California ISO

2027 Default Resource Adequacy Values

Draft PRM and QC values

Stakeholder meeting

September 9, 2026

10:00 am

Housekeeping

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The meeting is structured to stimulate dialogue and engage different perspectives.

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You may also send questions via chat to all panelists.

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Agenda – Default RA Values

Time	Topic	Presenters
10:00 – 10:15 am	Welcome + today's agenda	Christina Guimera

10:15 – 11:45 am	• Meeting purpose
	• QC and PRM values
	• Process overview
	  • Analytical process
	  • Resource adequacy model
		Mark Kootstra

11:45 am – 12:00 pm	Next Steps	Christina Guimera

Purpose of today's meeting

"The CAISO provides stakeholders an opportunity to provide feedback on the proposed results of the analysis and key inputs to the analysis before finalizing the results and also provides transparency regarding the final results."

- CAISO Tariff, Section 40.2.2.1

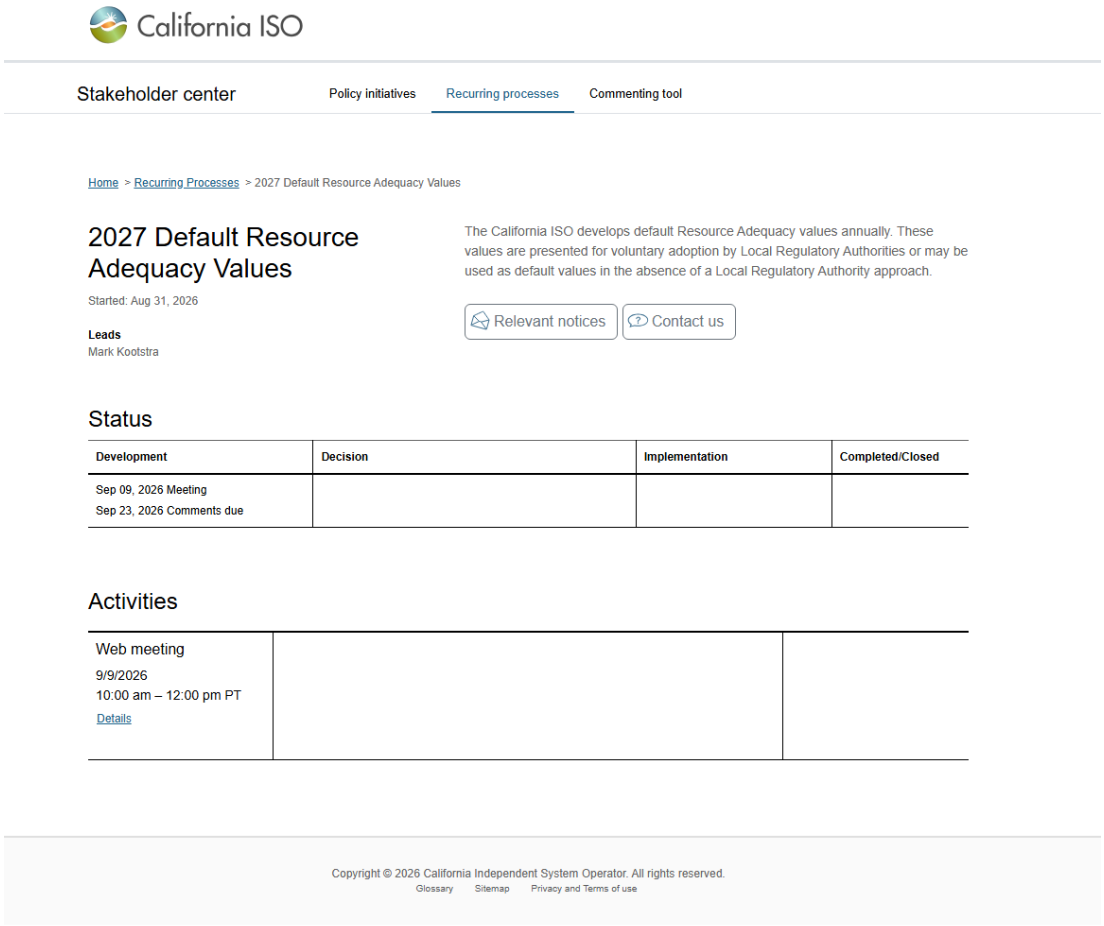
The CAISO default resource adequacy approach is described in the business practice manual which implements the tariff requirements

- **BPM:** Business Practice Manual for Reliability Requirements, Version 85, Last Revised July 1, 2026.
  - Default Resource Adequacy Rules, Section 13.
- **Tariff:** Section 40 – Resource Adequacy Demonstration for Scheduling Coordinators in the CAISO Balancing Authority Area as of May 1, 2026, posted June 30, 2026.
  - Reserve Margin, Section 40.2.2.1.
  - CAISO Default Qualifying Capacity Criteria, Section 40.8.

Note: CAISO default rules only apply if LRAs do not provide QC criteria or a reserve margin for their jurisdictional LSEs.

The CAISO default RA values will be posted in the stakeholder center under recurring processes

- Each set of default rules will generate a new page associated with the annual process.
  - 2027 Default Resource Adequacy Values.
- The final QC and PRM values will be posted here.
  - Default values will not be posted to the resource adequacy page to prevent confusion.



