0" a negative evaluation or a neutral evaluation? How is the qualitative portion compared to other portions of PSE's evaluation?
n. Refer to PSE's final CEIP, page 34, Table 2-10, # 13a. What does PSE mean by "Provides… Access"? What does the word "community" mean here? How big of a discount is/will be provided to income eligible customers?
o. Refer to PSE's final CEIP, page 34, Table 2-10, # 13. What does the word "subscribe" mean here? What is the nature of the credit the customers receive?
p. Refer to PSE's final CEIP, page 35, Table 2-10, #20 and #20a. What are the differences between items #20 and #20a? In What ways is #20 exclusive to income eligible customers? Please explain what "income eligible" means here? What is the threshold to be income eiligible? Describe any customer costs associated with leasing. If an income eligible customer is a renter how would they interact with #20a?

Response:

a. Puget Sound Energy ("PSE") did not weight its customer benefit indicator ("CBI") scores, societal cost test ("SCT"), and lowest cost to select the preferred portfolio of distributed energy resource ("DER") program concepts. PSE prioritized DER program concepts that reflected a combination of high CBI scores, high SCT, and lower cost, while also ensuring DER program offerings would be available for all customer classes with a mix of utility- and customer-owned concepts included. Refer to Appendix D-2: DER Preferred Portfolio Selection for documentation of the selection process and PSE's preferred portfolio of DER program concepts.

b. CBIs are not necessarily being prioritized over cost and access. Refer to Appendix D-2: DER Preferred Portfolio Selection for PSE's methodology for selecting its preferred portfolio of DER program concepts, including maximizing CBIs. PSE set a minimum CBI score intended to filter DER program concepts for selection in order to create a portfolio that reflects a combination of high CBI scores, high SCT, and lower cost, as well as different structures of ownership and potential customer classes. For example, the "Multi-Family Solar Partnership" program concept was included in the preferred portfolio, while the "C&I Roof-top Solar Leasing" program concept was not included, despite both concepts having the same CBI score and "Multi-Family Solar Partnership" having a higher $/watt cost, in order to increase the number of programs in the portfolio that promote accessibility, recognizing that the "C&I Roof-top Solar Incentive" program concept had already been selected for the preferred portfolio.

c. In Chapter 8 of the 2021 IRP, beginning on page 8-16, PSE illustrates a step by step approach for how the outputs from AURORA were translated into rankings to compare across portfolios. Each metric in each portfolio is ranked against the corresponding metric in the other portfolios, and a rank is generated. The ranking of all the metrics in a single portfolio is then averaged. The averages across each portfolio are once again compared and ranked against one another to create the final overall ranking. The calculation for the "overall Rank" provided in Figure 3-14 of the 2021 Final IRP may be found in Appendix H – "Aurora Outputs of all modeled sensitivities [Excel, 0.9MB]" on sheet "Metric Summary Select_2045" in Column "C", Rows 61 to 82. All metrics were considered in the calculation of the overall ranking as shown in Appendix H. Supporting information including raw data and processing is available for review within the same sheet.

d. Attached as Attachment A to PSE's Response to WUTC Staff Data Request No. 010, please find the data relied upon to support the statement that a "Rent-to-Own Distributed Solar" program concept has lower returns for customers. The word "customers" in the statement refers to program participants. For the 'Rent-to-Own Distributed Solar' program concept, the customer economics has a net present value ("NPV") of $1,573; whereas for the 'Residential Roof-top Leasing Income Eligible" program concept, the customer economics has a NPV of

$6,441. Attachment A also provides data for project economics of the 'Rent-to-Own Distributed Solar' program concept that would impact ratepayers. The data was provided by Black & Veatch, a third-party consultant retained by PSE, and included a 25-year time horizon for the "Rent-to-Own Distributed Solar" and "Residential Roof-top Solar Leasing" program concepts, as well as a 15-year rental time horizon before transfer of ownership to customer for the "Rent-to-Own Distributed Solar" program concept.

e. The estimated customer payment to PSE for "backup power services" is included in PSE's Final Clean Energy Implementation Plan ("CEIP") Appendix K on page 8, table 1-1-2. The item labeled as the Participants Cost ($/kW-Yr); OPEX is intended to reflect the customer's annual payment to PSE for use of the customer sited battery for "backup power services." This figure was developed for PSE by Black and Veatch. PSE does not have any further documentation on the development of this payment amount that is not included in Appendix K.

PSE is not able to ensure that the batteries associated with this program will be charged and available to dispatch to manage system/local peaks. For example, there may be a small probability that when a battery is called upon to serve during a system/local outage that is followed immediately by a system/local peak event, then the battery may not be able to serve during both events. Still, PSE is highly confident that a majority of the battery systems associated with this program likely would be available for dispatch to manage system/local peaks given:

- Residential schedule 7 customers currently have no price signals to incentivize dispatching customer sited battery systems beyond this program's incentivized dispatches;
- Outage events and system/local peaks are not closely correlated, given that a majority of PSE's outages are storm related while system/local peaks are correlated to either cold, clear winter days or clear, hot summer days.

In short, even though PSE is not able to ensure in all cases that the batteries associated with this program would be charged for backup services, the likelihood of these battery events overlapping is a low probability. As such, PSE's "Capacity $/Watt Cost ($/Watt)" would not substantially change if PSE limited the dispatch of batteries associated with this program to managing system/local peaks.

