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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 25-10-003

OPENING COMMENTS OF THE CALIFORNIA INDEPENDENT SYSTEM OPERATOR CORPORATION ON TRACK 1 PROPOSALS

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I. Introduction

Pursuant to the *Assigned Commissioner's Scoping Memo and Ruling* (Ruling), issued on December 12, 2025, and the *Administrative Law Judge's Ruling On Energy Division's Transactability Report and Modifying Track 1 Schedule,* dated February 24, 2026, the California Independent System Operator Corporation (CAISO) hereby submits its opening comments on Track 1 proposals.

First, the CAISO responds to party proposals to allow "Energy Only capacity" to meet charging sufficiency requirements or Resource Adequacy (RA) requirements in the California Public Utilities Commission's (Commission) RA program.[1] The CAISO urges the Commission not to adopt these proposals without first taking certain actions. As part of the CAISO's 2026-2027 Transmission Planning Process, the CAISO will perform a study that will provide information the Commission can use to evaluate whether it is reasonable to assume that storage resources can charge from Energy Only capacity. Until the Commission determines, based on those study results, that this assumption is reasonable, , the CAISO urges the Commission to not allow Energy Only capacity to meet charging sufficiency requirements. Additionally, the Commission must establish complementary rules, such as how and when Energy Only capacity

[1] The CAISO uses the term "Energy Only capacity" to refer to: (1) all capacity from Energy Only resources that are not co-located with a storage resource; (2) capacity from Energy Only resources above the level that is used to charge co-located storage resources; and (3) the non-deliverable portion of resources with Partial Capacity Deliverability Status.

can meet charging sufficiency requirements, before allowing Energy Only capacity to meet charging sufficiency requirements. Without first taking these actions, the Commission risks relying on storage resources with insufficient state of charge to meet grid reliability needs during peak conditions, leading to potential reliability shortfalls. However, regardless of whether the Commission allows Energy Only capacity to meet charging sufficiency requirements, the Commission should not allow Energy Only capacity to meet RA requirements.

Second, the CAISO expresses deep concern with party proposals that would impose restrictions on all RA resources for the bidding of, or eligibility to receive revenues from, imbalance reserves and reliability capacity. These restrictions would create grid reliability challenges, risk higher costs to ratepayers, and harm regional market participation. These restrictions would also unfairly impose a permanent solution to a temporary concern of double compensation. The Commission should instead view the introduction of the imbalance reserves and reliability capacity products as an opportunity to gather information to consider RA program reforms that provide potential savings to ratepayers.

Third, the CAISO recommends the Commission adopt Energy Division's proposal for an Unforced Capacity (UCAP) framework and seek further enhancements before a 2028 implementation date. The Commission should also provide CAISO with qualifying capacity (QC) values identical to those the Commission uses to limit RA showings for storage and thermal resources in its RA program.

Finally, the CAISO recommends the Commission adopt Energy Division's proposal for the QC calculation methodology for storage resources, with two modifications, to better align the Commission's adopted QC counting methodology for storage resources with the Commission's adopted QC counting methodology.

II. Discussion

A. The Commission Should Not Allow Energy Only Capacity to Meet Charging Sufficiency Requirements At this Time.

Many parties proposed the Commission allow "Energy Only capacity" to meet charging sufficiency requirements.[2] The Commission should not allow Energy Only capacity to meet

[2] *See* Pacific Gas and Electric Company (PG&E) Track 1 Proposals, p. 1; Southern California Edison Company (SCE) Track 1 Proposals, p. 7; California Community Choice Association (CalCCA) Track 1 Proposals, p. 9; Joint Parties (California Energy Storage Alliance (CESA), Solar Energy

charging sufficiency requirements at this time. The Commission must first determine that is reasonable to assume storage resources can charge from Energy Only capacity based on a forthcoming CAISO study.[3] In addition, the Commission must also establish additional complementary rules, such as how and when Energy Only capacity can meet charging sufficiency requirements, before considering this proposal. If the Commission adopts this proposal before taking these actions, the Commission risks storage resources being insufficiently charged when needed to maintain grid reliability.

The RA planning process does not include a transmission system study that evaluates whether transmission system constraints restrict generators from supplying energy to charge storage resources during non-peak hours. Adopting party proposals to allow Energy Only capacity to meet charging sufficiency requirements would therefore rely on an untested assumption that Energy Only capacity can provide charging energy to storage resources.

The Commission's RA program should not rely on this assumption unless a rigorous study of the transmission system demonstrates that this assumption is reasonable. If the assumption is not reasonable, the Commission's RA program will rely on storage resources being charged by energy that may not be delivered. This may result in storage resources having insufficient state of charge to meet grid reliability needs during peak conditions, leading to potential reliability shortfalls.

As part of its 2026-2027 Transmission Planning Process, the CAISO will perform a study that will provide information the Commission can use when considering whether it can reasonably assume storage resources can charge from Energy Only capacity. The CAISO expects preliminary results will be available in November 2026. The CAISO will incorporate the results into the Transmission Plan scheduled for approval by the CAISO Board of Governors in May 2027.

