



**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

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**TRACK 1 PARTY PROPOSALS OF THE CALIFORNIA ENERGY STORAGE
ALLIANCE**

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The California Energy Storage Alliance (“CESA”) hereby submit these Track 1 Party Proposals (“Proposal”) pursuant to the scope¹ and schedule² in the *Assigned Commissioner’s Scoping Memo And Ruling* (“Ruling”) filed on December 12, 2025.

I. INTRODUCTION

CESA appreciates the opportunity to provide these Track 1 Party Proposals. The Track 1 scope includes the design of an Unforced Capacity (“UCAP”) methodology to be used in the slice-of-day Resource Adequacy (“RA”) framework. CESA’s proposal is focused on resolving very important jurisdictional concerns, equitability concerns, and affordability concerns in the UCAP design.

Regarding the UCAP methodology,

¹ Ruling, Section 2.1.8

² Ruling, Section 4

- In ***Section II.A***, CESA proposes clear principles and rationales for outage selection. The Commission must establish clear principles and rationales for the types of outages that will be evaluated for UCAP purposes.
- In ***Section II.B***, CESA proposes a clear regulatory forced outage definition. The Commission must establish a clear regulatory definition for outages that will be evaluated for UCAP purposes.
- In ***Section II.C***, CESA proposes a methodology to establish when energy storage resources are in demand on a resource-specific basis. Energy storage resources must be assessed during times that they would reasonably have been needed for reliability, and therefore dispatched by CAISO.
- In ***Section II.D***, CESA proposes a data validation and operator review process to allow thorough vetting and verification of UCAP values. The Commission should establish a formal, structured data validation process before finalizing UCAP values to build stakeholder confidence in the resulting capacity values and ensure they meaningfully reflect operational performance rather than administrative artifacts or data errors.

II. UCAP PROPOSALS

CESA finds several areas of the Energy Division’s (“ED”) proposed UCAP methodology³ moving in the right direction; that is, towards a methodology that provides an accurate and comparable assessment of the system reliability value of resources. We support the use of the

³ Energy Division UCAP Methodology, November 3-4, 2025, RA workshops on UCAP and LDES and VER Accreditation

Equivalent Forced Outage Rate in Demand (“EFORd”) approach, which is preferred as it is resource-specific. We support the shift toward using verifiable, California-specific data, including the use of CAISO’s Outage Management System (“OMS”) data set instead of relying on different data sources for different resource classes, which would increase the risk of inequitable treatment of outages for different resource classes. Furthermore, CESA supports the ED’s decision to calculate EFORd, individually assessed, for each resource wherever possible and the approach endorsed by the 2025 RA Decision⁴ to use the best 3-in-4 years EFORd values. CESA also supports ED in clearly defining its outage assessment principles.⁵

CESA is increasingly concerned that the Commission will unwittingly cede jurisdiction and effective control over its QC methodology to the CAISO if it does not establish clear principles and rationales for outage selection and establish a clear regulatory forced outage definition. In 2025, CAISO modified outage definitions on two occasions through unexpected updates to its Business Practice Manuals (“BPMs”), highlighting the potential for QC-relevant changes to occur outside of Commission decisions.⁶ Implementing precise regulatory definitions through Commission decisions is necessary to ensure the Commission maintains jurisdiction over the RA program’s QC methodology and resulting values. These definitions must not reference CAISO Tariff defined terms nor CAISO Business Practice Manual (“BPM”) defined terms.

CESA also proposes a methodology to establish when energy storage resources are in demand on a resource-specific basis. CESA has consistently advocated for a UCAP methodology that considers whether the CAISO would have actually dispatched a resource if it were not on

⁴ Decision 25-06-048

⁵ RA Workshop Slide 22

⁶ CAISO PRR 1634 and PRR 1656

outage. The proposal in **Section II.C** is an update to prior proposals to allow the Energy Division to implement it using only public data.

A. Proposal Establishing Clear Principles and Rationales for Outage Selection

CESA proposes that any methodology defining which outages impact a resource’s UCAP value must adhere to a clearly defined set of principles to ensure the UCAP accurately captures dependable capacity and incentivizes proper resource maintenance. Throughout the now multiple proceedings discussing UCAP methodologies, parties have articulated various reasons why certain outage types should or should not impact a resource’s UCAP value. These discussions have been difficult because there has not been an articulation or agreement on the principles to follow when selecting outages and the rationales behind those principles. Once clear principles and rationales are established, defining specific Outage Management System (“OMS”) nature-of-work fields that meet those principles be straightforward, as all parties will know the Commission’s intent and can measure their arguments relative to that intent.