Currently, the only way an income eligible customer who rents rather than owns a home to participate in program #11a is if the customer resided in low-income housing that meets PSE's program participation requirements.

f. PSE's contractor for program cost assumptions, Black & Veatch, assumed a monthly roof lease payment for item 20 in Table 2-10 to be $720 annually. Comparing the net present value from the customer's perspective for item 20 compared to a similar sited/sized net-metering arrangement has a difference of over $11,100. The estimated NPV of item 20 in Table 2-10 is $4,800 whereas the NPV of a net energy metering system is -$6,200.

g. The "Capacity $/Watt Cost ($/Watt)" is the AURORA output nominal net cost of each CEIP program divided by the cumulative capacity of the program. Driving the difference between the C&I Rooftop Solar Incentive, Multi-family Community Solar, and Multi-family Rooftop Solar Incentive programs is the variation in the estimated program costs/benefits associated with program implementation outlined in both Appendix K and Appendix A-2 tab "DER FOM&VOM". The estimated costs/benefits for these programs were established by Black & Veatch who "leveraged its experience in designing and constructing solar and BESS along with a review of existing PSE solar and BESS installations to identify system sizes and site parameters that adequately characterize and cost a representative system applicable to each program concept."[1]

h. Similar to the response for question g. above, the primary driver of differences in the "Capacity $/Watt Cost ($/Watt)" and Societal Cost Tests ("SCT") of the Residential Rooftop Solar Leasing and Residential Rooftop Solar Leasing – Income eligible is the program assumptions. Specifically, the main difference between the two concepts is the annual lease payment to the customer for use of their roof, with the income eligible program having a higher lease payment. The higher program cost associated with the income eligible program increases both the "Capacity $/Watt Cost ($/Watt)" and SCT output for the program.

i. In order to increase equity and access, PSE selected all potential DER program concepts intended for income eligible or multifamily participants. The programmatic market potential for customer enrollment, estimated by Black and Veatch, PSE's third party consultant, comprise the megawatts ("MWs") from income eligible DER concepts included in PSE's preferred portfolio.

The income eligibility threshold for these potential future programs has not been established. Therefore, PSE is unable to estimate at this time the percent of customers that may be eligible. If these programs are ultimately pursued as part of implementation of PSE's CEIP, at that time PSE will determine, through program design with input from stakeholders, the income eligibility requirements and what percentage of customers are eligible to participate.

[1] 2022 CEIP Appendix K, Page 7

It is important to note that PSE views stakeholder engagement to be a critical part of the design process for future DER programs, including increasing equity and access for income eligible customers.

j. In developing the CEIP, PSE strove to closely align its application of the SCT in the CEIP to the SCT as defined in the National Standard Practice Model (NSPM). In doing so, PSE did not make any material deviations from the NSPM's approach to SCT.

k. The difference between Suite 2 and Suite 4's methodology is that the DER program concepts selected for Suite 2 are all utility-owned. Therefore, Suite 2 is comprised of all DER program concepts in which the costs of the program would be reflected in general rates.

l. The section referenced in this data request comes from PSE's 2021 All Source RFP, which was filed with the Commission on April 1, 2021 and approved on June 14, 2021, prior to the filing of the 2021 Final CEIP. The scoring rubric referenced would apply to both utility scale and DER resources submitted to the All Source RFP. The consideration of highly impacted communities and vulnerable populations is inherent in the energy and non-energy benefits category, per WAC 480-100-610 (c). In Exhibit B of the All-source RFP on Tab 2a in the "Customer Benefit Plan" section, PSE asks bidders to provide the location of their bids based on the mapping of highly impacted communities. In the evaluation process, PSE considers the potential impacts (both positive and negative) to highly impacted communities and vulnerable populations, and how each Customer Benefit Plan proposes to address those impacts. Particular attention is given to the degree to which each Customer Benefit Plan identifies and explains specific plans and contains commitments to carry out those plans and/or track the contributions of the proposed project. For example, a utility scale project with a Customer Benefit Plan that only address economics by generating new jobs may score a 1. A similar project that creates the same number of jobs but commits to hiring in named communities may warrant a score of 2 to reflect the direct benefits to named communities.

m. The All-source RFP scoring is broken into a qualitative and quantitative score. The quantitative portion is seventy percent of the total score, and the qualitative portion is thirty percent of the total score. Exhibit A of the All-source RFP at Table 3, gives a breakdown of the percentages in the qualitative portion of the evaluation. As referenced in the Data request, within the qualitative portion of the evaluation, thirty-five percent is attributed to the 'CETA Equity Plan'. The other 65 percent of the qualitative portion of the evaluation is composed of Counterparty Viability, Project Viability, Site Control/Customer Acquisition Status, Permitting and Studies, and Energy Delivery. Customer benefit indicators are considered qualitative at this time because of the lack of available quantitative data for each customer benefit indicator translatable into an econometric value. Submission of

a Customer Benefit Plan is a minimum requirement of the RFP, and a “0” score reflects “No CETA Equity Plan provided”. A description of the qualitative scoring rubric is also provided beginning on page A-4 of Exhibit A. The combination of quantitative scoring and qualitative scoring is used to determine the overall ranking of proposals by resource category for the purpose of determining which will advance to Phase 2 of the evaluation process. An example of how the quantitative and qualitative scoring is compared is shown in the Exhibit A Appendix: Sample Rubric.

n. In contrast to many of the DER program concepts discussed in this set of data requests, which are conceptual, item #13a describes PSE’s existing community solar program, which is detailed in the approved Community Solar Projects Services Schedule 134. Under that program, PSE electric income-eligible customers can subscribe to a single share of an available solar project and “will receive benefits of their Community Solar share at no charge.” The discount is equal to 100% of the standard subscription fee paid by non-income-eligible participants of $20 per month.

