Resource Adequacy Enhancements

Fourth Revised Straw Proposal

March 17, 2020

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1. Executive Summary

The California Independent System Operator (CAISO) is performing a comprehensive review of the CAISO's Resource Adequacy (RA) tariff provisions and proposing enhancements that ensure effective procurement of capacity to reliably operate the grid all hours of the year. This comprehensive review has identified potential modifications to the CAISO tariff provisions for System, Local, and Flexible RA.

For purposes of this Fourth Revised Straw Proposal, the CAISO is focusing only on a subset of the issues identified within the scope of this initiative. Specifically, the CAISO is addressing matters regarding System RA Showings and Sufficiency Testing, Planned Outage Process Enhancements, RA Import Provisions, and Backstop Capacity Procurement Provisions. The other topics discussed previously in this initiative are still within scope but will be taken up in the next proposal once additional data gathering and analysis is completed and certain interrelated policies are further advanced in the Day-Ahead Market Enhancements initiative.

The proposal considers developing a portfolio assessment process to ensure that reliability needs can be met by the shown RA portfolio during all hours. The CAISO believes this proposed portfolio assessment is necessary to test and assure resource sufficiency given the growing reliance on use- and availability-limited resources. The CAISO is proposing to develop a stochastic production simulation model that assesses the RA fleet's ability to reliably operate the grid under a variety of conditions.

The CAISO is proposing several changes to the existing planned outage provisions and the planned outage process. In response to stakeholder feedback, several proposed changes are intended to ensure planned outages scheduled by 45 days prior to the month actually can be taken when scheduled. The CAISO proposes to redesign the planned outage process to reflect system UCAP targets rather than traditional NQC targets. The CAISO offers two new options for addressing planned outage substitution based on stakeholder feedback. The first option accounts for the need for planned outages in the upfront procurement and eliminates the need for all planned outage substitution. Under the second option, the CAISO would procure all substitute capacity on behalf of resources seeking planned outages. The CAISO would then allocate the costs of replacement to the resource SC. Under both options, the CAISO will (1) eliminate RAAIM, and (2) retain complete discretion to grant or deny all off-peak and/or short-term opportunity outages.

The CAISO proposes modifications to the RA import provisions, including adoption of certain existing California Public Utilities Commission (CPUC) rules to ensure RA imports are backed by a forward commitment of physical capacity with firm transmission delivery. LSEs will be required to submit supporting documentation demonstrating that any RA import resource shown on annual and monthly RA and Supply plans represent physical capacity and firm transmission. The CAISO will include these requirements in the tariff to ensure similar treatment among all LSEs. The CAISO also proposes to require that non-specified RA imports, at minimum, identify the source BA that will provide the capacity to ensure that RA imports are not double counted for EIM entities' resource sufficiency tests or otherwise relied upon by the host BA to serve native load. The CAISO has also removed consideration of Maximum Import Capability

provisions from the scope of this initiative and has initiated a standalone stakeholder initiative to fast track resolution of MIC related modifications.[1]

The CAISO is proposing modifications to its backstop capacity procurement provisions to align backstop authority with the resource adequacy counting rules and adequacy assessments. These proposed modifications include new procurement authority to use the capacity procurement mechanism as an option to fulfill load serving entities' unforced capacity deficiencies and system deficiencies as determined through a resource adequacy portfolio showing analysis. The CAISO is seeking feedback on potential changes for that could be made for incentivizing performance for RMR resources. The CAISO is also seeking authority for a tool to incentivize load serving entities to show UCAP capacity up to requirements.

2. Introduction and Background

The rapid transformation to a cleaner, yet more variable and energy-limited resource fleet, and the migration of load to smaller and more diverse load serving entities requires re-examining all aspects of the CAISO's Resource Adequacy program. In 2006, at the onset of the RA program in California, the predominant energy production technology types were gas fired, nuclear, and hydroelectric resources. Although some of these resources were subject to use-limitations because of environmental regulations, start limits, or air permits, they were generally available to produce energy when and where needed given they all had fairly dependable fuel sources. However, as the fleet transitions to achieve the objectives of SB 100,[2] the CAISO must rely on a dramatically different resource portfolio to operate the grid reliably. In this stakeholder initiative, the CAISO, in collaboration with the California Public Utilities Commission (CPUC) and stakeholders, will explore reforms needed to the CAISO's resource adequacy rules, requirements, and processes to ensure continued reliability and operability under the transforming grid.

The CAISO has identified certain aspects of the CAISO's current RA tariff provisions that, among other things, require refinement to ensure effective procurement, help simplify overly complex rules, and ensure resources are available when and where needed all hours of the year. The following issues are of growing concern to the CAISO:

- Current RA counting rules do not adequately reflect resource availability, and instead rely on complicated substitution and availability incentive mechanism rules;
- Flexible capacity counting rules do not sufficiently align with current operational needs;
- Provisions for import resources need clarification to ensure physical capacity and firm delivery from RA imports;

[1] Maximum Import Capability Stabilization and Multi-Year Allocation Stakeholder Initiative Webpage: http://www.caiso.com/StakeholderProcesses/Maximum-import-capability-stabilization-multi-year-allocation

[2] The objective of SB 100 is "that eligible renewable energy resources and zero-carbon resources supply 100% of retail sales of electricity to California end-use customers and 100% of electricity procured to serve all state agencies by December 31, 2045." https://leginfo.legislature.ca.gov/faces/billNavClient.xhtml?bill_id=201720180SB100

- Current system and flexible RA showings assessments do not consider the overall effectiveness of the RA portfolio to meet the CAISO's operational needs; and
- Growing reliance on availability-limited resources when these resources may not have sufficient run hours or dispatches to maintain reliable grid operations and fully meet energy needs in local capacity areas and sub-areas.

The CAISO is conducting a holistic review of its existing RA tariff provisions to make necessary changes to ensure CAISO's RA tariff authority adequately supports reliable grid operations into the future. The second revised straw proposal specifically presents the CAISO's proposals for changes to system RA regarding the following topics: system RA requirements, showings and sufficiency testing, RA capacity counting rules, Must Offer Obligations and bid insertion, the planned outage process, and RA imports.

The CAISO also presents its proposal to modify aspects of its backstop capacity procurement, including certain enhancements to the Capacity Procurement Mechanism.

3. Stakeholder Engagement Plan

Table 1 outlines the schedule for this stakeholder initiative below. The CAISO plans to seek CAISO board approval of the elements in this RA Enhancements initiative in the first quarter of 2021.

Table 1: Stakeholder Engagement Plan

Date	Milestone
March 17	**Fourth revised straw proposal**
March 24	Stakeholder call on fourth revised straw proposal
April 7	Stakeholder comments on fourth revised straw proposal due
Late June	**Fifth revised straw proposal**
July	Stakeholder meeting on fifth revised straw proposal
Late July	Stakeholder comments on fifth revised straw proposal
September	**Draft final proposal**
September	Stakeholder meeting on draft final proposal
October	Stakeholder comments on draft final proposal
Sept-Dec	Draft BRS and Tariff
December	**Final proposal**
Q1 2021	**Present proposal to CAISO Board**

4. RA Enhancements Fourth Revised Straw Proposal

The following is the comprehensive list of the resource adequacy enhancements the CAISO is addressing in this initiative. The CAISO also provides a list of principles and objectives that are guiding this policy development in the appendix of this document. For purposes of this Fourth Revised Straw Proposal, however, the CAISO is focusing only on a subset of the issues. Specifically, the CAISO herein is addressing matters regarding System RA Showings and Sufficiency Testing, Planned Outage Process Enhancements, RA Import Provisions, and Backstop Capacity Procurement Provisions. The other topics that have been discussed previously in this initiative are still within scope and will be addressed in the next proposal.

The topics advanced in this Fourth Revised Straw Proposal are highlighted in bold text:

- System Resource Adequacy
  - Determining System RA Requirements
  - Unforced Capacity Counting
  - **System RA Showings and Sufficiency Testing**
  - Must Offer Obligation and Bid Insertion Modifications
  - **Planned Outage Process Enhancements**
  - **RA Import Provisions**
  - Operationalizing Storage Resources
- Flexible Resource Adequacy
  - Identifying Flexible Capacity Needs
  - Identifying and setting Flexible RA Requirements
  - Establishing Flexible RA Counting Rules: Effective Flexible Capacity Values and Eligibility
  - Flexible RA Allocations, Showings, and Sufficiency Tests
  - Flexible RA Must Offer Obligation Modifications
- Local Resource Adequacy
  - Forced Outage Rates and RA Capacity Counting
- Backstop Capacity Procurement Provisions
  - **Capacity Procurement Mechanism Modifications**
  - Making UCAP Designations
  - Reliability Must-Run Modifications
  - **UCAP Deficiency Tool**

Stakeholders have provided valuable feedback on all the issues discussed in the CAISO's comprehensive Third Revised Straw proposal. Given the depth and breadth of issues covered in this initiative, the CAISO decided to advance certain topics ahead of others in this proposal. This bifurcated approach allows the CAISO additional time to gather and analyze data on topics such as UCAP, while allowing stakeholders to vet a more narrow set of issues that are ready to be advanced.

As shown in gray text above, the CAISO is delaying discussion on flexible RA until the Day Ahead Market Enhancements' policy advances. The CAISO also is assessing UCAP provisions and associated data, as requested by stakeholders, including UCAP's application in setting the resource adequacy capacity requirements. The CAISO is in the process of compiling additional

data based on stakeholder feedback and will provide this data and UCAP updates in the next proposal.

4.1. System Resource Adequacy

Resource deliverability under stressed system conditions remains an essential and important part of the resource adequacy program. Given the importance of resource deliverability, the CAISO must preserve the current deliverability studies and associated NQC calculations for resources, *i.e.*, the CAISO will continue to perform NQC calculations exactly as it does today, and the CAISO will continue to derate Qualifying Capacity values (QC) based on deliverability.

For all resources with NQC values, the CAISO proposes to establish UCAP values to identify the unforced capacity value (NQC discounted for units' forced outage rates) for use in system, local, and flexible RA showings and assessments.[3] The UCAP value speaks to the quality and dependability of the resources procured to meet RA requirements; lower forced outage rates mean higher UCAP values, which translate to more dependable and reliable capacity. For this reason, the CAISO believes that system RA requirements and associated sufficiency tests must account for unit forced outage rates. In other words, a resource's RA value would be measured by its UCAP value, and individual LSE sufficiency tests would be measured based on meeting UCAP requirements each month. For additional detail regarding the CAISO's most current proposal on the transition to UCAP requirements, please refer to the CAISO's Third Revised Straw Proposal.[4]

The remainder of this section provides the CAISO's proposed modifications to System RA Showings and Sufficiency Testing, Planned Outage Process Enhancements, and RA Import Provisions.

4.1.1. System RA Showings and Sufficiency Testing

Stakeholder feedback

As a general matter, most stakeholders support the CAISO developing a portfolio assessment for only RA resources. However, stakeholder were generally not supportive of the CAISO's proposed deterministic model. For example, Calpine recommended that the CAISO utilize a stochastic modeling to develop a more robust assessment under a variety of different conditions. As a result, the CAISO reviewed a variety of stochastic model options and available production simulations models. The CAISO has determined that it is possible to utilize one if its existing production simulation platforms to conduct the portfolio analysis. The CAISO provides additional detail on the this change to the proposal, below.