CESA recommends the following principles be followed in determining which outages should be assessed under UCAP, recognizing an overarching objective to incentivize appropriate planned maintenance activities across the built fleet of resources. This objective is highly desirable, because it improves overall system reliability and allows the system operators to appropriately coordinate maintenance activities well in advance of potential equipment failures.

- **The forced outage rate used to determine the UCAP value should be comparable across resource classes.** This principle ensures the methodology provides an accurate and equitable representation of each resource’s contribution to reliability. Comparability is critical because, without it, the methodology risks

creating disparate treatment between resource types, leading to certain resources inequitably receiving higher accreditation values. This is particularly true where resource accreditation, which should focus on equipment failures leading to loss of capability, accidentally incorporates limitations stemming from market design deficiencies rather than resource failure.

- **The forced outage rate used to determine the UCAP value should reflect a resource's tendency to experience equipment failures or imminent equipment failures leading to loss of capability.** This principle recognizes that forced outages due to equipment failures occur suddenly and can severely strain reliability causing the need for extraordinary operator actions within a relatively short timeframe. The need for additional capacity procurement to address these instances is reflected through a derate to each resource's capacity value. For clarity, CESA has proposed defining forced outages based on the established NERC GADS Event Types, specifically U1, U2, U3, D1, D2, and D3 in the past. These events typically occur due to poor maintenance, which the resource operator can control to improve a resource's capacity value.
- **The forced outage rate used to determine the UCAP value should not reflect outages used to ensure an accurate dispatch of a resource operating within its design specifications.** This principle recognizes that all types of resources are available to the CAISO within their design specifications. If CAISO happens to dispatch resources into known operating limitations due to deficiencies in its market/resource modeling, suppliers should not be penalized for expressing these limitations to the CAISO through the submittal of an outage card. Many of these

types of limitations are currently directly modeled by CAISO for some resource types, but not all, causing potential disparate treatment between resource types if this principle is not maintained. Penalizing resources for submittal of such outages is a consequence of deficiencies in CAISO's market/resource modeling, these outages are a direct result of the way in which the CAISO dispatch algorithm happened to drive the resource in the past (which will be different in the future), no amount of maintenance can be performed to avoid these outages in the future, and once the CAISO market/resource model matures there will not be associated outages to assess in the future.

- **The forced outage rate used to determine the UCAP value should not reflect outages that are outside of management control.⁷** The UCAP value should not reflect outages that are completely outside of management control, such as limitations imposed by the transmission system or gas pipeline availability, as the generator itself remains fully available and capable of responding to a CAISO dispatch. These outages have nothing to do with the resource capabilities and no amount of maintenance can be performed to avoid these outages in the future. Including curtailments or outages due to circumstances wholly outside the resource owner's control—such as transmission system limitations or gas pipeline limitations—dilutes the performance incentive inherent in UCAP and potentially

⁷ If the effect of outages that are outside of management control are so large as to present a reliability challenge, it is more appropriate to include them in the determination of the RA program's Planning Reserve Margin ("PRM"), the costs of which would be borne by all load-serving entities, rather than penalizing individual LSEs that have contracted with resources experiencing events that are driven by the broader system and would not be improved by better maintenance activities.

penalizes resources for systemic issues, rather than unit reliability. The generator is fully available and capable of responding to a CAISO dispatch in such cases.

B. Proposal Establishing a Clear Regulatory Forced Outage Definition

Following the principles discussed in *Section II.A*, CESA proposes clearly defining a “forced outage/derate for UCAP purposes” – in words, rather than directly designating specific CAISO-defined nature-of-work fields as the types of outages that are to be assessed. CESA previously proposed definitions based on NERC GADS Event Types (U1, U2, U3, D1, D2, and D3) to categorize immediate, delayed, and postponed forced outages, all of which would be assessed under the UCAP methodology. The forced outage definition should not include outages reflecting operation of resources within their design specifications and outages outside of management control.

Implementing precise definitions is necessary to ensure the Commission maintains jurisdiction over the RA program’s QC methodology and resulting values. It is imperative that the Commission defines an explicit regulatory definition for “UCAP Assessed Forced Outages” that does not reference CAISO Tariff defined terms nor CAISO Business Practice Manual (“BPM”) defined terms. This is important to ensure that the UCAP and resulting QC calculations remain fully within the Commission’s jurisdiction. For instance, this past summer, CAISO changed its definition of the “Plant Trouble” nature-of-work field through a surprise Emergency BPM update,⁸ which made the change effective immediately. The re-definition changed the underlying meaning of a nature-of-work field that has not changed for over two decades, overnight. Again in the Fall, CAISO proposed changing the definition of the “Ambient Due to Fuel Insufficiency” nature-of-

⁸ CAISO PRR 1634, Revising the Outage Management BPM to provide a clarification on a generation outage nature of work to include curtailment due to plant configuration parameters

work field through a BPM update that CAISO claims is a “clarification.”⁹ Actually, the change has broad RA policy implications, with the results being a unilateral change to the expected services contracted RA resources are to provide with no involvement from the Commission. Those changes are not consistent with the services that other similarly situated RA resources provide, and are potentially discriminatory.

