PacifiCorp - Stakeholder Feedback Form

2019 Integrated Resource Plan

PacifiCorp (the Company) requests that stakeholders provide feedback to the Company upon the conclusion of each public input meeting and/or stakeholder conference calls, as scheduled. PacifiCorp values the input of its active and engaged stakeholder group, and stakeholder feedback is critical to the IRP public input process. PacifiCorp requests that stakeholders provide comments using this form, which will allow the Company to more easily review and summarize comments by topic and to readily identify specific recommendations, if any, being provided. Information collected will be used to better inform issues included in the 2019 IRP, including, but not limited to the process, assumptions, and analysis. In order to maintain open communication and provide the broader Stakeholder community with useful information, the Company will generally post all appropriate feedback on the IRP website unless you request otherwise, below.

Date of Submittal 2/5/2019

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*Organization: National Grid Ventures

Address: Click here to enter text.

City: Click here to enter text. State: Click here to enter text. Zip: Click here to enter text.

Public Meeting Date comments address: **1/24/2019** ☐ Check here if not related to specific meeting

List additional organization attendees at cited meeting: David Howarth

*__IRP Topic(s) and/or Agenda Items:__ List the specific topics that are being addressed in your comments.

Energy Storage Capacity Contribution

☐ Check here if any of the following information being submitted is copyrighted or confidential.

☐ Check here if you do **not** want your Stakeholder feedback and accompanying materials posted to the IRP website.

*__Respondent Comment:__ Please provide your feedback for each IRP topic listed above.

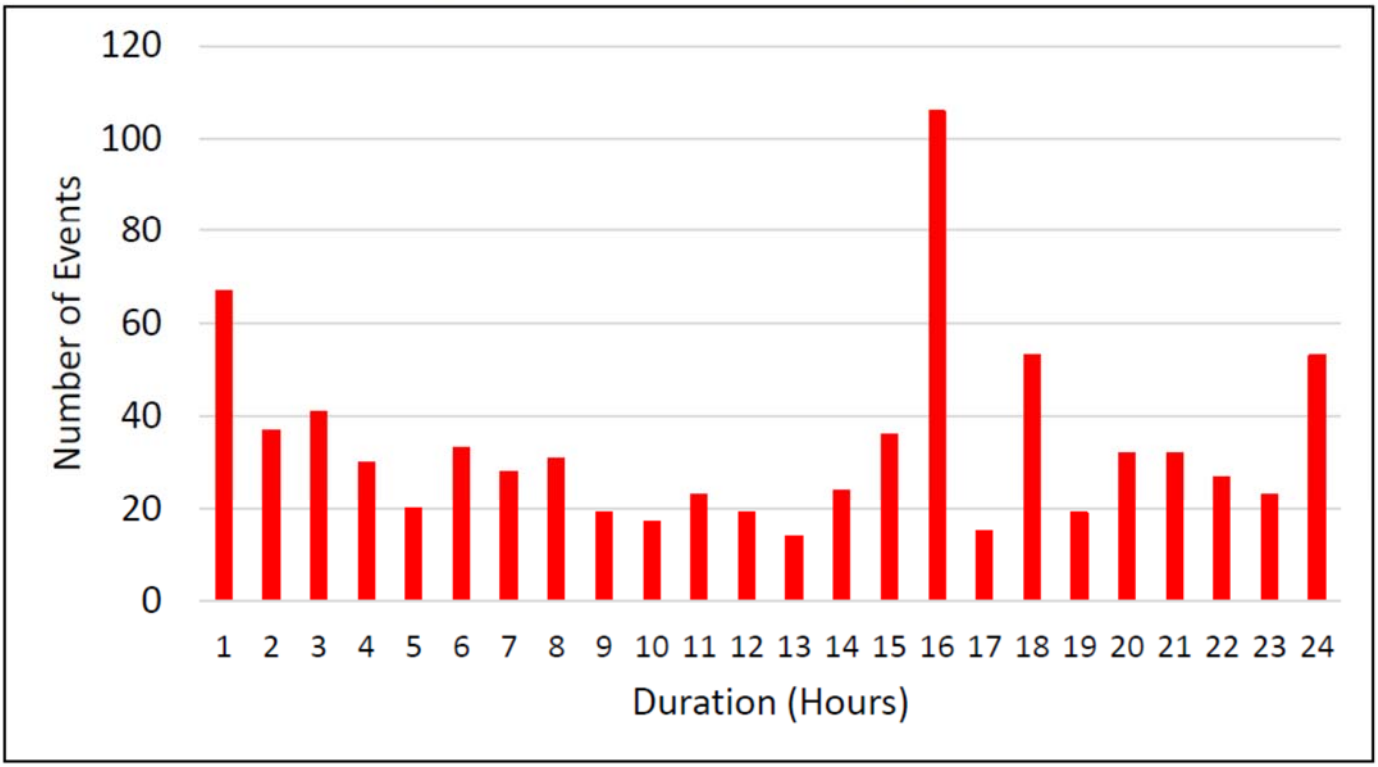
Thank you for providing the explanation of the Capacity Factor Approximation Method (CF Method) for estimating the capacity contribution of energy-limited resources and the way you have applied this method to energy storage resources. We understand that this method involves selecting a test year (2030 for summer and 2036 for winter) and then estimating the loss-of-load probability in every hour based on the results of 500 stochastic iterations. The capacity contribution of a storage resource with a given duration is then based on the proportion of events for which the resource is available to deliver capacity (i.e., not depleted or charging).

