BEFORE THE PUBLIC UTILITIES COMMISSION
OF THE STATE OF CALIFORNIA

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Order Instituting Rulemaking to Oversee the Resource Adequacy Program, Consider Program Refinements, and Establish Forward Resource Adequacy Procurement Obligations.	Rulemaking 19-11-009 (Filed November 7, 2019)

CALIFORNIA INDEPENDENT SYSTEM OPERATOR CORPORATION TRACK 2 PROPOSALS

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TRACK 2 PROPOSALS

I. Introduction

On January 22, 2020, the California Public Utilities Commission (Commission) issued the *Assigned Commissioner's Scoping Memo and Ruling* (Scoping Memo) soliciting party proposals for refinements to be considered for the 2021 and 2022 resource adequacy compliance years.

The California Independent System Operator Corporation (CAISO) submits three proposals:

- **Slow Demand Response** - The CAISO has developed a methodology to dispatch "slow" proxy demand response resources, which will allow them to be dispatched pre-contingency as local capacity. With the implementation of the CAISO's new methodology, the Commission should end the practice of "crediting" investor-owned utility demand response resources, both proxy demand response and reliability demand response resources, against resource adequacy requirements starting with the 2021 resource adequacy year.
- **Hybrid Resource Counting** – The CAISO proposes that the Commission align its definitions for "hybrid" and "co-located" resources with definitions in the CAISO's Hybrid Resources stakeholder initiative. The CAISO also proposes that the Commission adopt a permanent qualifying capacity counting methodology for resources with investment tax credit (ITC) charging restrictions that is based upon actual production data, which will more

accurately reflect the reliability benefits provided by hybrid resources. The Commission should consider using an exceedance methodology for each hybrid and co-located resource with ITC restrictions as one potential solution.

- **Variable Output Energy-Limited Demand Response** – The CAISO proposes to apply an effective load carrying capability (ELCC) methodology to calculate qualifying capacity values for variable output energy-limited demand response resources. The CAISO requests the Commission commit to transition to such a methodology in Track 2 and to complete the transition by the end of Track 4.

In addition to the proposals listed above, this filing provides the Commission with informational updates regarding the CAISO's support in developing an improved hydro resource counting methodology and relevant developments from the CAISO's Resource Adequacy Enhancements stakeholder initiative. These developments include implementing a Minimum Unforced Capacity Requirement (UCAP) methodology and a monthly energy-based portfolio assessment as part of the CAISO's resource adequacy program.

II. Discussion

A. Slow Response Demand Response Technical Solution

1. Background

In recent years, the CAISO and the Commission worked to ensure both "fast" and "slow" demand response resources can meet local capacity requirements consistent with Applicable Reliability Criteria.[1] CAISO Tariff Section 40.3 specifies that the CAISO will conduct an annual Local Capacity Technical Study to determine the amount of Local Capacity Area Resources needed to meet identified Contingencies.[2] The CAISO applies methods for resolving Contingencies consistent with North American Electric Reliability Corporation (NERC) Reliability Standards and the CAISO Reliability Criteria.[3] NERC standards and the CAISO tariff specify a maximum manual adjustment time of 30

[1] Terms not otherwise defined herein are used as defined in the CAISO tariff.
[2] CAISO Tariff Sections 40.3.1 and 40.3.1.1.
[3] CAISO Tariff Section 40.3.1.1

minutes after a first Contingency event for the CAISO to prepare the system for a subsequent Contingency.[4] In other words, the system must be back to a normal state within 30 minutes. The CAISO has stated on numerous occasions that to manually readjust the system within the NERC-mandated 30-minute window, some amount of time must be reserved for operator action and market dispatch.[5] Based on operational experience, the CAISO has determined that CAISO operators need 10 minutes to identify the Contingency and assess the problem, identify a solution, and then redispatch the system, which means full resource response must occur within 20 minutes post contingency.