Stakeholders also continue to request additional information about establishing up-front rules and/or guidance to minimize the risk of backstop and backstop cost allocations. To address these concerns, the CAISO is doing two things. First, the CAISO is coordinating with the CPUC and will work with other LRAs such that LRAs are able to set up-front requirements for their

[3] Resources without an NQC are not eligible to provide system or local RA capacity.
[4] Available at http://www.caiso.com/InitiativeDocuments/ThirdRevisedStrawProposal-ResourceAdequacyEnhancements.pdf.

jurisdictional LSEs. Second, because the CAISO will utilize an existing production simulation platform to conduct the portfolio assessment, it is working to provide some preliminary results to help further inform market participants.

Overview

The CAISO will conduct two sufficiency tests for system capacity: an individual deficiency test and a portfolio deficiency test. These tests are designed to ensure there is both adequate UCAP to maintain reliability for peak load and that the portfolio of resources, when combined, work together to provide reliable operations during all hours at the system level. The CAISO will also conduct tests for flexible and local capacity needs, however, those elements are not covered in this Fourth Revised Straw Proposal. The individual deficiency assessments have not been modified from the CAISO's previous proposal. However, the CAISO has made numerous changes to the portfolio deficiency test.

Individual Deficiency Assessments

The CAISO will assess LSE RA showings and resource supply plans to ensure there is sufficient UCAP shown to meet the identified UCAP need described above. Because the CAISO will be assessing system capacity showings based on UCAP values, the CAISO proposes that LSEs and resource SCs need only submit and show resources' UCAP values. Once shown, the CAISO will consider each resource's UCAP value to conduct its UCAP assessment.

Additionally, LSEs will not be permitted to procure only the "good part" of a resource (*i.e.*, LSEs cannot simply procure only the unforced capacity portion of a resource, and any amount shown for RA will be assessed considering the resource's forced outage rate). For example, an LSE could not claim to buy 90 MW of both NQC and UCAP from a 100 MW resource with a 10 percent forced outage rate. In comments to the straw proposal – part 2, several parties requested CAISO allow resources to sell and show only the UCAP value of the resource. There are two reasons CAISO cannot allow this. First, the UCAP accounting method relies on the probability that some resources will be out at various times. Allowing some resources to do so would likely require CAISO to maintain the same complicated substitution rules it is seeking to eliminate to maintain the desired level of reliability. Second, the CAISO's review of best practices in other ISO's shows such practices are not permitted.

Partial RA resources (shown for RA for only a portion of its capacity) will receive a proportional UCAP value reflecting the proportion shown for RA purposes (*i.e.*, a 100 MW resource with a 10 percent forced outage rate shown for 50 MW of NQC will be assessed as being shown for 45 MW of UCAP RA).

LSEs that fail to meet the UCAP requirement will be notified of the deficiency and provided an opportunity to cure. LSEs that fail to cure may be subject to backstop procurement cost allocation. Specific backstop procurement authority for this deficiency and cost allocation are discussed in greater detail in Section 0.

Individual RA Showing Incentive

The CAISO also proposes to develop an individual LSE RA showing incentive. The CAISO proposes to develop a new tool called the UCAP deficiency tool, which is intended to discourage LSEs from failing to show RA at least equal to their UCAP requirement and incentivize LSEs to show above their UCAP obligations. The concept of the UCAP deficiency tool is to apply a penalty to LSEs that show less than (below) their UCAP requirement, and distribute those collected penalties to LSEs showing over (above) their UCAP requirements. This proposed tool and incentive is described in 4.2.1, below. Examples and further discussion of this proposed concept are also provided in Section 4.2.4.

Portfolio Assessment

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

The objective of a portfolio analysis is to assess if the CAISO can serve load with the shown RA fleet. Because year ahead system RA showing requirements are currently only 90 percent for the five summer months for CPUC jurisdictional entities, the CAISO can only reasonably conduct this assessment using monthly RA showings.

The CAISO has considered a variety of deterministic, stochastic, and hybrid modelling approaches for this portfolio analysis. Based on stakeholder feedback and additional CAISO assessments, the CAISO has determined that a stochastic approach offers the greatest opportunity to assess the widest array of load, wind, and solar profiles as well as various outage profiles for other resource types. Additionally, the CAISO sought to leverage its existing production simulation expertise and modeling by relying on tools that are already available. This provides at least two benefits. First, using an existing production simulation model will help the CAISO expedite testing and implementation. Second, the CAISO can utilize an accepted and vetted model that has been relied on for other CAISO published studies.

The CAISO proposes to use the production simulation tool that it currently uses for the Summer Loads and Resources Assessment (Summer Assessment) study.[5] The CAISO has used its production simulation tool to conduct this study since 2016, updating the model annually to create a robust tool for CAISO to convey potential risks for the upcoming summer needs. More specifically,

> The 2019 Summer Loads and Resources Assessment ("Assessment") provides an assessment of the upcoming summer supply and demand outlook for the California Independent System Operator (CAISO) balancing authority area. The CAISO works with state agencies, generation and transmission owners, load serving entities, and other balancing authorities to formulate the summer forecast and identify any issues regarding upcoming operating conditions. The Assessment considers the supply and demand conditions across the entire CAISO balancing authority area (representing about 80 percent of California).[6]

Although the Summer Assessment has been developed for a slightly different purpose, much of the core modelling functions are identical to what the CAISO needs for the proposed portfolio analysis. For example, the model is a detailed representation of loads and resources characteristics across the CAISO. It can also model resources across the WECC, allowing the CAISO imports into the CAISO. The model commits resources based on load, unit specific forced outage rates, ramp rates, start times, and minimum down times to meet CAISO needs, including operating reserves, regulation, and load following. Load following requirements are necessary because the analysis is run on hourly blocks. The model can run both stochastically and deterministically, allowing the CAISO to develop robust statistical results while still testing various sensitivities.

The CAISO notes that the model setup will be different from that of the Summer Assessment to align its functions with the objective of an RA portfolio assessment. The primary difference will be to allow only RA resources to be scheduled by the model. The Summer Assessment assumes that all resources are available to the CAISO to meet peak summer loads. However, the portfolio assessment model will only model the shown RA resources to assess how well the RA fleet meets a given reliability standard. Energy provided in the CAISO's day-ahead or real-time markets from non-RA resources represents economic energy substitutes, which will not be considered in the portfolio assessment to determine if the RA fleet is adequate. Additionally, the CAISO will coordinate with the CPUC and CEC to develop a common set of hourly load profiles so that the CAISO and the CPUC are using consistent distribution of load profiles for their respective modeling purposes.

If the portfolio is adequate, the CAISO will take no additional actions. If the RA portfolio fails the portfolio assessment, the CAISO will declare a collective deficiency, provide a cure period, and if the deficiency remains, conduct backstop procurement using the CPM competitive solicitation

[5] The annual study process is typically completed in May of each year. The most current study is the 2019 assessment, available at http://www.caiso.com/Documents/Briefing-2019-SummerLoads-Resources-Assessment-Report-May2019.pdf

[6] http://www.caiso.com/Documents/Briefing-2019-SummerLoads-Resources-Assessment-Report-May2019.pdf at p. 1.

process to find the least cost solutions to resolve any uncured deficiency. The CAISO provides the specific details regarding CPM designations and cost allocation in Section 4.2.1.

A stochastic monthly assessment of the RA fleet to support additional backstop procurement authority creates unique challenges that do not exist under the simple accounting tools currently used for RA showings. The two primary challenges are (1) establishing the defined reliability criteria that triggers the need for backstop procurement, and (2) establishing the quantity of capacity needed to cure the portfolio deficiency. As part of this stakeholder initiative, the CAISO will propose solutions to both of these challenges. However, at this time, the CAISO only provides additional details regarding each challenge and will propose specific solutions in subsequent proposals within this stakeholder process.

Stochastic capacity analyses have been conducted in California for several years, starting with the CPUC's Long-Term Procurement Planning process. These analyses have evolved, and variations of these types of studies are used in the CPUC's Integrated Resource Planning proceeding and the RA proceeding for determining ELCC values for wind and solar. Despite all of the work that has been in these proceedings, there is still a great deal of debate about the ultimate reliability standard that must be met. Some of the debate centers on the difference between studying a full year, which has been done historically in most LOLE studies, versus a single month, which is done for California's RA program. Other areas of debate include what constitutes a loss-of-load event. For example, the original loss-of-load studies did not account for ancillary service requirements. Current studies include ancillary services, but there is a debate about whether a loss-of-load event is defined by utilizing any of those ancillary services or only by merely dropping below three percent reserves – when the CAISO must initiate firm load shedding. Alternatively, the answer to what constitutes a loss-of-load event may also include how often the CAISO would be expected to rely on its reserves. For example, how often is it acceptable for the CAISO to rely on reserves and dip below 6 percent reserves? Is it acceptable during one percent of hours, 10 percent, 15 percent or more? As noted above, the CAISO will offer a solution in a subsequent iteration.

In addition to developing criteria for when additional capacity is needed, the CAISO must also develop a methodology to determine how much capacity is needed. Therefore, if the CAISO identifies a portfolio deficiency, the CAISO must establish a means for determining the amount of additional capacity needed either through a capacity cure period or through CAISO backstop procurement

The CAISO considered additional assessments of individual RA showings, however, it is not feasible to adequately develop individual LSE load profiles and determine how a specific LSE's RA portfolio contributed to the collective deficiency and, therefore, is subject to LSE specific cost allocation. However, the CAISO supports, and is committed to, working with the LRAs to establish up-front procurement requirements, similar to the CPUC's maximum cumulative capacity (MCC) buckets to help ensure collective procurement of a resource portfolio with the best possibility of passing the portfolio assessment.

4.1.2. Planned Outage Process Enhancements

The CAISO considered modifying its planned outage provisions to correspond with the proposed modifications to its RA counting rules and assessments. The CAISO describes proposed changes to its planned outage provisions in the following section and provides relevant background on the current provisions.

Stakeholder feedback

In the third revised straw proposal, the CAISO put forward two planned outage processes aimed at simplifying the planned outage process and timeline. As with previous iterations, stakeholders continue to express significant concerns with the CAISO's proposal. Most concerns stem from the burden of providing replacement capacity and the potential incentives created for withholding capacity from the bilateral capacity markets. As noted in the third revised straw proposal, the CAISO shares these concerns. As a result, the CAISO will no longer pursue either of the options identified in the third revised straw proposal. Instead, the CAISO will explore two new options suggested by stakeholders. It is important to note that both options maintain opportunities for short duration and off-peak opportunity outages without replacement.