Additionally, if the Commission wishes to allow Energy Only capacity to meet charging sufficiency requirements, it must first establish a comprehensive framework to enable this approach. This framework should include rules that complement the overarching rule that allows

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Industries Association (SEIA), Large-scale Solar Association (LSSA), California Wind Energy Association (CalWEA)) Track 1 Proposal, p. 5; American Clean Power – California (ACP-CA) Track 1 Proposals, p. 3.

[3] CAISO's comments only refer to constraints on the transmission system. They do not refer to other constraints, such as those on the distribution system.

load serving entities (LSEs) to show Energy Only capacity to meet charging sufficiency requirements. The Commission should provide an opportunity for parties to submit proposals for these complementary rules.

Regardless of whether the Commission allows Energy Only capacity to meet charging sufficiency requirements, it should not allow Energy Only capacity to meet RA requirements.

1. CAISO Will Provide Study Results that the Commission Can Use in Assessing Whether Energy Only Capacity Can Meet Charging Sufficiency Requirements.

The CAISO's current methodology for studying deliverability assesses whether RA-eligible resources can serve CAISO system load during stressed grid conditions. The CAISO performs this study to determine the amount of capacity the transmission system can reliably support with deliveries from RA-eligible supply resources to the aggregate of CAISO system load. Transmission congestion limits the capability of the system to deliver energy to load. If congestion limits a resource's capacity to deliver its energy to load, that capacity cannot be relied on during stressed grid conditions.

The Commission's RA program appropriately recognizes congestion limitations through its requirement that RA resource's capacity must be deliverable.[4] If it failed to recognize deliverability, the Commission's RA program might assume that load can be served by energy that cannot be delivered, resulting in unreliable resource planning outcomes.

The CAISO has historically focused its deliverability studies on assessing constraints on the transmission system during stressed system conditions. These conditions often arise during hours with high demand for firm loads, such as space cooling, vehicle charging, and other customer-driven needs. However, in recent years, storage resources have become an increasingly significant source of demand on the system. In the CAISO's deliverability studies, the CAISO has not traditionally evaluated how storage-charging loads affect congestion as storage resources rarely charge during peak load periods. They usually charge during lower priced, non-peak load periods when solar energy is plentiful. Accordingly, the RA planning process does not include a

[4] 2026 Resource Adequacy and Slice of Day Guide, p. 18. https://www.cpuc.ca.gov/-/media/cpuc-website/divisions/energy-division/documents/resource-adequacy-homepage/resource-adequacy-compliance-materials/guides-and-resources/2026-ra-slice-of-day-filing-guide.pdf

transmission system study that evaluates whether transmission system constraints restrict generators from supplying energy to charge storage resources during non-peak hours.

The expected results of such a study are not obvious because of the ambiguous impacts on transmission congestion from the varying levels of firm loads, storage-charging loads, and generation output during non-peak load hours. During non-peak load hours, storage-charging load and firm load levels will differ from the levels during peak load conditions, creating offsetting impacts to congestion. Storage-charging loads will be higher during non-peak load hours, whereas firm load levels will be lower. These dynamics could fully offset, partially mitigate, and even exacerbate transmission congestion. Supply assumptions during non-peak load hours will also impact transmission congestion, though in a less ambiguous way. The CAISO's current deliverability studies assume relatively low solar output because grid stress typically occurs later in the day when solar production is diminished relative to the middle of the day. In contrast, higher solar output during non-peak load hours increase transmission congestion relative to peak load hours. Only a detailed study of the transmission system can demonstrate how these interacting factors impact congestion.

The CAISO plans to perform this study as part of its 2026-2027 Transmission Planning Process.[5] This study will provide two important sets of results: (1) the extent to which transmission congestion constrains output from generation resources; and (2) the extent to which transmission congestion constrains storage resources' ability to charge. This study will assess the time of day during which storage typically charges. The results will also be locationally-specific, indicating in which areas generation output is limited by transmission congestion and in which areas storage resource's ability to charge is limited by transmission congestion.

The CAISO plans to publish results of its study investigating whether Energy Only capacity can provide charging energy to storage resources according to the 2026-2027 Transmission Planning Process schedule.[6] The CAISO will publish the preliminary results of the study and solicit feedback in November 2026. The CAISO will then incorporate the study results into the Transmission Plan. The draft Transmission Plan is scheduled for release in March 2027 and the CAISO Board of Governors is currently scheduled to consider whether to approve the

[5] *See* CAISO 2026-2027 Transmission Planning Process Unified Planning Assumptions and Draft Study Plan – Feb 2026, p. 58, https://stakeholdercenter.caiso.com/InitiativeDocuments/2026-2027-Transmission-Planning-Process-Unified-Planning-and-study-Plan-Draft-Feb-2026.pdf

[6] *Id*., p. 4.

final Transmission Plan in May 2027. Once published, the Commission can use the study results to assess whether it can reasonably assume that Energy Only capacity can provide charging energy to storage resources.