For purposes of this proposal, "fast" demand response resources are those that can fully respond within 20 minutes so the CAISO operator can assess and re-dispatch resources to effectively reposition the system within 30 minutes post-contingency. In contrast, "slow" demand response resources are those that cannot respond within 20 minutes post-contingency. Therefore, to meet local capacity requirements, the CAISO must dispatch slow demand response resources prior to a contingency, *i.e.* pre-contingency, to ensure the system can be repositioned within 30 minutes after the contingency event. This recognizes that although slow demand response resources may be able to quickly reduce load at a scheduled time, they require longer lead times to know specifically when to reduce load.[6]

2. Proposal

The CAISO proposes that the Commission adopt rules to require load-serving entities (LSEs) to show all demand response resources on supply plans to meet resource adequacy requirements. Specifically, the Commission should discontinue the practice of "crediting" investor-owned utility (IOU) demand response programs against resource

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[4] CAISO Tariff Section 40.3.1.1(1).

[5] *See*, Tr. at 493, lines 7-11, *Testimony of Neil Millar*, Order Instituting Rulemaking to Enhance the Role of Demand Response in Meeting the State's Resource Planning Needs and Operational Requirements (R.13-09-011), p. 6.

[6] The CAISO's 2017 Slow Response Local Capacity Resource Assessment study found that at current levels of energy and availability limited resources on the system, most existing slow demand response resources appear to have the required availability characteristics needed for local resource adequacy if dispatched pre-contingency as a last resort, with the exception of duration limitations. https://www.caiso.com/Documents/Presentation_JointISO_CPUCWorkshopSlowResponseLocalCapacityResourceAssessment_Oct42017.pdf

adequacy requirements. "Crediting" demand response programs against resource adequacy requirements will no longer be necessary because the CAISO will implement a dispatch methodology for slow proxy demand response resources in fall 2020. This will allow the CAISO to dispatch slow proxy demand response resources to meet local capacity requirements. As a result, these resources will help the CAISO effectively maintain Applicable Reliability Criteria and will fully count toward CAISO local resource adequacy needs. With the CAISO implementing its slow demand response resource dispatch methodology, discontinuing the "crediting" practice will align Commission and CAISO local resource adequacy rules. The CAISO more fully describes the dispatch methodology below.

The CAISO dispatch methodology for slow demand response resources is designed to allow such resources to effectively meet local capacity requirements. This methodology will allow the CAISO to dispatch slow demand response resources after the completion of the CAISO's day-ahead market run as a preventive measure to maintain local capacity area requirements in the event of a potential contingency. Specifically, the methodology allows the CAISO to assess whether there are sufficient resources and import capability in a local capacity area to meet forecasted load and potential contingencies without using slow demand response. If the assessment shows insufficient generation and import capability in the local area, the CAISO will use the new methodology to commit available slow demand response resources. After the CAISO's day-ahead market runs, it will determine the specific resources necessary to meet the anticipated insufficiency and commit them via exceptional dispatch to reduce load as necessary during the next operating day. This solution will enable the CAISO to use slow demand response resources to reduce loads in a local area and position the system to meet Applicable Reliability Criteria should a contingency occur. The CAISO plans to implement the slow demand response dispatch solution for proxy demand response resources in the fall of 2020 for use starting in the 2021 resource adequacy year.

The CAISO will not use the new slow demand response dispatch methodology to dispatch slow reliability demand response resources (RDRR). Slow RDRR cannot resolve local contingencies due to its unique dispatch limitations, which stakeholders

agreed to in the settlement agreement adopted in Decision (D.) 10-06-034.[7] Pursuant to that decision, the CAISO can only dispatch RDRR if there is an actual warning or emergency. In other words, the CAISO cannot declare an unwarranted warning or emergency to gain access to the slow RDRR to prevent an emergency situation from occurring in the first instance. Therefore, the CAISO's slow demand response dispatch methodology will not enable slow RDRR to meet local capacity requirements. However, fast RDRR, *i.e.*, those RDRR that can respond post-contingency within 20 minutes, can count as local resource adequacy capacity. Due to the unique nature and purpose of RDRR, the CAISO asks the Commission to clarify in its June decision that RDRR must be available within 20 minutes to qualify for local resource adequacy.

With the CAISO's slow demand response dispatch methodology and by appropriately qualifying those RDRR that can respond within 20 minutes, the Commission should specify in its June decision that it will end the practice of "crediting" investor-owned utility (IOU) demand response resources, both proxy demand response and RDRR, against resource adequacy requirements starting with the 2021 resource adequacy year.

