



June 5, 2023

Amanda Maxwell
Executive Director and Secretary
Washington Utilities and Transportation Commission
621 Woodland Square Loop SE
Lacey, WA 98503

Re: **Renewable Northwest’s comments regarding Puget Sound Energy’s Electric Integrated Resource Plan Progress Report, Docket UE-200304**

Dear Director Maxwell:

Renewable Northwest (“RNW”) thanks the Washington Utilities and Transportation Commission (“the Commission”) for this opportunity to comment in response to the Commission’s April 21, 2023, Notice of Opportunity (“Notice”) to Comment on 2023 Gas IRP Docket UG-220242 and 2023 Electric IRP Progress Report Docket UE-200304, which Puget Sound Energy (“PSE” or “the Company”) published March 31, 2023.

These comments focus mostly on PSE’s hydrogen cost assumptions to inform its portfolio modeling, some considerations regarding battery energy storage systems (“BESS”), modeling of the Inflation Reduction Act on demand-side resources, and PSE’s projected resource adequacy. We appreciate PSE’s incorporation of stakeholder feedback during this Integrated Resource Plan (“IRP”) cycle, and we look forward to continued collaboration with the company during future IRPs.

COMMENTS

A. Hydrogen Cost Assumptions

To address rising peaking capacity in the coming decade, PSE modeled the use of CETA-qualifying fuels, such as biodiesel and hydrogen. PSE assumed “natural gas to hydrogen

blending would begin at 30 percent hydrogen in 2030 and increase to 100 percent by 2045,” with their preferred portfolio ultimately driving construction of more than 800 MW of new hydrogen peakers by 2045.¹ However, RNW believes the IRP’s hydrogen cost assumptions bear further scrutiny to ensure they do not produce erroneous results.

In this progress report, PSE developed its “hydrogen price forecast based on assumptions from the E3 Pacific Northwest report² and industry consultations.”³ However, the E3 report advises that “in the short-term, it is possible to blend 5-20 percent by volume of hydrogen into the existing natural gas pipeline infrastructure without the need for costly retrofits or upgrades.” In the E3 report’s modeled High-Hydrogen Scenario, “hydrogen is blended into the existing natural gas pipeline at up to 7% (by energy), in order to avoid triggering significant pipeline or end use device infrastructure upgrades.” **RNW is concerned that PSE has thus relied on E3’s reported hydrogen production costs, but failed to account for the cost of significant pipeline upgrades, given its proposed high blending percentage.** If PSE’s hydrogen cost assumptions are too low, this skewed model could erroneously justify the construction of more hydrogen peakers than is economically prudent. RNW recommends the Commission investigate these assumptions to ensure costs are being modeled appropriately.

B. Long Duration Battery Considerations

Compared to PSE’s 2021 IRP, RNW appreciates the increased use of standalone battery storage in the preferred portfolio. The significant uptick in battery storage in the Company’s preferred portfolio appears to be the result of modeling improvements following the Company’s 2021 IRP and developed collaboratively in docket UE-210220 regarding PSE’s 2021 All-Source Request for Proposals. We specifically appreciate the Commission’s attention to this issue in prior dockets and the Company’s approach to undertaking improvements.

For its next resource plan, we would recommend PSE also model an 8-hour Li-ion battery configuration (or an 8-hour consolidated battery technology, to align with NREL’s cost information) and a 24-hour battery. Long-duration energy storage resources will be key to unlocking the value of large-scale renewable energy procurement brought on by the Clean Energy Transformation Act (“CETA”). They would also add value by providing capacity in the dual peaks (early morning and late evening) that PSE sees in its system. As an example, California Community Power, a Joint Powers Agency representing a group of nine Community Choice Aggregator energy suppliers in the state, announced that it would procure an 8-hour

¹ IRP Page 3.10.

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https://www.ethree.com/wp-content/uploads/2020/07/E3_MHPS_Hydrogen-in-the-West-Report_Final_June2020.pdf.

³ Page D-22 of IRP Appendix D: Demand Forecasting Models.

utility-scale Li-ion battery project called Tumbleweed which will have a 69-MW output and 552 MWh of capacity.⁴

We would recommend particular attention to 24-hour batteries. Long duration 24-hour (or longer) batteries are not currently available, and PSE argues that they will evaluate long-duration batteries as they become commercially viable.⁵ However, Xcel Energy has recently entered into a pilot project with Form Energy to develop a 10 MW **100-hour** battery project.⁶ As battery storage technology improves, looking at longer durations seems not just reasonable but highly prudent. This is especially true given PSE's observation regarding the effect of 4-hour batteries on its capacity needs:

The first tranche of energy storage produces a lot of energy during peak demand hours, corresponding to having a relatively high [effective load carrying capacity ("ELCC")]. However, as one adds more energy storage, the net peak demand (load minus energy storage generation) flattens and spans a longer period, see Table 7.3. As a result, the ELCC for these later tranches is lower because the storage has already mitigated during the highest peak demand hours but can't contribute the same reliability value longer due to the limited stored energy available to discharge.⁷

Longer-duration batteries could help to address a longer, flatter net peak. Given other energy providers' procurement of 8-hour Li-ion batteries and the increasing commercial viability of 24-hour batteries, we recommend these technologies be closely investigated in the Company's next IRP.

C. IRA Demand-Side Modeling

We agree with PSE that analyzing the effects of the Inflation Reduction Act on the demand side as well as the supply side will be an illuminating exercise. For consideration in this revised demand-side analysis, we reiterate our above observation that electrification does not have to result in an increased peak. We recommend the company consider whether and how it can integrate increasing building and transportation load into an evolving grid either by using

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<https://www.solarpowerworldonline.com/2022/01/7-california-ccas-sign-on-for-nearly-70-mw-long-duration-energy-storage-project/>.

