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Phase 1 - Pacific Northwest ELCC Sensitivity Study Synopsis

The Pacific Northwest is facing a supply gap in the coming years driven by increasing electrification and demand from new large load growth. To meet the growth in demand, the public and private utilities in the region must evaluate new generation and storage resources to determine their value. The procurement of new resources is driven by factors such as generation and transmission costs, clean energy goals, and their ability to provide accredited (firm) capacity, among many others. This study addresses the accredited capacity value offered by renewables, storage, and combustion turbines in the Pacific Northwest. It also investigates how sensitive accreditation is to the way planners represent their system in power system models. The goal is not to identify the "correct" accredited capacity value of all resources, but rather to further the conversation around how modeling assumptions affect firm capacity values and where gaps may exist for the industry to investigate and improve.

The phase 1 work revolved around a series of sensitivity analyses for the 2026 system where we calculated the equivalent load-carrying capability (ELCC) of energy storage resources (4-hr, 8-hr, and 24-hr), Oregon wind, Oregon solar, and natural gas combustion turbines. Each sensitivity modified a single assumption to test how the ELCC of the candidate resources differed. For each resource we also evaluated the ELCC when returning to the starting loss of load expectation criterion (0.1 days/year), or returning to the expected unserved energy criterion at 0.1 days per year LOLE.

The modeling sensitivities were:

- Hydropower dispatchability beyond load-following mode
- Mixing weather year conditions (load, wind, and solar) with varying water year conditions (hydropower availability) or keep them correlated (2000 water with 2000 weather)
- Battery operations (arbitrage against net load or hold back for reliability)
- Random (independent) or correlated cold weather outages on new thermal units
- Modeling neighbors when accrediting resources

The results of our study revealed that how planners set up their models—including how hydropower and water availability are represented and how neighbors are represented—will dramatically change accreditation results for energy storage resources of all durations. Energy storage resources also receive a higher accreditation when evaluated against loss-of-load expectation criteria versus expected unserved energy. This indicates accreditation may benefit from evaluating both frequency and magnitude. The headline results for energy storage resources showed that when modeling neighbors (CAISO, NWMT, WAUW, and PACE), energy storage accreditation significantly increased due to the load and resource diversity benefits across the western interconnection. Energy storage also enabled shifting of imports to moderate hydropower risks in low water years and meet peak load.

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Phase 1 - Pacific Northwest ELCC Sensitivity Study Synopsis (Continued)

For local Oregon solar and wind, ELCC values were consistently below 10%. The primary benefit of increased local renewable energy will come alongside energy storage resources to enable conservation of water resources to better optimize hydropower during low water years. External solar and wind resources were not evaluated, but weather diversity, particularly for winter risks in low water years, could receive higher accreditation. Enabling this requires transmission access and likely wide-area resource adequacy programs or markets that avoid seams and inefficiencies.

For new natural gas combustion turbines, accreditation was consistently high at 90% unless new units face cold weather outage risks due to fuel supply disruptions or lack of weatherization. Historical data for the Pacific Northwest is sparse regarding correlated outage risks for the gas system. However, gas demand is highly dependent on storage. Two sensitivities evaluated the ELCC for new gas CTs based on an incremental forced outage rate trending from 0% increased risk at 25 degrees F to 10% or 30% at -5 degrees F or lower using example public data from SPP and MISO. Results showed new natural gas CTs could have accreditation ranging from 55% to 90% depending on cold weather outage risks.