CAISO Default RA Program

QUALIFYING CAPACITY AND PLANNING RESERVE MARGIN

Default Resource Adequacy Qualifying Capacity Types

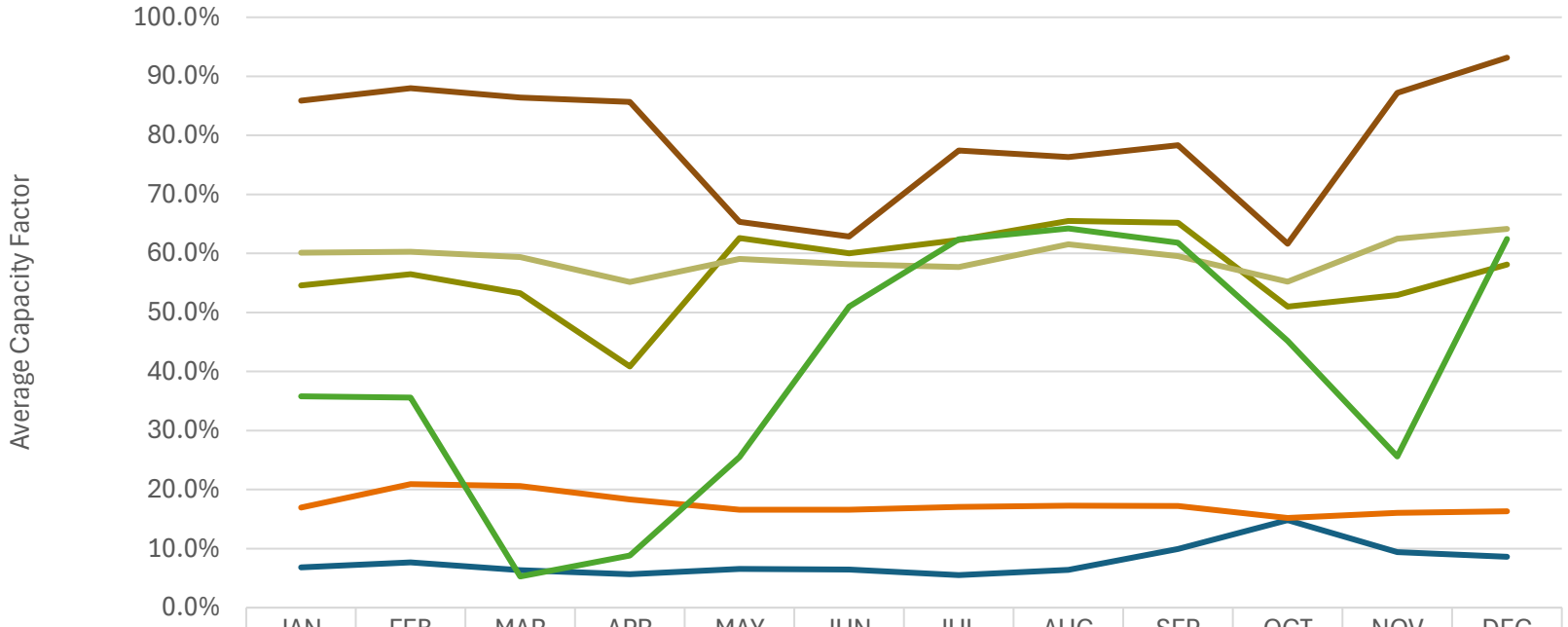
Resource types	Proposed methodology
Fossil Thermal, Dispatchable	Seasonal UCAP for each resource
Renewable Thermal and Other, Dispatchable	
Pumped Hydro	
Nuclear	
Fossil Thermal, Nondispatchable	Monthly average generation
Renewable Thermal and Other, Nondispatchable	
Participating load	Annual reduction in demand per dispatch
Supply Side Demand Response	Annual performance to dispatch
Battery Storage (includes hybrid and co-located)	Average ELCC, with unit specific, seasonal adjustments based on availability
Dispatchable Hydro	
Run-of-River Hydro	Average ELCC, with unit specific, seasonal adjustments based on performance
Wind	
Solar (including solar thermal)	

Draft average UCAP percentages by fuel and technology

Summer is May to October, Winter is November to April

Fuel, Gen Tech Type	Capacity	Count	Summer	Winter
BIOGAS OTHER	2.3	1	91.81%	78.70%
BIOGAS RECIPROCATING ENGINE	6.6	5	92.63%	86.81%
BIOMASS OTHER	4.9	2	88.13%	88.15%
BIOMASS STEAM	30.0	1	94.87%	95.67%
DISTILLATE COMBUSTION TURBINE	110.0	2	89.25%	85.08%
NATURAL GAS COMBINED CYCLE	16,942.4	42	88.97%	89.47%
NATURAL GAS COMBUSTION TURBINE	6,390.2	93	89.56%	90.74%
NATURAL GAS FTUR	2,275.4	30	93.92%	93.20%
NATURAL GAS OTHER	159.3	3	98.76%	99.22%
NATURAL GAS RECIPROCATING ENGINE	272.8	7	96.39%	92.49%
GEOTHERMAL OTHER	10.5	1	73.76%	94.63%
GEOTHERMAL STEAM	1,262.0	21	73.17%	75.91%
OTHER	4.5	1	77.50%	99.07%
URANIUM STEAM	2,300.0	2	99.65%	99.24%

Draft QC values Nondispatchable thermal resources, except nuclear, represented as monthly capacity factors



	JAN	FEB	MAR	APR	MAY	JUN	JUL	AUG	SEP	OCT	NOV	DEC
OTHER	6.8%	7.6%	6.4%	5.7%	6.6%	6.5%	5.5%	6.4%	9.9%	14.8%	9.4%	8.6%
BIOMASS	54.6%	56.5%	53.3%	40.9%	62.6%	60.0%	62.3%	65.5%	65.2%	51.0%	53.0%	58.1%
BIOGAS	60.1%	60.3%	59.4%	55.2%	59.1%	58.2%	57.7%	61.5%	59.5%	55.2%	62.5%	64.2%
NATURAL GAS	16.9%	20.9%	20.6%	18.4%	16.6%	16.6%	17.1%	17.3%	17.2%	15.2%	16.1%	16.3%
GEOTHERMAL	85.9%	88.0%	86.4%	85.6%	65.4%	62.9%	77.4%	76.3%	78.3%	61.6%	87.2%	93.2%
WASTE	35.8%	35.6%	5.3%	8.8%	25.5%	51.0%	62.4%	64.2%	61.8%	45.2%	25.6%	62.4%

QC = CF * Nameplate

Fuel Type	Count	MW
OTHER	19	280
BIOMASS	19	401.5
BIOGAS	39	236.2
NATURAL GAS	25	725.6
GEOTHERMAL	3	81.5
WASTE	2	34.7

Draft performance based QCs used for demand response and participating loads

Performance to Dispatch

- Demand response resources.

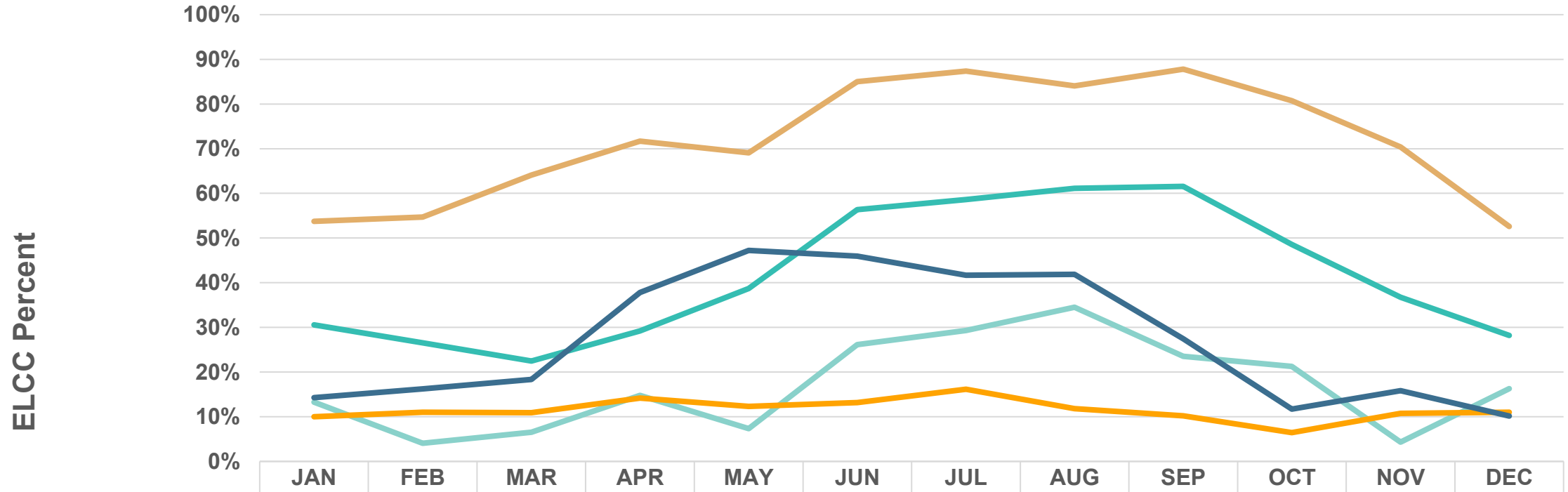
Performance Factor: 47.98%

Reduction in Demand Per Dispatch

- Participating load.
- Class averages are not applied or used.

