PSE 2021 All Source RFP – WUTC Docket UE-210220 ELCC comments of JSR Capital Inc.

Summary
Comments are submitted at the request of PSE in the WUTC UE-210220 Docket. JSR Capital Inc. is pleased to submit comments to aid PSE on insights into the proper criteria for the selection of the most competitive resources in Phase 2 that are evaluated from the All-Source 2021 RFP process. JSR Capital Inc. invests in development stage projects in the region and offers its comments from this viewpoint.

PSE has produced an IRP and a 2021 RFP during an extremely difficult time period. In Docket UE-210220. PSE provided comments to WUTC that a timely 2021 All Source RFP was required to meet load requirements and PSE was reluctant to slow the process down to modify the Phase 2 analysis of bids, as had been contemplated by Commissioner Rendahl. The Phase 2 analysis involves various portfolio simulations that utilizes the capacity value of different resources established in the Electric Load Carrying Capacity ("ELCC") process. PSE has engaged various outside consultants and provided interested parties with an ELCC workshop to foster the best insights into the most appropriate ELCC capacity values for different resources including wind, solar, hydro and thermal generation.

After participating in the ELCC workshop and reviewing the consultant reports, JSR Capital Inc. believes that the most important insights to highlight are:

- CETA (and WA State) recognizes that climate change will affect PSE loads, and using the past 88 years (through 2016) as representative of temperatures and loads is not appropriate for the next 20-40 years and the PSE Phase 2 process as it was initially envisioned;
- Heating Degree Days ("HDD") are rapidly decreasing, Cooling Degree Days ("CDD") are increasing and PSE is transforming, similar to Portland General, and becoming a dual peaking utility in the near future, due to climate change;
  In the October 8th E3 ELCC report on page 59, "E3 recommends that PSE reevaluate the appropriateness of its current approach to considering temperatures in developing load shapes." However, they leave that for a future IRP without adequate justification. The E3 analysis is based on year average values and the impact on peak winter conditions versus evaluating both peak summer as well as peak winter conditions and loads. Table 10 of the document shows a profound difference in ELCC values for Lund Hill solar of 30.3% to 54.3% using temperature data (2027 and 2031 respectively) versus 8.3-7.5% using PSE base case numbers. While generic eastern WA wind decreases in ELCC value from 17.8% (base case) to 7.8% (temperature case) in 2027. Therefore, without taking changing temperatures into account in this RFP process and modifying the summer and winter load shapes due to climate change, PSE will be designing a portfolio to better suit the past 88 years versus the future that WUTC has requested. Commissioner Rendahl stated that the Utility [PSE] should be building a utility for the future and not for the past.
- For resource planning, it may be appropriate to wait for the next IRP to reevaluate temperatures, load shape, and the resulting impact on ELCC. However, for the purpose

of the All-Source 2021 RFP Phase 2 evaluation process, waiting is not a prudent decision. Based on its Phase 2 evaluation, PSE will be making resource decisions that will impose additional costs on PSE's customers. PSE is obligated to select resources that are lowest reasonable cost and to make that determination they must utilize the most-recent information available to them.

- Climate change is exponentially occurring based on United Nations data, Union of Concerned Scientist reports and other sources.
- PSE indicated to WUTC that there was sufficient time to readjust its portfolio decisions in the upcoming RFP Resource Acquisition Phase 2 analysis and PSE should not wait to incorporate the Temperature Sensitivity analyses for the 2022 IRP. Using temperature data for ELCC summer values and appropriately modifying the load shapes is an essential part of that process. At a minimum, the ELCC temperature values as detailed in Table 10 should be used as the base case in the revised PSE modeling for the portfolio determination of Phase 2.
- ELCC values should be differentiated between summer and winter and a single value for the year is not reflective of either the best winter or the best summer resources to meet PSE's peak loads and LOLP. Specifically, a 4% ELCC, which was the PSE IRP base line value going-in for eastern WA PV solar as a single ELCC year average value, is not reflective of climate change's impact to PSE, coincidental summer benefits, or expected summer loads over the next 20-40 years which is the expected service life of an Eastern WA solar asset.