Stakeholders also continue to comment on the CAISO's view that, depending on the circumstances, it can violate the tariff for a generator or transmission operator to submit a forced outage after the CAISO has rejected the same outage when submitted as a maintenance outage. This topic of "planned-to-forced" outage reporting has been the subject of even more attention given the recent appeal to the CAISO executive appeals committee of a CAISO revision to the business practice manual for outage management.[7] As a result of stakeholder feedback and the appeals committee's decision on this appeal, the CAISO will start an expedited tariff clarification process to consider this issue. Per the committee's decision, this initiative will consider:

> What amendments are necessary in the outage reporting sections of the ISO tariff to further clarify when planned-to-forced outage reporting is prohibited and when it is permitted. Such amendments to consider include, but are not limited to, amendments to the definitions of planned and forced outages, as appropriate. This process also should consider resolving any other potential ambiguities in section 9 of the tariff, as well as consideration of further illumination of the factors used in determining whether to approve or reject a planned outage, whether in the tariff or BPM, as appropriate.[8]

Additionally, the CAISO will review whatever tariff amendments are made in that expedited initiative continue to review this policy as part of this stakeholder process. Specifically, a properly designed UCAP construct may eliminate the incentive for market participants to engage in problematic planned-to-forced outage reporting, which in turn may influence the relevant outage reporting tariff provisions. Given that the CAISO is not advancing the UCAP

[7] Details of that appeal, which related to proposed revision request 1122, are available at: http://www.caiso.com/Pages/documentsbygroup.aspx?GroupID=D8E40756-EA62-4851-B528-3F2D6DD04728

[8] http://www.caiso.com/Documents/ExecutiveAppealsCommitteeDecision-PRR1122-Mar112020.pdf

construct as part of this fourth revised straw proposal, it will not make a specific recommendation on this matter at this time. However, the CAISO commits to providing additional details in the next straw proposal.

Background

The CAISO's Planned Outage Substitution Obligation (POSO) process is codified in CAISO tariff sections 9.3.1.3 and 40.9.3.6 and the Outage Management BPM.[9] RA resources currently enter planned outages into the CAISO Outage Management System (OMS). The CAISO's Customer Interface for Resource Adequacy (CIRA) system runs a daily POSO report and determines the planned outage substitution need. The POSO process is currently conducted on a first-in, last-out basis.[10] Therefore, resources submitting planned outages earliest will have the greatest likelihood of taking their planned outages without substitution requirements. The POSO process compares the total amount of operational RA capacity to the total system RA requirement.

As noted previously, LRAs establish system RA requirements based upon CEC monthly peak forecasts, which are updated 60 days prior to the start of each delivery month. If, after removing all planned outages, available capacity is less than the RA requirement, the CAISO assigns substitution obligations for resources seeking to take planned outages.

Objectives and Principles

The CAISO lists the following objectives and principles that inform changes to its planned outage provisions. Modifications to the CAISO planned outage provisions should:

- Encourage resource owners to enter outages as early as possible
- Avoid cancellation of any approved planned outages to the extent possible
- Minimize or eliminate the need to require substitute capacity to greatest extent possible
- Identify specific replacement requirements for resources requiring replacement
- Allow owners to self-select, or self-provide, replacement capacity
- Include development of a CAISO system for procuring replacement capacity

Current Planned Outage Substitution Obligation Timeline

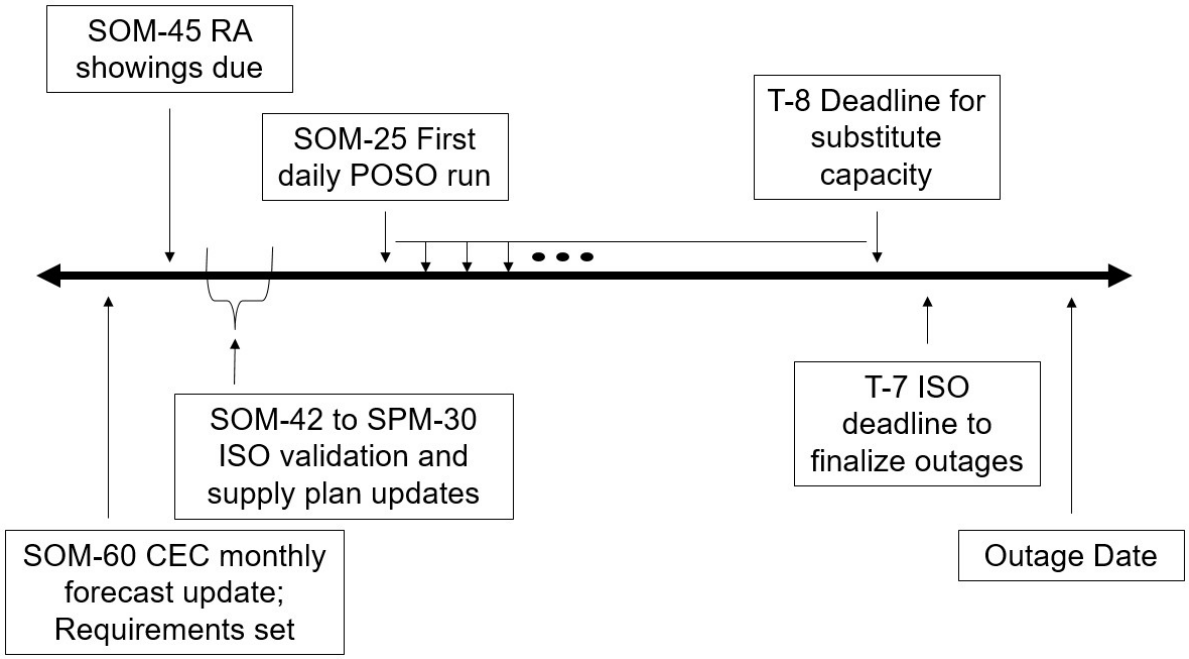
The current POSO timeline is provided in Figure 1 below. The current timeline provides the first POSO assessment at T-22, or 22 days prior to the start of the RA delivery month, for all outages submitted prior to T-25. This is the first instance when resource owners are provided with

[9] Outage management BPM found here: https://bpmcm.caiso.com/Pages/BPMDetails.aspx?BPM=Outage%20Management

[10] CAISO will first request the resource providing RA Capacity with the most-recently-requested outage for that day to provide RA Substitute Capacity and then will continue to assign substitution opportunities until the ISO has sufficient operational RA Capacity to meet the system RA requirement for that particular day.

indication of any POSO replacement obligations. Resource owners are allowed to provide replacement capacity through the T-8 timeframe, and the CAISO finalizes replacements and outages at T-7.

Figure 1: Current POSO timeline



Proposed Modifications to the Planned Outage Process

Based on stakeholder comments, the CAISO is proposing several changes to ensure planned outages can be taken with minimal cancellation risk after their initial approval. Additionally, numerous stakeholders noted the challenges with providing comparable capacity for planned outages. Therefore, the CAISO has removed this requirement. The CAISO also is attempting to remove obligations for outage replacement to the greatest extent possible. The CAISO proposes to redesign the planned outage process to reflect system UCAP targets rather than traditional NQC targets. This proposed change will better align with the counting rules and RA assessments proposal to incorporate forced outage rates in capacity valuation and assess resource adequacy on a UCAP basis.

Revised RA Planned Outage Process

To facilitate outage coordination and provide the greatest certainty regarding the timing of planned outages to both the CAISO and resource SCs, the CAISO is considering two options. Option 1 would establishes a planned outage reserve margin for off-peak months. Option 2 establish a replacement marketplace conducted by the CAISO.

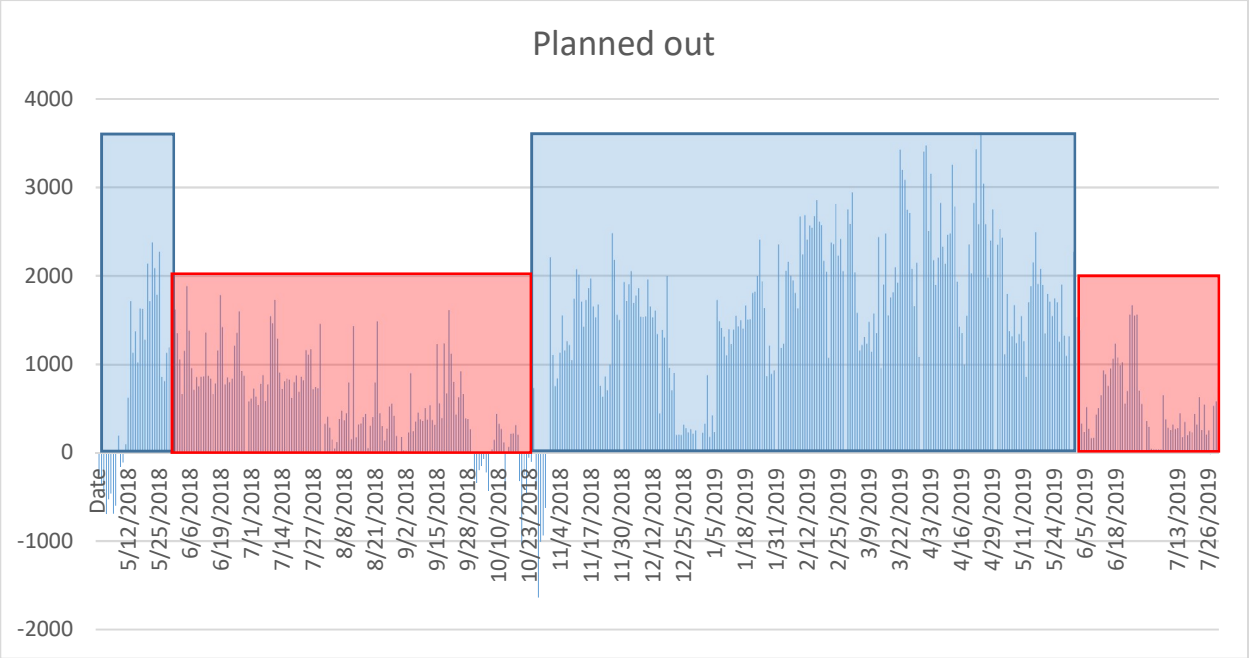
The CAISO shares stakeholder concerns that both options in the third revised straw proposal generally incented LSEs to withhold capacity from the bilateral capacity market. As a result, the

CAISO proposes to eliminate both of the previous options. Instead, the CAISO has developed the two new options for consideration and comment based on feedback provided by stakeholders. The first option is based on a concept put forward by CalCCA. Specifically, this option accounts for the need for planned outages in the upfront procurement and eliminates the need for all planned outage substitution. The second option is based on comments submitted by SDG&E. Under this option, the CAISO would procure all substitute capacity on behalf of resources seeking planned outages. The CAISO would then allocate the costs of replacement to the resource SC. Under both options, the CAISO will (1) eliminate RAAIM and (2) retain complete discretion to grant or deny all off-peak and/or short-term opportunity outages.

Option 1: Include planned outage planning in procurement requirements

Under this option, the CAISO would establish two new elements of the RA program. First, the CAISO would no longer allow for anything other than short-term and off-peak opportunity outages between June 1 and October 31. As can be seen from Figure 2 below, the vast majority of planned outages occur during off-peak months. Additionally, the off-peak months also provide the greatest opportunity to procure low cost capacity to ensure adequate capacity is available to the CAISO.

Figure 2: Approved Planned Outages (Both with and Without Substitution)[11]



Under this option, the UCAP capacity requirement would increase during the non-summer months, creating a well-defined planned outage reserve margin. No substitute capacity is allowed or required for an outage. The CAISO's proposed capacity outage calendar would track all planned outages for each day until RA showings are made for a given month. Once RA

[11] Observations with negative values represent days when the quantity of substitute capacity exceed the quantity on approved planned outage.

showings are made, the CAISO will track how much additional capacity can take a planned outage under the planned outage reserve margin.

