

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

Order Instituting Rulemaking to Oversee the
Resource Adequacy Program, Consider
Program Reforms and Refinements, and
Establish Forward Resource Adequacy
Procurement Obligations.

Rulemaking 21-10-002
(Filed October 7, 2021)

**OPENING COMMENTS ON THE FUTURE OF RESOURCE ADEQUACY WORKING
GROUP REPORT OF THE CALIFORNIA INDEPENDENT SYSTEM OPERATOR
CORPORATION**

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I. Introduction

The California Independent System Operator Corporation (CAISO) submits opening comments on the *Future of Resource Adequacy Working Group Report* (Report) pursuant to the *Administrative Law Judge's Ruling Seeking Comments on the Future of Resource Adequacy Working Group Report and the Local Capacity Requirement Working Group Report* (Ruling). The CAISO provides comments on the Report and responds to the following questions posed in the Ruling:

- (1) What additional milestones are necessary to further develop the preferred RA framework and when should the milestones be achieved? Provide preferred timelines that reflect paths to implementation.
 - a. Please comment on the feasibility of the milestones/timeline and whether a phased-in implementation timeline or test year prior to full implementation is necessary.
- (2) In light of Energy Division's loss of load expectation (LOLE) and Effective Load Carrying Capability (ELCC) study, has your party position (as documented in the Future of RA Working Group Report) changed? If yes, please explain why.

II. Discussion

The Commission and the CAISO are partners in administering the resource adequacy program. The CAISO recognizes rapid changes to the resource mix and demand trends warrant revisiting the resource adequacy program structure, and it supports the Commission's efforts to that end. As parties consider significant reforms, the CAISO commits to coordinating with the Commission to harmonize program assumptions, rules, and requirements to the extent possible to ensure a reliable and efficient resource adequacy program. Consistent with the Commission's principles, the CAISO looks to balance effectiveness, simplicity, and flexibility, and the CAISO also must ensure it can operate the entire system reliably in coordination with all of the local regulatory authorities (LRAs) in the CAISO footprint.

A. The CAISO Has an Overarching Responsibility to Ensure Reliability for the Entire System and Administer Its Resource Adequacy Program for All LRAs in the CAISO Footprint.

In informal comments, the CAISO identified seven attributes (*see* Attachment A) the Commission's future resource adequacy program should include to support reliability. Two of these key attributes are:

- Sufficient capability to meet both energy and capacity needs, including resources to meet storage charging demand, and
- Coordination with CAISO's resource adequacy construct, which the CAISO must administer for all local regulatory authorities (LRAs) within its footprint.

The CAISO evaluated these two attributes when identifying milestones for resource adequacy program reform. The CAISO recognizes the urgency and the importance of potential reforms being considered in this proceeding. In the sections below, the CAISO discusses the critical issues to consider in establishing a successful resource adequacy program and identifies potential pathways forward.

B. The Evolving Nature of the Demand and Resource Mix Necessitates an Assessment of Both Energy and Capacity Within the Resource Adequacy Program to Ensure Reliability.

The rapidly evolving nature of the resource fleet necessitates more than a simple, single point-in-time system capacity assessment to meet peak demand. California is transitioning to a

resource mix increasingly comprised of variable, use-limited, and availability-limited resources while retiring existing baseload and dispatchable capacity. The future resource fleet requires a more granular resource adequacy framework to ensure both energy and capacity needs can be met.

The resource fleet will fundamentally change as the state moves toward its long-term environmental and policy goals. The Diablo Canyon Power Plant units, which provide significant baseload capacity, are scheduled to retire in 2024 and 2025. In addition, the CAISO expects significant dispatchable resource retirements over the next five years as the remaining once-through-cooling gas-fired generation resources reach the end of their compliance extensions. Storage resources are expected to comprise the majority of new capacity needed to maintain reliability after dispatchable thermal resource retirements. The Commission's recent Integrated Resource Planning (IRP) process Decision projects load serving entities (LSEs) will need to add 2,500 MW of battery storage in 2022, with a cumulative 11,300 MW increase by 2025.¹ Given the expected battery capacity influx, it will be increasingly important for the resource adequacy program to determine whether the resource adequacy fleet has sufficient excess energy to charge battery storage resources. The Commission should ensure the reformed resource adequacy program has an energy sufficiency component to maintain reliability with the evolving resource fleet.