The Commission must ensure equal treatment by requiring LSEs to show all resource adequacy resources, including demand response, on their supply plans. This will create a level playing field between IOU and third-party demand response and will ensure that resource adequacy resources are subject to the same CAISO tariff provisions, including the Resource Adequacy Availability Incentive Mechanism (RAAIM). Importantly, for the CAISO to implement its proposed slow demand response dispatch solution, the monthly LSE supply plans must provide data regarding the available slow demand response resources. Showing these resources on the LSE supply plans will enable the CAISO to exceptionally dispatch slow demand response resources when the CAISO identifies a pre-contingency need using its new dispatch methodology. Lastly, the proposed dispatch methodology will only consider slow demand response resources

[7] *See* California Public Utilities Commission, D.10-06-034, *Decision Adopting Settlement Agreement on Phase 3 Issues Pertaining to Emergency Triggered Demand Response Programs*, (R.07-01-041), June 24, 2010.

shown for resource adequacy to avoid exceptionally dispatching non-resource adequacy resources, which would trigger a capacity procurement mechanism payment.

B. Qualifying Capacity Proposals

In this section, the CAISO presents proposals addressing qualifying capacity counting methodologies for hybrid resources and variable output energy-limited demand response.

1. Hybrid Resource Qualifying Capacity Methodology Proposal

a. Background

In Commission Decision 20-01-004 (Hybrid Decision), it adopted an interim methodology to establish qualifying capacity values for in front of the meter hybrid resources. The interim methodology provides that qualifying capacity value will be "the greater of either: (i) the effective load carrying capacity-based qualifying capacity (QC) of the intermittent resource or the QC of the dispatchable resource, whichever applies, or (ii) a modified QC of the co-located storage device capped at the maximum amount of expected energy available to charge the storage device."[8] For the purpose of this proposal, the CAISO generally refers to this approach as the "greater of" methodology.

In the Hybrid Decision the Commission defined hybrid resources as "a generating resource co-located with a storage project and with a single point of interconnection."[9] The Hybrid Decision further clarified that the interim methodology will "only apply to hybrid resources with Investment Tax Credit-related charging restrictions."[10] On February 11, 2020, several parties filed a joint petition to modify the Hybrid Decision to provide an alternative qualifying capacity methodology for co-located resources with multiple CAISO Resource IDs.[11] The CAISO presents proposals to address the concerns raised in the joint petition and to better align Commission and CAISO terminology.

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[8] Hybrid Decision, p. 9.
[9] *Id*. at 15.
[10] *Id*.
[11] *Petition for Modification of Decision 20-01-004 by the California Energy Storage Alliance, American Wind Energy Association of California, Center for Energy Efficiency and Renewable Technologies, and Enel X North America, Inc.* http://docs.cpuc.ca.gov/PublishedDocs/Efile/G000/M326/K933/326933780.PDF.

b. Commission and CAISO Hybrid Resource Definitions Should Align.

The CAISO recognizes and appreciates that the Hybrid Decision established an interim counting methodology for hybrid resources that did not have an established qualifying capacity value. However, in the long-term, the Commission's definitions for "hybrid" and "co-located" resources should align with definitions developed in the CAISO's Hybrid Resources stakeholder initiative.[12] The CAISO's proposed definitions distinguish between "co-located" resources—which have two or more Resource IDs—and "hybrid" resources—which have a single Resource ID. Maintaining different Commission and CAISO definitions could be problematic because the CAISO is proposing distinct must offer obligations tied to the definitions. Distinguishing between co-located and hybrid resources is important to provide the CAISO with the bids necessary to support the reliable operation of the system and market outcomes. Divergence between Commission and CAISO definitions may lead to market participant confusion and unintended consequences.

c. *The Commission Should Consider Alternative Qualifying Capacity Methodologies for Hybrid and Co-Located Resources.*

The Hybrid Decision adopts the relatively conservative "greater of" methodology based on the assumption that resources with ITC charging restrictions will not be available to serve reliability needs when on-site generation charges the storage device. Some parties proposed a simple "additive" approach that would establish the qualifying capacity value based on the sum of the qualifying capacities of the underlying generation and storage components making up the hybrid resource. However, neither methodology ensures the system will realize the assigned reliability value in actual operation. For example, hybrid or co-located resources are unlikely to guarantee charging behavior *ex ante*. Depending on system and market conditions, these resources may charge from the grid some of the time, none of the time, or all of the time, regardless of ITC charging restrictions. Hybrid resource operators will make operating decisions based on simple economic tradeoffs between the ITC incentives and potential market revenues. Thus, the

[12] *See* CAISO Hybrid Resources Revised Straw Proposal, December 10, 2019, p. 8-9. http://www.caiso.com/InitiativeDocuments/RevisedStrawProposal-HybridResources.pdf.