The CAISO will review outage requests as they are submitted. Outage requests submitted prior to RA showings will either be approved or denied based on the CAISO's reliability assessment. The CAISO will not wait for RA showings to make this determination. The difference between this and current practices is that the CAISO will no longer issue POSO notifications at T-22 days prior to the month for outages requested by T-25. When RA showings are made, the CAISO will subtract all planned outages on RA showings from the planned outage reserve margin for each day in the RA month. If on a given day the approved planned outages for RA resources exceeds the planned outage reserve margin, then the CAISO will not allow any additional planned outages for that day. If the approved planned outages are less than the planned outage reserve margin, the CAISO will allow for additional planned outages on a given day for up to the remaining difference. Once subsequent planned outage requests reach the remaining planned outage reserve margin, the CAISO will automatically reject all additional planned outage requests. However, even if additional planned outage reserve margin remains, all planned outages will be subject to the CAISO's reliability assessment and may be denied for potential adverse reliability impacts. Finally, the CAISO will retain complete discretion to grant or deny all off-peak and/or short-term opportunity outages, regardless of threshold.

Table 2 below provides several examples of how the CAISO would assess a 300 MW resource requesting a planned outage. This example assumes a 3,000 MW planned outage reserve margin based on the data shown in Figure 2, above

Table 2: Examples of how CAISO will assess planned outages with a planned outage reserve margin

Timing of submission	Outage Calendar requests	Remaining planned outage reserve margin	Approved or rejected
Request made January 1 for outage on June 1	0 MW	NA	Rejected
60 days prior to month	2,500 MW	NA	Based on reliability assessment
60 days prior to month	3,500 MW	NA	Based on reliability assessment
20 days prior to outage date	2,000 MW	1,000	Based on reliability assessment
20 days prior to outage date	2,800 MW	200	Rejected

1 day prior to requested outage	3,000 MW	0	At the discretion of the CAISO

For purposes of UCAP calculations, any outage approved by the CAISO will not impact the resource's UCAP calculation. However, all rejected planned outages, if taken, may count against the resource in it UCAP calculation.[12] This applies regardless of the timing of the outage request or the ultimate RA status of a resource.

This option has the benefit of eliminating all planned outage substitution and removing any incentive for LSEs to withhold capacity from the market to provide substitute capacity. Instead, all excess capacity should be readily available for sale in the bilateral capacity market, maximizing LSEs' opportunities to find capacity when needed. This applies in both peak and off-peak months. Although, this option would require higher overall procurement, it focuses on off-peak months to minimize the potential for increased capacity prices to LSEs.

Option 2: CAISO procures all planned outage substitution capacity

Under this option, the CAISO would develop a new procurement tool designed to procure planned outage substitution capacity.[13] The procurement would take place for daily substitute capacity obligations. This new procurement option, and the tool the CAISO would employ, would be separate from its existing CPM authority. Instead, the CAISO will serve as a facilitator to enable planned outages. Resource participation to provide daily substitute capacity via a competitive solicitation process would be completely voluntary.

Although this option may seem conceptually easy to understand, there are numerous complex policy issues that must be resolved. The CAISO does not attempt to address all of these issues at this time. Instead, the CAISO will attempt to identify core policy questions and will work with stakeholders to address them should this be the preferred option.

As a starting point to this option, the CAISO will continue allowing resources to submit planned outages requests at any time prior to eight days before the start of the outage. However, starting 44 days prior to the RA month, the CAISO will run a daily substitute capacity procurement market. All resources that have submitted a planned outage request prior to RA showing submission that are then included on an RA showing will automatically be included in this market as substitute capacity demand. Resources may submit a price, in $/kW-day, above which they are not willing to procure substitute capacity. All planned outage capacity requests with no price will be price takers, meaning they are willing to pay whatever price for substitute capacity.

[12] The final determination of if the outage would count in the resource's UCAP calculation depends on the final UCAP calculation methodology.
[13] The SDG&E proposal suggested the CAISO develop this tool for both planned and forced outages. However, the CAISO's proposal will not extend to forced outages. The basis for this decision is discussed later in this proposal.

All non-RA capacity would be allowed to submit a daily bid into the CAISO to provide substitute capacity. An open policy question is determining the timeline for submitting the bids and if, and on what schedule, the bids can be revised. For example, in the existing intra-monthly CPM rules, bids into the CAISO competitive solicitation process must be submitted 14 days prior to the month and cannot be increased during the adjustment period. Bids can be removed or lowered by 9 AM at T-1 to the day of a potential CPM.[14] However, under this planned outage option, the CAISO would be facilitating daily transactions for two counter parties, not monthly, 30, or 60 days transactions for system or local reliability needs. There may be reasons for altering capacity bids on a daily basis in response to previous days' awards. Therefore, the CAISO requests stakeholder feedback on when bids should be submitted and how and when they could be changed under this option, and what are the implications of doing so under any proposed option.

Another key policy element that requires resolution for this option is bid price caps and monthly award caps. The CAISO has a monthly soft offer cap of $6.31/kW-month in the competitive solicitation process or a total of $75.68/kW-year. One approach would be to pro-rate this amount to a daily value of $0.21/kW-day to establish the daily capacity price. However, it is not clear to the CAISO that this logic should hold for a daily product as opposed to a monthly product. A related question is whether the CAISO should impose a monthly cap on the total amount of revenues a resource should be permitted to earn under this construct. For example, if the resource bids and clears at $1 for seven days of planned outages, should there be a cap comparable to the $6.31/kW-month CPM soft offer cap? Further, if a monthly cap is imposed and reached, should the resource be required to bid into the daily market at $0 for the remainder of a 30 days rolling window, simply treated as RA capacity, or added to the planned outage reserve margin, allowing other resources to take planned outages.

Once all bids to buy and sell capacity have been submitted, the CAISO will compare supply, demand, and system reliability needs to determine which planned outage requests are approved. Each day is assessed independently of other days.[15] Because the CAISO will run the assessment daily, any approved planned outage substitution will settle at the price for that day and will be incorporated into subsequent assessments. For example, if a resource is approved for a planned outage on day 1, it will pay the price of substitute capacity on day one. If another resource requests a planned outage on day 5, it will settle at the price for day 5. This approach creates an incentive for resources to submit outages early in an effort to get access to lower cost substitution when there is more capacity available. The CAISO may deny the planned outage request under this option for one of two reasons. First, the resource requesting the outage has not submitted a demand bid that clears. In other words, if the resource requesting a planned outage puts in a planned outage substitute capacity demand bid for $0.20/kW-day and the lowest supply bid is $0.25/kW-day, then the CAISO will inform the resource requesting the planned outage that the request has been denied. The second reason

[14] CAISO tariff section 43A.4.2.5 and Reliability Requirements Business Practice Manual, section 5.3.4.
[15] The CAISO has considered the idea of allowing for multiday assessments and has determined that it adds a level of complexity such that the CAISO believes the costs of implementing such a solution would exceed the benefit. In which case, market participants would be better off reverting to the bilateral construct.

the CAISO may reject the planned outage request is that adequate substitute capacity cannot be found, regardless of price. More specifically, if there are locational concerns such that the CAISO cannot identify a resource that would provide adequate capacity to meet its reliability needs. In other words, the CAISO will still have to run its reliability assessment before approving a planned outage request.

The CAISO must also resolve how to manage outages that only clear for part of their requested outage under this option. For example, how should the CAISO handle the scenario when resource submits a week long planned outage request and the CAISO is only able to find substitute capacity for four of the seven days? Although this may provide a significant incentive to submit long duration planned outages as soon as possible, it is unlikely to resolve the challenge completely. As a result, the CAISO would still need to determine if the whole outage should be denied, if it should be approved with UCAP penalties on the days on which replacement was not available, or if there is some other means to resolve this scenario. The CAISO, therefore, seeks stakeholder input on how such a scenario should be handled.

Finally, this option has an additional downside in that it does not resolve the issue of LSEs withholding capacity to self-insure against replacement costs. In fact, given that the resource SC will be charged directly for the substitute capacity, it provides an incentive for that SC to have additional capacity on hand to minimize the price and maximize the probability that capacity is available when requesting planned outages. For example, it is possible that an LSE could submit both the demand and supply bids on days when they are requesting planned outages. This would allow the LSE to get low cost substitute capacity and avoid true market price risk.

Short-term opportunity and off-peak outages

The CAISO currently allows both short-term opportunity and off-peak outages. The CAISO proposes to maintain both of these options, regardless of which planned outage option is ultimately selected. Further, as noted in the third revised straw proposal section **Error! Reference source not found.**, the CAISO is proposing to modify the RA must offer obligation to focus on day-ahead bidding. With limited exceptions, if resources do not receive any day-ahead awards, the resource will be eligible to take a short-term opportunity outage. These outages may only be requested after the day-ahead market closes and are subject to the CAISO review and approval. If approved, no replacement capacity is required for these outages. However, because no replacement is required, these outages are only permitted for a single day and resources must participate in the subsequent day-ahead market.

Planned Outage Outlook Transparency

The CAISO proposes to offer greater visibility into how much resource adequacy capacity is shown relative to the resource adequacy requirements. The goal is to provide resources greater transparency regarding available capacity well in advance of planning outages. Specifically, CAISO proposes to develop a calendar that shows in advance and on a daily basis, the potential availability of additional system RA headroom. This RA headroom should allow resources to identify potential calendar dates with RA headroom in advance of requesting planned outages, thus mitigating replacement obligations and helping the CAISO maintain

adequate available capacity. If the calendar shows no available headroom, then any RA resource requesting a planned outage will be required to show substitute capacity.

Outages will be approved and denied through the planned outage tool discussed above. The CAISO will continue to evaluate and accept outages and substitute capacity and adjust the outage calendar on a first-in, last-out basis. Thus, resources submitting outage requests will be assessed first, making it less likely the CAISO will deny their outage or require substitute capacity compared to later requesting resources. The CAISO will continue to allow resources taking outages requiring replacement to self-provide substitute capacity for any outages requiring replacement.

Figure 3 demonstrates the conceptual planned outage outlook calendar. The CAISO proposes to publish this type of calendar including daily MW values for UCAP headroom in excess of system RA requirements. The specific content of this calendar will ultimately be driven by the planned outage option selected, however, the goal of providing this type of information is to assist resource SCs in planning outages and ensuring proper resource maintenance.

Figure 3: Example substitution availability calendar

Planned Outage Substitution Capacity Bulletin Board

In previous proposals, the CAISO proposed to develop a bulletin board to facilitate planned outage substitution. However, given the two options outlined above, it is not clear that such a bulletin board is needed. Under option 1, planned outages replacement would no longer be required and under Option 2, the CAISO would facilitate substitute capacity procurement. Therefore, the CAISO seeks stakeholder feedback regarding whether or not this element is necessary and, if so, why given the effort to develop and maintain.

If a clear need and benefit are identified, then the CAISO proposes to develop a bulletin board for resources to match planned outages requiring substitution with substitute capacity resource sellers. This planned outage substitution bulletin board should make it easier for resources to connect with potential substitute supply. Resources not shown as RA resources or with additional available UCAP may voluntarily offer that capacity to provide substitute capacity. The resource SC will be able to list resources and a specified price for use of that substitute capacity. Resources looking for substitute capacity can use this bulletin board to find the comparable capacity needed to take the planned outage.