In the future, new CAISO definitions may be at odds with the Commission’s intent in setting its RA program QC values. If the CAISO changes its definitions to be out-of-sync with the Commission’s intent, Energy Division would still be empowered to ensure its calculation methodology follows the Commission’s intent and definitions for its RA program accreditation.

Implementing precise definitions is necessary to ensure consistent and equitable application of the UCAP methodology across all resource classes. CESA emphasizes that for resource comparability and accuracy, normal operating limitations should be incorporated into the CAISO resource model/market design as much as possible. Storage resources must currently report normal operating resource limitations as outages due to CAISO market design shortcomings and reporting practices. Treating these market design issues as unit forced outages in the UCAP calculation would convey an incorrect view of unforced capacity and a resource’s ability to be available in the future.

Importantly, the inclusion of outages reflecting normal operating limitations in the UCAP assessment would lead to disparate treatment between resource types. More mature resource types with extensively modeled design limitations would inequitably receive higher accreditation values.

⁹ CAISO PRR 1656, Clarifying Nature of Work for generation outages related to distribution utility limitations

For these mature resources, similar operating criteria are explicitly built into the CAISO market resource model, which negates their need to use outages to convey limitations.

For example, the CAISO Multi-Stage Generation (“MSG”) resource model incorporates known design limitations. If an MSG resource remains in a lower capacity configuration (e.g., 1x1) due to modeled minimum run times, it does not need to enter an outage card and therefore would not be penalized in the UCAP calculation. In contrast, if CAISO dispatches an energy storage resource into a ramp-limited state-of-charge region, the resource operator must insert an outage card to ensure feasible dispatches because CAISO's energy storage resource model does not yet incorporate these known design limitations. Any UCAP proposal that assesses these storage outages would penalize the storage resource for operating within its ramp-limitation region but not penalize the MSG resource for operating in a similarly constrained configuration.

To ensure storage and thermal UCAP values are comparable, CESA puts forward two hypothetical options: (1) Do not count outages for resources operating within design specifications across all resources, or (2) Count interval unavailable pmax values for MSGs and thermal ramp limitations against their UCAP value. Both options are logically consistent towards getting comparable values between resource types, but the first option would recognize that CAISO's dispatch optimization is in control of driving the resources and it does at times drive a resource into a limitation. Given that the correct long-term solution is to mature the market model to accurately reflect resource physical design specifications, the first option makes the most sense.

Aligned with the principles and rationales discussed in *Section II.A*, CESA proposes the following definition for “UCAP Assessed Forced Outages” which is based on NERC GADS Event Types (U1, U2, U3, D1, D2, and D3):

UCAP Assessed Forced Outage/Derate. This is an outage that requires immediate, delayed, or postponed removal of a unit from service, derating, or another outage state due to equipment failure or risk of imminent equipment failure.

Immediate - This type of outage usually results from automatic control system trips or operator initiated manual trip of the unit in response to unit alarms but can also occur while the unit is offline.

Delayed - This is an outage that does not require immediate removal of a unit from the in-service state or derating, instead requiring removal or derating within six hours. This type of outage can only occur while the unit is in service.

Postponed - This is an outage that can be postponed beyond six hours but requires that a unit be removed from the in-service state or derated before the end of the next weekend (Sunday at 2400 or before Sunday turns into Monday). This type of outage can only occur while the unit is in service.

C. Proposal to Assess Energy Storage Resource Outages Only During Times That They Would Reasonably Have Been Dispatched By CAISO

CESA proposes a methodology to establish when energy storage resources are in demand on a resource-specific basis. CESA has consistently advocated for a UCAP methodology that considers whether the CAISO would have actually dispatched a resource if it were not on outage. This ensures the resulting UCAP value reflects its true contribution to reliability and necessarily involves some consideration of unit economics.¹⁰ Other approaches may result in resources being assessed during a time of year or on a specific day in which CAISO would not have economically

¹⁰ D.25-06-048 recognizes that “...A UCAP framework accounts for the expected availability of a resource by adjusting its capacity value based on historical outage rates, ensuring a more accurate reflection of the resource's reliable contribution to meeting demand”

dispatched the resource because there was plenty of other lower cost supply. This may result in some resources appearing to be excellent performers due to an “inflated denominator” when in reality, at the times that they are needed most, they would otherwise have a higher forced outage rate. Furthermore, if other resources were on forced outage at a time when they would not have been dispatched, those resources would inaccurately appear to have a worse contribution to reliability. This concern arises in methodologies that evaluate hours that resources are not necessarily in demand. This concern can be corrected by tailoring the assessment hours based on when specific resources would have been dispatched by CAISO if it were not on outage.