⁵ IRP page 2.7. We would note, however, that PSE simultaneously relies on modeling hydrogen for its resource plan, which is likewise an emerging technology that has not proven to be commercially viable.

⁶ <https://formenergy.com/form-energy-partners-with-xcel-energy-on-two-multi-day-energy-storage-projects/>.

⁷ IRP page 7.7.

economic tools to shape demand patterns or by investing in technology that could help give the company direct control over electrification load.

D. Resource Adequacy

Regional reliability and the ability of individual utilities to achieve resource adequacy are increasingly challenging and dynamic questions in the West, as the region transitions from heavy reliance on thermal resources as a complement to hydroelectric generation to increasing reliance on variable renewable resources. Aggressive clean energy standards paired with retirement of coal-fired generating resources across the region have led to new approaches for both analyzing and achieving resource adequacy, from increasing reliance on complex probabilistic modeling efforts to the development of the Western Resource Adequacy Program (“WRAP”). Against this backdrop, we offer some thoughts on elements of the company’s IRP that relate to resource adequacy. Because this IRP is essentially an interim filing, we intend this section not as a critique of the company’s work, but rather as food for thought for the next planning cycle.

To start, the IRP identifies a planning reserve margin (“PRM”) of 23.8%⁸ and further discusses an E3 analysis indicating a PRM of 26%.⁹ The IRP indicates that its identified PRM “result[s] in a capacity deficit of 2,629 MW” and attributes the increased PRM to the company’s use of climate change-adjusted weather data and increased load related to electric vehicles.¹⁰ Given that the North American Electric Reliability Corporation has identified a norm for PRMs of “15 percent ... for predominately thermal systems and 10 percent for predominately hydro systems”—while admittedly not directly addressing PRMs for systems with high concentrations of renewable resources—the Company’s PRM seems high.¹¹ To the extent this analysis is driving a plan to invest in new thermal resources at a time when those resources rely on speculative future fuel plans and may well become stranded in the future, the analysis deserves close scrutiny. Below, we identify three elements that may merit particular attention.

First, the demand forecast presented in the IRP appears to show a very significant contribution to peak demand from electric vehicles over time.¹² It is fair to question both whether this forecast is likely to reflect actual charging patterns (especially given the ability of home charging

⁸ IRP page 3.14.

⁹ IRP page 7.12.

¹⁰ IRP pages 3.14–3.15.

¹¹ <https://www.nerc.com/pa/RAPA/ri/Pages/PlanningReserveMargin.aspx>.

¹² IRP Figure 6.15 (which, according to page 6.31, “shows the December evening peak demand” attributable to electric vehicles).

stations to delay charging until post-peak hours) and whether the company can avoid this pattern either through time-of-use rates or through future control over “smart” home charging.

Second, the IRP reduces the company’s reliance on short-term markets during peak demand hours “by more than 200 MW per year starting in 2024,” eventually reaching zero by 2029.¹³ Woven throughout the IRP are references to the region’s tightening capacity position. What is not clear, however, is that a reduction to zero by 2029 is reasonable or appropriate. This is especially questionable given the company’s investment in the development of the Southwest Power Pool’s Markets+ initiative.¹⁴ The company’s approach to market purchases may well result in a plan to invest in new capacity resources that will ultimately prove unnecessary in short order and at customers’ expense. It is worth putting more careful thought into how to model markets in this admittedly dynamic time.

Third, the IRP includes two interesting analyses related to the WRAP, in which the company is a participant. First, the company notes that it “cannot run the long-term capacity expansion model to evaluate [a WRAP sensitivity] due to incomplete information regarding ELCC saturation curves ...”¹⁵ This is fair enough but we anticipate a remedy prior to the company’s next IRP. Second, PSE did produce an estimate using WRAP values—which is appropriate, as sharing capacity as through the WRAP should result in different capacity contribution values and a different PRM—and that estimate showed that its participation in WRAP would likely reduce its PRM by several percentage points and its capacity needs by hundreds of megawatts.¹⁶

One final note on resource adequacy: we would like to reiterate our note above regarding the effect of storage resources on the company’s ability to achieve resource adequacy. Just as short-duration storage resources have the effect of reducing and lengthening the company’s projected net peak, so long-duration storage could potentially flatten the peak to the point of eliminating it and significantly reducing the company’s PRM—and its need to invest in new peaking units.

E. Transmission

We appreciate the company’s observations regarding regional transmission constraints in Section 2.10. These constraints are some of the most significant barriers to achieving the clean energy transformation mandated by Washington law. PSE’s work to quantify these constraints

¹³ IRP page 7.16.

¹⁴ Markets+ does not appear to be mentioned in the IRP; neither does CAISO’s Extended Day-Ahead Market.

¹⁵ IRP page 8.27.

¹⁶ IRP pages 7.22 and 8.27–8.28.

and begin developing a proactive response is appropriate, and we look forward to the company's continued work in this space as it develops its next IRP and CEIP.

CONCLUSION

RNW thanks the Commission for their consideration of this feedback. We are optimistic that the changes and additional analysis we have recommended above will help PSE identify a least-cost portfolio that also puts the Company on a path to achieving CETA's clean energy standards and the Company's own emission reduction goals. We look forward to continued engagement as a stakeholder in future IRP processes.

Respectfully submitted,

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