Commission cannot ensure that hybrid resource owners will make their resource available and operate in a manner consistent with either the "greater of" or the "additive" qualifying capacity methodologies.

To address this issue, the Commission should adopt a permanent counting methodology for resources with ITC charging restrictions based upon actual production data, which more accurately reflects the reliability benefits provided by hybrid and co-located. The CAISO recommends the Commission apply an exceedance methodology to set qualifying capacity values for all hybrid resources and co-located storage resources with ITC charging restrictions. Wind and solar resources with co-located configurations should receive an ELCC-based qualifying capacity value. An exceedance methodology—based on a resource's actual historical output—may provide a more accurate qualifying capacity value that better reflects the resource's reasonably expected future reliability contribution. Further, the exceedance methodology will establish proper incentives for these resources to produce the maximum amount of energy possible since actual energy production will drive the resource's future capacity value.

The CAISO acknowledges that the exceedance methodology requires actual historical production data to establish qualifying capacity values, which is not available for new resources. As a transitional measure, the CAISO recommends the Commission adopt an "additive" methodology for hybrid resources with a single Resource ID until it can compile one to two years of actual historical production data to calculate qualifying capacity based on the exceedance methodology. The Commission should consider additional details regarding how to apply the exceedance approach for various resource configurations. For example, an exceedance methodology would require an evaluation of each individual hybrid resource with a single resource ID to establish an individual exceedance-based qualifying capacity. For co-located resources, *i.e.*, a resource with two or more CAISO Resource IDs, each individual co-located resource would receive its own respective qualifying capacity value based on the exceedance-based qualifying capacity value for the storage resource and the ELCC-based qualifying capacity value of the solar or wind resources.

The Commission could also consider alternative qualifying capacity methodologies for co-located storage resources with ITC charging restrictions that

account for the impacts of ITC charging restrictions and the relative sizing of the co-located resources. Other approaches can also address daily charging limitations using calculations based upon the size of the storage and co-located wind or solar resource used for on-site charging.

If the Commission adopts a qualifying capacity methodology that reflects on-site charging impacts of hybrid and co-located resources, it must also consider which hours it will assess under the exceedance methodology. The hours assessed are important because they can drive incentives to perform in the selected timeframe. For further consideration, the CAISO proposes the Commission consider using hourly windows to assess a resource's exceedance value that is specific to the hybrid resource configuration. For instance:

- For hybrid resources with a single Resource ID, all configurations would be assessed under an exceedance methodology, regardless of any stated ITC charging restrictions, and the hours utilized for the exceedance assessment should cover 5:00 a.m. to 9:00 p.m. This timeframe encompasses when a vast majority of system reliability issues occur.
- For co-located resources with ITC charging restrictions, all storage resources would be assessed on their exceedance value during the Availability Assessment Hours (AAH). Doing this would provide an incentive for the storage resources to shift energy from solar production peak periods to the net load peak periods covered by the AAH, which provides the system with the greatest reliability impact. The solar or wind resources in a co-located resource configuration should still receive an ELCC-based qualifying capacity value.

In addition, the Commission should consider ways to mitigate the potential that the economics of the system costs and market dispatch awards excessively reduce the exceedance value of these resources for qualifying capacity purposes. The CAISO suggests that the Commission could conduct the exceedance methodology assessment during only certain hours when the observed system prices are at a sufficiently high level.

d. The Commission Should Clarify Qualifying Capacity Methodology for Hybrid Resources without ITC Charging Restrictions.

The Commission's Hybrid Decision focused on establishing an interim qualifying capacity methodology to address interactions with the ITC charging restrictions. The CAISO believes the Commission's interim definition for "hybrid resource" and interim qualifying capacity methodology create a gap for hybrid resources with a single Resource ID and no ITC charging restrictions. Table 1 below demonstrates the potential gap.