CESA proposes the Commission assess UCAP Assessed Forced Outages that occur during intervals where an individual resource’s Pnode Price is greater than or equal to an established energy bid cost. The established energy bid cost should be based on the CAISO’s Storage Resource Option Default Energy Bid (“DEB”) methodology¹¹ for energy storage resources. This option uses the following variables, only one of which is non-public: (a) real-time energy prices, (b) resource charging duration, (c) resource round-trip efficiency, (d) variable storage operations cost, and (e) day-ahead market energy prices. ED could consider its own average value to stand-in for the storage operators’ submitted variable storage operations cost. In general, the Storage Resource Option DEB summarizes the storage resource’s operating cost as the greater of charging in the lowest priced hours of the day (considering its duration, round-trip efficiency, and variable costs) or the cost of energy the resource could discharge during the highest-priced continuous block, based on day-ahead prices (its opportunity cost).

¹¹ CAISO Tariff Section 39.7.1.8

$$RT_Storage_DEB = \text{MAX} \left[\left(\frac{\text{MAX}(E_n \cdot \delta, 0)}{\eta} + \rho \right), OC_\delta \right] \cdot 1.1$$

Not public

Variable	Description	Calculation/Source
En	Expected Energy Cost to Charge	Calculated using the average price of Energy during the lowest-priced continuous block of time needed to fully charge the resource. This is based on IFM (Day-Ahead) LMPs in the RTM calculation.
Delta	Energy Duration	The full continuous discharge duration of the storage resource (e.g., 4 hours for a 4-hour battery).
Eta	Round-Trip Efficiency	The efficiency factor that accounts for charging losses.
Rho	Variable Storage Operation Cost	Represents the non-fuel variable cost, such as cell degradation (cycling wear-and-tear) beyond the resource's designed daily cycling range, submitted by the Scheduling Coordinator and validated by CAISO.
OC(delta)	Storage Opportunity Cost	Represents the opportunity cost of being dispatched now, which is the value of the energy the resource could discharge during the highest-priced continuous block of time, accounting for its discharge duration.

To establish the Variable Storage Operation Cost, CESA proposes the Commission either use a public data source such as the National Renewable Energy Laboratory or an average fleetwide value published by the CAISO Department of Market Monitoring or the CAISO. Public data from national labs and other sources typically under-represent the Variable Storage Operating Cost because they do not include cycling degradation. Average data published from the CAISO would allow a more accurate representation in the Energy Division's calculations.

CESA understands that Energy Division staff may find this proposed methodology to determine the outage assessment hours administratively complex. There are alternative ways to

select outage evaluation hours to be more aligned with when resources are in-demand. At the November 3-4, 2025, RA Workshop, the Energy Division proposed to evaluate outages occurring during the RA Availability Assessment Hours (“AAHs”), which are defined by the CAISO each year. CESA’s primary issue with Energy Division’s proposal is that every day of the year would be assessed, even if particular resources were not in demand on a given day during the AAHs. The Commission should consider further refining the outage assessment hours to be those AAHs on the highest 10 net load peak days each month. This refinement would focus the UCAP outage assessment onto days and hours in which all resources are more likely to actually be in demand and needed for reliability.

D. Proposal to Establish a Data Validation and Operator Review Process

The Commission should establish a formal, structured data validation process before finalizing UCAP values. This process should follow a similar framework to the CPUC’s Market Resource Data (“MRD”) review process, allowing resource operators to flag errors, correct misclassifications, and document extraordinary events before calculations are finalized.

For the 2028 UCAP calculation (the first binding year), the Commission should establish a 60-day review window following publication of preliminary UCAP values. During this window, all generator owners, regardless of technology type, are entitled to participate in the review process. Resource operators may review preliminary OMS outage data classifications and flag errors, misclassifications, or extraordinary circumstances (e.g., equipment replacements, extended maintenance). Operators must provide a written explanation for any proposed reclassifications and attest to the accuracy of the information. Energy Division staff review operator submissions and either incorporate verified corrections or document the basis for rejecting proposed changes. Final UCAP values reflect the Energy Division’s response to the operator review process and are

published with transparency regarding any data corrections. The Commission should also consider a dispute-resolution process to address disagreements between resource operators and the Energy Division regarding forced outage data classifications that could not be resolved during the 60-day review window.

This process builds stakeholder confidence in the resulting capacity values and ensures they meaningfully reflect operational performance rather than administrative artifacts or data errors.

III. CONCLUSION

CESA appreciates the opportunity to submit this proposal and looks forward to working with parties in this proceeding to enhance the Commission's RA program.

Respectfully submitted,

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