As defined in Schedule 134, a Community Solar Project is defined as “a solar energy system shared by multiple community subscribers.” Schedule 134 also defines a participating customer as “a customer who opts to take service under this schedule.

“Provides…access” is intended to convey the voluntary nature in which an eligible customer can opt into the service; as well as the fact that the product was designed to be more "accessible" to qualified income-eligible participants by eliminating the barrier of participation costs.

o. The word “subscribe” is intended to convey a recurring monthly expense added to the subscribed customers’ bill. As detailed in the approved Community Solar Projects Services Schedule 134, on which item #13 as outlined in Table 2-10 of PSE’s CEIP is based, PSE electric customers can subscribe to one or more shares of an available solar project. Each share is $20 per month and represents 1.46 kW of the selected site. Community Solar requires a one year commitment and is connected to a specific solar energy project.

Credits vary each month and are based on actual energy generated by the subscribed share. Energy credits are equal to $0.045 per kWh generated by the customer’s share of solar energy at the selected solar project.

p. The predominant difference between items #20 and #20a listed on page 35, Table 2-10 of PSE’s final CEIP is the customer eligibility criteria used to define who can participate in these programs. The intent is that a residential customer served under the Company’s Electric Schedule 07, who is also the legal owner of the property, can voluntarily choose to participate in item #20. An income-eligible

residential customer served under the Company's Electric Schedule 07, who is also the legal owner of the property, can voluntarily choose to participate in item #20a. As defined in the *Acronyms and Definitions* section of the CEIP page XIII, an "income eligible household is a household of one or more persons whose maximum income does not exceed 80 percent of area median income."

The intent during the design phase of the various low-income programs in the 2021 CEIP was to follow established national best practices that leverage existing national or state income eligible enrollment processes. As PSE is initiating its product development process for its DER Preferred Portfolio, it is important to note that such work may further define specific eligibility requirements and program design. A first step in that process includes developing and implementing a public participation process to initiate stakeholder interviews and meetings with community-based organizations, as well as conduct focus groups and workshops to collect input from customers to ensure that PSE can work to understand the benefits and barriers these entities and customers may face when it comes to DERs and how future products and services can alleviate these barriers and maximize the desired benefits.

PSE does not expect eligible customers participating in items #20 and #20a to incur any customer costs, rather they will be compensated by PSE for allowing PSE to utilize available space on their roof, through a termed lease agreement, so PSE can install a utility owned distributed solar system that will generate and send renewable energy directly from the property to act as a distributed resource for PSE.

Finally, as detailed above, to be eligible to participate in item #20a, the customer must also be the legal owner of the property as they would need the authority to enter into a termed lease agreement with PSE.

ATTACHMENT A to PSE's Response to WUTC Data Request No. 010

Assumptions

Solar System

Nameplate Capacity (AC)	MW	0.005833	ILR	1.2
Capacity Factor	%	0.136986		
Land Area	acres/MW	2.76		
Degradation	%/year	0.0005		
First Year Available		2022		
Economic Life	Years	30		
Greenfield Dev. & Const. Leadtime	Years	1		

Residential Rates

Energy Charge (<600 kWh/mo)	0.095631	$/kWh
Energy Charge (>= 600 kWh/mo)	0.115462	$/kWh
Energy Exchange Credit	-0.007386	$/kWh
Other Charges	0.007791	$/kWh

Financial Details

PSE Discount Rate	5.00%	
Customer Discount Rate	8.00%	
ITC Rate (2022)	26.00%	
SREC Value	$ 10.00	$/MWh
SREC Shared to Customer	40%	

Calculations

Yield	1200	kWh/kW
Solar Production	7000	kWh/y
Monthly Solar Production	583	kWh/mo
Monthly Demand	900	kWh/mo
Monthly Demand With Solar	317	kWh/mo
Monthly Cost without Solar	$ 92	
Monthly Cost with Solar	$ 30	
Monthly Savings	$ 62	
Annual Savings	$ 744	

YEAR		0	1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16	17	18	19	20	21	22	23	24	25
Project Economics (Simplified)																											
Rental Revenues			$ 744	$ 744	$ 744	$ 744	$ 744	$ 744	$ 744	$ 744	$ 744	$ 744	$ 744	$ 744	$ 744	$ 744	$ 744										
SREC			$ 42	$ 42	$ 42	$ 42	$ 42	$ 42	$ 42	$ 42	$ 42	$ 42	$ 42	$ 42	$ 42	$ 42	$ 42										
Equipment and Installation		$ (17,000)																									
Investment Tax Credit			$ 4,420																								
Maintenance Expenses			$ (229)	$ (229)	$ (229)	$ (229)	$ (229)	$ (229)	$ (229)	$ (229)	$ (229)	$ (229)	$ (229)	$ (229)	$ (229)	$ (229)	$ (229)										
SG&A			$ (81)	$ (81)	$ (81)	$ (81)	$ (81)	$ (81)	$ (81)	$ (81)	$ (81)	$ (81)	$ (81)	$ (81)	$ (81)	$ (81)	$ (81)										
Project Cashflow		$ (17,000)	$ 4,896	$ 476	$ 476	$ 476	$ 476	$ 476	$ 476	$ 476	$ 476	$ 476	$ 476	$ 476	$ 476	$ 476	$ 476										
NPV	$ (7,853.46)																										
% Effective Payback	54%																										
Customer Economics																											
Rental Payments			$ (744)	$ (744)	$ (744)	$ (744)	$ (744)	$ (744)	$ (744)	$ (744)	$ (744)	$ (744)	$ (744)	$ (744)	$ (744)	$ (744)	$ (744)	$ -	$ -	$ -	$ -	$ -	$ -	$ -	$ -	$ -	$ -
Solar Production Savings			$ 744	$ 744	$ 744	$ 744	$ 744	$ 744	$ 744	$ 744	$ 744	$ 744	$ 744	$ 744	$ 744	$ 744	$ 744	$ 744	$ 744	$ 744	$ 744	$ 744	$ 744	$ 744	$ 744	$ 744	$ 744
Customer Cashflow			$ -	$ -	$ -	$ -	$ -	$ -	$ -	$ -	$ -	$ -	$ -	$ -	$ -	$ -	$ -	$ 744	$ 744	$ 744	$ 744	$ 744	$ 744	$ 744	$ 744	$ 744	$ 744
Customer Savings			0%	0%	0%	0%	0%	0%	0%	0%	0%	0%	0%	0%	0%	0%	0%	67%	67%	67%	67%	67%	67%	67%	67%	67%	67%
NPV	$1,573.03																										