JSR Capital Inc. respectfully submits this request for PSE's consideration.

Background and Additional Discussion

PSE presented its views on the ELCC of various generation technologies at its WLCC workshop on August 31/2021 supported by its consultant Energy + Environmental Economics ("E3") using a PPT slide deck presented by its Senior Partner, Arne Olson.

E3 indicated that PSE's General LOLP (5% LOLP reliability) Approach to ELCC was reasonable and presented "no significant impact on ELCC results based on current review, and was "unlikely to impact the RFP process". They did consider PSE's temperature input data being a reasonable basis for Forecasts only a medium potential impact risk to the ELCC results.

PSE's LOLP methodology does not provide a "direct correlation between weather and renewable (solar, wind) output, or between load and renewable output" which is contrary to current Industry Practice "used in resource adequacy system modeling, which helps capture conditions which may drive loss-of-load events." "For future IRP cycles, E3 recommends utilizing weather-matched load that is aligned with wind and solar data for future analyses." And, as E3 noted "this will impact the ELCC results for wind and solar resources."

E3 noted that "there is no prevailing industry standard for how utilities should account for climate warming trends in their temperature input data" and that there is a precedent in the PNW region for using 88 historical years of temperature data in GENESYS modeling."

Given that PGE is transitioning from a winter peaking utility to a summer peaking utility, and given the speed of current climate warming trends, it may not be unreasonable to project that this trend may cause PSE to transition to a summer peaking utility over the twenty-to-forty-year service life of a Variable Energy Resource ("VER") as well. As Commissioner Rendahl noted in comments to PSE on its 2021 RFP regarding ELCC, when she considered delaying the RFP submission date until PSE had modified its ELCC assumptions, PSE was building a system for the future and not for the past (88 historical year temperature data). Commissioner Rendahl specifically questioned why PSE was using an annual ELCC of 4% for solar notwithstanding that PSE's own studies conducted by its consultant ITRON in November of 2020 (shown in the PSE IRP in Appendix L) determined that the solar ELCC contribution in summer was significant.

ITRON's "analysis shows that there is a strong and statistically significant increase in average temperature in the PSE service area. Temperatures at the Seattle-Tacoma International Airport have been steadily increasing over the last fifty years." The "PSE electric system demand peaks in the winter period" and "is largely driven by peak-day minimum temperatures,"

In the October 8, 2021 report, E3 stated, " E3 recommends that PSE do the following in future IRP cycles: 1) Utilize weather-matched load that is aligned with wind and solar data; 2) Reevaluate its current approach to considering temperatures in developing load shapes based on (1) the use of two different weather stations, and (2) the changing climate"; E3 does not offer any analytical discussion as to why these recommendations should wait for the next IRP cycle. Further, E3 does not offer any additional analysis on summer peak load shapes due to increasing temperatures arising from climate change. The E3 report is mostly focused on battery ELCC issues.

E3 in its description of the impact of temperature changes on ELCC offers Table 10 (also shown in the Appendix) which contains the following representative values for ELCC:

Generator	**2027 Base Case**	**2027 Temp. Case**
Lund Hill Solar	8.3%	30.3%
Golden Hills Wind	60.5%	49.3%
WA Generic East Solar	4%	21.6%
WA Generic East Wind	17.8%	7.8%

Generator	**2031 Base Case**	**2031 Temp. Case**
Lund Hill Solar	7.5%	54.3%
Golden Hills Wind	56.3%	39.3%
WA Generic East Solar	3.6%	45.6%
WA Generic East Wind	15.4%	12.0%

Profoundly, the temperature cases highlight the large ELCC value changes by resource type due to climate change. By PSE and E3 omitting the results of peak summer conditions and using year average values only, the true benefit of different generating resources are obscured, meaning that critical portfolio decisions responsive to changing weather and hotter temperatures would

be delayed. The more meaningful approach would be to use a unique ELCC value for summer and winter for different variable energy resources and use the temperature-based analysis for portfolio selection. At a minimum, the ELCC values for the temperature cases (in Table 10) should replace the base case values in the revised PSE Phase 2 portfolio modeling to reflect a more reasonable expectation of temperatures over the next 20-40 years.