Until the Commission is able to use the study results to determine that it can reasonably assume storage resources can charge from Energy Only capacity, the Commission should not allow Energy Only capacity to meet charging sufficiency requirements.

2. The Commission Must Develop a Comprehensive Framework to Reflect Energy Only Capacity in its RA Program Before it Allows Energy Only Capacity to Meet Charging Sufficiency Requirements.

The Commission's RA program does not contain any rules regarding in which hours and locations Energy Only capacity may be used to meet charging sufficiency requirements. The Commission also has not established a process to validate that Energy Only capacity is contracted to LSEs. These complementary rules, and potentially others, would serve as the basis of a comprehensive framework for how the Commission's RA program reflects Energy Only capacity. If the Commission allows Energy Only capacity to meet charging sufficiency requirements, the Commission must first establish a comprehensive framework to implement this approach. It should not allow Energy Only capacity to meet charging sufficiency requirements until it has developed the additional complementary rules that would comprise this comprehensive framework.

The first set of rules the Commission needs to adopt are rules for which hours Energy Only capacity can be used to meet charging sufficiency requirements. Storage resources predominantly charge during and directly after the solar ramping hours; charging is less common in the overnight hours and during the early afternoon. These changing load conditions across the day will create lower or higher levels of transmission congestion across the non-peak load hours. To reflect these changing load conditions in its RA framework, the Commission should consider whether Energy Only capacity can be used to meet charging sufficiency requirements in all of, or only a subset of, non-peak load hours. No parties have submitted proposals for which hours the Commission's RA program would recognize Energy Only capacity to charge storage resources. If the Commission does not develop these rules, LSEs might show Energy Only capacity in hours in which it cannot be reasonably assumed to provide charging energy.

The Commission should also consider developing rules for how the location of Energy Only capacity affects Energy Only capacity's ability to provide charging energy. One potential outcome of the CAISO's study is that generation resources' output is constrained only in certain areas on the system. The location of generation resources, firm loads, and charging loads, and the capacity of the transmission system itself, all impact congestion. Given this potential outcome, the Commission might consider limiting Energy Only capacity located in areas with transmission constraints from being able to meet charging sufficiency requirements. Ignoring these transmission constraints could lead storage resources to expect to charging from Energy Only capacity that the system cannot actually deliver.

Several parties have submitted proposals that account for the location of Energy Only capacity.[7] The CAISO believes these proposals are insufficient because they include locational restrictions that fail to account for local transmission constraints that might limit the ability of storage resources to charge.

Finally, the Commission should ensure that Energy Division can validate the Energy Only capacity shown to meet charging sufficiency requirements. Energy Only resources do not qualify for RA at the CAISO.[8] Accordingly, they are not included in the CAISO RA supply plans that Energy Division staff uses to validate LSE supply plans submitted to the Commission for compliance with its RA program.

No party proposal provides a way for Energy Division to validate the supply plans submitted to the Commission on a timely basis. Absent an expedient and straightforward way to validate supply plans, the Commission will have limited assurance that Energy Only capacity has been contracted by LSEs, risking energy from that Energy Only capacity not showing up when needed.

If the Commission allows Energy Only capacity to meet charging sufficiency requirements, the Commission must first establish a comprehensive framework that establishes when and how Energy Only capacity can be shown to meet charging sufficiency requirements and how to validate Energy Only capacity.

[7] *See* PG&E Track 1 Proposals, p. 6; Joint Parties (CESA, SEIA, LSSA, CalWEA) Track 1 Proposal, p. 9; ACP-CA Track 1 Proposals, p. 3.

[8] CAISO Tariff, section 40.4.6.1.

B. The Commission Should Not Allow Energy Only Capacity to be Shown to Meet RA Requirements.

Sonoma Clean Power Authority and CalCCA propose that the Commission allow Energy Only capacity to meet RA obligations as well as charging sufficiency requirements.[9] The Commission should not allow Energy Only capacity to be shown to meet RA requirements for two reasons.

First, CAISO's deliverability studies have already demonstrated that Energy Only capacity is undeliverable during stressed system conditions, indicating they cannot reliably serve the aggregate of CAISO system load during these hours.

Second, if Energy Only capacity can potentially serve load during non-peak hours, it likely can only serve storage charging loads and not the firm load reflected in RA requirements. As explained above, firm load is lower and solar generation is higher during hours when storage typically charges. Both factors lead to higher congestion compared to periods of stressed grid conditions. Only storage charge loads are likely to be sufficiently large to offset the congestion impacts of those factors. This means that any incremental transmission capacity likely to be freed up during non-peak hours will be used to serve storage charge loads, not to serve firm loads. As firm loads are reflected in RA requirements, the Commission cannot reasonably assume Energy Only capacity can meet RA requirements during non-peak hours. Because the Commission cannot reasonably assume Energy Only capacity can meet firm loads during non-peak hours, it should not allow Energy Only capacity to meet RA requirements during non-peak hours.