Assumptions

Solar System

Nameplate Capacity (AC)	MW	0.005833	ILR	1.2
Capacity Factor	%	0.136986		
Land Area	acres/MW	2.76		
Degradation	%/year	0.0005		
First Year Available		2022		
Economic Life	Years	30		
Greenfield Dev. & Const. Leadtime	Years	1		

Residential Rates

Energy Charge (<600 kWh/mo)	0.095631	$/kWh
Energy Charge (>= 600 kWh/mo)	0.115462	$/kWh
Energy Exchange Credit	-0.007386	$/kWh
Other Charges	0.007791	$/kWh

Financial Details

PSE Discount Rate	5.00%	
Customer Discount Rate	8.00%	
ITC Rate (2022)	26.00%	
SREC Value	$ 10.00	$/MWh
SREC Shared to Customer	40%	

Calculations

Yield	1200	kWh/kW
Solar Production	7000	kWh/y
Monthly Solar Production	583	kWh/mo
Monthly Demand	900	kWh/mo
Monthly Demand With Solar	317	kWh/mo
Monthly Cost without Solar	$ 92	
Monthly Cost with Solar	$ 30	
Monthly Savings	$ 62	
Annual Savings	$ 744	

YEAR	0	1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16	17	18	19	20	21	22	23	24	25
Customer Economics																										
Roof Lease Incentive	$	$ 960	$ 960	$ 960	$ 960	$ 960	$ 960	$ 960	$ 960	$ 960	$ 960	$ -	$ -	$ -	$ -	$ -	$ -	$ -	$ -	$ -	$ -	$ -	$ -	$ -	$ -	$ -
Solar Production Savings	$	$ -	$ -	$ -	$ -	$ -	$ -	$ -	$ -	$ -	$ -	$ -	$ -	$ -	$ -	$ -	$ -	$ -	$ -	$ -	$ -	$ -	$ -	$ -	$ -	$ -
Customer Cashflow	$	$ 960	$ 960	$ 960	$ 960	$ 960	$ 960	$ 960	$ 960	$ 960	$ 960	$ -	$ -	$ -	$ -	$ -	$ -	$ -	$ -	$ -	$ -	$ -	$ -	$ -	$ -	$ -
Customer Savings		87%	87%	87%	87%	87%	87%	87%	87%	87%	87%	0%	0%	0%	0%	0%	0%	0%	0%	0%	0%	0%	0%	0%	0%	0%
NPV	$6,441.68																									

Assumptions

Solar System

Nameplate Capacity (AC)	MW	0.005833	ILR	1.2
Capacity Factor	%	0.136986		
Land Area	acres/MW	2.76		
Degradation	%/year	0.0005		
First Year Available		2022		
Economic Life	Years	30		
Greenfield Dev. & Const. Leadtime	Years	1		
Operation and Maintenance costs	$/kW-year	27		
Installation Cost	$/kW	2673.8		

This NEM tab was not prepared by Black & Veatch. It was added by PSE Staff on 8/10/2022 for reference in response to UTC Staff CEIP Data Request 010 d. using Black & Veatch provided assumptions.

Residential Rates

Energy Charge (<600 kWh/mo)	0.095631	$/kWh
Energy Charge (>= 600 kWh/mo)	0.115462	$/kWh
Energy Exchange Credit	-0.007386	$/kWh
Other Charges	0.007791	$/kWh

Financial Details

PSE Discount Rate	5.00%	
Customer Discount Rate	8.00%	
ITC Rate (2022)	26.00%	
SREC Value	$ 10.00	$/MWh
SREC Shared to Customer	40%	

Calculations

Yield	1200	kWh/kW
Solar Production	7000	kWh/y
Monthly Solar Production	583	kWh/mo
Monthly Demand	900	kWh/mo
Monthly Demand With Solar	317	kWh/mo
Monthly Cost without Solar	$ 92	
Monthly Cost with Solar	$ 30	
Monthly Savings	$ 62	
Annual Savings	$ 743.64	