C. Transmission Deliverability Remains Key for the CAISO to Ensure the Reliability of the Resource Adequacy Fleet.

The resource adequacy fleet must be deliverable in order to meet system reliability needs under North American Electric Reliability Corporation (NERC) and Western Electricity Coordinating Council (WECC) standards. Deliverability is the only measure of whether there is sufficient transmission for generation to serve the aggregate of load during the most stressed system conditions. CAISO deliverability studies evaluate how much of a resource is capable of being delivered onto the CAISO transmission grid, which is the basis for determining net qualifying capacity (NQC) values. This determination is separate from the qualifying capacity

¹ California Public Utilities Commission, *Decision Adopting 2021 Preferred System Plan*, D.22-02-004, Order Instituting Rulemaking to Continue Electric Integrated Resource Planning and Related Procurement Processes, R. 20-05-003, February 10, 2022.

determination conducted under the LRA’s rules that is instead focused on determining the resource’s capability based on the characteristics of the resource. The NQC qualification is an essential component of the resource adequacy program because it ensures that the resources procured to meet the service level reliability set by the LRA are actually able to contribute to the supply on the CAISO grid when needed. The deliverability assessment is based on common industry methods used for assessing resource deliverability across the transmission system.² In the resource adequacy program, deliverability studies ensure procured capacity to be used by the CAISO to operate the grid reliably is actually usable during those stressed conditions (*i.e.*, the CAISO has enough transmission to use the designated resources to serve load under stressed conditions).

Deliverability assessments are complex, detailed engineering studies. In recent years, the CAISO expanded its deliverability studies from assessing a single peak to assessing two separate periods to capture solar output impacts during the periods of highest and secondary system need. It is impractical and unnecessary for the CAISO to assess resource deliverability in every hour of the day. Instead, the CAISO is already assessing deliverability and thus grid reliability under critical stressed conditions.

The Commission should not adopt proposals that fail to consider the transmission system’s ability to deliver generation resources to load and the CAISO’s critical role in such assessments as the independent system operator and partner in the resource adequacy program.

D. Gridwell’s and Southern California Edison’s (SCE) Proposals Both Represent Improvements Over the Status Quo Resource Adequacy Framework, But Each Could Benefit From Additional Detail.

Gridwell’s resource adequacy reform proposal largely retains the existing capacity-based framework, but it does not include an explicit energy sufficiency assessment. Under the Gridwell proposal, resource energy and availability limitations are assumed to be embedded in ELCC). Resource ELCC values are derived based on their interactive effects with the portfolio of resources with which they are studied. Although resource qualifying capacity (QC) values may be derated under an ELCC approach—requiring more resources overall to be shown to meet

² In fact, the importance of deliverability extends beyond the resource adequacy program and construct as it is also used in interconnection and transmission planning processes.

resource adequacy requirements—the shown resource adequacy fleet may significantly differ from the portfolio used to derive ELCC values. In such cases, validating the resource adequacy fleet based on capacity values alone may not ensure adequate energy to meet demand and battery charging needs in the resource adequacy compliance period. An explicit energy sufficiency check, in addition to a capacity check, is important to ensure a reliable resource adequacy portfolio.

SCE’s proposal addresses energy concerns by implementing a 24-hourly slice framework, but is less clear about how its proposal will consider deliverability. On the one hand, SCE’s proposal notes that:

SCE supports continuing the current on-peak deliverability study process and using the outputs in the 24-hourly slices framework... The CAISO on-peak deliverability study uses hourly modeled resource output and forecast demand to determine whether the studied resources can supply their full modeled output during critical system hours... A resource is deemed to be “fully deliverable” if its full modeled output can deliver to system load under summer peak load conditions... It should be noted this “full deliverability” amount is not dependent on the CPUC resource counting, only CAISO’s modeling... SCE proposes that wind and solar resources’ hourly capacity contribution values be based on deliverability status and hourly expected capacity contribution profiles. Because the CAISO deliverability study process models intermittent renewable resources at a very high output using 20% exceedance, the proposed deliverability hourly capacity values already account for the amount that is actually deliverable during critical system hours. It is thus reasonable to maintain the current on-peak deliverability study process as a starting point; the deliverability test can and should evolve over time to consider grid conditions in other hours.³ [Footnotes omitted]

However, later in its proposal SCE states:

SCE proposes the CAISO publicly identify the hour it will test for a deficiency and agree to use the CPUC hourly profile value for solar and wind for that hour, as well as the corresponding load level for that hour, in its test. Continuing to use the NQC base value could result in CAISO incorrectly identifying and quantifying a deficiency.⁴

In a footnote, the SCE suggests the CAISO should accept hourly generation profile values that exceed NQC values in CAISO showings.⁵ However, a resource’s generation profile does not reflect whether it is deliverable to load under stressed system conditions. Under SCE’s

³ Report, p.16.

⁴ Report, p.19.

