March 11, 2021

Dear IRP team and Commissioners,

At the final stakeholder webinar for PSE's 2021 IRP, PSE presented a table comparing the costs and benefits of 22 portfolio sensitivities (see slide 48 at https://oohpseirp.blob.core.windows.net/media/Default/2021/meetings/March_5_webinar/webinar13_FINAL.pdf):

Sensitivity	Cost	Climate Change	Air Quality	Market Position	Environment	Resource Adequacy	Resiliency	Overall Rank
1 Mid	3	13	13	4	10	18	16	8
A Renewable Overgeneration	15	4	10	20	18	6	5	11
C Distributed Transmission	13	20	20	17	8	13	6	20
D Transmission/build constraints - time delayed (option 2)	5	12	8	15	10	12	13	7
F 6-Yr DSR Ramp	4	15	15	7	11	15	14	16
G NEI DSR	8	14	16	12	12	7	10	12
H Social Discount DSR	9	16	13	18	12	5	8	15
I SCGHG Dispatch Cost - LTCE Model	1	10	11	11	10	8	9	3
K AR5 Upstream Emissions	6	16	13	2	9	16	14	8
M Alternative Fuel for Peakers - Biodiesel	2	7	4	8	8	9	11	1
N1 100% Renewable by 2030 Batteries	19	2	1	16	8	21	1	5
N2 100% Renewable by 2030 PSH	22	1	1	1	13	21	21	13
O1 100% Renewable by 2045 Batteries	16	8	6	19	12	20	2	17
O2 100% Renewable by 2045 PSH	21	11	8	14	7	10	21	19
P1 No Thermal Before 2030, 2Hr LiIon	18	21	21	21	18	14	4	21
P2 No Thermal Before 2030, PHES	17	5	7	13	9	19	7	10
P3 No Thermal Before 2030, 4Hr LiIon	20	22	22	22	18	17	3	22
V1 Balanced portfolio	10	11	13	5	8	1	17	4
V2 Balanced portfolio + MT Wind and PSH	14	17	17	3	9	1	19	14
V3 Balanced portfolio + 6 Year DSR	12	13	18	6	9	1	12	6
W Preferred Portfolio (BP with Biodiesel)	11	5	5	9	8	1	17	2
AA MT Wind + PHSE	7	14	10	10	11	11	20	18

PSE also provided a spreadsheet (https://oohpseirp.blob.core.windows.net/media/Default/2021/meetings/March_5_webinar/Portfolio%20Summary_Comparison_clean.xlsx) that shows the data and methodology used to calculate the overall ranking of these sensitivities.

We commend PSE on increased transparency regarding these results. However, careful study of the spreadsheet has revealed significant flaws in the design and methodology of this study. These problems cast doubt on the conclusions.

Study flaws

Some of our concerns are as follows:

1. **Questionable metrics.** The seven metrics shown in the above table determine the final score and overall ranking of each sensitivity. Some of the metrics are averages of rankings of other metrics. For example, "Environment" encompasses subcategories such as Utility Scale Renewable Generation, Energy Efficiency, Distribution Efficiency, Codes and Standards, DSP NWA, Rooftop Solar, Ground Solar, Customer net metering, and Customer Programs (Green Direct, Green Power, Qualifying Facilities). Some of these metrics matter more to customers and some less, but PSE weighs categories equally when calculating a final score for each sensitivity.

2. **NOx emissions.** Emissions of nitrogen oxides (NOx) are averaged with emissions of sulfur dioxide (SO2) and particulates (PM) to produce an "Air Quality" metric. Although NOx can combine with hydrocarbons to produce ground level ozone, this is not a major concern in the Puget Sound region. Puget Sound Clean Air Agency's Strategic Plan (https://www.pscleanair.gov/DocumentCenter/View/445/2014-to-2020-Strategic-Plan-PDF?bidId=) states the most harmful pollutants in our region are fine particle pollution and air

toxics. When considering an IRP that strives to meet CETA targets, NOx emissions are not nearly as important as the Social Cost of Greenhouse Gases (SCGHG) and CO2 Emissions. Sulfur dioxide emissions may also be subcritical.

3. **Premature ranking.** PSE ranks all the sensitivities with respect to a particular metric early in the analysis. This destroys meaningful distinctions between the sensitivities. For example, the cost difference between the two least expensive sensitivities is $34 million, while the difference between the two most expensive portfolios is $26 **billion**. Early ranking obscures the fact that the latter difference is 765 times larger than the former.

4. **Averaging rank scores.** After ranking is performed for each metric, all seven rank scores are averaged together to produce a composite score. Aside from the problem of treating each metric as equally important, the averaging process obscures another fact. Rank scores mean different things for different metrics. For example, the difference between rank 1 and rank 19 in the Customer Programs subcategory is 0.000004%. The difference between ranks 1 and 19 in Portfolio Cost is 208%. When the rank scores for these metrics are averaged together, the result is almost meaningless.

5. **Puzzling data.** We note that the Portfolio Cost for sensitivity M (Alternative Fuel for Peakers – Biodiesel) is the second least expensive sensitivity of this set. How can that be true, when the cost of biodiesel fuel was estimated to be ten times higher than natural gas in the webinar? Is PSE assuming that natural gas is likely to be used instead of biodiesel for practical cost reasons?

A better method

Stakeholders are developing a better method to score the sensitivities with the data PSE has provided in the spreadsheet. There has not been sufficient time to vet the new method before the deadline for comments, but we expect to publish the improved method soon. Initial results appear to produce a stronger preference for portfolios A and N1 compared to PSE's method. We believe it is possible to choose a portfolio that effectively meets CETA targets, avoids the uncertain availability and potential expense of biodiesel fuel, and keeps customer costs reasonable.

Respectfully,

Don Marsh, CENSE.org
Doug Howell, Sierra Club
Kevin Jones, Vashon Climate Action Group
Court Olson, Green building consultant, member of Shift Zero, Chair of People for Climate Action
Pete Stoppani, Indivisible Eastside
David Perk, 350 Seattle Leadership Team
Anne Newcomb
Michael Laurie, sustainability consultant, owner of Watershed LLC
Willard Westre, Union of Concerned Scientists
Kate Maracas, Managing Director, Western Grid Group