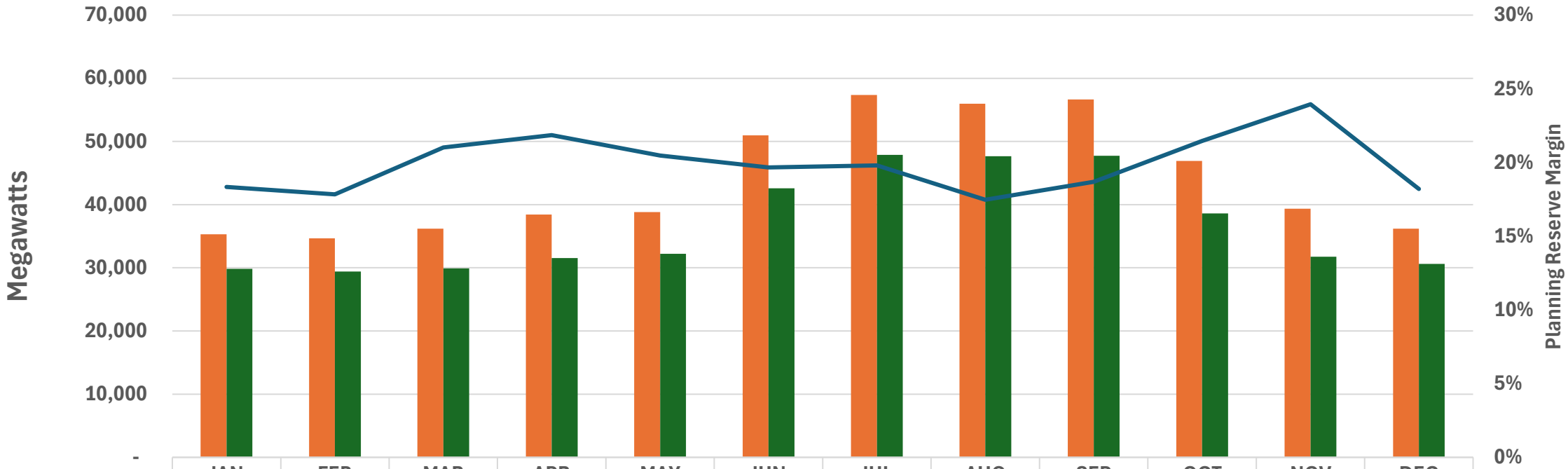
Total QC: 201 MW

Draft battery, hydro, solar, and wind average ELCC values. Qualifying capacity will be allocated to individual resources



	JAN	FEB	MAR	APR	MAY	JUN	JUL	AUG	SEP	OCT	NOV	DEC
Battery	53.8%	54.7%	64.1%	71.7%	69.1%	85.0%	87.4%	84.1%	87.8%	80.8%	70.4%	52.6%
Dispatchable Hydro	30.6%	26.5%	22.5%	29.2%	38.7%	56.3%	58.6%	61.1%	61.6%	48.5%	36.7%	28.2%
RoR Hydro	13.3%	4.1%	6.6%	14.8%	7.3%	26.1%	29.3%	34.5%	23.5%	21.3%	4.3%	16.3%
Solar	10.0%	11.0%	10.9%	14.2%	12.3%	13.2%	16.2%	11.8%	10.2%	6.5%	10.8%	11.0%
Wind	14.3%	16.2%	18.4%	37.8%	47.2%	45.9%	41.7%	41.9%	27.5%	11.7%	15.8%	10.2%

The draft planning reserve margin is based on the capacity included in the calibrated model that achieves a 0.1 LOLE across the year



	JAN	FEB	MAR	APR	MAY	JUN	JUL	AUG	SEP	OCT	NOV	DEC
QC Need	35,313	34,665	36,208	38,430	38,819	50,952	57,372	55,988	56,650	46,913	39,366	36,210
1-in-2 Peak*	29,839	29,415	29,919	31,536	32,224	42,579	47,891	47,660	47,729	38,622	31,759	30,634
PRM	18.3%	17.8%	21.0%	21.9%	20.5%	19.7%	19.8%	17.5%	18.7%	21.5%	24.0%	18.2%

* The 1-in-2 peak used in the calculation is the median peak from the stochastic load distributions used in the model.

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ANALYTICAL PROCESS

Important evaluation period definitions used throughout the analysis

Evaluation period

- 36 months:
  - From: November 2022.
  - To: October 2025.
- CAISO will substitute the missing periods of data with class average data in full month intervals.
  - A resource that began commercial operations after HE01 on December 1, 2022, will have the class average values used for December 2022 and earlier.

Time slices for the analysis

	Winter	Summer
Months	November – April	May – October
At risk days	10 days with the highest net peak load, by month	
At risk hours	HE 6-9 17-22 PT	HE 17-22 PT
Season -1	November 2024-April 2025	May 2025 – October 2025
Season -2	November 2023-April 2024	May 2024 – October 2024
Season -3	November 2022-April 2023	May 2023 – October 2023

UCAP is calculated for each season based on both partial derates and full outages on at risk days during at risk hours

- Outages are sourced from the CAISO's outage management system (OMS).
- All outages and derates are included, except Transmission Induced generation outages, as defined in the Outage Management BPM.

$$UCAP_{season} = P_{max} - \frac{1}{n}\sum_{i=1}^{n}(P_{out,i})$$

$$n = Total\ number\ of\ at\ at\ risk\ hours\ on\ at\ risk\ day, during\ the\ season$$

$$P_{out,i} = Average\ capacity\ unavailable\ due\ to\ a\ forced\ outage\ during\ hour\ i,$$

$$P_{max} = Installed\ capacity$$

- The UCAP value will be a weighted average forced outage rate, with the most recent seasons receiving a higher weight:

$$Final\ UCAP_{season} = 0.45(UCAP_{season-1}) + 0.35(UCAP_{season-2}) + 0.20(UCAP_{season-3})$$

Average Generation QC method for nondispatchable thermal units, excluding nuclear and solar thermal

Qualifying capacity is awarded based on the historic average hourly performance of the unit in that month of the year during the evaluation period.

$$QC_{month} = \frac{\sum_{i=1}^{3} Gen_{month,i}}{\sum_{i=1}^{3} Hours_{month,i}}$$

$$Gen_{month,i} = Total\ generation\ from\ the\ resource\ in\ the\ month\ and\ year\ i$$
$$Hours_{month,i} = Total\ number\ of\ hours\ in\ the\ month\ and\ year\ i$$

Performance based QCC applies to supply side demand response resources and participating load resources included on the NQC list

Performance to Dispatch

- Demand response
- Calculated at the DR provided level
- Annual performance factor value, calculated from the evaluation period

$$PF = \frac{\sum_r \sum_h \min(dispatch_{r,h}, reduction_{r,h})}{\sum_r \sum_h dispatch_{r,h}}$$