⁵ Report, p.19, Footnote 16.

proposals, it is unclear whether variable energy resource showings to the CAISO will represent deliverable capacity. SCE's proposal could benefit from additional clarity on how deliverability will be considered in showings to the CAISO.

E. The CAISO Commits to Coordinating with the Commission to Harmonize Program Assumptions, Rules, and Requirements to the Extent Possible to Ensure a Reliable and Efficient Resource Adequacy Program.

As a partner in the resource adequacy program, the CAISO commits to coordinating with the Commission to harmonize program assumptions, rules, and requirements to the extent possible to ensure a reliable and efficient program. To that end, a future resource adequacy program should ensure sufficient capability to meet both energy and capacity needs, including sufficient resources to meet storage charging demand. Consequently, the CAISO must evaluate new CAISO processes to assess the energy sufficiency of the resource adequacy fleet (to meet both demand and battery charging needs) through a future CAISO stakeholder process.

However, any deviation from assessing peak demand requirements using a single NQC value—*i.e.*, the current CAISO tariff framework—will require significant changes to CAISO processes. At a minimum, these changes will require the CAISO to conduct a stakeholder process to vet and coordinate changes among all LRAs in the CAISO footprint. In the stakeholder process, the CAISO could consider the following:

- Whether the CAISO should implement a CAISO-program where both capacity and energy are considered, but interaction with the CAISO is simplified and harmonized. In other words, the CAISO system might not need to duplicate all of the complexities of the Commission's resource adequacy program, but it should be able to accommodate different local regulatory authority programs within reason. For example, the Commission may wish to evaluate energy on multiple slices within the day while the CAISO only evaluates a single aggregate number that is the sum of hours the Commission will assess;
- Processes for the CAISO to evaluate the energy sufficiency of the resource adequacy fleet to meet demand and battery charging needs;
- Structure and needed data for the capacity and energy showings to the CAISO;

- Potential changes to CAISO processes and rules such outage, substitution, and backstop cost allocation

The CAISO seeks to minimize implementation complexity and harmonize requirements with the Commission’s resource adequacy program, but the CAISO expects changes to its resource adequacy program will be challenging to achieve for a January 1, 2024 implementation date. The CAISO, however, recognizes the urgency of resource adequacy reform and commits to working with the Commission and stakeholders to develop a more durable, longer-term resource adequacy framework that can be implemented soon after resource adequacy year 2024.

In the meantime, the Commission could consider enhancements or a transition period that would not require significant CAISO tariff-based changes to the existing resource adequacy framework and that would s maintain interoperability with CAISO systems. This would allow the Commission to move forward with its implementation without requiring the CAISO to complete a stakeholder process, make a filing at the Federal Energy Regulatory Commission (FERC), and implement its own processes. For example, the Commission could direct load serving entities to adhere to new requirements subject to Commission corrective action but the CAISO systems and processes would not mirror or penalize compliance with these new requirements. Otherwise, the Commission can implement new resource adequacy requirements on a non-binding basis to test new processes and evaluate whether further changes are necessary.

F. Energy Division Staff’s LOLE Study Remains Critical to Both the Existing and Future Resource Adequacy Program

The Energy Division staff’s LOLE and ELCC study (collectively Energy Division Study) remains a critical input for either the Gridwell or SCE proposal, as well as today’s resource adequacy program. The Gridwell proposal requires an updated planning reserve margin (PRM) and uses ELCC values. At a minimum, the SCE proposal requires an updated PRM value. The Commission should aim to use the Energy Division Study—with necessary modifications proposed by CAISO and other parties—to establish PRM and/or ELCC values in any future resource adequacy framework.

Regarding the first question posed in the Ruling, the outputs of the Energy Division Study can be considered a milestone itself. Because both proposals need a PRM value, the Commission should prioritize finalizing the Energy Division Study work. Furthermore, the

current resource adequacy program will benefit from updated PRM and ELCC values. Moving further upstream, the Commission should also coordinate with the California Energy Commission to develop a stochastic demand forecast set.

III. Conclusion

The CAISO appreciates the opportunity to provide comments on the Report. As a partner in the resource adequacy program, the CAISO commits to coordinating with the Commission to harmonize program assumptions, rules, and requirements to the extent possible to ensure a reliable and efficient program. To that end, a future resource adequacy program should ensure sufficient capability to meet both energy and capacity needs, including sufficient resources to meet storage charging demand. Consequently, the CAISO must evaluate new CAISO processes to assess the energy sufficiency of the resource adequacy fleet (to meet both demand and battery charging needs) through a future CAISO stakeholder process. Importantly, the Commission should ensure any proposal adopted considers the transmission system's ability to deliver generation resources to load and the CAISO's critical role in such assessments as the independent system operator and partner in the resource adequacy program.