YEAR	0	1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16	17	18	19	20	21	22	23	24	25
Customer Economics																										
SREC		$ 42	$ 42	$ 42	$ 42	$ 42	$ 42	$ 42	$ 42	$ 42	$ 42	$ 42	$ 42	$ 42	$ 42	$ 42										
Equipment and Installation	$ (17,000)																									
Investment Tax Credit		$ 4,420																								
Maintenance Expenses		$ (158)	$ (158)	$ (158)	$ (158)	$ (158)	$ (158)	$ (158)	$ (158)	$ (158)	$ (158)	$ (158)	$ (158)	$ (158)	$ (158)	$ (158)	$ (158)	$ (158)	$ (158)	$ (158)	$ (158)	$ (158)	$ (158)	$ (158)	$ (158)	$ (158)
Solar Production Savings		$ 744	$ 744	$ 744	$ 744	$ 744	$ 744	$ 744	$ 744	$ 744	$ 744	$ 744	$ 744	$ 744	$ 744	$ 744	$ 744	$ 744	$ 744	$ 744	$ 744	$ 744	$ 744	$ 744	$ 744	$ 744
Customer Cashflow	$ (17,000)	$ 5,048	$ 628	$ 628	$ 628	$ 628	$ 628	$ 628	$ 628	$ 628	$ 628	$ 628	$ 628	$ 628	$ 628	$ 628	$ 586	$ 586	$ 586	$ 586	$ 586	$ 586	$ 586	$ 586	$ 586	$ 586

NPV $ (6,291)

BEFORE THE WASHINGTON UTILITIES AND TRANSPORTATION COMMISSION

Docket UE-210795
Puget Sound Energy
PSE 2021 Clean Energy Implementation Plan

WUTC STAFF DATA Request No. 004:

DATA REQUESTS DIRECTED TO: Kara Durbin

REQUESTED BY: Byron Harmon

Re: Equity Data

a. Please refer to page 55 of PSE's final CEIP. Here, PSE refers to their process of rescaling factors from 1-5. Please explain the methods for applying this rescaling to normal, log normal, and non-normally distributed datasets with real examples of each if applicable.
b. Please refer to page 55 of PSE's final CEIP. Here, PSE states "We flagged these metrics with 0 or 1, where 0 indicates an absence of the condition and one indicates the condition is present." And shortly after "Following the k-means analysis, PSE summed the overall score for each block group…" Please explain how the 0 or 1 binary interacts with this summation process without resulting in an undervaluation of the binaried metrics.
c. Please refer to page 55 of PSE's final CEIP. Here, PSE states "Following the k-means analysis, PSE summed the overall score for each block group and divided the results into terciles labeled high, medium, and low." Please provide the datasets - pre-rescaling, after rescaling, and after summation - used for at least three block groups - one from each tercile.
d. Please refer to Appendix K of the PSE 2021 Integrated Resource Plan (filed April 1, 2021 in Docket UE-200304) on page 10. Here, PSE states "PSE has averaged the score for each of the attributes above and sorted these average scores by ranked percentile. The ranked percentile score for each census tract is then converted to a 1-10 score where a score of 1 is assigned to the ranked percentile between 0 percent and 10 percent, 2 is assigned to the ranked percentile 10 percent to 20 percent, and so on." Please explain the methods for applying this ranking to normal, log normal, and non-normally distributed datasets with real examples of each if applicable.
e. Please refer to page 68 of the PSE final CEIP, indicator "Improved affordability of clean energy". PSE describes the metric as "Reduce median electric bill as a percentage of income for residential customers" and "Reduce median electric bill as a percentage of income for residential customers who are also energy-burdened".

1. For the first metric, can lowering the median electric bill as a percentage of income for residential customers reliably result in reductions for customers in the top 80th or 90th percentiles of electric bill as a percentage of income?
2. How will PSE ensure that pursuit of the first metric will not strand renters?
3. Why didn't PSE pursue a metric more akin to "reduce median electric bills across each quintile measured in real dollars"?
4. How does pursuit of the second metric interact with the possibility that percentage of PSE customers that are energy-burdened might increase? That is, reducing the ratio of bills to income among the median cohort of energy burdened customers doesn't necessarily mean that it would reduce the number of people who are energy burdened. Rather, distributionally speaking it would suggest that the goal of the metric is to move the center of the distribution curve closer to being unburdened without necessarily crossing the threshold. Does PSE acknowledge that realizing the second metric may not reduce the number of energy-burdened households? If not, why?
5. Why doesn't the second metric focus on customers in the 80th or 90th percentile of energy burden? How will PSE ensure that pursuit of the second metric will result in a reductions of these extreme energy burdens?
6. The ratio of electric bill to income relies on factors that are largely outside of PSE's influence – namely the labor market and market prices/inflation. If these factors militate against reduction of the electric bill to income ratio, what steps or specific actions is PSE prepared to take to pursue a reduction in the ratio? Why didn't PSE select a metric more closely within their influence?

f. Please refer to Appendix D, sheet "CBI-Scoring", Columns G and H.
   1. How did PSE arrive at the 0,1,2 scoring system?
   2. What is the methodology for generating these scores (both for creating what a 0, 1, or 2 means in a given application and the methodology for applying these scores)? Provide real examples, step by step, of data being converted to these scores.
   3. Some scores of 0 correspond to "no impact" while other scores of 0 correspond to "May produce more annual metric tons of CO2". Explain how a score of 0 can reflect both a "neutral" and a negative impact.
   4. What is the reference scale of the scores mentioned in 3 above? Are all 1's equivalent/fungible in policy consideration?
   5. The scores appear to indicate subjective characterizations like "minimal," "substantial," "significant," "measurable," and "likely." Can PSE provide data/values for upper and lower bounds of these characterizations? What unit of measure do these scores reflect?
   6. How did PSE arrive at a 1 or 2 priority integer value? Why didn't PSE choose a spectrum of values that might provide greater resolution?