Where,

$dispatch_{r,h} = dispatch\ quantity\ of\ resource, r, in\ hour, h.$

$reduction_{r,h} = demand\ reduction\ of\ resource, r, in\ hour, h.$

Reduction in Demand Per Dispatch

- Participating loads
- Annual capacity value, calculated from the evaluation period

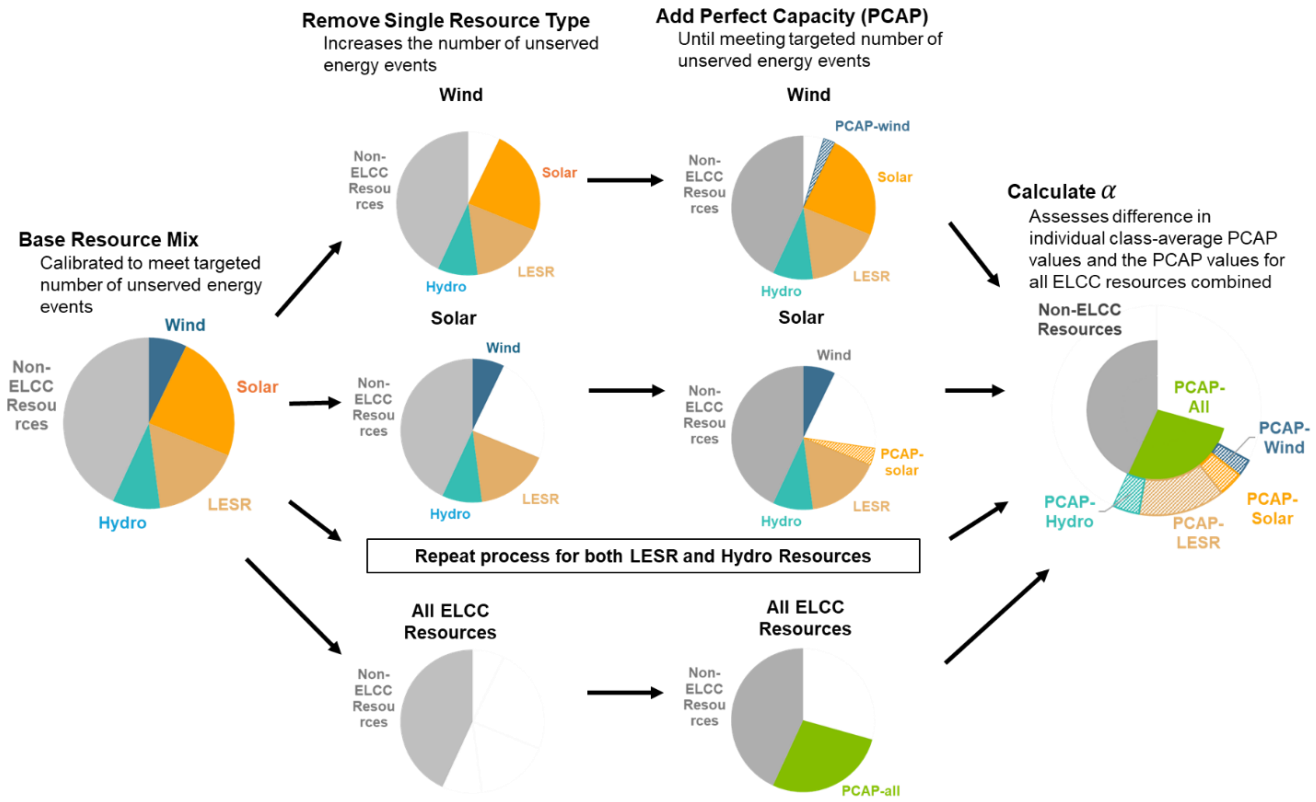
$$QC = \left(\frac{1}{n}\sum_{i=1}^{n} Reduction_{\,i}\right)$$

Where,

$Reduction_{\,i} = the\ load\ reduction\ in\ time\ period\ i$

$n = Total\ number\ time\ periods\ dispatched$

Class average ELCC values were calculated for batteries, run of river hydro, storage hydro, solar and wind



ELCCs are adjusted to account for interactive effects between ELCC resources.

$$ELCC_{class} = \alpha \frac{PCAP_{class}}{ICAP_{class}}$$

Where,

$$\alpha = \frac{PCAP_{all}}{\sum_{class} PCAP_{class}}$$

Unit specific allocations preserve the total QC of a resources type, but rewards more available and better performing resources

Availability Based

- Batteries and storage hydro.
- Monthly outage rates considering all hours of the month.

Performance Based

- Run of river hydro, solar, and wind.
- Monthly capacity factors using only generation during at-risk hours for each month.

$$ELCC_{resource} = ELCC_{class} \times \frac{(1 - FOR_{resource})}{(1 - FOR_{class})}$$

$$ELCC_{specific} = ELCC_{class} \times \frac{CF_{specific}}{CF_{class}}$$

Hybrid resources that employ multiple resource types receive qualifying capacity values based on the aggregation of the components

- QC values are calculated for each resource type behind the same point of interconnection using class average ELCC values against the installed capacity for that type.
- The total QC awarded is the minimum of the sum of the individual QC values and the interconnection limit.

$$QC_{hybrid} = \min\left[\left(QC_{type\ 1} + QC_{type\ 2}\right), (Interconnection\ Limit)\right]$$

The planning reserve margin is calculated for each month of the year, and is based on the QC needed to reach a modeled 0.1 LOLE

$$PRM_{month} = \left(\frac{Modeled\ QC_{month}}{Peak_{month}} - 1 \right) \times 100\%$$

Where,

$$Peak_{month} = 1 - in - 2\ peak\ load\ from\ the\ modeled\ load\ distribution\ for\ the\ month$$
$$Modeled\ QC_{month} = the\ total\ QC\ for\ all\ modeled\ resources\ for\ the\ month$$
$$PRM_{month} = The\ planning\ reserve\ margin\ for\ the\ month$$

