Northwest **Power** and **Conservation** Council

July 21, 2023

VIA ELECTRONIC FILING

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

RE: UM 2143—Northwest Power and Conservation Council Comments for the Investigation into Resource Adequacy in the State –

Staff of The Northwest Power and Conservation Council (Council) commends the efforts of the Public Utility Commission of Oregon to promote dialogue and collaboration on resource adequacy. With the development and implementation of the Western Resource Adequacy Program (WRAP), alongside growing attention to CAISO's Extended Day-ahead Market (EDAM) and SPP's Markets+, states are facing key opportunities to influence resource adequacy considerations and future directions of resource planning.

Council staff welcomes continued engagement and technical collaboration with the Public Utility Commission of Oregon and regional stakeholders to support its investigation of resource adequacy. As power systems are evolving in response to federal and state policies, adequacy perspectives evolve as well to meet uncertain planning environments. To expand the discussion about adequacy, Council staff would like to share its new multi-metric approach that more accurately describes the changing risks of the power system. Specifically, this approach captures the nature of frequency, duration, and magnitude of shortfall risks to set limits on the occurrence of major (very long and very big) shortfalls.

Historically, the Council has used the Loss of Load Probability (LOLP) metric to capture the risk of facing one year with one or more resource shortfalls (signaling a potential curtailment when supply cannot meet demand) in a year. Typically, shortfall challenges were associated with a combination of a low water year and higher loads. The threshold for determining if the power system was adequate was set to 5 percent LOLP, meaning a probability of 1-in-20 years to experience a supply side shortfall. For a system that heavily relied on thermal resources, hydropower, and energy efficiency to supply demand, this frequency metric was appropriate for representing shortfall risk, as generation availability was highly predictable.

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However, the response to substantial decarbonization policies and electrification efforts leads to major changes in the power system. Specifically, transitioning towards a heavy reliance on renewable variable generation, increasing load growth from electrification, and uncertainty in timing of commercially available new energy technologies requires a more nuanced representation of shortfall risk. The transitioning and future power system must plan for multiple layers of growing uncertainties: timing of rapid load growth, effects of climate change, supply-side renewable generation, and lastly, planning under constrained transmission systems.

The question we face now is no longer just "how frequent are events?" under these planning environments, but also "how long" and "how big" they are. These questions become more important as two or more systems with the same LOLP (or related frequency metric) can have widely different event durations and magnitudes. To capture the risk of frequency, duration, and magnitude of events, the Council has developed an adequacy approach with the objectives of preventing overly frequent use of emergency measures (to mitigate shortfalls) and limiting occurrences of very long, big capacity, and big energy shortfalls. To achieve these objectives, the approach focuses on expected frequency of events, and tail-end event statistics.

The selected metrics include Loss of Load Events (LOLEV), and Value at Risk for the 97.5th percentile ($VaR_{97.5}$) for Duration, Peak and Energy respectively, as described in Table 1 below. For a full explanation of the development and calculation methods see the Council's 2027 Adequacy Assessment. While the metrics themselves have been selected, the levels of risk, or the adequacy threshold, for determining whether a system is adequate are currently provisional. For context, the 5% LOLP threshold represents accepting the risk tolerance of experiencing at least one year with a shortfall out of twenty years. Accepting this risk threshold does not necessitate a shortfall will occur, but rather signifies that the system is considered adequate as long as no more than 1-in-20 years will have a shortfall. In other words, adequacy thresholds represent the limit of risk that stakeholders are willing to accept, as no system can economically be designed for an expected level of 100% adequacy (i.e., 0% LOLP is not economically feasible).

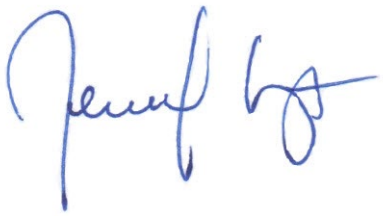
Table 1: Summary of Council's New Multiple Adequacy Metrics

Metric	Definition and Adequacy Limit
LOLEV (Events/year)	Loss of Load Events = Expected number of shortfall events/year, (total number of shortfall events divided by total number of simulations) Provisional limit ranges from 0.1 or 0.2 shortfall events/year
Duration $VaR_{97.5}$ (Hours)	Duration Value at Risk = Longest shortfall event for the 97.5th worst simulation year Provisional limit ranges 8 to 12 hours
Peak $VaR_{97.5}$ (MW)	Peak Value at Risk = Highest single-hour shortfall for the 97.5th worst simulation year Provisional limit ranges from 2,000 to 3,000 MW
Energy $VaR_{97.5}$ (MWh)	Energy Value at Risk = Total annual shortfall energy for the 97.5th worst simulation year Provisional limit ranges from 4,000 to 8,000 MWh

The Council is currently engaging with stakeholders to evaluate the thresholds of [1] the acceptable level of shortfall duration, peak-hour unserved energy, and annual unserved energy to plan for (see table 1 for levels), and [2] the risk tolerance of how often to plan for it. The provisional risk tolerance for frequency suggests a range of 1-in-10 and 1-in-5 year (0.1-0.2 LOLEV) standard as observed in the industry. For duration, peak-hour unserved and annual energy unserved the question is how long (hours) and how much (MW and MWh) emergency measures are available for the region to mitigate shortfalls that would be outside the capabilities of the bulk power system. As these metrics focus on the tail-end events (the major shortfalls to mitigate) they are held to a higher risk tolerance of avoiding very long and big events 39-out-of-40 years. This means that 39-out-of-40 years the system would be able to protect against minor shortfalls, accepting the risk of a major shortfall only 1-in-40 years (corresponding to $VaR_{97.5}$). All four metrics must be satisfied for a system to be deemed adequate, and the final threshold values will be determined for the next power plan.

Council staff recognize the evolving nature of regional adequacy perspectives, especially as utilities and regulators balance individual adequacy approaches and aligning with WRAP guidelines of 0.1 Loss of Load Expectation (LOLE). The multi-metric approach pursued by the Council offers a complementary holistic view of regional adequacy, and a convenient platform for promoting regional dialogue about the system risks. Staff are committed to working with the Public Utility Commission of Oregon and other stakeholders in the region to ensure that our efforts connect to and support these other regional efforts.

Sincerely,



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