

**BEFORE THE PUBLIC UTILITIES COMMISSION OF THE  
STATE OF CALIFORNIA**



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Order Instituting Rulemaking to Continue  
Electric Integrated Resource Planning and  
Related Procurement Processes.

Rulemaking 20-05-003  
(Filed May 7, 2020)

**COMMENTS OF THE CALIFORNIA INDEPENDENT  
SYSTEM OPERATOR CORPORATION**

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## Table of Contents

I.	Introduction.....	1
II.	Discussion.....	2
A.	The Commission Must Ensure that LSEs Procure Resources to Meet 2026 System Needs.....	2
B.	The RSP and the 38 MMT Portfolio Likely Understate 2026 Resource Needs. ....	3
C.	The 38 MMT Portfolio Does Not Meet GHG Targets. ....	5
D.	Improvements to Reliability-Based Modeling Are Necessary to Validate Portfolios.....	5
III.	Conclusion .....	7

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**I. Introduction**

Pursuant to Administrative Law Judge Fitch’s October 9, 2020 email ruling inviting initial comments on individual integrated resource plan (IRP) filings, the CAISO submits these comments. The CAISO’s comments primarily focus on load serving entities’ (LSEs’) narratives in Section III.a, regarding the conforming portfolios, and Section IV.e, regarding the portfolios’ ability to address retirement of the Diablo Canyon Power Plant (Diablo Canyon). To support these comments, the CAISO provides detailed modeling results from its production cost modeling assessment of the Commission’s 38 million metric ton (MMT) greenhouse gas target portfolio, one of the portfolios the Commission provided to LSEs as guidance for developing the individual IRPs.<sup>1</sup> The CAISO provides this analysis for the Commission to consider as it reviews the individual IRPs for aggregation and consideration of the Preferred System Portfolio.

Based on the CAISO’s reliability analysis of the 38 MMT Portfolio and comparison to the 46 MMT RSP, the CAISO continues to recommend that the Commission expedite procurement to replace the energy and capacity currently provided by Diablo Canyon as well as ensure progress is made on the boarder portfolio. The CAISO’s modeling results shows that incremental resource needs may be much greater than originally anticipated and that the system hits a critical inflection point after Diablo Canyon retires. Under the 38 MMT Portfolio, the CAISO’s modeling analysis found a significant resource deficiency—3,493 MW in effective capacity—in 2026. The Commission should coordinate expedited procurement with any contracted for new resources included in the individual LSE IRPs but not delay procurement to wait for planned but unexecuted procurement referenced in

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<sup>1</sup> Decision (D.) 20-03-028, p. 104. In these comments, the CAISO refers to this as the 38 MMT Portfolio.

the individual LSE IRPs. The Commission must ensure there are sufficient and diverse resources to meet this post-Diablo Canyon retirement need and reliably decarbonize the grid.

In addition, the CAISO provides comments regarding the need to improve modeling efforts to identify reliability needs, the benefits of resource diversity, and improve resource planning.

The CAISO will make its PLEXOS production cost models available to the public by request.

## **II. Discussion**

### **A. The Commission Must Ensure that LSEs Procure Resources to Meet 2026 System Needs.**

As the CAISO stated in previous comments in this proceeding, the Commission must prioritize authorizing procurement to replace the Diablo Canyon Power Plant (Diablo Canyon), which is scheduled to fully retire before the end of 2025.<sup>2</sup> The individual IRPs filed in this proceeding provide the Commission the opportunity to assess the extent to which LSEs have made progress toward meeting the near-term procurement needs caused by the Diablo Canyon retirement. The Commission's 46 MMT Reference System Portfolio (RSP) and 38 MMT Portfolio—which provided guidance for the individual LSE IRPs—demonstrate the need for significant new resource additions between 2024 and 2026. By 2026, the 46 MMT RSP includes 2,737 MW of new wind generation, 8,000 MW of new solar generation, 6,127 MW of new battery storage, 973 MW of new long-duration pumped storage, and 222 MW of new shed demand response.<sup>3</sup> At the same time, the 46 MMT RSP provides for no new natural gas generation retirement<sup>4</sup> by 2026 and only 30 MW of natural gas generation retirement by 2030. The 38 MMT by 2030 Portfolio indicates the need for even higher levels of total procurement with additional wind, solar, battery storage, and long-duration pumped storage by 2026 with no additional natural gas retirements in that timeframe.<sup>5</sup>