While we understand that the CF Method approximates capacity contribution and that other methods may be too computationally intensive for use in the IRP, we are concerned that Pacificorp's application of the CF Method using a test year may overestimate the capacity contribution of short-duration storage in some cases. For example, Pacificorp is currently performing studies to evaluate the economics of retiring coal plants earlier than assumed in the test years used to evaluate capacity contribution. A potentially significant reduction in thermal capacity is likely to lead to longer duration instances of capacity shortage, reducing the relative capacity contribution of storage resources able to provide fewer hours of supply. Likewise, Pacificorp has assumed 1,425 MW of capacity from front-office transactions through 2036. The reliability of this supply of firm capacity outside of Pacificorp's system is uncertain over such a time frame, especially if there are significant retirements of fossil generation in the region.

* Required fields

Finally, it is unclear the extent to which the stochastic simulations address low hydro conditions. The test year is based normal conditions, including hydroelectric supply. Hydro conditions can vary significantly from year to year. Supply adequacy is most at risk during low hydro years and capacity shortfalls can occur over extended periods. The Northwest Power Conservation Council's "NW Power Supply Adequacy Assessment for 2023," which models river volume as a random variable, found that the average load curtailment duration was 21 hours. Figure 2 from the report shows the distribution of load curtailment events by duration.

Figure 2: Event Duration Histogram



As seen above, outages of up to 4 hours represent less than 20% of the 1,018 total curtailment events (events over 24 hours are not depicted on the chart). The most common event duration is 16 hours, but this is because the hydroelectric system's output is adjusted, whenever possible, to spread any anticipated unserved energy across all 16 peak hours of the day (e.g., a 2-hour shortage of 800 MW becomes a 16-hour shortage of 100 MW). However, even if all 16-hour events are assumed to be 4 hours or less before smoothing, the outages of up to 4 hours represent just 25-30% of the total. Increasing the storage duration to 10 hours captures 40-45% of the events (~50% more than the 4-hr battery). These results suggest that, even before considering fossil retirements, Pacificorp's application of the CF Method may be overestimating the ability of 4-hr storage to address future capacity shortfalls and avoid curtailment events.

Data Support: If applicable, provide any documents, hyper-links, etc. in support of comments. (i.e. gas forecast is too high - this forecast from EIA is more appropriate). If electronic attachments are provided with your comments, please list those attachment names here.

Pacific Northwest Power Supply Adequacy Assessment for 2023, Document #2018-7, June 14, 2018.
https://www.nwcouncil.org/sites/default/files/2018-7.pdf

* Required fields

Recommendations: Provide any additional recommendations if not included above - specificity is greatly appreciated.

We are concerned that if the CF Method is overestimating the capacity contribution of 4-hr batteries versus longer-duration pumped storage, these assumptions may be introducing a bias to System Optimizer and that the resulting portfolios may not include any pumped storage. Since we expect that the benefits of longer-duration storage are more likely to be revealed through application of the Planning and Risk (PaR) model, it would be unfortunate if pumped storage were not considered at that stage of analysis, especially when explicity modeling significant retirements of coal-fired generation. As an alternative to performing a more extensive analysis of capacity contribution, we would appreciate Pacificorp including sensitivities in which a portion of the new capacity is provided by pumped storage resources so that the PaR results can be compared to the results for portfolios produced by System Optimizer without that constraint.

Please submit your completed Stakeholder Feedback Form via email to IRP@Pacificorp.com

Thank you for participating.

* Required fields