The CAISO will provide daily granularity. Resource owners looking for substitute capacity will have visibility into resources offering substitute capacity. Results will be filtered to only substitute capacity suitable for substitution. Accepting capacity through this tool will automatically match resources on outage with substitute capacity.

4.1.3. RA Import Provisions

In this fourth revised straw proposal, the CAISO provides further analysis and updates the proposed modifications to the RA imports provisions. The CAISO proposal addresses concerns about the reliability, dependability, and affordability of resource adequacy imports. Given California's long-standing reliance on resource adequacy imports, the CAISO must ensure there is sufficient dependable RA import capacity secured to meet California's capacity and energy needs, particularly as supply availability tightens across the west.

The CAISO included additional aspects of its RA imports proposal here to align with the CAISO's February 28 proposal in Track 1 of the CPUC RA proceeding (R.19-11-009).[16] These proposed modifications support the CAISO's RA import market participation rules and will help accomplish and support RA program rule changes the CAISO is advocating in the CPUC's RA proceeding. Alignment between CAISO and CPUC RA import rules will help ensure equitable treatment across all LSEs.

Background

LSEs can meet system RA requirements with a mix of RA resources, including imports from outside the CAISO balancing authority area. Import RA resources were used to meet an average of around 3,600 MW (or around 7 percent) of system RA requirements during the peak summer hours of 2017. In the summer of 2018, this increased to an average of around 4,000 MW (or around 8 percent) of system resource adequacy requirements.[17] Thus, import quantities are significant and affect the RA program and its ability to ensure reliability.

Today, RA import resources are not required to be resource specific or to specify that they represent supply from a specific balancing area. RA import resources are only required to be shown on RA supply plans with associated maximum import capability (MIC) allocations, and make offers as shown at a specific intertie point into the CAISO's system. Import RA can be bid at any price below the offer cap and does not have any further obligation to bid into the real-time market if not scheduled in the day-ahead integrated forward market or residual unit commitment process.

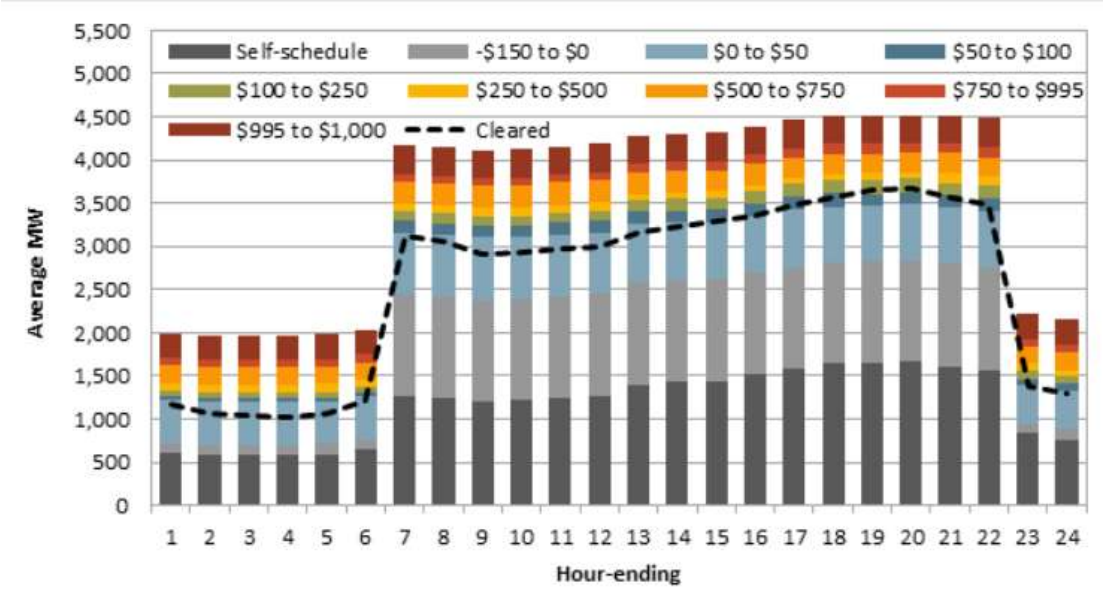
Stakeholders have expressed that current RA import provisions can undermine the integrity of the RA program and threaten system reliability. The CAISO's Department of Marking Monitoring (DMM) expressed similar concerns in their September 2018 DMM special report on

[16] CAISO Resource Adequacy Track 1 Proposal (R.19-11-009) Feb 28, 2020: http://www.caiso.com/Documents/Feb28-2020-Track1-Proposal-R19-11-009.pdf
[17] 2017 CAISO DMM Annual Report, p. 259: http://www.caiso.com/Documents/2017AnnualReportonMarketIssuesandPerformance.pdf

import RA.[18] In that report, DMM explained the existing rules could allow for some portion of resource adequacy requirements to be met by import RA that have limited availability and value during critical system and market conditions. For example, Non-Resource Specific RA (NRS-RA) imports could satisfy their RA must offer obligation by routinely bidding significantly above projected prices in the day-ahead market so they do not clear the market, relieving them of any further offer obligations in real-time. This is possible because NRS-RA imports can be speculative and do not have bid cost recovery or bid cost verification, meaning they can set their bids up to the bid cap to avoid delivery.

The DMM provided specific examples of these bidding behaviors in its comments on the recent CPUC Proposed Decision clarifying RA Import rules (R17-09-020). Figure 4 shows the average hourly RA imports offered into CAISO's market at various price levels.[19] This information provides additional evidence that around 1000-1200 MW RA imports were participating at bid levels in excess of $500/MW in August of 2018.

Figure 4: Average hourly RA imports offered by price bin (weekday hours) August 2018



RA Import related concerns and issues under review

The CAISO's review of the current RA import provisions is focused on determining if they cause reliability concerns and how to mitigate those concerns. The CAISO has identified two areas of concern with the current RA import provisions:

1. **Double counting of RA import resources**:

[18] DMM Special Report: Import Resource Adequacy, September 10, 2018: http://www.caiso.com/Documents/ImportResourceAdequacySpecialReport-Sept102018.pdf

[19] DMM comments on CPUC Proposed Decision clarifying RA Import rules (R17-09-020). September 26, 2019: http://www.caiso.com/Documents/CommentsofDepartmentofMarketMonitoringonProposedDecisionClarifyingRAImportRules-R17-09-020-Sept262019.pdf

The CAISO's RA import provisions should ensure the CAISO can certify that import resources shown for RA are not also used by the resource's native BA to serve native load, sold to a third party, or used to meet capacity needs of other areas in addition to CAISO load. The CAISO cannot determine if RA imports are being double counted under current provisions.

2. **Speculative RA import supply being used on RA showings**:

The CAISO believes that RA import provisions should foreclose (or at a minimum, discourage) speculative RA import supply. Speculative RA import supply occurs when RA imports shown on RA supply plans have no physical resource backing or no firm contractual delivery obligation secured at time of the showing.

The CAISO previously described speculative RA import supply and noted that it shares DMM's above-noted concerns about speculative supply. The CAISO has indicated that significant amounts of speculative supply supporting import RA could present reliability concerns. The CAISO's review of available evidence reflects frequent cases of relatively high priced DA bidding by NRS-RA imports. This conduct raises concern that these NRS-RA imports represent speculative supply, as this bidding practice is a logical strategy that a scheduling coordinator would use to meet the must-offer obligation but avoid an award from the CAISO market.

Objectives

The CAISO identifies the following objectives to guide RA import rule modifications.

- Modify RA import provisions to ensure that RA imports are backed by physical and verifiable capacity with firm transmission delivery.
- Create more comparable treatment for RA imports to internal RA resources. The current provisions provide less rigorous requirements for RA imports.
- Coordinate import provisions with any related modifications being proposed through CAISO's extended EIM and DAME initiatives. Coordination between the RA Enhancements initiative, Day-Ahead Market Enhancements (DAME) initiative, and Extension of the Day-Ahead Market for EIM (EDAM) is vital to ensure all of the interrelated aspects work together without unintended consequences.

RA Import Proposal

The CAISO's current provisions and existing CPUC RA program guidelines allow for non-resource specific resources to qualify as System RA capacity. As noted above, RA imports are not required to be resource specific or to represent supply from a specific balancing area. Instead, they are only required to be shown as sourced on a specific intertie into the CAISO system. Because of tightening supply in the West, the CAISO is increasingly concerned about the potential that Non-Resource Specific RA import resources are not supported by real, physical capacity that is not secured at the time of RA showings, i.e., they are speculative supply.

Similarly, the CAISO is very concerned that continuing to allow Non-Resource Specific imports to qualify for RA without any source-specification may create the potential that the underlying

resources may be double counted and unable to serve CAISO reliability needs, especially under stressed system conditions in the west. Double counting occurs when a RA resource is relied upon by other regions or Balancing Areas while simultaneously being shown as CAISO System RA capacity. The CAISO is concerned that these reliability risks will continue to exist as long as there is any potential for import RA supply to qualify without a forward source specification requirement.

On February 28, 2020, the CAISO submitted a proposal into the CPUC's RA proceeding, R.19-11-009.[20] The CAISO's proposal specifically addresses the need to eliminate speculative import RA supply by strengthening import RA qualification and verification requirements. The CAISO's proposal includes recommendations for priority actions the CPUC should adopt to both establish stricter RA program rules and collect data necessary to enforce those rules.

The CAISO proposed that the CPUC should require that resource adequacy imports:

1. Provide source specific information at the time of the resource adequacy showings. Source specification can be a specific generating unit, specified aggregation or system of resources, or specified balancing authority area, but should be clearly identified in advance.
2. Provide an attestation or other documentation that the resource adequacy import is a specific resource, aggregation of physically linked resources, or capacity in excess of the host balancing authority area or supplier's existing commitments that is dedicated to CAISO balancing authority area needs; and
3. Can be delivered to the CAISO balancing authority area boundary via firm transmission.

To support these proposed changes to the Commission's resource adequacy program, the CAISO intends to implement complementary CAISO tariff changes. The CAISO outlines corresponding modifications that it will pursue to support its CPUC Track 1 RA import proposal. Specifically, the CAISO indicated in its Track 1 proposal its intent to implement the following modifications to its tariff:

- Requiring attestations that all import resource adequacy supply included on resource adequacy supply plans is surplus, has not been committed to others, and will not be otherwise sold or relied upon to meet other area's needs after monthly showings;
- Requiring verification to ensure the resource-specific supply remains available to the CAISO markets through the operational timeframe;
- Clarifying that only supply that has provided source specification can qualify as resource adequacy import capacity; and
- Modifying CAISO tariff-defined import market participation models to extend Must Offer Obligations to the Real-Time Market for all MWs included on resource adequacy showings

The CAISO believes that that the collective impact of these four modifications will be to reduce or eliminate the potential for speculative import supply. These changes will also provide greater

[20] CAISO Resource Adequacy Track 1 Proposal (R.19-11-009) Feb 28, 2020: http://www.caiso.com/Documents/Feb28-2020-Track1-Proposal-R19-11-009.pdf

price transparency and the ability to validate import prices in the future. The CAISO's intent is to codify requirements and align its tariff with the proposal submitted to the CPUC to ensure similar treatment among all LSEs. These additional modifications are vital to ensure that the CAISO balancing area mitigates its exposure to non-specified or double counted import RA supply.