The Commission cannot reasonably assume that Energy Only capacity can meet firm loads at any point in the day. Therefore, the Commission should not allow Energy Only capacity to meet RA requirements. Otherwise, the Commission risks firm loads not being served, undermining a core purpose of its RA program

C. The Commission Should Not Impose Restrictions on All RA Resources for the Bidding of, or Eligibility to Receive Revenues from, Imbalance Reserves and Reliability Capacity.

Several parties propose that the Commission should impose bidding or revenue allocation requirements on LSEs for two market products CAISO is introducing as part of its Day Ahead

[9] CalCCA Track 1 Proposals, p. 9; Sonoma Clean Power Authority, p. 5.

Market Enhancements (DAME) initiative: (1) reliability capacity; and (2) imbalance reserves (collectively, the DAME Products).[10]

The CAISO is deeply concerned with these party proposals and strongly urges the Commission to not adopt them. As explained in CAISO's Track 1 proposals, restrictions on DAME Products bidding or revenue allocation would disrupt the CAISO's ability to perform its core functions as a balancing authority and market operator, threatening grid reliability and risking higher costs to ratepayers.[11] Proposals to restrict DAME Product bidding and revenue allocation would also harm regional market participation, which diminishes the benefits of participating in a regional day-ahead market.[12]

The Commission should instead view the introduction of the DAME Products as an opportunity to provide potential savings to ratepayers and improve the Commission's RA processes. The CAISO market design for the DAME Products incentivizes market participants to submit bids based on their underlying costs, yielding efficient market outcomes that minimize costs to ratepayers. Allowing imbalance reserves to work as designed can also provide the Commission with new insights into the costs incurred by RA resources to respond to variability in load and renewable resource output. This would allow the Commission to quantify and evaluate strategies to reduce those costs.

The Commission and CAISO have a long history of delivering reliable and cost-effective energy to ratepayers though their shared RA responsibilities. The CAISO expresses its continued commitment towards achieving these goals.

1. The Commission Should Not Address a Temporary Double Compensation Concern with a Solution that Would Permanently Distort the Market.

Based on statements made by the Commission in Decision (D.) 25-06-048, Energy Division proposes to impose a permanent restriction on the RA fleet's ability to receive a meaningful portion of DAME Product revenues. In D.25-06-048, the Commission raised the concern "that RA contracts that do not provide that the [residual unit commitment] (or successor) revenues will be credited back to the LSE will result in a potential double payment for capacity

[10] Energy Division Proposals, p. 25; SCE, p. 4; Alliance for Retail Energy Markets, p. 3.
[11] CAISO Track 1 Proposals, p. 4.
[12] *Id*., p. 5.

benefits already included in the RA contract price."[13] The Decision also notes uncertainty of whether imbalance reserves are sufficiently similar to the residual unit commitment process to warrant a similar concern of double payment.[14] To address these concerns of double compensation, Energy Division's proposal would impose a permanent restriction on the RA fleet's ability to receive a meaningful portion of DAME Product revenues. These restrictions would distort the CAISO market by removing the incentive for RA resources to bid the underlying costs of the DAME Products.[15]

The Commission should not address concerns of double compensation with a solution that would permanently distort the market. Accordingly, it should not adopt party proposals that seek to permanently restrict the RA fleet from receiving a substantial portion of the revenues from the DAME Products.

The CAISO understands that a risk of double compensation may exist if the Commission expects contracts to remain unchanged. Existing RA contracts may be priced with the assumption that residual unit commitment revenues are allocated back to the LSE. Although existing RA contracts may not have internalized the expected imbalance reserve revenues, if the parties agree that the prices struck did not anticipate these revenues, they may avail themselves of the CAISO mechanism that transfers the revenues to the LSE.[16]

Prospectively, the Commission should not expect that RA contracts will not take into consideration the expected revenue flow from imbalance reserves. This is a transitional issue which will be resolved by negotiations between the LSEs and RA suppliers. The parties will have the flexibility to strike a price that reflects the expected total day-ahead market revenues. To the extent parties agree that revenues will be retained by the supplier, RA contract prices are likely to be discounted to account for that expected revenue flow. On the other hand, if revenues will be transferred to the LSE, RA contract prices may reflect a higher price. This also more permanently mitigates any risk of double compensation because it is in the interest of LSEs to ensure RA suppliers are not compensated multiple times for the same service.

The introduction of the DAME Products provides RA suppliers and LSEs transparency to the cost of the flexibility needed to serve net load uncertainty. This will inform their negotiations

[13] D.25-06-048, p. 102.
[14] *Id*.
[15] *Id*. p. 6.
[16] Pending CAISO Tariff, section 11.2.6.

and will enable them to make more informed decisions. Therefore, the Commission's stated concern is only temporary. To the extent a double compensation risk exists, it only applies to the period of time that existing RA contracts are priced to reflect the embedded costs incurred by RA suppliers to provide the DAME Products.

