SERVM Production Cost Modeling Results: Unit outage rates resulting from 2024 RA modeling

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Purpose

- Present unit outage rates (EFOR, EFORd, startup probability) for certain unit categories resulting from input data entered into SERVM.
- Benchmark against CAISO outage data for use in the RA proceeding

Contents:

- Background and summary of unit outage rates
- Outage rates resulting from production cost modeling for RA (2024 study year)

Background

- The CPUC runs production cost modeling to assess reliability of the electric fleet.
- Most production cost models make use of unit outage data, generally based on NERC Generating Availability Data Systems (GADS) data.
    - Each generator owner in NERC is required to electronically submit forced and maintenance data including records of individual outages, and outages on specific components of the power plant.
    - These individual outage records are aggregated and analyzed to produce a variety of statistics that are eventually used in system reliability studies, including maintenance rate, EFOR, startup probabilities, and other data.
    - EFOR data is entered into SERVM as a distribution of time to fail and time to repair values, and SERVM stochastically draws from distribution when dispatching the unit each hour in SERVM.
- CAISO has proposed to also use outage data in NQC calculations, using an Unforced Capacity approach which derates the NQC of a power plant by it's EFORd
    - Some resource types (like storage or hybrids) may have NQC calculations that are not based on a UCAP approach. Nevertheless, outage rates are applied when modeled in SERVM just ot be sure they re accurately represented in the model.

Outage rates in SERVM modeling for RA (2024 study year)

CAISO Unit Category	EFOR (%)	EFORd (%)	Startup probability (%)
Battery Storage	5.4	0.0	97.9
BTM Battery Storage	4.9	0.0	97.9
CC	9.1	7.7	98.6
CT	22.1	11.2	99.5
Geothermal	0.9	0.9	98.2
HybridStorage	6.3	0.0	97.8
PSH	5.2	0.0	97.9

This outage information is used to dispatch generators in SERVM. Some of these resource types (like hybrids or storage) may have NQC derived from ELCC or exceedance methods that do not use outage rates as an input, but it is still important to simulate the generators accurately.

Notes on outage rates:
- These outage rates are based on class averages by technology type derived from GADS data and entered into SERVM.

- Other types of resources (Wind, solar, biomass) do not have outage rates entered into SERVM. Steam and Coal technology types not used in RA modeling for 2024.

- EFOR information is entered into the model as a distribution of time to repair and time to fail values built around the GADS EFOR and EFORd statistics.

- Outage rates in results partially depend on usage in model over the course of the year.