Table 1:
Hybrid Resource QC Methodologies Based on Interim Hybrid Decision

	With Charging Restriction	**No Charging Restriction**
Single Resource ID	Greater of ELCC VER component or storage component modified for charging capability	**None, needs clarification**
Multiple Resource IDs	Greater of ELCC VER component or storage component modified for charging capability	Standard QC for individual Resource ID technology

2. Variable Output Energy-Limited Demand Response Qualifying Capacity Methodology Proposal

The Commission should consider valuing variable output energy-limited demand response using an ELCC methodology to better assess its ability to maintain system reliability and serve energy needs every hour of the year. Variability in demand response maximum load reduction capability can be due to weather, temperature, production schedules, duty cycles, occupancy, or other factors and changes over the course of a day, month, or season. Energy limitations, including limited hours of operability, duration, and number of event calls, also affect a resource's ability to provide energy/load reduction over the course of the month or year. An ELCC methodology better captures variable output energy-limited demand responses' contribution to reliability for both capacity and energy needs that are no longer solely focused on the gross peak hour. The CAISO is exploring how to apply an ELCC methodology to determine qualifying capacity values as part of its Energy Storage and Distributed Energy Resources (ESDER)

stakeholder initiative and the Demand Response Counting Working Group in this proceeding.[13]

The Commission currently uses the load impact protocols (LIP) to determine qualifying capacity for demand response resources. The LIP evaluate a demand response program's load reduction capability in the resource adequacy measurement hours of the monthly peak day to set qualifying capacity values. The LIP do not address the variability of demand response and the interactive effects of variable and energy-limited resources. An ELCC methodology is a better approach to determine qualifying capacity for demand response resources because it takes into account those resources' contribution to system reliability given their variable and use-limited nature to determine if they can be relied upon to serve system load when needed. The ELCC methodology considers demand response variability, availability, load conditions, and the availability of the rest of the resource fleet. The Commission should assess capacity value for resources with variable or limited availability in the context of the rest of the resource fleet due to saturation effects that occur as variable and energy-limited resources increase.

In this Track 2, the CAISO requests the Commission commit to further vet and transition to an ELCC methodology for demand response qualifying capacity valuation given demand response resources' variable and use-limited nature. The Commission should collaborate with the CAISO and other stakeholders to develop an applicable ELCC methodology for demand response. This development should occur in parallel with consideration of open issues regarding the existing ELCC methodology for wind and solar resources. The CAISO requests that the Commission transition to using an ELCC methodology for demand response resources by the end of Track 4.

C. Informational Updates

In this section, the CAISO provides the informational updates from the Hydro Resource Working Group and the CAISO's Resource Adequacy Enhancements stakeholder initiative. Specifically, the CAISO provides an update on its proposed UCAP methodology and its development of an energy-based system portfolio assessment. The CAISO is not presenting proposals for Commission adoption in this

[13] *See*: http://www.caiso.com/StakeholderProcesses/Energy-storage-and-distributed-energy-resources.

section, but rather provides informational updates on these issues because they have a substantial nexus with this proceeding.

1. Hydro Resource Qualifying Capacity Methodologies

Under the current qualifying capacity methodology for hydro resources, dispatchable hydro resources have their qualifying capacity essentially assuming that they would face no water limitations. LSEs, however, must make year-ahead resource adequacy showings by the last business day in October—before knowing hydro conditions for the following year. LSEs can more accurately assess hydro capacity values after the winter and spring seasons, when annual precipitation and snow pack figures are better known. To address this disconnect, the CAISO strongly encourages that the Commission adopt an improved hydro counting methodology that discounts hydro qualifying capacity based on an historical assessment of hydro conditions that considers the possibility of below average water conditions. Such a methodology will allow LSEs to show more realistic and dependable capacity from the hydro fleet in the year-ahead timeframe.

The CAISO and Southern California Edison Company (SCE) co-chaired the hydro resource counting workshop hosted at the Commission on February 12, 2020 (Hydro Workshop). Interested parties at the Hydro Workshop broadly agreed with the CAISO and SCE that the Commission should enhance the current counting methodology for hydro resources. Parties indicated they will work to develop a consensus proposal for the Commission's consideration.