Respectfully submitted

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ATTACHMENT A

Attachment A: CAISO's Proposed Resource Adequacy Program Attributes for Consideration in the Resource Adequacy Proceeding Reform Track

1. Ensuring LSEs show and offer to the CAISO sufficient resources with the right capabilities under a 24x7 must-offer obligation.
 - a. This is necessary for the CAISO to operationalize the resource adequacy fleet effectively and efficiently to maintain reliability around-the-clock. If resources are not subject to a 24 x 7 must offer obligation, they may not be available when the CAISO needs them. The increasing number of energy and use-limited resources can create operational challenges during periods of the day other than the peak.
2. The ability to ensure a reliable resource adequacy fleet (e.g., a fleet that can meet a 0.1 loss of load expectation (LOLE) or planning reserve margin (PRM) based on a reliability-based assessment). This includes meeting reliability needs across critical operational periods, under multiple day high-load conditions, and other climate change driven risks/events.
 - a. An LOLE analysis and a one-in-ten year planning standard should be used to establish resource adequacy requirements and determine an appropriate PRM. This is a widely accepted practice and standard for determining resource adequacy. LOLE analyses, such as those based on a stochastic production simulation model, can model hundreds of iterations of full-year hourly chronological simulations. Such detailed modeling can test whether the resource adequacy fleet is capable of maintaining reliability in the face of different and extreme weather events, which may last several hours or days.
3. Sufficient flexibility to adapt to the rapidly changing demand and resource mix. The unique challenges presented by the changing demand and resource mix are detailed below.
 - a. Demand – According to the California Energy Commission's (CEC's) January 2021 demand forecast, the gross peak and net peak demand hours will

converge by 2023.⁶ Expected future fuel substitution and economy-wide electrification will further change the load shape and potentially change the critical operational periods on the grid.

- b. Resources – California is shifting to a resource mix increasingly comprised of variable, use-limited, and availability-limited resources.
 - i. Between summer 2020 and the end of 2021, the battery storage fleet increased from 500 MW to 2,500 MW.
 - ii. Based on the Final Decision in the Integrated Resource Planning proceeding, LSEs are expected to add an additional 2,500 MW of battery storage in 2022, increasing to a cumulative 11,300 MW by 2025.⁷
 - iii. This same Final Decision indicates LSEs will add 1,000 MW of geothermal resources and 1,000 MW of long-duration storage by 2028.
 - iv. Significant dispatchable resource retirements are expected over the next five years as the remaining once-through-cooling gas-fired generation resources reach the end of their compliance extensions.
 - v. The Diablo Canyon Power Plant, which provides significant baseload capacity, will reach its scheduled retirements in 2024 and 2025.
4. Resource counting rules that accurately reflect resource availability, including outage rates and use limitations.
 - a. Resource counting rules should provide a reasonable expectation of the availability of the resource adequacy fleet. Counting rules that appropriately reflect resource availability and use limitations, while providing incentives for resources to be available, can help the Commission and the CAISO avoid relying on resources that may not actually be available when needed in the operating timeframe.

⁶ California Energy Commission, CED 2021 Hourly Forecast - CAISO - Mid Baseline - AAEE Scenario 3 - AAFS Scenario 3 (2021 IEPF forecast). The gross peak occurs by 2023 at hour ending 19 Pacific Standard Time (hour ending 8:00 p.m. Pacific Daylight Time).

⁷ California Public Utilities Commission, *Decision Adopting 2021 Preferred System Plan*, D.22-02-004, Order Instituting Rulemaking to Continue Electric Integrated Resource Planning and Related Procurement Processes, R.20-05-003, February 10, 2022.

5. Sufficient capability to meet both energy and capacity needs, including resources to meet storage charging demand.
 - a. A significant amount of dispatchable thermal resources will retire, and storage resources are expected to provide the bulk of capacity needed to maintain reliability in the face of these retirements. The resource adequacy program should consider when storage resources will be charged and discharged and assess whether there will be sufficient capability to meet storage charging requirements.
6. Contracting sufficient to meet established resource adequacy capacity requirements and minimize CAISO backstop procurement.
 - a. CAISO procurement mechanisms are intended to serve as back-stops to local regulatory authority (LRA) resource adequacy programs, and they should not be relied upon to front-run the Commission's procurement processes.
7. Coordination with CAISO's resource adequacy construct, which the CAISO must administer for all LRAs within its footprint.
 - a. The Commission should coordinate closely with the CAISO because changes to the Commission's resource adequacy program may affect the CAISO's overall resource adequacy construct. The CAISO must ensure it has a resource adequacy construct that is workable and just and reasonable across all LRAs