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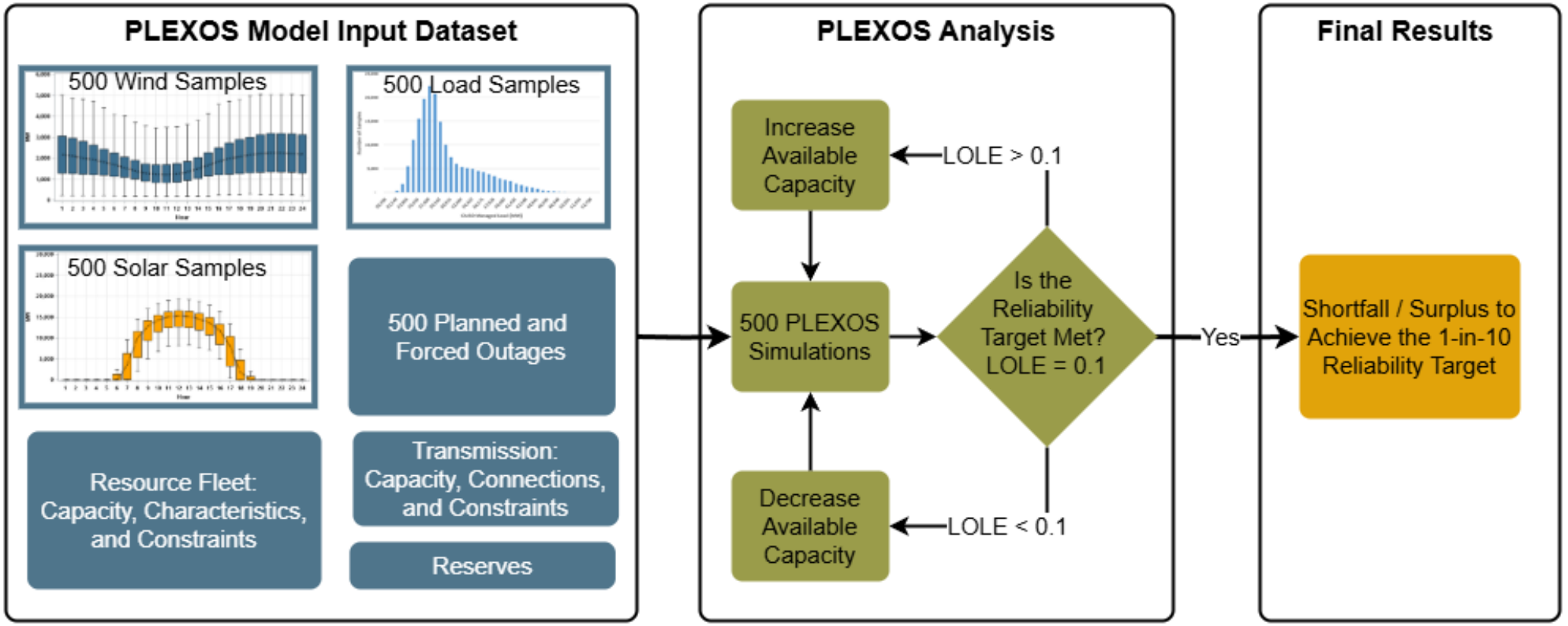
RESOURCE ADEQUACY MODEL

The CAISO made use of the probabilistic assessment model used for the 2026 Summer Loads and Resources Assessment



The Summer Assessment concluded that the portfolio meets the planning performance targets and yields a surplus of 2,547 MW.

The 2026 Summer Loads and Resources Assessment model was used for the resource adequacy model

- The resource portfolio was updated
  - December 2026 capacity from the summer assessment is used for the whole year.
  - Demand response is reduced to include only the 3rd party DR included in the NQC list.
- Hydro resources are model with 500 stochastic samples, rather than the anticipated hydro conditions for 2026.
- Planned outages are only modeled for the initial base calibration. Forced outages align with those included in the summer assessment.

2026 Summer Loads and Resource Assessment documents and models.

For the default RA model, the resource portfolio was adjusted reflect final operating capacity and supply plan DR only

Generation Capacity

Fuel type	Operating Capacity
Battery Storage	16,557
Biogas	152
Biomass	261
Geothermal	1,219
Hydro	7,570
Natural Gas	26,384
Nuclear	2,280
Other	159
Solar	23,932
Wind	6,624
Total	**85,138**

- Modeled operating capacity reflects new additions and all retirements used in the Summer Assessment for December 2026.
- Demand response reflects only 3rd party DR that is included on utility supply plans.
  - A reduction of 250 MW to 760 MW depending on the month

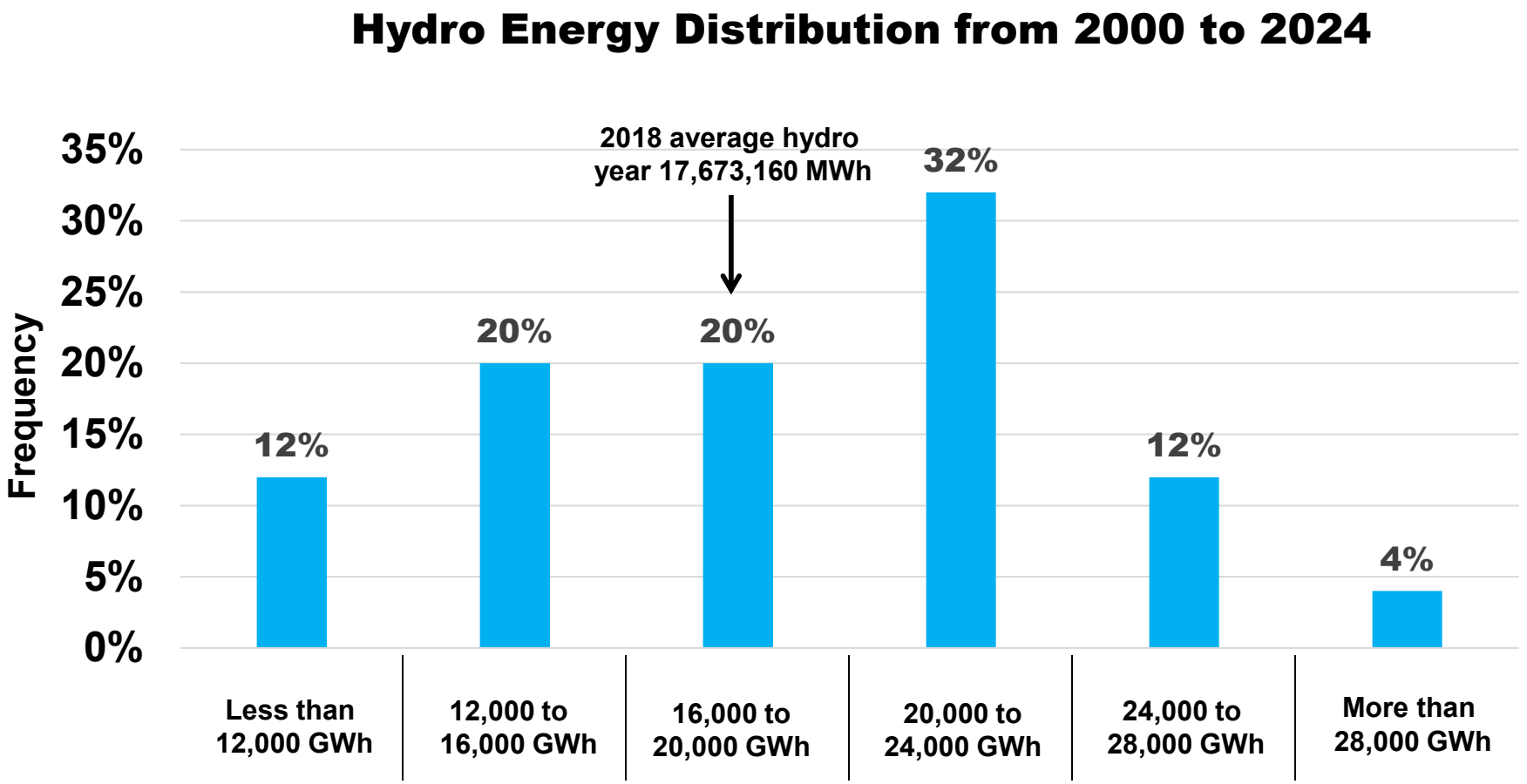
Demand Response

Month	MW
Jan	28
Feb	26
Mar	26
Apr	25
May	103
Jun	124
Jul	145
Aug	157
Sep	152
Oct	87
Nov	59
Dec	48