7. How are the priorities determined? Do they all follow the same rubric? Please provide the rubric to apply the priority values used as well as a real example applying the rubric step by step.
8. Does a priority value of 2 mean that an entry has twice the priority of an entry with priority 1?

Response:

a. Puget Sound Energy's ("PSE's") method for mapping a continuously distributed feature to a discrete 1-5 score was to calculate which quintile a given block group belongs to, for that feature (that is, whether a block group's value for the feature belongs in the 1st, 2nd, … 5th quintile, in the distribution of that feature value among all block groups considered).

For example, one feature used to delineate vulnerable populations was the proportion of customers in a block group who are estimated to be energy burdened. First, we calculated that energy burden proportion for each block group under consideration. Then, when considering the distribution among all block groups of that proportion value, we assigned each block group a value of 1-5 based on whether the percentile for its proportion value was in the 1-20th, 20-40th, … 80-99th percentile.

A purposeful result of this method is that the distribution of census block groups' 1-5 scores within a feature is 20% of block groups with score 1, 20% with score 2, … 20% with score 5, regardless of how the feature value is distributed among block groups (e.g., normally, log-normally, or any other).

b. In order to place binarized vulnerability features on a comparable scale to the continuous vulnerability features, we included the binarized features in the rescaling process described in (a) above. That is, we assigned each block group a 1-5 score for binarized features. Depending on the distribution of binary 0 or 1 values for the raw feature among all block groups, a given block group could then take on a value from 1 through 5.

This method ensured that when we summed the 1-5 values for all vulnerability features, for a given block group, each feature could take on the same range of values (1-5), even those that were originally binary. Without rescaling as we did, binary features would potentially carry less weight than the continuously-valued vulnerability features.

c. Please find attached a spreadsheet with the requested information for three census block groups, one in each vulnerability tercile.

d. To calculate the vulnerable population score as described on Page 55 of Appendix K in the 2021 Integrated Resource Plan ("IRP"), PSE performed the following steps:

1. Metrics were selected from the Environmental Health Disparities Map that were averaged for each census tract in Washington State to obtain an average score representing vulnerability.
2. These (census tract average vulnerability) scores were then organized into a ranked percentile using the PERCENTRANK.INC function in Excel.
3. The PERCENTRANK score for each census tract was then quantized to a score between one and ten to align with the score range used in the Environmental Health Disparities Map.

Attached as Attachment A to PSE's Response to WUTC Staff Data Request No. 004, please find the vulnerable population calculation performed in the 2021 IRP. The calculation would remain consistent regardless of the distribution of the input dataset (e.g. normal, log-normal, non-normal). The 2021 IRP vulnerable population average score is normally distributed as illustrated in Attachment A. The percentile ranking process transforms this normal distribution into a uniform distribution. A uniform distribution is well suited for this data application to measure relative impacts between census tracts, as opposed to absolute impacts, which are represented by the original distribution.

e.

1. Yes. In the responses below, PSE will refer to "electric bill as a percentage of income" as the "electric bill portion of energy burden" abbreviated as "electric EB." It is important to note that PSE does not have any control over the denominator of the energy burden equation – customers' income levels. Furthermore, there may be exogenous economy-wide events, such as a recession, that would lower PSE customers' average income during this Clean Energy Implementation Plan ("CEIP") period that were not anticipated when developing the CEIP. All responses below are provided under the assumption that income levels would stay the same throughout the CEIP period.

   PSE's Energy Burden Analysis found that the vast majority of highly energy-burdened customers are low-income according to Climate Energy Transformation Act's ("CETA") definition of low-income, which is at or below the greater of 200% Federal Poverty Level or 80% Area Median Income. Given this finding, PSE anticipates that PSE's efforts to improve electric energy affordability of low-income customers will lower both median electric EB and any higher percentile of electric EB, including the 80^{th} or 90^{th} percentile.

This outcome is anticipated because there is a distinction between (a) the strategies PSE will use for lowering electric EB of low-income customers and (b) the metrics identified to quantify the impact of such strategies. PSE's mechanisms and strategies to reduce electric EB of low-income customers will especially impact customers with the highest levels of electric EB. Therefore, PSE's low-income energy assistance efforts are not expected to improve affordability only for median electric EB customers at the exclusion of those with higher electric EB. As electric EB of low-income customers declines for customers currently at higher levels of energy burden, the mathematical consequence will be an overall reduction in median electric EB, which is the metric PSE has identified it will track in its CEIP for affordability.

2. PSE intends to track median electric EB for all residential customers, including renters. By virtue of the formula, the numerator and denominator in this equation remain the same whether the customer rents or owns their residence. A customer could be a renter with a higher or lower income as compared to the average income of a PSE customer; this calculation remains the same for all customers.

3. PSE thought that this metric provided the best overview and analysis of cost impacts for all of PSE's electric residential customers, as compared to Highly Impacted Communities, Vulnerable Populations Low, Vulnerable Populations Medium, and Vulnerable Populations High. PSE wanted to highlight the impacts on Named Communities, rather than on quintile customer data, due to the emphasis in CETA on reducing burdens for named communities.

4. The goal of the second metric is to focus on populations already identified as energy-burdened, and then to make the metric more granular by looking at the CETA categories of Highly Impacted Communities and Named Populations. The objective of this customer benefit indicator in the CEIP is to report the median electric EB across the customer base, and also examine subsets of the named communities to show focused effort in closing disparities between them. Therefore, the first and second metrics, with all subsets, are intended to be considered together.