JSR Capital Inc. conclusions are similar to those of the NW Energy Coalition.

The NW Energy Coalition testimony by Lauren McCloy stated the following:

1. *Climate change will increase the number of cooling degree days and decrease the number of heating degree days on PSE's system. According to PSE's own temperature sensitivity analysis, which is based on modelling of climate impacts conducted by the NWPCC and likely to be included in the 2021 Regional Power Plan,* ***accounting for climate change impacts on temperature reduces PSE's peak capacity need by more than one-third (907 MW to 328 MW in 2027).***
2. *To quote PSE's own analysis,* ***"resources with higher capacities in the summer, such as solar, will have a higher peak capacity credit while those with strong winter generation become less effective with a lower peak capacity credit."*** *For example, the ELCC for Eastern WA solar increases from 4.0% (the number used in this RFP) to 21.6% in 2027 and 45.6% in 2031. The ELCC for 4-hour Li-ion batteries and 6-hour flow batteries increases from 24.8% and 29.8% respectively (the numbers used in this RFP) to 66.6% and 79.2% respectively in 2027. And, the ELCC for 4-hour duration for demand response increases from 32% to 69.8% in 2027 and 80.8% in 2031. While these numbers were offered as a sensitivity analysis in the IRP, they are not used to select PSE's preferred portfolio. Therefore,* ***the RFP before the Commission today significantly devalues resources that PSE's own analysis shows to have increased value due to climate impacts during this decade.***
3. *This simply doesn't pass muster as a lowest reasonable cost approach. "Lowest reasonable cost" must consider "the risks imposed on the utility and its ratepayers, public policies regarding resource preference adopted by Washington state or the federal government, and the cost of risks associated with environmental effects including emissions of carbon dioxide." Under this standard, the resources that PSE is building for resource adequacy should clearly reflect the risks imposed due to the impacts of climate change.*

PSE is using the "industry standard" to derive normal degree days using a 30-year historical period. Many utilities have moved to a 20-year and even 10-year normal period in recognition that temperatures are increasing; the shorter estimation period gives more weight to the current, warmer temperatures" (ITRON). And PSE ratepayers may be better served by using a 20-year or even a 10-year period instead of the pre-climate change industry standard. ITRON goes on to say that "By 2019, we would expect to see fewer HDD (Heating Degree Days) and more CDD (Cooling Degree Days) than those derived from the 30-year average."

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JSR Capital Inc. is of the opinion that PSE should reconsider its stated position that it is a pure winter peaking utility, and reconsider that it will likely be morphing into a summer peaking utility and that it would be prudent for PSE to consider itself a "dual-peaking" utility given that the CETA legislation requires PSE to be 100% carbon neutral by 2045. Over the next 25 to 40-year service life of the VERs that PSE will be acquiring in this 2021 Resource Acquisition, it would be imprudent to not consider this shift to summer peaking and the ever-increasing number of CDD. For PSE to continue to use for its RFP evaluation an outdated Base Scenario with an annual 4% ELCC single value contribution for solar would materially understate the contribution that solar contributes to the ELCC in summer. For the reasons discussed, this is not analytically valid for the 2021 RFP portfolio selection.

While the ELCC of wind may make a significant contribution to meeting the winter peak, it is not similarly able to make a significant contribution to meeting a summer peak. Likewise solar, based on the ITRON study, indicates that by 2031 solar will have an ELCC of 45.6% (significantly higher than the 3.6% ELCC attributed to solar by PSE using its annual ELCC methodology for solar) by more than an order of magnitude.