Hydro electric resources are modeled with 500 stochastic profiles

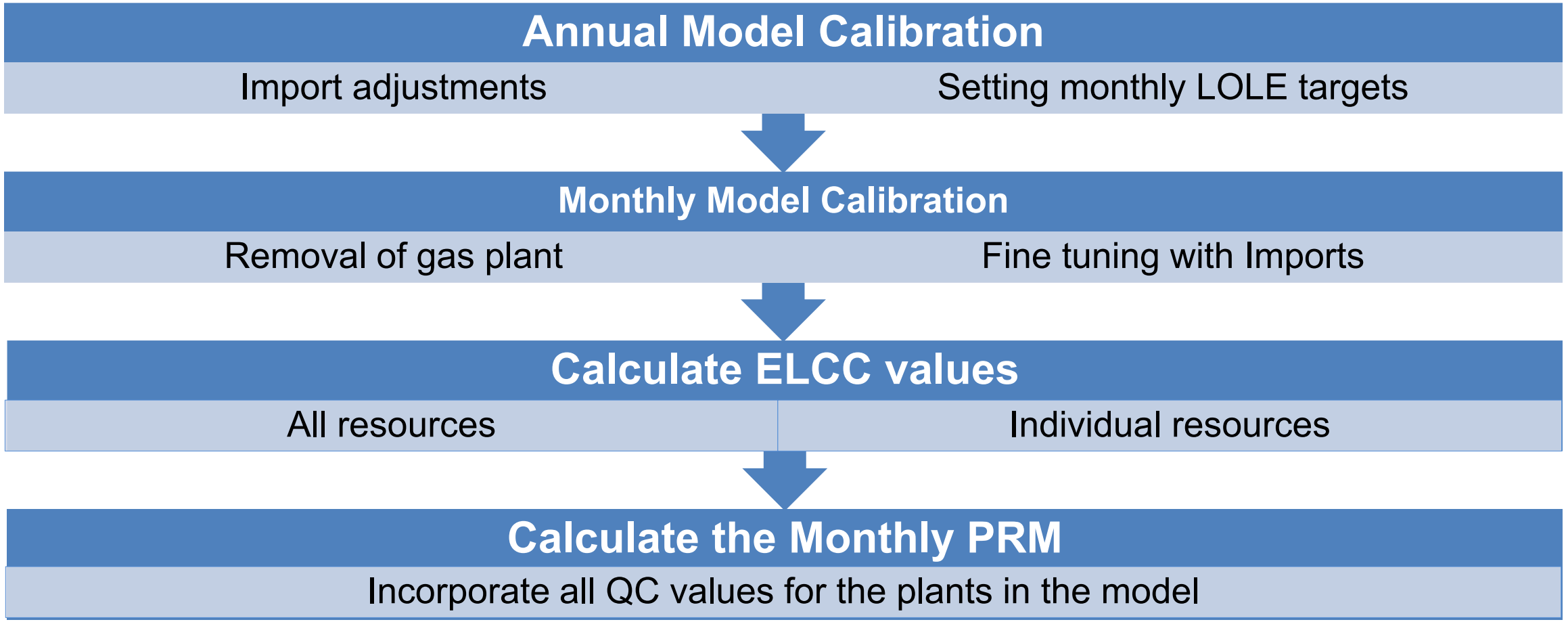
- Using 500 stochastic samples based on historical hydro years to increase hydro diversity for improved risk management instead of using a single representative hydro year.
- Hydro data sourced from 2000-2024:
  - 2000-2008 energy data from CEC and 2009-2024 hourly data from CAISO.
  - Hydro data was categorized by annual energy to mimic historical hydro energy distribution.
  - 500 hydro year profiles were randomly drawn from each bin based on the frequency distribution.

Stochastic Hydro Model



- Frequency distribution of 25 hydro years used to generate stochastic sampling.
- For example, 20% of the 500 hydro samples are pulled from Bin 3, which includes the average hydro year from 2018.

A multi-step process is used to establish monthly qualifying capacity values and the planning reserve margin



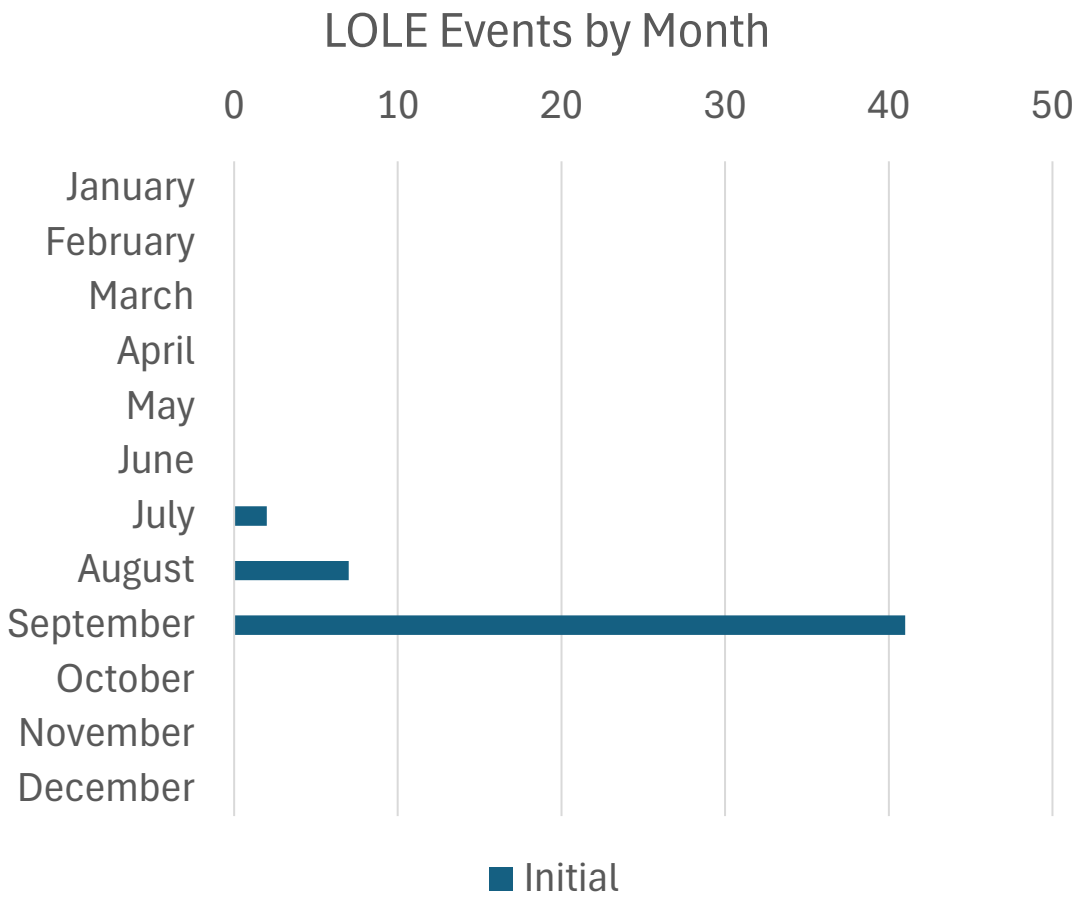
Step 1, the revised probabilistic dataset is run to find an updated surplus value by reducing imports from the default value