Source specification requirements for all RA import supply

In light of the recent CPUC proceedings considering modifications to import RA guidelines, the CAISO has reconsidered modifications to the provisions for specifying the source of RA imports to ensure all RA imports are real, physical supply, secured at the time of RA showings, and dedicated only to meeting CAISO reliability needs. The CAISO previously discussed this need for RA import source specification in its initial RA enhancements straw proposal, but it did not receive overwhelming support. In light of the tightening system conditions in the broader western region, the CAISO is committed to making important and non-trivial changes to import RA rules that mitigate the possibility for double counting and speculative supply.

The CAISO proposes to require all import RA supply provide specification of the physical sources backing resource adequacy import showings. This requirement will apply to all RA import resources shown on annual and monthly RA and Supply plans. To count as resource adequacy, all import RA supply must provide a source specification at the time of showings. Source specification means that the resource adequacy importer must provide specification of either the specific unit, aggregation of units, or the source balancing authority area. This requirement will ensure that importers truly have capacity in excess of their existing commitments.

The CAISO recognizes there may be additional and appropriate costs associated with this more rigorous standard, but that requiring RA imports to provide source specification puts import RA on par with the quality and obligations of internal resource adequacy resources and will create benefits that justify any additional costs. Adopting a source specification requirement will require host balancing authorities and suppliers to secure the necessary fuel and position their resources to meet their own needs and their commitments to the CAISO balancing authority area. Adopting requirements for forward source specification from real, physical resources committed to serving the CAISO will address both the speculative import supply and bidding behavior concerns because it ensures actual physical resource capacity is designated toward its resource adequacy commitment to California.

With the potential extension of the day-ahead market to EIM entities, the CAISO believes that, at minimum, RA import resources must specify the source BA. The proposed source specification would allow the CAISO to ensure that RA imports are not double counted for EIM entities' resource sufficiency tests. Without this rule, it would be possible for an EIM entity to count on capacity from a resource within its own BA to pass the EIM resource sufficiency evaluation, while also showing the resource as import RA to the CAISO. This is not an appropriate outcome because the resource is incapable of physically meeting both the BA's needs *and* the CAISO's needs. The CAISO anticipates that requiring a designation of the

source Balancing Area will be sufficient to ensure RA imports are not double counted to meet both the CAISO's RA needs and the EIM resource sufficiency tests.

Non-specified energy contracts alone should not qualify for Import RA

Although the CAISO supports non-resource specific firm energy contracts for hedging and to provide economic energy, they do not address speculative supply or double counting concerns and as such are not a substitute for advance procurement of real physical capacity. Accordingly, such contracts should not count as RA capacity. Firm energy contracts and related hedging mechanisms can help mitigate day-ahead and real-time market price risk, but they cannot ensure that real physical supply is secured in advance, which is the purpose of the resource adequacy program. In the CPUC's Decision (D.) 05-10-042, it disallowed liquidated damages (LD) energy contracts from internal supply because of the potential for double counting. D.05-10-042 established that LD contracts (which are "non resource-specific" contracts) would be phased out for resource adequacy purposes because they allowed the possibility of double-counting resources and were not subject to deliverability screens.[21]

The D.05-10-042 continues to explain why the Commission continued to accept firm LD import energy contracts for resource adequacy purposes. Decision D.05-10-042 specifically states:

> *"Firm import LD contracts do not raise issues of double counting and deliverability that led us to conclude that other LD contracts should be phased out for purposes of RAR. We note that firm import contracts are backed by spinning reserves. Accordingly, we approve the exemption of firm import LD contracts from the sunset/phase-out provisions applicable to other LD contracts as adopted in Section 7.4.6."*[22]

It is not clear if D.05-10-042 pointed to backing spinning reserves as the rationale for allowing firm import energy contracts to continue to count for RA purposes because the purpose of requiring RA imports to be backed by spinning reserves has not been explained in detail. It appears the CPUC decision may rely on the faulty notion that because firm import LD contracts are backed by spinning reserves, they do not double count resources and should be permitted to qualify as resource adequacy.

The presence of spinning reserves does not change the fact that firm energy contracts without a specified source generates the same double counting concern the CPUC expressed in disallowing internal LD contracts. In other words, non-specified resource adequacy imports are by nature not resource specific. Thus, without requirements for documentation of the sources backing these imports to support RA showings the non-specified resources, they may be relied upon by another balancing authority area or load-serving entity, especially in tight system conditions.

Moreover, SCE and Middle River Power have explained in their feedback that WECC contingency reserve requirements have changed from what was in place when D.05-10-042 was adopted. Under the WECC modifications a BAA's contingency (and, by extension, its

[21] CPUC D.05-10-042, p. 101
[22] CPUC D.05-10-042, p. 68.

spinning) reserve obligation is no longer determined by its type and amount of interchange, but instead by the greater of its most severe single contingency and the sum of three percent of (a) its load and (b) its internal generation. As a result, any reference to RA imports being backed by spinning reserves is no longer applicable as a WECC requirement. Therefore, any reliance that D.05-10-042 may have placed on RA imports being backed by spinning reserves to support the conclusion that firm liquidated damages RA import contracts warrant different treatment than other liquidated damages energy contracts is now inconsequential given these changed circumstances.

Attestation and Contract Submission Requirements

The CAISO also proposes that all import supply provide attestation of the physical sources backing RA imports and submission of the associated contract. The supporting documentation that the CAISO will require is important to bolster the forward source specification requirement and ensure that import RA supply represents physical supply secured in advance that is surplus to other commitments. The CPUC already requires some similar attestation or contractual language be provided for import RA supply. The CAISO believes that this should make the proposed requirement to submit similar documentation and attestation to CAISO relatively straightforward. The CAISO believes that this is necessary to include under the CAISO provisions to ensure this requirement applies to all RA import supply, not just the supply provided by CPUC jurisdictional LSEs. Therefore, the CAISO does not find arguments regarding burdens related to the duplication of documentation compelling.

The CAISO proposes it will require an attestation and supporting documentation in the form of actual contracts to verify that RA import supply represent real, physical supply that has been committed exclusively to providing resource adequacy capacity to meet CAISO balancing authority area needs to be submitted at the time of month ahead RA showings. The CAISO proposes to require that LSEs with import RA on supply plans also submit their contracts with external supply, listing the actual physical source(s) of the capacity. This will support verification of the supporting resources.

To validate source specification and ensure that any resource adequacy import is in excess of existing commitments the required attestations should indicate:

1. The physical source or sources of capacity being included on RA showings with attestation that it has been secured at the time of RA showings,
2. is in excess of the supplier's existing commitments, i.e., has not been sold to others, and
3. it will not be used to meet another area's needs after the time of showings.

The CAISO is also considering additional documentation needs to support the attestation that the supply is truly in excess of the suppliers own needs, and their commitments to others. The CAISO understands that the relevant documentation required may vary based on the disposition of the supplier, e.g., a marketer versus external load serving entity in another balancing authority area. The CAISO understands that an LSE designating a specific balancing authority area source as a source-specified import could be required to provide documentation that its CAISO-dedicated resource adequacy import capacity is in excess of its own projected load needs and any other supply commitments made to other entities. A supplier of resource

adequacy with no other load serving commitments that designates an aggregation of resources as its specified supply source may need to have slightly different documentation requirements due to these differences in available information.

At the time of the resource adequacy showings, these suppliers may not be able to provide the same level of supporting documentation that their specific resources is not and will not be relied upon by other balancing authorities or load-serving entities. The CAISO understands that any tariff provisions must apply equally to all parties, so this proposal aspect may need to be limited to simply a suggested informational submission to support the proposed attestation of import RA suppliers. At a minimum, the CAISO believes that it is reasonable and necessary to require suppliers to attest and provide the associated contracts.

Bidding requirements for RA imports

The current bidding rules for RA imports for non-resource specific resources provide that only RA import bids that receive day-ahead awards are required to bid in real-time. The CAISO previously has declined to change this bidding rule for a number of reasons, including concerns over the need to release unused transmission for other use in real-time and for consistency with other resources covered in **Error! Reference source not found.** and the Day-Ahead Market Enhancements initiative. However, in light of the other proposed changes, CAISO has submitted to the CPUC and included in this proposal a modification to extend must offer obligations to the Real-Time Market for all MWs included on RA showings. This change will help address the concerns expressed by the CAISO DMM and CPUC Staff regarding bidding behavior of import RA by providing an incentive to bid economically and actually receive market awards.

With the addition of the forward requirement for source specification and the related attestation and supporting documentation that the supply will be dedicated only to the CAISO, the following CAISO-defined imports types will be able to qualify as resource adequacy imports: (1) Dynamic Resource-Specific System Resources or Pseudo-Tie resources, (2) Non-Dynamic Resource-Specific System Resources, and (3) Non-Resource Specific System Resources. CAISO specifies the current availability and market participation requirements for these CAISO-defined resource types as follows:

1) **Resource Specific (Pseudo-Tie or Dynamic)**
   - Pseudo-Tie Resources and Dynamic Resource-Specific System Resources – Current CAISO tariff requirements include Day-Ahead and Real-Time Must Offer Obligation for all MWs included on resource adequacy showing.
     - Resources must submit a bid for the Day-Ahead Market, and to the Real-Time market to the extent (1) the resource has a day-ahead schedule for energy or ancillary services, or (2) the resource is a short or medium start resource (regardless of day-ahead awards).

2) **Resource Specific (Non-Dynamic)**
   - Non-Dynamic Resource Specific System Resources (with specified Generating Unit or specified aggregations or systems of fuel linked resources) – Current CAISO tariff

requirements include Day-Ahead Must Offer Obligation for all MWs included on resource adequacy showing and Real-Time Must Offer Obligation for all MWs included on resource adequacy showing.

- Resources must submit a bid for the Day-Ahead Market for the full resource adequacy obligation; and to the Real-Time Market but only to the extent the resource has a day-ahead schedule for energy or ancillary services.

3) Non-Resource Specific (non-dynamic)

- Non-Resource Specific System Resource (non-dynamic) with a specified aggregation of resources, or specified balancing authority or suppliers with otherwise uncommitted capacity in their control – Current CAISO tariff requirements include a Day-Ahead Must Offer Obligation for all MWs included on resource adequacy showing and a Real-Time Must Offer Obligation for all MWs included on resource adequacy showing.
  - Resources must submit a bid for the Day-Ahead Market for the full resource adequacy obligation; and to the Real-Time Market but only to the extent the resource has a day-ahead schedule for energy or ancillary services.

CAISO will extend must offer obligations to the Real-Time Market for all MWs included on resource adequacy showings consistent with existing rules for internal resources and pseudo ties. The CAISO would modify requirements for this category to provide all information and data on the resource configuration needed from resource adequacy import resources to ensure the CAISO master file accurately reflects start up times of the import resources.[23] This would extend the must-offer obligation to import resources in the same manner that it applies to internal resources and pseudo-ties. This would ensure that import supply is required to remain available to the CAISO balancing authority area through the real-time and would continue to be subject to any physical constraints on physical resources that can be modeled in the CAISO's systems.