Party proposals that seek to permanently restrict the RA fleet from receiving a substantial portion of the revenues from the DAME Products would permanently distort the CAISO market in an attempt to address a temporary concern. The Commission should not adopt these proposals. The adverse effects would outlast the temporary problem, creating negative impacts that far exceed any potential benefit.

Instead, the Commission should consider solutions that align with the timeframe of the problem they aim to address. This could include temporary solutions such as requiring LSEs to make reasonable efforts to utilize the DAME Transitional Measures. The DAME Transitional Measures are a mechanism that will allow LSEs and RA suppliers to mutually agree to allocate all reliability capacity and a portion of imbalance reserves revenues to the LSE for a period of three years.[17] RA contracting parties can use the three-year period during which the DAME Transitional Measures apply to allow for existing RA contracts to expire and negotiate new RA contracts that contain provisions for how DAME Product revenues are allocated. Temporary solutions to the risk of double compensation, such as the DAME Transitional Measures, would then be replaced by the more permanent solution of bilateral negotiations between LSEs and RA suppliers as they negotiate new RA contracts.

2. Imbalance Reserves are Not a Capacity Product.

Energy Division's proposal states that imbalance reserves are a capacity product.[18] Imbalance reserves are not a capacity product; they are a reserve product. The CAISO's market already clears reserve products, such as spinning reserves, without disrupting the Commission's RA program. The Commission should treat imbalance reserves similar to other reserve products by not imposing restrictions on how RA resources bid or receive revenue from these products.

[17] Pending CAISO Tariff, section 11.2.6.
[18] Energy Division Proposal, p. 28.

3. Must-Offer Obligations and Imbalance Reserves are Complementary Reliability Tools, Not Substitutes.

Energy Division's proposal states that must-offer obligations address net load uncertainty.[19] Net load uncertainty describes the unpredictable nature of changes in load and renewable resource output that arise between the day-ahead and real-time market timeframes.

Must-offer obligations are an insufficient tool to address net load uncertainty alone. Must-offer obligations simply require RA resources to offer into the market. They do not ensure RA resources have the output range necessary to respond to the flexibility needed to address load and supply variability in the real-time market. If this output range is not reserved, the CAISO market will use resources that meet net load uncertainty in a less cost-effective manner. In addition, when the system is constrained and the CAISO has not procured sufficient resources to meet the uncertainty that actually materializes, it may compromise its ability to serve the system reliably.

The actions of CAISO operators demonstrate that must-offer obligations are unable to address net load uncertainty alone. Since at least 2017, CAISO operators have routinely adjusted the load forecast used in the residual unit commitment process to help address net load uncertainty.[20] These adjustments have consistently exceeded thousands of MW, comprising a substantial portion of CAISO load. If the must-offer obligation was a sufficient tool to manage net load uncertainty, these ongoing adjustments would not be necessary at these significant levels.

Imbalance reserves address net load uncertainty by withholding part of a resource's output from day-ahead market commitments, allowing the resource to provide flexibility in the real-time market. Must-offer obligations and imbalance reserves are complementary reliability tools, not substitutes for each other. Must-offer obligations ensure resources are offered into the market and imbalance reserves ensure operational flexibility.

By restricting how RA resources bid or receive revenues from imbalance reserves, the Commission would keep imbalance reserves from performing this complementary reliability function, undermining the reliability and economic benefits that imbalance reserves can provide.

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[19] *Id*., p. 28.

[20] CAISO, DAME Revised Final Proposal, p. 14, https://stakeholdercenter.caiso.com/InitiativeDocuments/RevisedFinalProposal-Day-AheadMarketEnhancements.pdf

D. The Commission Should Adopt Energy Division's Resource-Specific UCAP Proposal and Seek Further Enhancements Before a 2028 Implementation Date.

The CAISO appreciates Energy Division's efforts to coordinate the development of a UCAP framework. Energy Division's UCAP proposed framework reflects enhancements over previous versions.

The Commission should adopt Energy Division's proposal for a resource-specific UCAP framework. Core aspects of Energy Division's resource-specific proposal substantially align with the CAISO's UCAP framework. Both proposals are resource-specific, calculate the UCAP derate based on an almost identical list of outage types, and use similar approaches to determining the UCAP demand hours. These similarities result in UCAP frameworks that place incentives on RA resources to be available when needed for grid reliability, along with other benefits. Energy Division's resource-specific UCAP proposal also aligns with the CAISO's and stakeholders' longer-term vision of reforming the CAISO's availability incentive mechanism.

The Commission should adopt Energy Division's resource-specific proposal for RA Year 2028. Before UCAP implementation in 2028, the Commission should enhance its UCAP framework by developing a UCAP calculation methodology for hybrid resources.