Changes from the 2026 SA model

- Adjust generation capacity
- Reduced DR
- Stochastic hydro

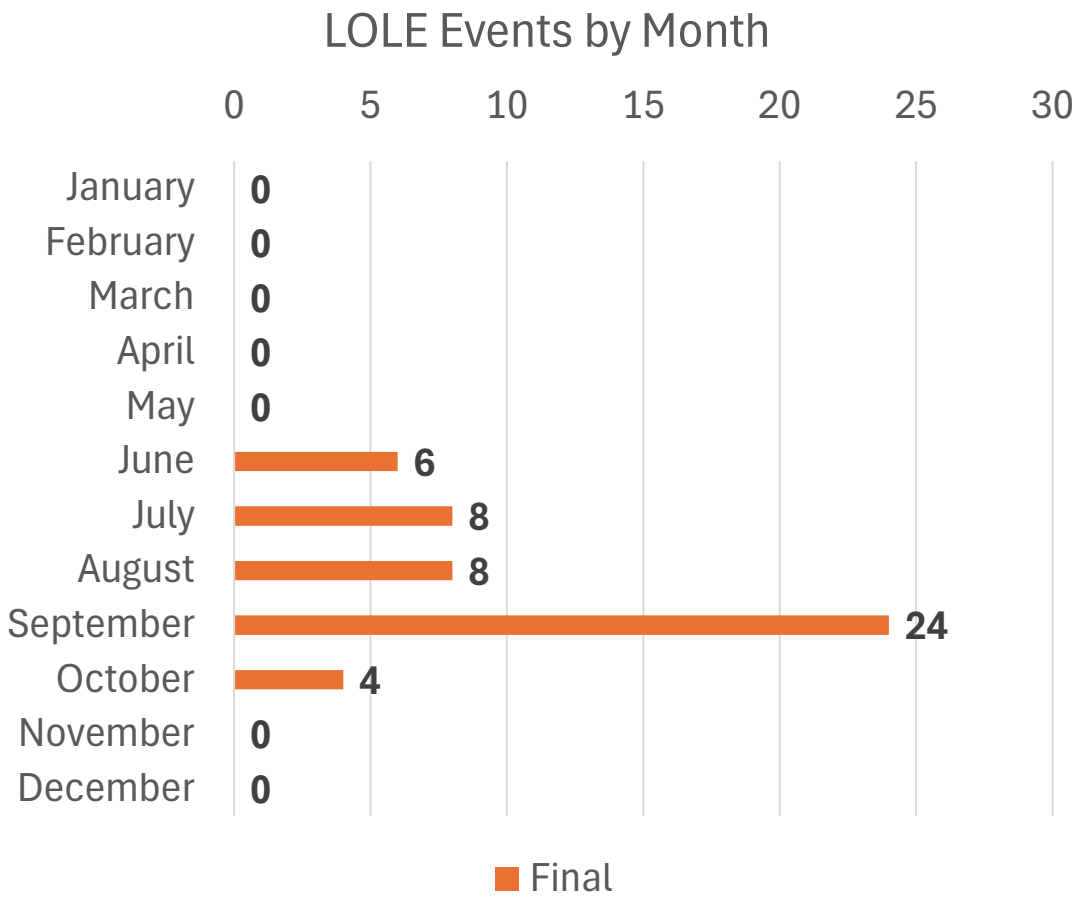
Results

Surplus: 1,617 MW



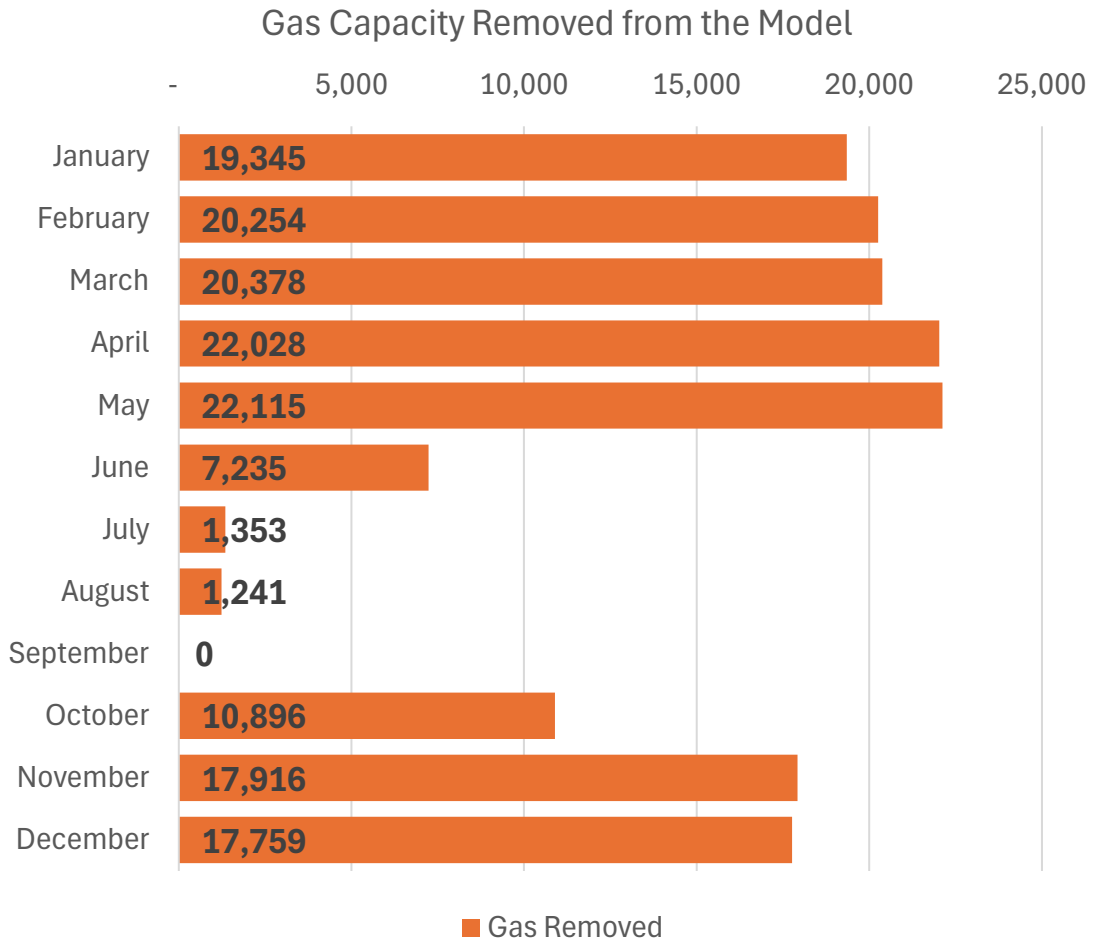
Step 2, Modifications are made to the annual model for the monthly calibration with gas plants

- Planned outages were removed.
- The 1617 MW import surplus was removed in all months.
- Use the LOLE event targets on the left.

