

July 9, 2021

Public Utility Commission of Oregon
201 High Street SE, Suite 100
Salem, OR 97301-3398

Re: PacifiCorp Comments on Staff's Effective Load Carrying Capability (ELCC) Straw Proposal

PacifiCorp, d/b/a Pacific Power (PacifiCorp) provides these comments in response to the Public Utility Commission of Oregon (Commission) Staff Straw Proposal for ELCC modeling standards (ELCC Straw Proposal). PacifiCorp appreciates the opportunity to provide these comments, as well as the efforts of Staff to identify areas of consensus and compromise among stakeholders through its solicitation of written comments and hosting of workshops. The ELCC Straw Proposal would benefit from additional discussion among the stakeholders either through comments and/or workshops because as written the ELCC modeling standards adds an onerous amount of work for PacifiCorp that would not achieve the objectives intended.

Requirement 1:

As proposed in the ELCC Straw Proposal, Requirement 1 would necessitate on the order of three weeks of model run time, *for every resource/location/configuration under consideration:*

1. A 20 year, multiple-iteration study (with varying load, outages, etc. PacifiCorp has previously performed 500 iterations loss of load analysis) with the resource being evaluated. This could represent around a week of model runtime.
2. A 20 year, multiple-iteration study (with varying load, outages, etc.) with an estimate of the perfect capacity resource equivalent being evaluated. This could represent around a week of model runtime. The estimate is almost certain to be higher or lower than desired, resulting in one portfolio being more reliable than the other
3. To revise the perfect capacity input and rerun the 20-year study – an additional week of run time.
4. If studies 2 and 3 manage to over- and under-estimate the capacity value, interpolating between the two might produce a reasonable ELCC, as long as the values are not too far apart. The accuracy of the interpolation would depend on a number of factors and is likely to vary. Additional studies might be required to refine the results.

PacifiCorp's Integrated Resource Plan (IRP) has hundreds of resource options in numerous locations. Parties have raised the prospect of evaluating a range of combinations, with factors such as: DC:AC ratio, storage capacity, and storage duration, and those are just for combined solar and storage resources. The resulting analysis would be obsolete before it is complete. It would also require significant additional effort as new resource options are identified (offshore wind, hydrogen, ocean thermal energy conversion, space-based solar power, etc.). In addition to

being onerous, the functionality and details of the modeling will be opaque to nearly all stakeholders. A single “perfect capacity” estimate for each resource will mask possible synergies or diminished benefits from including a variety of resources in a portfolio. While running a solar and storage combination through the proposed process is reasonable, the combinations become exponential when paired resources are being drawn from multiple locations, for instance Oregon solar and Idaho wind.

The results from Requirement 1 are also portfolio-dependent, meaning that the rest of the portfolio (besides what is being evaluated) influences the results. If a significant transmission build is being contemplated, it could meaningfully change the capacity contribution of other components, as a result of the resource opportunities it makes available. Similarly, if a substantial number of thermal resources are to be retired and replaced by batteries, the contribution of those batteries will be lower if they represent 40 percent of the Company’s peak requirements than if they were only 10 percent of the Company’s peak requirements. The ELCC results under the proposed Requirement 1 will not be equally applicable under the examples identified above, making them effectively useless for the intended purpose of “planning and reliability.”

Instead, PacifiCorp would ask Staff and stakeholders to consider whether a single 20-year multiple-iteration study, performed using the IRP preferred portfolio, could provide sufficient detail to meet many of the needs being considered in this proceeding. The resulting loss of load event data, by iteration, can be used to identify whether any resource/location/configuration would have contributed to a more reliable system. This is known as a “Capacity Factor Approximation Method” and is described in Appendix N of PacifiCorp’s 2019 IRP. PacifiCorp acknowledges that this method may not be sufficient for duration-limited resources such as energy storage and certain demand response programs, because loss of load data on its own does not identify how much additional energy could have been stored (or shifted) in hours without loss of load events before triggering shortfalls. PacifiCorp is open to discussions to identify a technique to address duration-limited resources.

Because the results of the proposed study would be based on the preferred portfolio, utilities would be obligated to demonstrate that their preferred portfolio and any other portfolios under consideration provide the desired level of reliability, just as they do today. Any portfolio which does not provide adequate reliability is irrelevant for purposes of comparison – it would need to have resource additions sufficient to make it reliable. As a result, individual resource contributions are secondary to ensuring reliable operation with a portfolio as a whole and are likely better interpreted as an IRP output than an IRP input.