The CAISO is largely aligned with SCE's hydro counting approach. SCE's proposed methodology sets qualifying capacity values based on a historical-year weighted average assessment. Specifically, SCE's methodology calculates hydro qualifying capacity based on the average of: (1) the availability from the previous calendar year (weighted at 50 percent); (2) the availability from the calendar year prior to the previous year (weighted at 30 percent); and (3) the availability from the year with the least availability in the prior 10 years (weighted at 20 percent). By design, SCE's proposed assessment period captures both recent and abnormally dry years. The CAISO strongly supports using an historic availability assessment to account for relevant below average water years. However, the CAISO will further vet the appropriate look back

period and weighting to apply to prior years as part of the hydro working group efforts in the effort to produce a consensus hydro counting proposal.

A potentially revised hydro qualifying capacity methodology also has implications for the CAISO's tariff rules on RAAIM. Most dispatchable hydro generators would qualify for conditionally available resource status under the CAISO tariff. Today such resources have access to RAAIM-exempt outage cards to cover instances where the resource faces availability limitations due to water conditions. Because of that exemption, hydro resources would face no RAAIM consequence if they are shown for resource adequacy capacity that would not feasibly be met based on existing hydro conditions. This status quo could be viewed as undermining incentives for such hydro resources to ensure they are making themselves fully available to the CAISO markets. Through the Commitment Cost Enhancements Tariff Clarifications initiative, which the CAISO plans to present for approval to its Board of Governors at its March meeting, the CAISO would clarify that conditionally available resources would not hold such a RAAIM exemption. However, if the Commission were to set qualifying capacity values for hydro resources in a way that accounts for low hydro conditions and provides incentives for hydro resources to maximize their availability to the CAISO markets, then the CAISO would strongly consider making a further tariff amendment filing to exempt hydro resources whose qualifying capacity is set under the methodology now under discussion.

2. Minimum Unforced Capacity Requirement

In its Resource Adequacy Enhancements stakeholder initiative, the CAISO has proposed to incorporate a UCAP framework for resource adequacy capacity. This framework includes a minimum unforced capacity requirement and a concept for determining the impacts of forced outage rates on resource adequacy resources. The CAISO's proposal seeks to maintain alignment with the Commission's resource adequacy program. However, the CAISO is concerned that continuing to rely solely on an installed-capacity-based planning reserve margin, as is the case today, is not sustainable given the rapidly transforming grid, the expected new resource mix and its associated operational characteristics. The CAISO seeks to work closely with the Commission to align the resource adequacy programs while ensuring they are effective at

maintaining system reliability given future conditions. Many of the U.S. Independent System Operators and Regional Transmission Operators use both installed capacity and UCAP concepts to maintain resource adequacy. Installed capacity values generally represent physical generating capacity and account impacts caused by ambient weather conditions. UCAP represents the percent of installed capacity available after accounting for forced outages.

All resources, whether resource adequacy or non-resource adequacy, should be evaluated and recognized for their contribution to providing dependable and reliable capacity and their ability to support system reliability. Information regarding a resource's relative effectiveness in meeting reliability and outage information should be transparent. If a resource has a higher availability and is more effective at relieving local constraints relative to other resources, then such information should be publicly available to enable LSEs to compare and contrast resources to identify the best, most effective resources to meet their procurement needs. Having this information publicly available to LSEs will improve opportunities for the most dependable and effective resources to sell their capacity. Similar to the current provisions of other system operators, the CAISO proposes to calculate and publish both installed capacity (leveraging today's net qualifying capacity or net qualifying capacity values) and UCAP values, utilizing both figures in the CAISO's resource adequacy processes.

To date, neither the CAISO nor the Commission's resource adequacy program accounts for the impact forced outages and unit derates have on system reliability beyond what the planning reserve margin assumes. Instead, the CAISO relies on substitution rules and its Resource Adequacy Availability Incentive Mechanism (RAAIM) to incentivize capacity availability during the delivery month and operating horizon. RAAIM is intended to incentivize compliance with bidding and must-offer obligations and ensure adequate availability of resource adequacy resources. However, the CAISO believes that confirming whether or not resource adequacy capacity is available, and if not, then replaced, occurs far too late in the planning process. The dependability and reliability attributed to all resources should be better known and understood in advance during the resource adequacy procurement process. This will allow resource adequacy buyers to procure the most cost-effective and reliable resources.