Finally, the Commission should not adopt Energy Division's class-average UCAP proposal.

1. The Core Aspects of Energy Division's Resource-Specific Proposal Substantially Align with those Found in the CAISO UCAP Framework.

The CAISO's Board of Governors recently approved a UCAP framework as part of an update to CAISO's default counting rules.[21] The CAISO and its stakeholders designed the CAISO UCAP framework to incentivize RA resources to be available during stressed grid conditions, bolstering grid reliability. The CAISO supports Energy Division's UCAP framework because it is a well-balanced approach and provides a similar reliability incentive, as well as other benefits.

Energy Division's UCAP resource-specific proposal would calculate UCAP derates that are specific to each resource based on that resource's historical availability, similar to CAISO's

[21] https://www.caiso.com/documents/decision-on-resource-adequacy-modeling-and-program-design-track-1-motion-oct-2025.pdf

UCAP framework.[22] Calculating UCAP derates based on a resource's specific forced outage rate ensures the resulting capacity value reflects that resource's contribution to reliability during stressed grid conditions. This incentivizes the resource to be available during the hours of greatest reliability risks because the resource would receive a lower capacity value if unavailable during stressed grid conditions, making it less attractive for LSEs to contract with.

Additionally, Energy Division's proposed list of outage types reflected in UCAP is almost identical to the list in CAISO's UCAP framework. Both Energy Division's proposed list and CAISO's list reflect almost all outage types, with limited exceptions. A UCAP framework that captures a wide set of outage types reduces the incentives for RA resources to submit inappropriately classified forced outages to avoid impacts to the UCAP derate. In turn, this promotes accurate outage reporting at the CAISO.

Energy Division's proposed use of the RA Measurement Hours to determine UCAP demand hours also aligns conceptually with CAISO's UCAP demand hours. The Commission approves the RA Measurement Hours annually, creating the opportunity for the Commission to re-evaluate whether they still reflect the hours in which the grid is most likely to experience stressed conditions. Similarly, CAISO's UCAP demand hours are based on the CAISO's determination of the hours most likely to experience loss of load, calculated annually as part of CAISO's Summer Assessment. Both frameworks' use of the hours of highest reliability risk should yield consistent capacity values and incentivize RA resources to be available during stressed grid conditions. Both frameworks also regularly reassess the demand hours, allowing them to capture changes in reliability risks over time. Overall, this contributes to greater reliability.

2. Energy Division's Resource-Specific Proposal Aligns with CAISO's Longer-Term Vision for Reforming its Availability Incentive Mechanism.

CAISO's availability incentive mechanism, the Resource Adequacy Availability Incentive Mechanism (RAAIM), encourages RA suppliers to make their RA capacity available when needed for grid reliability.

In CAISO's Resource Adequacy Modeling and Program Design stakeholder process, CAISO and its stakeholders are developing a longer-term vision of reforming the CAISO's

[22] *Id*., p. 45.

availability incentive mechanism, in which a resource-specific UCAP framework supplements a reformed RAAIM design to provide an additional availability incentive. The current objective of the stakeholder process is to reform the RAAIM design to focus RAAIM only in the hours when CAISO expects stressed conditions in its balancing area, rather than across a wider set of hours.

The CAISO supports Energy Division's proposed resource-specific UCAP framework because it aligns with this longer-term vision. Only a resource-specific UCAP framework would adequately supplement a reformed RAAIM design because a resource-specific UCAP framework places a sufficient incentive on the individual RA resource to perform during the UCAP demand hours. A class-average UCAP framework would dilute the incentive for individual RA resources to perform in the demand hours by spreading the impact on its capacity value across a wider set of resources.

3. The Commission Should Adopt a UCAP Framework for RA Year 2028.

The time is ripe for the Commission to adopt a UCAP proposal. The Commission has considered UCAP proposals periodically since at least 2022.[23] This extended time has allowed parties to reach a shared consensus, reflected in Energy Division's proposal.

Energy Division's proposal to implement UCAP in 2028 is a reasonable timeframe. It allows parties enough time to update contracts. The CAISO also expects a 2028 implementation would allow the CAISO and its stakeholders enough time to consider any market design changes required to accommodate UCAP-derated QC values.

4. The Commission Should Further Enhance its UCAP Framework Before Implementation by Developing a UCAP Calculation Methodology for Hybrid Resources.

Energy Division's proposed framework for resource-specific UCAP is sufficiently developed for the Commission to adopt. As explained above, the proposed framework contains the core elements of a UCAP framework that will contribute to reliable outcomes.

The CAISO encourages the Commission to further enhance its UCAP framework before implementation in 2028 by developing a UCAP calculation methodology for hybrid resources. The CAISO is concerned that absent a UCAP calculation methodology, hybrid resources and co-located resources may receive disparate treatment. Hybrid resources are resources that CAISO

[23] *See* D.22-06-050.

models as a single resource but contain two or more underlying technology types located at the same point of interconnection (most commonly solar and storage resources). Co-located resources are similar to hybrid resources because they represent multiple technology types located at a single point of interconnection, but CAISO models co-located resources as separate resources. If a co-located resource contains a storage component, Energy Division's proposal would apply UCAP to that storage component.