In reviewing the individual IRPs, the Commission should ensure LSEs are not only planning to procure for 2026, but are also actually *contracting* for the incremental resources necessary to maintain reliability. As the CAISO details below, it is likely LSEs will need to procure resources in excess of the RSP and the 38 MMT Portfolio to maintain reliability and meet state greenhouse gas reduction goals. As a result, it is imperative LSEs begin contracting for the necessary new resources

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<sup>2</sup> See CAISO's July 15, 2020 comments on the preliminary scoping memo (<http://www.aiso.com/Documents/Jun15-2020-Comments-PreliminaryScopingMemo-IntegratedResourcePlanning-R20-05-003.pdf>) and July 24, 2020 prehearing comments (<http://www.aiso.com/Documents/Jul24-2020-ReplyComments-Proposed3YearSchedule-Comments-PrehearingConference-IntegratedResourcePlanning-R20-05-003.pdf>).

<sup>3</sup> D.20-03-028, p 41, Table 5.

<sup>4</sup> Outside of once-through-cooling units already scheduled to retire.

<sup>5</sup> D. 20-03-028, p. 46, Table 8.

immediately with a focus on supply diversity. The Commission should develop a reporting and tracking mechanism to transparently show the progress of such contracting.

**B. The RSP and the 38 MMT Portfolio Likely Understate 2026 Resource Needs.**

Although the RSP and the 38 MMT Portfolio include significant incremental resource additions by 2026, the CAISO's production cost modeling analysis shows they likely underestimate the total quantity of new resources needed to maintain reliability.

Decision (D.) 20-03-028, explained that "Commission staff have not conducted and parties have not vetted a complete reliability assessment of a 38 MMT portfolio."<sup>6</sup> To fill this gap, the CAISO conducted production cost modeling of the 38 MMT Portfolio and includes the results in Attachment A to this filing. To conform to Commission filing requirements for the individual IRPs, the CAISO used the California Energy Commission's (CEC's) 2019 Integrated Energy Policy Report (IEPR) demand forecast, rather than the 2018 IEPR Update used to develop the original portfolios.<sup>7</sup> As in prior processes, the CAISO relied on the PLEXOS model rather than SERVM for the analysis.

The CAISO's study results show the 38 MMT Portfolio is not reliable in that it does not meet the target loss of load expectation (LOLE) in 2026 or 2030. The CAISO production cost modeling found a 0.890 LOLE in 2026, well in excess of the 0.1, or one day in ten-year LOLE target. The 0.890 LOLE equates to a 3,493 MW shortfall in effective capacity in 2026. Effective capacity is the energy-backed capacity that is available when needed to avoid a loss of load event.<sup>8</sup> For 2030, the CAISO's analysis shows a 0.268 LOLE, which is equivalent to a 1,383 MW shortfall in effective capacity. These results show that system resource needs hit a critical inflection point after Diablo Canyon retirement and the lower 2030 LOLE is likely attributable to the addition of new resources in the RESOLVE model between 2026 and 2030.

The high LOLE found in the CAISO's modeling of the 38 MMT Portfolio raises questions about the Energy Division staff's reliability results under the RSP. In D.20-03-028, the 46 MMT RSP was found to result in a 0.113 LOLE in 2026 and 0.108 LOLE in 2030, slightly in excess of the 0.1 LOLE standard.<sup>9</sup> However, the CAISO notes the 38 MMT Portfolio contains more incremental resource additions than the RSP in terms of both capacity and energy. Specifically, the 38 MMT

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<sup>6</sup> D.20-03-028, p. 31.

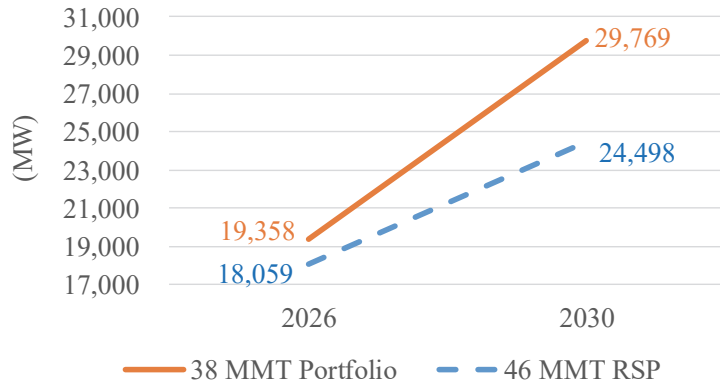
<sup>7</sup> *Filing Requirements Overview*, June 15, 2020. available at: [ftp://ftp.cpuc.ca.gov/energy/modeling/Filing\\_Requirements\\_Overview.pdf](ftp://ftp.cpuc.ca.gov/energy/modeling/Filing_Requirements_Overview.pdf)

<sup>8</sup> Installed capacity may be higher depending on the ability of the resource to address the shortfall.

