**System Reliability Modeling Datasets 2024**

This page lists system reliability modeling datasets used by Energy Division to model the CAISO balancing area electric system along with the rest of California and neighboring regions of the WECC. This modeling supports the Resource Adequacy (RA) and Integrated Resource Plan (IRP) proceedings, as well as the Aliso Canyon Investigation and the [Avoided Cost Calculator](https://www.cpuc.ca.gov/industries-and-topics/electrical-energy/demand-side-management/energy-efficiency/der-cost-effectiveness). The prior version of this webpage is here: [System Reliability Modeling Datasets 2023](https://www.cpuc.ca.gov/industries-and-topics/electrical-energy/electric-power-procurement/long-term-procurement-planning/2022-irp-cycle-events-and-materials/system-reliability-modeling-datasets-2023).

All data were exported from the “Strategic Energy & Risk Valuation Model” (SERVM), a probabilistic system reliability and production cost model developed by [Astrapé Consulting](http://www.astrape.com/servm/). In the first half of 2024, Energy Division performed a major input update of SERVM. The RA proceeding’s (R.23-10-011) [July 2024 Loss of Load Expectation (LOLE) study of target year 2026](https://www.cpuc.ca.gov/-/media/cpuc-website/divisions/energy-division/documents/resource-adequacy-homepage/resource-adequacy-compliance-materials/slice-of-day-compliance-materials/2026_lole_final_report_07192024.pdf) is the first use case of this major input update. The IRP proceeding’s (R.20-05-003) 2024-2026 Cycle will also use this input update for modeling to be conducted later in 2024.

**Electricity Consumption, Managed, and Demand Modifier Profiles**

The following files contain hourly system electricity consumption and managed demand profiles (in MW) for all regions modeled, including any demand modifiers. Weather-dependent profiles are provided for weather years 2000-2022. Median annual energy and peak demand for all California regions are based on the [2023 IEPR California Energy Demand Forecast, 2023-2040](https://www.energy.ca.gov/data-reports/reports/integrated-energy-policy-report/2023-integrated-energy-policy-report/2023-1). Median annual energy and peak demand for non-California regions are derived from the [WECC Anchor Data Set](https://www.wecc.org/ReliabilityModeling/Pages/AnchorDataSet.aspx) 2032, publicly available IRPs from non-California LSEs, the 2023 vintage of [FERC Form 714](https://www.ferc.gov/industries-data/electric/general-information/electric-industry-forms/form-no-714-annual-electric/data), and [EIA Form 861M](https://www.eia.gov/electricity/data/eia861m/) (Net Metering data for BTMPV extrapolation from historical).

DataDictionary\_HourlyLoadComponents

HourlyLoadComponents\_CAISO\_2026

HourlyLoadComponents\_NonCAISO\_California\_2026

HourlyLoadComponents\_NonCalifornia\_2026

The above files represent the year 2026. Other target years (2030, 2035, 2040, 2045) will be posted soon.

**Generating Units**

The following file lists the updated Baseline of resources modeled in SERVM and consists of online and In-Development resources, consistent with the definition used in the IRP proceeding. Online resource data was drawn from the CAISO Master Generating Capability Lists as of January 2024. In-Development resource data was drawn from LSE IRP Filings and LSE MTR Procurement Order Filings as of December 1, 2023. Non-CAISO resource data was drawn from the WECC Anchor Data Set 2032 and publicly available IRPs from Non-CAISO LSEs.

BaselineGeneratorList\_v20240809

**SERVM-specific Hydroelectric Input Variables**

The following file contains SERVM-specific input variables defining hydro unit inputs. It can be used to develop hydro unit inputs for other production cost models. The inputs were developed from 23 years (2000-2022) of monthly data from the EIA and 4 years of hourly data from the CAISO, BPAT, and EIA (2019-2022). The source data was translated into monthly generation, daily minimum, average, and maximum generation, and monthly maximum output parameters. SERVM schedules the hydro according to the net load conditions of a given scenario (a particular weather year and a particular hydro year, which are not necessarily the same historical year).

ServmHydroVariables\_HY2000-2022

**Renewable Generation Profiles**

The following files contain renewable generation hourly production profiles (in MW) for all regions modeled, for weather years 2000-2022. The profiles are sized according to the installed capacity listed in the Baseline Generator List above. The profiles are aggregated up into unit category totals per region.

RenewableProfiles\_WY2000-2022\_California\_2026

RenewableProfiles\_WY2000-2022\_NonCalifornia\_2026

The above files represent the year 2026. Other target years (2030, 2035, 2040, 2045) will be posted when modeling for those years are conducted later this year.

**Normalized Renewable Generation Profiles**

The (large) zip file below contains NORMALIZED renewable generation hourly production profiles for all regions modeled, for weather years 2000-2022. It can be used to develop profiles for other production cost models. Normalized profiles need to be mapped to a particular unit using the “weather station” variable. Then, that particular unit’s installed capacity and other technology attributes determine the final magnitude and shape of the production profile modeled in SERVM. The Baseline Generator List above includes the weather station and the installed capacity of each renewables unit to match with a normalized profile to create the final production profile corresponding to that unit that is modeled in SERVM. The zip file below includes a README describing the contents and steps to derive final production profiles from normalized profiles.

NormalizedSolarWindProfiles\_WY2000-2022\_V2024

**Representation of the CAISO Transmission System and Neighbors**

The following file specifies the regions, transfer limits (MW), and hurdles (2022 $) that are modeled in SERVM. Descriptive details are in the file.

RegionTransferLimitsAndHurdles\_2024Jun

**Burner-Tip Fuel and Carbon Prices**

The following files specify the monthly fuel prices and annual GHG prices, all in 2022 $, used in SERVM.

MonthlyFuelPricesFlatTransport : Fuel transport (handling) costs were assumed flat across years – this assumption was used for the July 2024 RA report of LOLE studies for target year 2026 referenced above. The [NAMGas model outputs](https://www.energy.ca.gov/programs-and-topics/topics/energy-assessment/natural-gas-electric-generation-prices-california-and) upon which commodity prices were based assumed fuel transport costs escalating by year. CPUC staff intends to align with this escalating assumption before further modeling efforts in 2024.

GHGPriceProjection2022IEPR : Units are 2022 $ per short ton and derived from [CED 2022 GHG Allowance Price Scenarios](https://efiling.energy.ca.gov/GetDocument.aspx?tn=248410&DocumentContentId=82843). A more recent version of source data, [CED 2023 GHG Allowance Price Scenarios](https://efiling.energy.ca.gov/GetDocument.aspx?tn=254569&DocumentContentId=89994), is available but not yet incorporated into SERVM.