   The mechanisms and strategies PSE intends to use to reduce electric EB of its low-income customers will also result in lowering the number of energy-burdened customers. However, mathematically, it could be possible that the median could shift down while the number of energy-burdened customers would stay the same.

   PSE customers, through PSE's low-income energy assistance programs or through increases in income estimates, could move from energy-

burdened to non-energy burdened categories. Under such a scenario, a customer who is no longer energy-burdened would move from the second metric to the first metric, and their electric EB would impact the median in the first metric now. The second metric would continue to show the median for electric EB of PSE's already, still, or newly energy-burdened customers. The second metric is intended to be an indicator of how much more assistance or other strategies or mechanisms would be needed to address the energy assistance needs of PSE's energy-burdened customers (again, the vast majority of whom are low-income), especially in the Named Communities.

PSE would like to reiterate that because PSE does not have control over customers' incomes, the electric EB of its customers may stay the same or increase, leading to more energy-burdened customers and potentially higher median EB metrics, if customer incomes decrease.

5. CETA's focus on Named Communities and equity influenced the way in which PSE established this metric. PSE thought it was important to focus on Named Communities given the emphasis on Named Communities in the equitable distribution of benefits provision in RCW 19.405.040(8). As noted in Table 3-3: Range of Mean Across Terciles, one of the most important vulnerability factors identified is energy burden. Thus, higher levels of energy burden are connected to high levels of Vulnerable Populations.

6. PSE agrees that there are economic factors outside of its control, including the labor market, and market prices/inflation. PSE chose to use this equation because measuring affordability requires the comparison of two quantitative points – how much the cost of the electricity is, and the available funds to pay for the electricity cost. For example, the Commission definition of energy-burdened customers (the share of annual household income used to pay annual home energy bills) requires a comparison of these two data points. In order to accurately reflect the true electric cost for customers, PSE thought that it needed to include customers' estimated incomes. Only including the cost of the electricity would not provide a holistic picture of a customer's ability to pay. Providing a comparison of the two data points is what provides the best analysis of the question of cost.

f.

1. For this CEIP, PSE developed a methodology that it believed could best distinguish the impacts of each potential distributed energy resources ("DER") program on the customer benefits. Given the compressed time frame, PSE was not able to identify quantitative data to attribute to each customer benefit indicator as part of the scoring for each program.

Therefore, PSE's approach was to use a qualitative '0', '1' or '2' scale. A score of '0', '1' or '2' corresponds to the degree of influence of each indicator on each potential DER program described in Chapter 3 of the CEIP. During stakeholder meetings in June and July of 2021, PSE asked its four advisory groups — the Equity Advisory Group, the Low-Income Advisory Committee, the Conservation Resources Advisory Group, and the IRP stakeholders — to help refine the customer benefit indicators ("CBI"), and to provide feedback on the CBI metrics as well as PSE's proposed scoring and weighting methodology when using CBIs to evaluate potential clean electricity programs.

2. Subject matter experts within PSE evaluated each possible program on a scale of '0', '1' or '2'. Column H provides examples of how PSE scored each row. For example, for the CBI "Improved participation in clean energy programs from highly impacted communities and vulnerable populations" the scoring was "'0' - No increase in [electricity] from DERs or participation by highly impacted communities and vulnerable populations; '1' - Some increase in electricity from DERs or participation by highly impacted communities and vulnerable populations; '2' - Increase in electricity from DERs and participation by highly impacted communities and vulnerable populations." For the CBI "Increase in quality and quantity of clean energy jobs" the scoring was "'0' - No increase in quantity and quality of clean energy jobs; '1' - Minimal increase in quantity and quality of clean energy jobs; '2' – [Substantial] increase in quantity and quality of clean energy jobs." Because of the varied nature of the CBIs, the application of how '0', '1' and '2' are scored does vary some between indicators.

   For example, in Appendix D-3, tab "CBI-Scoring," cells L 10 through 12, "C&I Space Leasing for Batteries" was judged to be a "1," indicating that it would provide some increase in electricity from DERs or participation by highly impacted communities and vulnerable populations. In the same tab, cells M 10 through 12, Multi-Family Unit Battery Program was judged to be a "2," indicating that it would provide an increase in electricity from DERs and participation by highly impacted communities and vulnerable populations. In these two examples, subject matter experts made a determination that the Multi-Family Unit Battery Program provided a greater increase in electricity from DERs than the C&I Space Leasing for Batteries.

3. PSE wanted to account for negative impacts and use scoring that accurately reflected those negative impacts to show the range of benefits, including the risk of a negative consequence. Because each indicator has different impacts, the nature of the scoring for each indicator varies some by indicator.

For example, there could be no negative impact to improved access to reliable clean energy for some indicators. For other indicators of a different nature, such as greenhouse gas emissions, there could be some negative impacts in that greenhouse gas emissions could increase.

4. In general, PSE used three levels: ‘0’, ‘1’ or ‘2’. These are supposed to reflect the degree of influence. Broadly, a ‘0’ score was a negative impact to no impact; a ‘1’ score was a minimal impact; and a ‘2’ score was a positive impact on each customer benefit indicator.

