

Results Table Legend

MWs Retired

- This column reports the amount of capacity assumed to have retired in this portfolio, presented in megawatts (MW).

Capacity Mix to Achieve Frequency Target

- This column indicates the capacity mix of the resources added to the portfolio to achieve the targeted frequency: either adding 100% combustion turbines (CTs) or a mix of resources based proportionately on the May 2023 Capacity, Demand & Reserves (CDR) Report.

Portfolio Reserve Margin (Summer and Winter)

- These columns present reserve margins for the summer and winter seasons respectively that reflect the Effective Load Carrying Capability (ELCC) of wind, solar, battery storage and non-Private Use Network (non-PUN) thermal resources.

Expected Unserved Energy

- This column includes the Expected Unserved Energy (EUE) across the 5,250 simulations, effectively a EUE-weighted average for the resource portfolio.

MWs of Additional (new) Dispatchable Generation

- This column reports the amount of “non-summer” CT capacity added to the portfolio to achieve the LOLE in the FREQUENCY column.

Fixed Cost of Additional CT Generation

- This column includes the fixed capital cost of the CT capacity added to the portfolio in thousands of dollars per year.
- The capital cost is based on the Cost of New Entry (CONE) value of \$119/MW-year (i.e., \$119,000/kW-year) and reflects overnight construction costs and levelized fixed Operations & Maintenance (O&M) costs.
- Note that the capital costs reported in the results table only reflect those for the incremental CT additions needed to meet a reliability standard; the capital costs for the solar and battery resources are assumed to be sunk regardless of the reliability standard assumptions.

Total Variable Costs

- This column reflects the sum of total production and capacity scarcity costs in millions of dollars.
- Capacity scarcity costs include load curtailments costs (valued at \$5,000 per MWh of Expected Unserved Energy), the cost of spin/non-spin reserve deployment, dispatched Load Resource costs, and Emergency Response Service costs.
- Note that the Total Variable Costs diminish as the reliability of a portfolio increases. The decreases reflect lower capacity scarcity costs as well as lower production costs due to replacement of retired resources with advanced CTs and, for the CDR Mix scenarios, battery and solar capacity.

Total Cost

- This column presents the sum of annual capital costs for CT capacity by adding the Fixed Cost of Additional CT Generation column and the Total Variable Costs column.

Max Duration

- This column presents the maximum duration (in hours) of the event that occurred in this scenario.

Max Magnitude

- This column presents the maximum magnitude (in MW) of the event that occurred in this scenario.

Exceedance Probability Required for Duration

- This column indicates the likelihood that the duration (in hours) for a portfolio will be higher than the risk tolerance threshold indicated in the DURATION column.
- Note that as the portfolio LOLE decreases, the exceedance probability decreases.
- An exceedance probability of 0% indicates that the portfolio, at the given LOLE, has a maximum event duration that is less than the DURATION threshold.

Exceedance Probability Required for Magnitude

- This column indicates the likelihood that the Loss-of-load event magnitude (in MWs) will be higher than the risk tolerance threshold indicated in the MAGNITUDE column.
- Note that as the portfolio LOLE decreases, the exceedance probability decreases.
- An exceedance probability of 0% indicates that the portfolio, at the given LOLE, has a maximum event magnitude that is less than the MAGNITUDE threshold.

Annual Incremental Fixed Cost of EUE Reduction

- This column reports the annual incremental fixed capital cost needed to avoid a MWh of EUE based on the LOLE of the portfolios.
- For example, moving from a 1-in-5 LOLE CDR mix portfolio (i.e., scenario #9 in the table) to a 1-in-10 LOLE CDR mix portfolio (scenario #10) results in a capital cost of \$56,360 per MWh of avoided EUE. Moving to a 1-in-15 LOLE CDR mix portfolio (scenario #11) increases the cost to \$252,922 per MWh of avoided EUE. The capital cost thus increases by 3.5 times, indicating that the marginal capital cost of additional CT capacity increases significantly as the target LOLE level for a resource portfolio decreases.
- Note that these values do not reflect system costs associated with avoiding scarcity events and the implied cost of unserved energy (i.e., a Value of Lost Load (VOLL) at \$5,000 per MWh).