Import sellers can currently specify the source balancing authority area or resource aggregations as a Non-Resource Specific System Resource. To facilitate the option of a resource aggregation or balancing authority being specified as a supply source, the continued use of the Non-Resource Specific System Resource participation model for resource adequacy imports will still be necessary. However, it is vital that this resource model option only be acceptable for resource adequacy imports if it is also combined with the addition of the requirement for the source specification and attestation that the supply will be dedicated only to the CAISO. The CAISO believes this option will also require a need for additional requirements for operational data to enable the CAISO to verify that import RA supply is offered exclusively to the CAISO markets and has not been sold to others or used to meet other balancing authority area's reliability needs, as discussed below.

A related question that must be considered is the concept of sub-set of hours contracts and the related MOO provisions for these import RA resources. The CAISO intends to apply the real

[23] This proposal to extend the import RA MOO into Real-Time for all MW on RA showings regardless of Day-Ahead awards would only apply to the extent the physical resource providing the import RA supply is able to meet a Real-Time MOO if it has not received any Day-Ahead awards, i.e., is a short-start or medium-start resource.

time MOO for all MW included on RA showings and must consider how to treat subset of hours contracts. Note that the CAISO has previously proposed to extend the RA MOO for all RA resources to 24 hours by 7 days a week. The CAISO will need to determine how to approach this proposed change as related to import RA resources that currently qualify with subset of hours contracts that limit the resource's MOO to only those hours specified in contracts.

The CAISO intends to adopt these modified MOO provisions as an interim measure until other ongoing initiatives also considering MOO-related issues are developed. The CAISO commits that other related efforts will be coordinated with these proposed RA import modifications to ensure that any future modifications do not undermine the intent of this interim extension of the import RA MOO.

Requiring verification to ensure the resource-specific supply remains available to the CAISO markets through the operational timeframe

CAISO will pursue modifications to its tariff to require RA import suppliers to provide operational data that the CAISO can use to verify performance. This verification will allow the CAISO to ensure that supply committed as a resource adequacy import remains available to the CAISO markets through the operational timeframe. The CAISO can accomplish this verification via telemetry or the review of other acceptable performance data.

RA importers can provide the necessary operational data for verification purposes without the CAISO having the direct operational control over the import resources. Suppliers across the west have indicated that these operational data requirements should not be problematic for real, physical supply to provide. This verification coupled with the forward requirements for source specification will allow the CAISO to monitor RA import behavior and refer potential tariff violations of these requirements or misrepresentations regarding the required documentation to the CAISO Department of Market Monitoring and the FERC Office of Enforcement. The CAISO provides some initial options for verification of requirements in the forward and operational timeframes in the following table. The CAISO plans to further explore the ability for verification of these requirements in the forward timeframe and in the operational window.

Table 3: Source specification verification options by RA import resource type

Resource Type	Resource Specific Resource	Resource Specific Dynamic	Non-Resource Specific - Dynamic	Non-Resource Specific - Balancing Area Source	Non-Resource Specific - Aggregate Resource
Forward Verification	Attest to evidence of resource obligations	Attest to evidence of resource obligation	Attest plus accounting for BA Capacity obligations	Attest plus accounting for BA Capacity obligations	Attest to evidence of resource obligations
Operational Verification	Telemetry	Telemetry	BA unloaded capacity telemetry	BA unloaded capacity telemetry / after-the-fact	Telemetry / after-the-fact submission of

				submission of operational data	operational data

Transmission delivery requirements for RA imports

The CAISO believes it is essential that resource adequacy imports resources are backed by high quality transmission service that ensures the imports are treated on par with the host BAA's native load. Therefore, it should be appropriate to require delivery of all RA import energy to the CAISO balancing authority area boundary via firm transmission. The CAISO accordingly proposes to require that importers of RA capacity must hold firm transmission to support the import at the time monthly RA showings are submitted to the CAISO. A month ahead firm transmission requirement from source to sink will provide more comparable treatment between internal supply and RA imports and to minimize delivery risk.

The most robust and appropriate transmission delivery requirement for RA imports would be to require firm transmission along the entire delivery path from the source to the CAISO balancing authority area. Other organized market regions have similar requirements. The following reflects the requirements imposed in other resource adequacy constructs by the other ISOs and RTOs:

- ISO-NE requires that in support of new import capacity resources, the customer must submit "documentation for system-backed import capacity that the import capacity will be supported by the Control Area and that the energy associated with that system-backed import capacity will be afforded the same curtailment priority as that Control Area's native load;"[24]
- MISO requires "demonstrating that there is firm transmission service from the External Resource to the border interface CPNode of the Transmission Provider Region and either that firm Transmission Service has been obtained to deliver capacity on the Transmission System from the border to a Load within an LRZ or demonstrating deliverability…;"[25]
- NYISO requires that in order to participate as external installed capacity suppliers, external resources must demonstrate that "if they demonstrate that the External Control Area will afford the NYCA Load the same curtailment priority that they afford their own Control Area Native Load Customers;"[26]
- PJM requires different requirements depending on how the external resource participates in the capacity market that can be either as rigorous as a pseudo-tie arrangement or as is required in most other areas, that the resource have firm transmission service to the PJM border.[27]

[24] ISO New England, Transmission, Markets and Services Tariff, Section 13.1.3.5.1
[25] MISO Tariff, Module E, Sheet 69A.3.1.c
[26] NYISO MST - Market Administration and Control Area Services Tariff (MST), Section 5.12.2.1
[27] PJM Manual 18: PJM Capacity Market, Section 4.2.2

CAISO recognizes that there may be different degrees of firmness for firm point-to-point service based on the length for which the service is procured. For example, under the Pro Forma OATT, although short-term firm transmission rights owners have the right of first refusal, long-term firm transmission service rights would have a higher reservation priority if available transfer capability is insufficient to satisfy all requests and reservations. However, all long-term term point-to-point transmission service has an equal reservation priority with native load customers.[28]

The CAISO understands it is also important to consider the timing of requirements for securing firm transmission carefully to balance cost, market efficiency, and reliability. Some parties have previously indicated that firm transmission rights are more difficult and costly to secure in the month ahead timeframe. The CAISO also appreciates that non-firm service may provide the import resource adequacy resource the ability to deliver the power to the ISO grid under certain circumstances. However, non-firm service has a lower scheduling priority than firm service, which poses certain challenges. For example, under the Pro-Forma OATT, although non-firm service can be procured ahead of time, it is more susceptible to curtailments "for economic reasons in order to accommodate (1) a request for Firm Transmission Service, (2) a request for Non-Firm Point-To-Point Transmission Service of greater duration, (3) a request for Non-Firm Point-To-Point Transmission Service of equal duration with a higher price, (4) transmission service for Network Customers from non-designated resources, or (5) transmission service for Firm Point-to-Point Transmission Service during conditional curtailment periods…"

Because firm transmission service can be scheduled up to twenty minutes before the start of the next scheduling interval (i.e., the operating hour), even if a non-firm transmission rights owner schedules in the day-ahead, the transmission provider can "bump" the non-firm rights holder if the firm rights holder submits their schedule prior to the operating hour or if needed to serve their native load. Although there may be a reasonable degree of probability that a resource with non-firm service can support resource adequacy imports in many instances, the CAISO anticipates these may not materialize when system conditions are strained and external entities are competing for the same transmission. These deficiencies with non-firm rights are the type of "recallable" rights the CAISO agrees would be not suffice to support resource adequacy imports. However, these concerns are not present with firm transmission rights.

Some parties have expressed concern that imposing firm transmission requirements for RA imports resources might create competitive advantages for holders of firm transmission service on major paths. Although the CAISO understands the concern, this issue should not be conflated with the quality of firm transmission service and its degree of dependability. The CAISO recognizes that it may be more difficult to obtain firm rights as the operating hour approaches, and any capacity "released" by firm rights owners is likely to be available on a non-firm basis. However, as discussed above, this has nothing to do with whether resource adequacy imports backed by firm transmission service have the same priority as native load.

At minimum, the CAISO believes that firm transmission must be demonstrated in the day-ahead timeframe. A day-ahead e-tagging requirement for suppliers to provide a day-ahead

[28] Pro Forma OATT at Section 13.2

transmission profile may be able to satisfy requirements for demonstration of firm transmission in the day ahead timeframe. A day-ahead transmission profile e-tagging requirement would allow verification that firm transmission has been secured by the supplier across all balancing authority areas along the delivery path.

The potential approach of requiring day-ahead e-tagging of firm transmission may also address concerns about the availability of firm transmission along the entire delivery path at the time of month ahead showings. This concept provides more flexibility while still attempting to ensure the delivery to be made via firm transmission. The CAISO notes that more flexible approaches that allow for securing firm transmission after the monthly showing timeframe may not guarantee that firm transmission can always be secured for delivery. The CAISO is also open to considering if penalties or other enforcement actions are necessary if delivery is not made over firm transmission.

The CAISO also notes that it is considering the need for day-ahead tagging requirements for all import transactions under the CAISO's Extended Day-Ahead Market (EDAM) Initiative. This aspect of import participation requirements is important to consider for all import transactions, not only RA imports.

4.2. Backstop Capacity Procurement Provisions

In this initiative the CAISO is: (1) proposing new authority to make CPM designations, (2) flagging potential changes to the RMR performance mechanism if changes to RAAIM are considered, and (3) proposing a new tool to encourage load to procure resources up to full UCAP requirements and discourage load serving entities from leaning on capacity procured by other entities.

The CAISO proposes new CPM authority to procure resources in the following three scenarios: (1) system UCAP deficiencies through the RA process; (2) inability to serve load in the portfolio deficiency test; and (3) an identified need to procure local RA after an area or sub-area fails to meet the energy sufficiency test. These three needs are proposed extensions of the existing CPM authority.

This proposal includes a new tool called the UCAP deficiency tool, which incentivizes entities to show at or above their UCAP requirements and will discourage leaning between entities during the RA showings. This tool will assess charges against entities that show UCAP below their requirements and allocate these payments to entities that show above their requirements.

4.2.1. Capacity Procurement Mechanism Modifications

The CAISO uses CPM to backstop the RA program. Specifically, when there is insufficient capacity shown in the RA process to reliably operate the grid, the CAISO may make CPM designations to procure resources that have not been shown in the RA process so that sufficient capacity is available to reliably operate the system. RA is shown on a year-ahead and a month-ahead basis, and CPM can be used to backstop in either timeframe or in a more granular timeframe. Resource owners with additional non-RA capacity can participate in the competitive solicitation process (CSP) for their bids to be considered if and when the CAISO makes a CPM

designation. Generally, in any timeframe the CAISO makes a designation, the CAISO considers all options for procurement and selects the least cost option that meets the reliability need is selected. Additionally, when the CAISO makes any CPM designation, it posts information about the designation and supporting documentation outlining why the CAISO needs the resource.

Authority to make CPM designations for capacity currently includes the following designation types:

1. System annual/monthly deficiency – Addresses insufficient system RA capacity in year-ahead or month-ahead RA showings
2. Local annual/monthly deficiency – Addresses insufficient local RA capacity in year-ahead or month-ahead RA showings for one specific entity making showings
3. Local collective deficiency – Addresses insufficient local RA capacity in year-ahead RA showings to meet the reliability needs for one specific local area
4. Cumulative flexible annual/monthly deficiency – Addresses insufficient flexible RA capacity in the year-ahead or month-ahead showings for system needs
5. A “Significant Event” occurs on the grid
6. CAISO “Exceptional Dispatches” non-RA capacity

The CAISO proposes modifying its existing CPM authority to procure additional capacity in the following scenarios: (1) system UCAP deficiencies through the RA process; (2) inability to serve load in the portfolio analysis test; and (3) an identified need to procure local RA after a local area or sub-area fails to meet the energy sufficiency test.