5. The use of the words “minimal,” “substantial,” “significant,” “measurable,” and “likely” are used to describe the amount of impact for each indicator. There are no specific quantitative upper or lower data bounds associated with these words for the purposes of this report. Due to the limited data available and the compressed time frame, PSE was not able to use quantitative values to measure impact. PSE will continue to develop and revise this methodology through its public participation process to inform future CEIPs.

6. In Column G, PSE originally went through the exercise of prioritizing specific customer benefit indicators. This prioritization was based on feedback from customers and through the public participation process. However, based on feedback from PSE’s advisory groups, in particular the Equity Advisory Group (“EAG”), PSE decided not to use this prioritization in the final DER scoring.

7. PSE originally determined priorities for CBIs based on feedback from customers through the public participation process, and the feedback from the advisory groups that PSE consulted within in developing this rubric. Based on the feedback received, PSE included a priority value for each customer benefit indicator, as seen in Column G in tab “CBI-Scoring” in Appendix D-3.

   An example can be found in row 10-12 for “Improved participation in clean energy programs from highly impacted communities and vulnerable populations,” which has a priority of a ‘1’, whereas row 13 for “Increase in quality and quantity of clean energy jobs” has a priority of ‘2’. The reason this indicator received a ‘2’ is because of the overwhelming feedback from customers that this indicator should be a higher priority. However, based on feedback from PSE’s advisory groups, in particular the EAG, PSE decided not to use this prioritization in the final DER scoring.

8. Yes, a priority value of ‘2’ does mean that the entry has a value that is twice the value of an entry of ‘1’.

ATTACHMENT A to PSE's Response to WUTC Data Request No. 004

Below are the raw feature values used in assigning vulnerability labels (low, medium, high) for three census block groups. The rescaled values indicate the feature values when converted to a 1-5 scale.
Additionally, we have provided a histogram of total vulnerbility scores for all block groups considered, so that it is clear where the low, medium, and high terciles of vulnerability are delineated.

	Low Vulnerability BG		**Medium Vulnerability BG**		**High Vulnerability BG**	
Feature	Raw Value	Rescaled Value	Raw Value	Rescaled Value	Raw Value	Rescaled Value
energy burdened count	18.000	2	119.000	5	164.000	5
energy burdened percent	0.059	2	0.231	5	0.433	5
arrears count	10.000	2	69.000	5	72.000	5
arrears percent	0.028	1	0.112	5	0.169	5
owner high mortgage burden	0.133	1	0.044	1	0.347	4
renter high rent burden	0.333	2	0.130	1	0.715	5
multy-occupancy room	0.000	2	0.325	5	0.148	5
rent count	7.000	1	34.000	4	155.000	5
renter percent	0.021	1	0.061	2	0.381	5
renter percent (ACS)	0.079	1	0.214	2	0.499	4
household of 6 percent	0.022	4	0.000	2	0.024	4
household of 7+ percent	0.000	2	0.000	2	0.111	5
household nonfamily percent	0.242	2	0.349	3	0.290	3
percent BIPOC	0.087	1	0.019	1	0.897	5
percent race Black	0.010	2	0.000	1	0.471	5
percent race American Indian	0.000	2	0.000	2	0.000	2
percent race Asian	0.049	2	0.007	1	0.332	5
percent race Hawaiian & Pacific Islander	0.000	2	0.000	2	0.000	2
percent Hispanic	0.020	1	0.038	2	0.078	3
percent race Some Other	0.000	1	0.000	1	0.083	5
percent race two or more races	0.028	2	0.012	1	0.011	1
percent race two or more including some Other race	0.000	2	0.000	2	0.006	4
percent race two or more including 2+ Other race	0.028	2	0.012	1	0.005	1
low income senior count	24.000	2	131.000	5	49.000	3
low income senior percent	0.072	1	0.236	5	0.120	3
retirement income percent	0.242	4	0.146	2	0.114	2
high school or GED education count	14.000	1	224.000	5	194.000	5
high school or GED education percent	0.042	1	0.403	5	0.477	5
public assistance income percent	0.000	2	0.000	2	0.031	4
children present percent	0.241	1	0.475	4	0.469	3
no insurance percent	0.000	1	0.025	2	0.110	5
has disability percent	4.800	1	16.100	5	16.900	5
mental health metric	8.700	1	0.000	3.2	16.100	5
hospital discharges	1133.000	1	5736.000	5	3527.000	4
limited English proficiency percent	0.000	1	0.024	3	0.278	5
unemployed percent	0.034	3	0.020	2	0.086	5
below poverty line percent	0.022	1	0.056	3	0.552	5
no digital engagement count	23.000	4	49.000	5	60.000	5
no digital engagement percent	0.064	3	0.080	4	0.142	5
no internet percent	0.000	1	0.071	4	0.082	4
average temperature score	79.888	1	0.000	3.2	87.656	5
tree canopy gap	0.000	1	0.000	4	0.138	3
TREE index priority	0.246	1	0.000	2.6	0.657	5
Lengthy commute percentage	0.192	1	0.143	1	0.471	5
EHD cardiovascular health risk	1.000	1	10.000	5	9.000	5
EHD low birth weight risk	0.000	1	9.000	1	9.000	1
food desert 1 mile / 10 miles metric	0.000	3	0.000	3	0.000	3
food desert 1/2 mile metric	0.000	2	0.000	2	1.000	5
food desert 1 mile / 20 miles metric	0.000	3	0.000	3	0.000	3
food desert low vehicle access	0.000	3	0.000	3	0.000	3
low vehicle access	0.000	3	0.000	3	0.000	3
Vulnerability Sum		**89**		**151**		**207**
		(low)		(medium)		(high)