<sup>9</sup> D.20-03-028, p. 44, Table 7: Key Metrics for New 2019-2020 RSP.

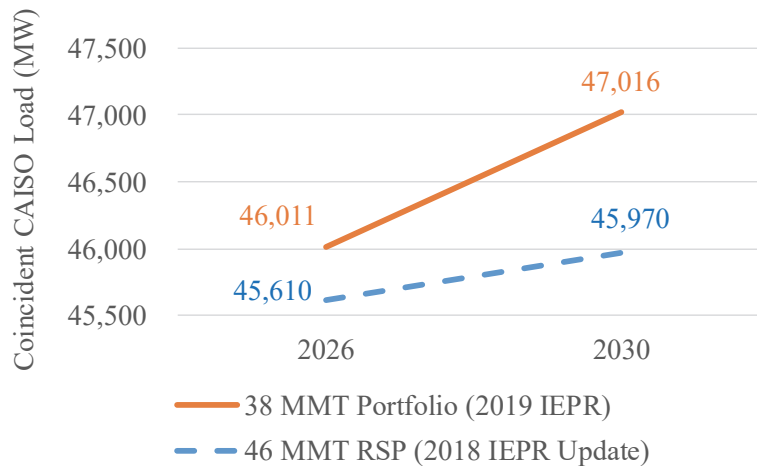
Portfolio added a net 10,411 MW<sup>10</sup> of installed capacity between 2026 and 2030 compared with only 6,439 MW under the 46 MMT RSP. The 38 MMT Portfolio also includes more incremental renewable resources but slightly less storage capacity in 2026 and 2030 than the 46 MMT RSP, as shown in Figure 1 below.

Figure 1: Comparison of Incremental Capacity by Portfolio



Load forecasts, on the other hand, only increased by 401 MW in 2026 and 1,046 MW in 2030 between the 2018 IEPR Update and the 2019 IEPR, as shown in Figure 2.

Figure 2: Comparison of IEPR Load Forecasts



As a result, the CAISO expects that its production cost modeling would show comparable or an even greater LOLE for the RSP compared to the 38 MMT Portfolio. Energy Division staff’s SERVM production cost modeling did not show significant resource deficiencies in 2026 or 2030

<sup>10</sup> Net of gas retirements but does not include 327 MW of customer side batteries, which brings the total to 10,738 MW.

with the RSP. Without further extensive benchmarking, it is difficult to precisely account for why the SERVVM results differ markedly from the CAISO's production cost modeling, but the 401 MW increase in the 2026 demand forecast does not fully explain the divergence in LOLEs.

The CAISO's production cost modeling results show the period after the Diablo Canyon retirement will be a critical point for system reliability. The Commission should plan accordingly and authorize procurement now to meet the identified needs.

**C. The 38 MMT Portfolio Does Not Meet GHG Targets.**

In addition to the reliability issues identified, the CAISO's analysis also shows the 38 MMT Portfolio produced 41.2 MMT of CO<sub>2</sub> emissions in California, or 3.2 MMT in excess of the 2030 38 MMT target. This means additional and/or different resources will be necessary to meet GHG emissions targets under that portfolio. The CAISO's analysis also shows that given the portfolio and load levels studied, there is no "excess" or oversupplied renewables to charge storage resources. The model results show an increase in thermal generation, and thus CO<sub>2</sub> emissions, to ensure battery storage resources are charged to meet the net demand (after sunset) evening ramp.

**D. Improvements to Reliability-Based Modeling Are Necessary to Validate Portfolios.**

The CAISO's modeling analysis indicates there are significant issues with both the RESOLVE capacity expansion and SERVVM production cost modeling used to develop the RSP and 38 MMT Portfolio. The modeling issues produce portfolios that fail to meet reliability needs and GHG reduction goals and fail to produce diversified portfolios. The CAISO discusses these modeling issues in more detail below.