However, Energy Division's proposal does not contain a UCAP calculation methodology for hybrid resources despite most hybrid resources containing storage components. This creates the situation where a hybrid resource and a co-located resource that are identical, other than how CAISO models them, would receive two different QC values. This would result in unequitable outcomes.

The Commission should resolve this difference before it implements a UCAP framework in 2028. Applying UCAP to both hybrid and co-located resources would ensure the Commission treats similarly situated resources consistently, enhancing the equitability of the Commission's RA program. It would also bolster reliability by ensuring the Commission's RA program incentivizes hybrid resources to be available during stressed grid conditions.

The CAISO stresses that this enhancement should not keep the Commission from adopting Energy Division's resource-specific UCAP proposal for implementation in 2028. A hybrid resource UCAP methodology can be developed in a later track of this proceeding, alongside UCAP for thermal and other resources containing storage components, in time for a 2028 implementation. This staggered development will allow Energy Division staff to consider the UCAP calculation methodology for hybrid resources while it establishes the processes to implement UCAP for other resource types. Once the Commission adopts a UCAP calculation methodology for hybrid resources, it can then leverage the processes Energy Division has already developed to implement UCAP for those other resource types. The efficiencies of this staggered approach would create the opportunity for a timely 2028 implementation of UCAP for thermal, hybrid, and other resources containing storage components.

5. The Commission Should Not Adopt Energy Division's Class-Average UCAP Proposal.

Energy Division proposes an alternative implementation for UCAP that would assign class-average UCAP derates to resources for the first four years of implementation.[24] The Commission should not adopt this alternative proposal.

Class-average UCAP derates dilute the incentive for resources to be available during stressed conditions. As explained above, resource-specific UCAP values incentivize resources to be available when the grid needs them most. A class-average UCAP value reduces the impact on the resource's capacity value when it is unavailable, decreasing the incentive for the resource to be available during critical grid conditions. A class-average UCAP would also penalize resources that perform better than the class average and reward those that perform worse than the class average. This structure is the opposite of what UCAP should be incentivizing: to encourage resources to minimize outages during stressed grid conditions.

E. The Commission Should Provide the CAISO with the Same QC Values the Commission Uses to Limit RA Showings for Storage and Thermal Resources in its RA Program.

Energy Division proposes "to retain the current methodology for calculating QC for resources subject to UCAP…"[25] CAISO understands Energy Division's proposal to mean that the Commission would send QC values to CAISO that do not reflect a UCAP derate.

The Commission should not provide the CAISO with QC values that do not align with the values the Commission uses to limit RA showings for storage and thermal in its RA program. Instead, the Commission should provide the CAISO with QC values identical to those the Commission uses to limit RA showings for storage and thermal resources in its RA program.

Energy Division's proposal would create confusion for RA suppliers and LSEs because they would need to track two different counting values for resources comprising a substantial portion of the RA fleet. Under Energy Division's proposal, RA suppliers and LSEs would need to contract for two separate counting values: one capacity value for showings at the Commission and one capacity value for showings at the CAISO. Storage and thermal resources form a substantial portion of the RA fleet, therefore ensuring RA contracts reflect two sets of counting

[24] *Id*.
[25] Energy Division Proposal, p. 32.

values for these resources will be a significant administrative burden on RA suppliers and LSEs.[26]

It is also not clear how the Commission would validate the showings from storage and thermal resources under Energy Division's proposal. Energy Division staff uses the CAISO RA supply plans to validate the supply plans submitted to the Commission for compliance with its RA program. If the CAISO RA supply plans show values that do not align with the counting methodology used for storage and thermal, Energy Division's existing process for validating supply plans will not suffice.

Finally and most importantly, the CAISO is concerned that Energy Division's proposal would result in the Commission sending the CAISO a planning reserve margin (PRM) that is not adjusted for UCAP, resulting in RA requirements set at unreliable levels. Energy Division's proposal does not explain how it would adjust the PRM that it sends to the CAISO to account for UCAP-derated QCs. Absent clarification, the CAISO is concerned that Energy Division's proposal would result in the CAISO receiving QC values that exceed the capacity values used to calculate the PRM. This would mean the PRM sent to the CAISO would reflect a lower reliability margin than the PRM used in the Commission's RA program, resulting in the CAISO RA requirements that do not reflect the Commission's reliability standard. This creates the potential for reliability shortfalls.

The Commission should instead send the CAISO QC values identical to those the Commission uses to limit RA showings in its RA program for storage and thermal resources. This would result in a single set of capacity values for use in contracting and RA supply plan validation, eliminating confusion and retaining the established process for validating supply plans. It would also align the methodology the Commission uses to determine capacity values and the methodology the Commission uses to determine the PRMs for the CAISO's RA process by reflecting UCAP derates in both. This would ensure the CAISO RA requirements reflect the Commission's reliability standard.