Some stakeholders expressed concern that the CAISO's proposed UCAP concept could create two different system resource adequacy capacity procurement targets. The CAISO does not believe the proposed UCAP requirement and UCAP counting rule concepts will create incompatible procurement targets for system resource adequacy. Rather, the CAISO views the two concepts as interrelated and complementary, not problematic and incompatible. The proposed CAISO UCAP requirement will be a subset (or lower bound) of the local regulatory authority's established system resource adequacy planning reserve margin target. In other regions utilizing UCAP and planning reserve margin concepts, there are two established targets: one system planning reserve margin target (generally based upon the installed capacity, or ICAP, need), and one UCAP requirement that is also a subset of the system planning reserve margin target that simply removes the additional margin established to cover the forced outage component of the system planning reserve margin target.

Establishing a UCAP requirement appropriately and effectively moves the impact of forced outages into the planning horizon. Incorporating the impacts of forced outages into the resource adequacy valuation process provides greater transparency about the reliability of the resources during the procurement process and in advance of resource adequacy showings. For these reasons, the resource adequacy program can provide greater reliability by securing in advance the mix of resources that have better dependability, rather than relying on complex substitution and replacement rules after the resource adequacy showings have been made.

The CAISO is not making a specific UCAP proposal in this proceeding, but seeks to begin building the record for future consideration of these important concepts. Ultimately, the CAISO hopes that any changes needed to ensure alignment and coordination between the various related processes and requirements that would be impacted by the proposed UCAP framework should be incorporated into both the Commission's resource adequacy program regulations and CAISO resource adequacy-related tariff provisions.

3. Portfolio Assessment

As part of the CAISO's Resource Adequacy Enhancements stakeholder initiative, the CAISO has also proposed to conduct a monthly portfolio deficiency test. This

monthly test would consider all shown resource adequacy resources to determine if the aggregate portfolio is adequate to serve load under various load and net load conditions during all hours of the month.

The portfolio deficiency test will use only the shown resource adequacy fleet in a production simulation to determine if the CAISO is able to serve forecasted gross and net-load peaks while maintaining adequate reserves and load following capability. The need for this assessment is similar in concept to the collective deficiency test CAISO currently conducts for local resource adequacy. However, the CAISO will only conduct this assessment for monthly resource adequacy showings, which are the only showings that require LSEs to show 100% of system, local, and flexible resource adequacy capacity requirements. The increased number of energy and availability-limited resources and the reliance on these resources to meet resource adequacy needs means that some resource mixes provided to meet resource adequacy requirements may not ensure reliable operation of the grid during all hours of the day across the entire month. Similar to the current local assessments, the CAISO seeks to maintain a consistent definition for capacity to facilitate transacting a homogeneous product. However, the CAISO must assess how the shown resource adequacy fleet works collectively to meet system needs.

The CAISO is considering three general approaches to conducting this model. The CAISO will model only resource adequacy resources in this portfolio analysis. Any additional energy provided in the CAISO's day-ahead or real-time markets represents energy substitutes in those markets, but are not needed in the portfolio assessment to determine if the resource adequacy fleet is adequate. Additionally, the CAISO must establish baseline inputs into the portfolio assessment. The CAISO will rely on the California Energy Commission's (CEC) 1-in-2 hourly load forecast, which includes behind-the-meter load modifiers. Because the analysis is run on hourly blocks, the CAISO will also include load following requirements. The wind and solar production profiles will be generated prior to running the production simulation. These profiles represent maximum potential output from these resources. These profiles will not be considered must take capacity, and actual use of wind and solar resources in the production simulation may be lower than the profile. Generator availability will be determined through Monte Carlo draw using resource forced outage rates.

If the portfolio is adequate, then the CAISO will take no additional actions. If the portfolio is unable to serve load under given load or net load conditions, then the CAISO will declare a collective deficiency, provide a cure period, and conduct backstop procurement using the capacity procurement mechanism competitive solicitation process to find the least cost solutions to resolve the deficiency if left uncured.

III. Conclusion

The CAISO appreciates this opportunity to provide proposals in this resource adequacy proceeding and looks forward to presenting additional details throughout the course of this proceeding.

Respectfully submitted,

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