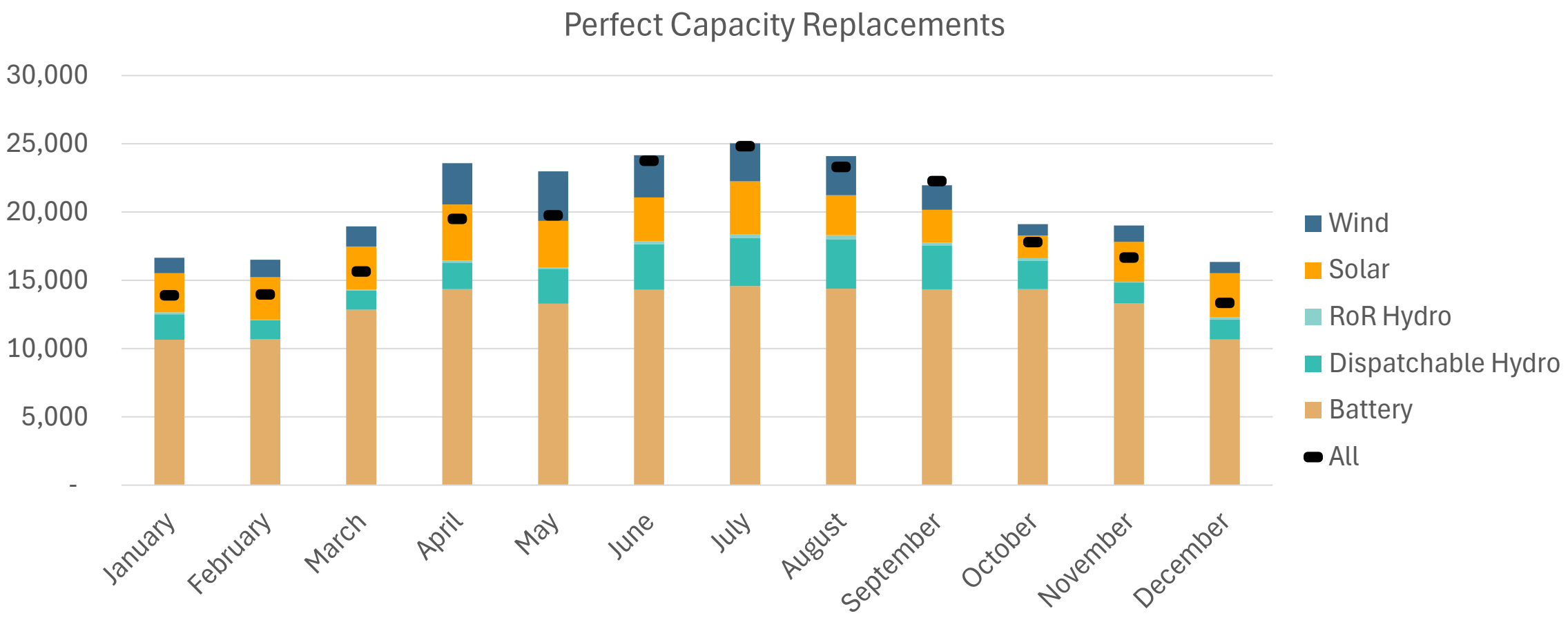


Step 2, gas plants were removed from the model until only the minimum capacity needed to meet the monthly LOLE event target

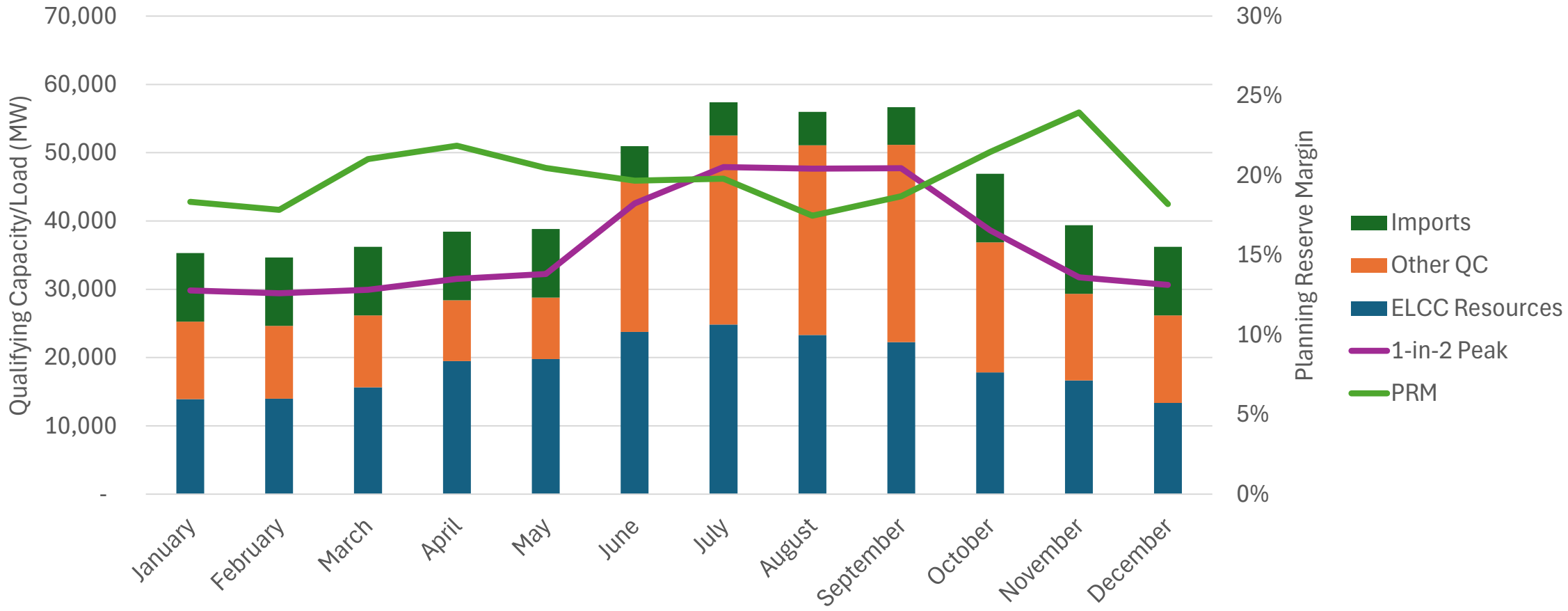
- Calibration had 3 steps:
  - Removal of gas capacity from smallest to largest.
  - Re-adding gas capacity from smallest to largest.
  - Imports adjusted monthly to close any remaining gap.
- For September ~600 MW of imports was added back to achieve the LOLE target.



Step 3, ELCC resources are removed and replaced with perfect capacity



Step 4, the modeled QC, ELCC values, and imports are combined and compared to the modeled 1-in-2 peak to get the PRMs



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QUESTIONS AND COMMENTS

Next Steps

- Stakeholder comments on today's meeting are requested by **September 23** California ISO - 2027 Default Resource Adequacy Values.

- For any other questions, please reach out to us at ISOStakeholderAffairs@caiso.com

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