[26] The CAISO notes that Energy Division is considering how a UCAP framework may affect the value the CAISO should use as the must-offer obligation. The CAISO expects that, if adopted, Energy Division's proposal would not ultimately change how the CAISO determines the must-offer obligation for storage and thermal resources. *See* Energy Division UCAP Framework Proposal, slide 22, https://www.cpuc.ca.gov/-/media/cpuc-website/divisions/energy-division/documents/resource-adequacy-homepage/resource-adequacy-compliance-materials/resource-adequacy-history/2-10-2026-track-1-proposals/feb-10-workshop-slides.pdf.

F. The Commission Should Adopt Energy Division's Proposal for the QC Calculation Methodology for Storage Resources with Two Modifications.

1. Energy Division's Proposal Would Better Align the Commission's QC Calculation Methodology for Storage Resources with the Commission's Adopted QC Counting Methodology.

Energy Division proposes to update its QC methodology for storage resources in a two-phase process.[27] The first phase would use as inputs the MAX_ CONT_ENERGY_LIMIT and MIN_CONT_ENERGY_LIMIT fields derived from CAISO's Master File. These fields represent the maximum and minimum state of charge levels to which the CAISO market will dispatch a storage resource. In other words, these fields represent the ends of the state of charge range across which the CAISO market will dispatch a storage resource, (its dispatchable range). The second phase would replace the dispatchable range with the state of charge range that is unaffected by foldback as an input to the QC calculation, once data about that range is available. Foldback, or nonlinearity, is a phenomenon experienced by certain storage technology types whereby a storage resource is no longer capable of discharging or charging at its maximum level as they approach the extremes of its state of charge range.

The CAISO supports the first phase of the Energy Division's proposal without modification. The first phase represents an incremental improvement to the current QC calculation methodology by recognizing that the CAISO market cannot access the state of charge range between the MIN_CONT_ENERGY_LIMIT and zero MWh. The first phase would recognize that the CAISO market will not dispatch a storage resource below its MIN_CONT_ENERGY_LIMIT, rendering the resource incapable of discharging in this state of charge range.

The CAISO supports the second phase of Energy Division's proposal with two modifications, explained further below. The second phase, with modifications, would fully align the QC calculation methodology with the adopted QC counting methodology because the calculation would incorporate the lowest state of charge level at which the resource can sustain its maximum output in MW for four or more uninterrupted hours.[28]

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[27] Energy Division Proposal, p. 14.

[28] In D.14-06-050, the Commission adopted QC rules for storage resources, stating, "[T]he storage operator must submit to the CAISO an output level (in MW) at which the resource is capable of discharging for four or more uninterrupted hours; this is defined to be its PmaxRA, the maximum output that can be considered for RA calculations."

The second phase of Energy Division's proposal, and the CAISO's proposed modifications, will require the Commission to access data for storage resources' maximum state of charge and discharge nonlinearity breakpoint data. The CAISO plans to gather this data as part of market design enhancements currently under consideration in the CAISO's Storage Design and Modeling stakeholder process.[29] If approved, these enhancements would become effective no sooner than spring 2027. The CAISO expresses its willingness to share this data with the Commission to support enhancements to its storage QC calculation methodology.

2. The Commission Should Adopt Two Modifications to Energy Division's Proposal.

The CAISO recommends two modifications to Energy Division's proposal. First, the QC calculation should consider only the impacts of nonlinearity in the discharge direction because the adopted QC methodology focuses only on how a storage resource discharges, not on how it charges.[30] A storage resource experiences nonlinearity when both discharging and charging. Nonlinearity affects discharge when the resource is near its minimum state of charge. Conversely, nonlinearity affects charge when the resource is near its maximum state of charge. The state of charge level at which a storage resource can no longer discharge at its maximum output level can be defined as the discharge nonlinearity breakpoint. As such, nonlinearity does not impede a storage resource's capability to discharge at its maximum output level across the state of charge range between its maximum state of charge range and its discharge nonlinearity breakpoint.

Second, the QC calculation should use the higher of the following two values: (1) the state of charge level at the lower end of a storage resource's dispatchable range; and (2) its discharge nonlinearity breakpoint. This would account for the potential situation where a storage resource can only be discharged to a state of charge level that is higher than the resource's discharge nonlinearity breakpoint. These situations may arise due to operational or contractual limitations. In that situation, the QC calculation should only reflect the range at which the market can feasibly dispatch the resource.

[29] See Storage Design and Modeling initiative webpage, https://stakeholdercenter.caiso.com/StakeholderInitiatives/Storage-design-modeling.

[30] D.14-06-050, p. B-9.

III. Conclusion

The CAISO appreciates the opportunity to provide opening comments on Track 1 proposals.

Respectfully submitted,

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