The ITRON report concluded that in a survey it found that only "16% of respondents are making climate change adjustments….to evaluate the impact of increasing temperatures…on electric loads. Average Temperatures in the PSE service area have been increasing since at least the 1950s. On average, temperatures are increasing 0.4 degrees per decade. It is reasonable to assume… that expected CDDs will be higher than the thirty-year average."

Given that the PSE ratepayers will be shouldering the cost of the future VERs which PSE will either contract for and/or build, through the rates charged by PSE to the ratepayers JSR Capital Inc. is of the opinion that it would be prudent for the utility to reconsider its approach to climate change and its impacts on the utility peaking HDD and CDD peak demands by adopting a two-step approach to ELCC using one ELCC for winter, which would favor the wind VERs, and another ELCC for summer, which would favor solar VERs, with a transition between these wind and solar ELCC regimes, during the shoulder months. It bears mentioning, once again, that for resource planning, it may be appropriate to wait for the next IRP to reevaluate temperatures, load shape, and the resulting impact on ELCC. However, for the purpose of the All-Source 2021 RFP Phase 2 evaluation process, waiting is not a prudent decision. Based on its Phase 2 evaluation, PSE will be making resource decisions that will impose additional costs on PSE's customers. PSE is obligated to select resources that are lowest reasonable cost and to make that determination they must utilize the most-recent information available to them.

JSR Capital Inc. appreciate your consideration of the above comments and are available for additional discussions as you may deem appropriate. JSR Capital Inc. appreciate PSE's work to properly establish the correct ELCC resource values for use in Phase 2 analysis.

Respectfully Submitted October 22, 2021 by:

JSR Capital Inc.

By: James Ross
Its: President

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Appendix
Table 10 on page 68 from its ELCC Final Study Report "Review of Puget Sound Energy Effective Load Carrying Capability Methodology" dated October 2021.

Table 10. ELCC by Resource and by Sensitivity in PSE 2021 IRP[22]

WIND AND SOLAR RESOURCES	Capacity (MW)	ELCC Year 2027		ELCC Year 2031	
		Base Scenario	Temp. Sensitivity	Base Scenario	Temp. Sensitivity
Existing Wind	823	9.6%	6.8%	11.2%	6.7%
Skookumchuck Wind	131	29.9%	17.6%	32.8%	9.2%
Lund Hill Solar	150	8.3%	30.3%	7.5%	54.3%
Golden Hills Wind	200	60.5%	49.3%	56.3%	39.3%
Generic MT East Wind1	350	41.4%	28.5%	45.8%	28.1%
Generic MT East Wind2	200	21.8%	13.1%	23.9%	17.7%
Generic MT Central Wind	200	30.1%	23.1%	31.3%	20.9%
Generic WY East Wind	400	40.0%	29.1%	41.1%	32.7%
Generic WY West Wind	400	27.6%	27.2%	29.4%	34.0%
Generic ID Wind	400	24.2%	25.6%	27.4%	28.0%
Generic Offshore Wind	100	48.4%	38.6%	46.6%	27.6%
Generic WA East Wind	100	17.8%	7.8%	15.4%	12.0%
Generic WY East Solar	400	6.3%	13.5%	5.4%	32.5%
Generic WY West Solar	400	6.0%	16.2%	5.8%	36.3%
Generic ID Solar	400	3.4%	16.0%	4.3%	47.3%
Generic WA East Solar	100	4.0%	21.6%	3.6%	45.6%
Generic WA West Solar – Utility-scale	100	1.2%	7.6%	1.8%	20.2%
Generic WA West Solar – DER Roof	100	1.6%	7.6%	2.4%	19.4%
Generic WA West Solar – DER Ground	100	1.2%	7.6%	1.8%	20.2%