The CAISO's assessment of the 38 MMT Portfolio found a significant capacity shortfall in 2026. This indicates the RESOLVE model did not correctly identify system capacity needs and select sufficient resources to ensure system reliability. In addition, the Commission did not conduct and there was insufficient time for modeling parties to conduct production cost modeling to verify the reliability of the 38 MMT Portfolio prior to providing it as guidance for the individual LSE IRPs. As a general rule the Commission should ensure all portfolios, at minimum, successfully meet a 0.1 LOLE criteria using industry-standard production cost models. Specifically for the RSP and 38 MMT Portfolio, the Commission should evaluate the individual LSE IRPs to ensure collectively there are sufficient resources to cover load growth and replace Diablo Canyon.

Regarding GHG reduction goals, the CAISO's modeling shows RESOLVE understates GHG emissions in the 38 MMT portfolio. Going forward, the Commission should rely on production cost

modeling to validate expected GHG emissions produced in the capacity expansion modeling. The capacity expansion modeling is limited in terms of its study period and its modeling capabilities. Both the CAISO and Energy Division staff production cost modeling demonstrate that expected GHG emissions exceed the targets established in the capacity expansion modeling.

Finally, the simplified RESOLVE capacity expansion model cannot capture the full costs and benefits a particular portfolio will bring to the system. The “least-cost” portfolio, which is based on the input cost parameters in the capacity expansion model, is not necessarily the optimal portfolio from a reliability or prudent resource planning perspective.

Instead, the CAISO recommends the Commission use the RESOLVE capacity expansion model only as a starting tool to create initial portfolios. The Commission should then develop alternative portfolios based on policy guidance as validated by production cost modeling by simulating different sensitivity cases based on the initial portfolio. For example, the least cost constraint in RESOLVE does not seem to reflect the value of diversity upfront. In fact, the RESOLVE model tends to diversify only in later years after less expensive resources have been “exhausted” in earlier years. This approach leads to a less diversified portfolio in the near-term that may be suboptimal to address grid needs. As the CAISO’s attached report details, there are numerous system conditions that RESOLVE does not assess—such as ramping needs and multi-day cloud cover events—that would benefit from a more diverse set of resources.<sup>11</sup> As a policy matter, the Commission should seek to “pull in” a greater diversity of resources from later years to mitigate the risks of over-reliance on one or two resource types and to appropriately plan for more complex resource build-outs earlier.

Further, given the potentially large build-out that is needed over the next few years, the Commission should reconsider its limitation on imports that count as incremental capacity to only those imports that are dynamically transferred or pseudo-tied to the CAISO system.<sup>12</sup> Incremental imports could help meet short-term resource needs while resources are planned and constructed to address the 2026 shortfall identified in the CAISO’s analysis. Concerns about the lack of resource specificity and potential speculative imports can be addressed via CAISO’s proposal submitted to the resource adequacy proceeding.<sup>13</sup>

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<sup>11</sup> See Attachment A, pp. 15-17.

<sup>12</sup> D.19-11-016, pp. 31-32.

<sup>13</sup> The CAISO’s proposal seeks to transition to a resource adequacy import framework that requires resource-specific capacity dedicated solely to California and secured in advance using high priority transmission service to ensure secured



Lastly, production cost modeling ensures the resulting portfolios meet both the reliability criterion and GHG emission targets. The Commission should then select the RSP from the alternative sensitivity portfolios after comparing the costs and benefits of each based on the production cost modeling results and policy guidance.

### **III. Conclusion**

Both the Commission's RSP and the 38 MMT Portfolio already indicate the need for significant resource additions by 2026. The CAISO's analysis provides evidence that incremental resource needs may be much greater than originally anticipated. In any event, the system will need additional resources by 2030 to meet the increasing demand forecast and long-term GHG goals. The Commission should act now to expedite least regrets resource procurement for 2026. Any over-procurement in the 2026 timeframe will reduce 2030 needs.

The Commission should coordinate this expedited procurement with any contracted for new resources included in the individual LSE IRPs. However, the Commission should not delay procurement to wait for planned but unexecuted procurement referenced in the individual LSE IRPs. Put simply, there is insufficient time to wait for the results of such LSE resource planning exercises and simultaneously ensure LSEs secure sufficient new resources to meet the 2026 needs. The Commission should use its procurement authority to ensure 2026 resource needs are met.

Respectfully submitted

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power can actually flow to California, particularly during stressed west-wide system conditions. CAISO, Track 3.B Proposals, R.19-11-009, August 7, 2020. Available at: <https://docs.cpuc.ca.gov/PublishedDocs/Efile/G000/M344/K841/344841567.PDF>