Requirement 2:

While PacifiCorp has concerns with the application of the ELCC by resource type as described above, it generally agrees with the reporting details identified in Requirement 2. PacifiCorp offers the following additional comments on specific aspects of Requirement 2:

Requirement 2(c). PacifiCorp's proposal would allow for a relatively simple spreadsheet to be used to calculate the contribution of any resource, thereby ensuring that differences in characteristics can be captured and the resulting effects reviewed by all interested parties. Indeed, such a spreadsheet already exists in the form of the Resource Value of Solar template adopted by the Commission in dockets UM-1910/1911/1912, which is designed around the use of resource-agnostic reliability data such as that to be collected under PacifiCorp's proposed preferred portfolio reliability analysis.

Requirement 2(d). PacifiCorp's proposal is also conducive to evaluation of energy efficiency and other demand-side programs that may represent a vast array of resource profiles.

Requirement 2(e). Since PacifiCorp's proposal only requires a detailed reliability analysis to be performed once, on the preferred portfolio, preparing annual results for the entire IRP study term is more likely to be reasonable. PacifiCorp would caution that changes in capacity contribution from year to year are also likely to be associated with changes in the net cost of capacity from various resource types. The contribution, performance, and costs of capacity resources thus need to be changed in coordination, and interpolating may not yield reasonable results.

Requirement 2(g). PacifiCorp opposes the requirement that only committed, firm resource additions be used in the analysis. Any portfolio which does not provide adequate reliability is irrelevant for purposes of comparison – it would need to have resource additions sufficient to make it reliable. The optimized selection of those future resources is in indeed the intent of the IRP preferred portfolio. In the absence of a mix of future resource additions optimized to reliably and cost-effectively serve load, a utility will be unable to reliably serve load, and capacity contribution data will be skewed in manner that will be inconsistent with the benefits customers would expect to receive when resources are operated as part of complete portfolio.

Requirement 3:

PacifiCorp appreciates the importance of variations in renewable resource output and system reliability, but is concerned that the ELCC Straw Proposal does not adequately capture the inter-related nature of renewable resource output relative to nearby resources of the same type, resources of different types, and relative to load.

The mean and variance of an individual renewable resource has little to do with system reliability on its own. While synthetic data from disparate third-party sources may appear reasonable on their face based on review of these parameters, if that data is inconsistent with other renewables or load in the region it will produce inaccurate system-level results. While PacifiCorp agrees that multiple years of data would be helpful, the ELCC Straw Proposal's use of synthetic third-party data to ensure eight years of data is arbitrary and unlikely to lead to a coherent result. In particular, PacifiCorp would note that studies have shown that the short-term volatility of wind power does not vary significantly from year to year. [*see Long-Term Wind*

Power Variability. Y. H. Wan. Technical Report, NREL/TP-5500-53637. Retrieved online at <http://www.nrel.gov/docs/fy12osti/53637.pdf>].

As a result, while many years of data are necessary to determine the potential variation in annual or monthly output, the range of hourly and daily variation is less likely to require a many-year sample. Given the complexity of this topic, PacifiCorp does not believe that the proscribed methodology proposed in the ELCC Straw Proposal will produce an enduring result. Best practices are likely to evolve over time and the trade-offs inherent in any modeling exercise may require a more nuanced approach. This is especially true in light of potential climate-related effects that may be increasingly relevant and for which very little is known. While PacifiCorp does not have specific proposals at this time, it does recommend that this issue distinguish between at least the three following parameters related to renewable resource output:

1. Monthly generation forecasts and variability;
2. Hourly generation forecasts and variability; and
3. Additional review of forecasts and variability during peak-producing conditions, the resource performance during the days with the highest load and/or the lowest renewable output.

While individual forecasts and variability may be of interest, they are only relevant for the monthly generation forecast. For hourly and peak conditions, the aggregate forecast is more important, especially an individual resource's incremental contribution to the total.

Requirement 4:

PacifiCorp agrees that incorporating the relationship between load and renewable resource generation is an important aspect of reliable system operation and capacity planning.

Requirement 5:

PacifiCorp agrees that capturing the impact of energy-limited resources such as energy storage and demand response is an important aspect of reliable system operation and capacity planning.

Respectfully submitted,



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