Revised SERVM PCM Results:
30 MMT Portfolio with 2021 IEPR-ATE scenario IRP (R.20-05-003) CAISO 2023-24 Transmission Planning Process Portfolio Analysis

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Purpose

- Present revised SERVM production cost modeling (PCM) inputs and results to support the CAISO 2023-2024 Transmission Planning Process (TPP)
  - 30 MMT Portfolio paired with the California Energy Commission's 2021 Integrated Energy Policy Report (IEPR) electric demand forecast – managed mid demand paired with the Additional Transportation Electrification (ATE) scenario
- Proposed Decision (PD) in Rulemaking (R.) 20-05-003 mailed in January 2023, "Ordering Supplemental Mid-Term Reliability Procurement (2026-27) and Transmitting Electric Resource Portfolios to CAISO for 2023-2024 TPP", included reliability modeling results for the TPP base case portfolio
- Staff revised modeling since the PD, with the adopted decision D.23-02-040 providing updated reliability modeling results for the TPP base case portfolio (note: portfolio resource composition was unchanged). This document provides supporting detail to D.23-02-040 section 3.1.6.2 regarding the reliability study input and results.

Contents

- Background and summary of results
- Modeling Changes and Descriptions of inputs, modeling conventions, recent updates
- Revised Reliability and PCM analysis results (2026-2035)

Summary of revised results

For the 30 MMT TPP Base Case Portfolio paired with the 2021 IEPR managed mid demand forecast and ATE scenario, model years 2026, 2030, 2033 and 2035:

- Patterns in GHG emissions and generation are reasonable, and LOLE results in 2026 are close to 0.1. Recent updates show reduced generation in cogeneration, CT and geothermal categories to reflect revised data on reliability contribution. Slight increases in other categories, specifically CCGT.

Revised inputs led to Final Decision results

Staff identified some key changes to the model recommended by work performed for recent updates.

- PSH versus DR dispatch – DWR pumping load changed from PSH to DR
- 40 year retirement rule implemented, as well as other CT units recategorized as cogeneration based on research into CAISO data.
- Significant change – capping cogeneration, geothermal and biomass units at monthly NQC, not Pmax in the model. Effectively removes about 900 MW of capacity from the model.

Revised Reliability and PCM analysis

Study definition

- Study years: 2026, 2030, 2033, 2035
- Electric demand input: 2021 IEPR demand forecast – managed mid demand paired with ATE scenario
- 30 MMT TPP Base Case Portfolio modeled in RESOLVE and posted here: Portfolios and Modeling Assumptions for the 2023-24 TPP
- LOLE Capacity: Capacity shortfall due to running out of available capacity to schedule/dispatch in a given hour
- EUE Capacity: Expected unserved energy due to capacity shortage

Key modeling inputs (BOLD represents revised modeling updates)

- 1998-2020 historical weather-based distribution of hourly electric demand, and wind and solar generation
- 2021 IEPR Mid-Mid electric demand forecast
- Major baseline resource update
  - CAISO Master Generating Capability List as of 11/8/2022
  - 11/1/2022 LSE IRP filings
  - 10/2022 NQC List
  - WECC 2032 Anchor Dataset
  - **40 year retirement rule for fossil fueled power plants**
  - **Cogen, geothermal, biomass capped at NQC**
- 1998-2020 hydro data and methodology refreshed
  - Simulated each hydro year against each weather year – multiplied cases and combinations
  - Hourly and monthly data collected from EIA, CAISO, BPA
  - Detrended monthly data used to develop dispatch model
  - Emergency hydro capacity added

Calibration and Simplification of external areas

Staff consolidated external regions to just those areas closer to California and calibrated their load and resource balance to near 0.1 LOLE

- Purpose was to create a realistic pattern of imports and accurately reflect reliability. Sought to avoid leaning on external areas unrealistically
- Staff calibrated LOLE in external regions by adding additional demand to raise LOLE or add Perfect Capacity to lower LOLE
- Also sought to remove complexity and better create reasonable results. Staff conciliated (reduced) regions more than one state away from California

Co-dispatch group	Modeled Regions
CAISO	PGE, SCE, SDGE
NW	BPAT, PACW
SW	AZPS, NEVP, SRP, WALC
Unlinked	IID, LADWP, SMUD, TID, PortlandGE
Not Modeled	PSCO, IPCO, CFE, BCHA-AESO, TEPC, PNM_EPE, NWMT-WAUW, PACE, WACM

Reliability Results for 2026, 2030, 2033 and 2035

Factor	2026	2030	2033	2035
LOLE	0.098	0.002	0.009	0.070
Loss of Load Hours (LOLH)	0.135	0.002	0.027	0.260
LOLH/LOLE (hours per event)	1.378	1.000	3.000	3.714
Expected Unserved Energy (GWh)	149	2	89	1,749
Annual Demand (GWh)	256,149	281,417	314,879	338,616