The CAISO will seek additional CPM authority to procure capacity based on system UCAP deficiencies. The CAISO will not make these designations merely because some LSEs are deficient, but instead will only make such designations when there are overall deficiencies based on all RA showings. To make these designations, the CAISO will compare all UCAP reflected in RA showings to the total requirements for UCAP, and may make additional designations based on that difference. This authority will be similar to the CAISO’s existing authority to procure for system deficiencies, which are based on total shown NQC values. This new authority will be based on shown UCAP and will apply in the year-ahead and month-ahead timeframes. Similar to existing authority, CAISO will alert entities with shortfalls and provide those entities with a chance to cure any shortfall. CAISO backstop procurement will only occur after this cure period closes and deficiencies remain.

The CAISO is not seeking authority to procure additional backstop capacity merely because an individual entity shows less capacity than its requirement. CAISO procurement based on individual LSE shortfalls could result in the CAISO procuring more capacity than is necessary if other LSEs happen to show more capacity than they are required. By procuring only for system UCAP shortfalls, the CAISO will ensure it receives enough UCAP to reliably operate the grid. This approach is consistent with other categories of CPM procurement authority, where the CAISO only procures if there is a cumulative deficiency. However, procurement in this manner

could result in entities "leaning" on other entities that show capacity in excess of their individual UCAP requirement. Because of these incentives, the CAISO also proposes to implement a UCAP incentive mechanism, discussed further below.

Section 4.1.1, above, provides details about the portfolio analysis the CAISO will conduct to determine if the resources procured through the RA process will be sufficient to meet the energy and peak capacity needs over the entire month. If the CAISO determines it is unable to meet these needs through this analysis, it can designate additional capacity using the CPM tool to pass the analysis. The CAISO will use this procurement authority at the same time it undertakes month-ahead designations for other CPM backstop designations. If the CAISO identifies a reliability concern through the portfolio analysis, it will continue to allow entities to first cure the identified deficiency before the CAISO makes any backstop designations.

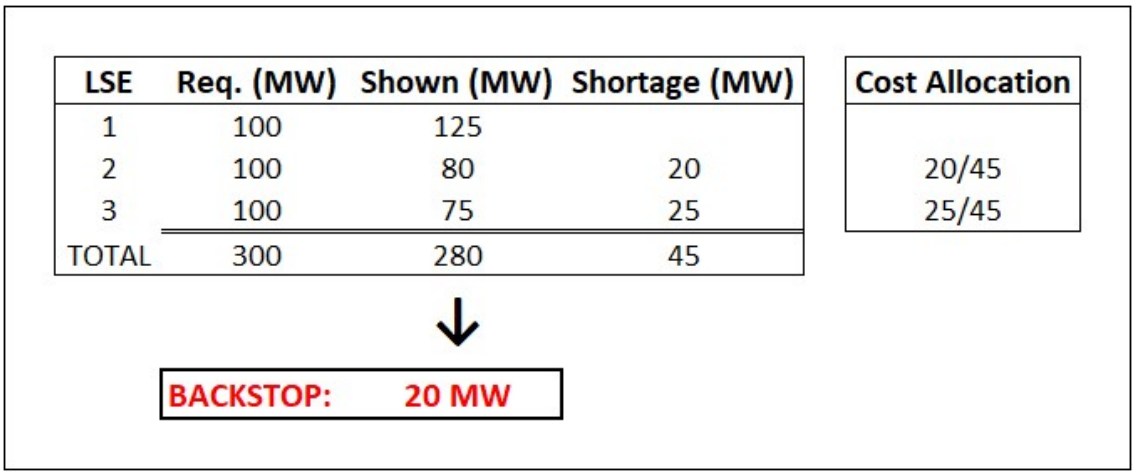
Finally, the CAISO proposes additional backstop authority to ensure that procured local resources can meet energy needs in each local area and sub-area during the upcoming year. If CAISO identifies any capacity and/or energy shortfall, it will provide a cure period for entities to clear any deficiencies before exercising its backstop procurement authority.

Example: UCAP Deficiency

The CAISO provides the following brief example to explain a scenario where it could make a potential CPM designation for deficient UCAP procured in the RA process, after the cure period.

Assume in this example that there are three load serving entities, each with a requirement to show 100 MW of UCAP. The first entity shows 125 MW, or 25 MW above the requirement, while the second and third entities show 80 MW and 75 MW respectively, or 20 MW and 25 MW below requirements, respectively. In aggregate, at the system level the RA process procures 280 MW and does not meet the 300 MW requirement for UCAP. This indicates a 20 MW shortfall at the system level, for which CAISO could undertake backstop procurement. If CAISO procures backstop capacity, it will allocate costs for that backstop to the entities that were deficient, in this case entities 2 and 3, per the LSE's share of the overall deficiency. In this case, entity 2 will be assigned 44% (20/45) of the costs and entity 3 will be assigned 56% (25/45) of the costs to procure the additional capacity for this designation. The CAISO provides additional discussion, below, about how LSE 1's showing can result in incentive payments for its 25 MW of excess capacity.

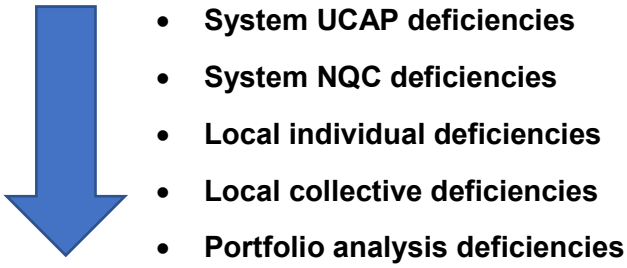
Figure 5: UCAP Deficiency CPM Backstop



CPM Designation Order

Today, if the CAISO makes multiple CPM designations for any single planning horizon, it first allocates costs and credits to individual entities that are deficient in their RA showings, then to all applicable LSEs for the residual collective deficiency. The CAISO will maintain the similar paradigm with the new authority. Going forward, the CAISO will first allocate the costs to system UCAP deficiencies, then to NQC system deficiencies, then to local individual deficiencies, then to local collective deficiencies, and finally to portfolio deficiencies. This order is illustrated in Figure 6 below. As with current practice, if the CAISO considered multiple designations in one timeframe, it would make designations that meet all of the necessary reliability needs at the least cost. This figure may be used to determine cost and credit allocation, if the CAISO makes multiple CPM designations using different CPM authority.

Figure 6: CPM Designation Order



4.2.2. Making UCAP Designations

Today, the CAISO uses net qualifying capacity as the basis for determining all designations for all CPM procurements. These quantities are used to determine the total capacity cost for the designations (Quantity x CSP price) and the total amount of credit that is allocated to load serving entities who incur these costs. With the proposed additions to the CPM authority discussion in the section above, the CAISO may procure for a specific MW quantity of UCAP, rather than NQC. The CAISO is not planning to change pricing rules, the soft offer cap or bidding rules under the existing CPM tool.

Each resource will have a UCAP and NQC value that is stored in CAISO databases used for resource adequacy calculations. These values can be used to inform a ratio, or conversion factor, between UCAP and NQC. With this ratio, a specific price can be determined for any quantity of UCAP designation, similar to any NQC designation. This may imply that a designation for UCAP may be awarded to a resource with a higher bid price, but better conversion factor.

An example of the UCAP counting is outlined in Table 4. This table shows two hypothetical resources, resource 1 and resource 2. In this example resource 1 has an NQC value of 200 MW with an accompanying UCAP value of 100 MW, and resource 2 has an NQC value of 150 MW and a UCAP value of 125 MW. Resource 1, bids into the competitive solicitation process for CPM at $5/MW, while resource 2 bids at $6/MW. If the CAISO makes a designation for NQC needs for a local deficiency it will first select capacity from resource 1 because the bid prices are less expensive for resource 2. However, if the CAISO is making a designation for UCAP, capacity from resource 2 will be selected first, as the effective bid prices for resource 2 are less expensive. In this example, the effective price for UCAP capacity for the resource 1 is $10/MW, while the price is $7.20/MW for resource 2.

Table 4: UCAP CPM price example

	NQC	UCAP	UCAP:NQC	Bid ($/MW NQC)	Effective UCAP Bid ($/MW UCAP)
Resource 1	200	100	0.5	$5	$10
Resource 2	150	125	0.8	$6	$7.20

4.2.3. Reliability Must-Run Modifications

This proposal includes removing the RAAIM tool from CAISO processes and tariff provisions. RAAIM incentivizes those RA resources that bid shown RA capacity into the market during the availability assessment hours, and charges those RA resources that do not. The CAISO believes the RMR provisions already provide sufficient incentive for RMR resources to be available and perform. The CAISO is also proposing a new penalty structure for RMR resources, which would assess performance penalties if the resource was not available above some pre-determined threshold.

An appropriate penalty structure for RMR resources may be one similar to the existing RAAIM tool. The RAAIM penalty has predetermined thresholds for performance, with performance below 94.5% penalized and performance above 98.5% incentivized during any specific month. Through this initiative, the ISO is considering 1) if incentive payments are appropriate for RMR resources, 2) changing the penalty parameter and availability thresholds that RMR resources are subject to, and 3) how incentive penalties should be distributed.

It may not be appropriate for RMR resources to receive a performance incentive payment similar to resources that are exposed to the RAAIM. RMR resources are individually contracted and include specific terms of service. It may not be appropriate for the agreement to include payments for higher performance, as the performance and needs of the system should already

be internalized and expected in the contract. There is also a question about how additional incentive payments would be funded and if they would come from the same group of load serving entities that are already paying for the RMR designation, or from a different pool.

An appropriate performance threshold might not be 94.5% for RMR resources as it is for RAAIM. Since each RMR contract is tailored to the specific resource, it may make sense that performance targets are customized based on the past performance of the particular RMR resource. For example, a RMR resource may have a recent historic availability of 98% while another's is 85%. It seems appropriate to apply a higher performance threshold to the former resource than the latter.

Further, targets could be designed to vary with different seasons. This may be appropriate where critical need for a resource is during a particular time of year. Similar to the RAAIM penalty, the CAISO could calculate the availability on a monthly basis and assess penalties on those amounts. Unlike RAAIM, this tool might not be self-funding given the limited number of RMR units, and any collected penalties could be returned to the parties assessed costs for the RMR designation.

The CAISO may continue to use the CPM soft offer cap as the penalty price for poor performance for the RMR incentive tool, but may also elect to use a penalty price set at the RMR price. Using the CPM soft offer cap would be consistent with historic penalty rates assessed for resources, and using a rate equal to the rate of the specific RMR contract might set a price more appropriate for the specific resource receiving the RMR designation. The CAISO continues to seek stakeholder feedback on an appropriate availability incentive design to apply to RMR resources after the removal of the RAAIM tool.

4.2.4. UCAP Deficiency Tool

As noted above, the CAISO is not proposing new CPM authority to make a designation when a specific entity shows less UCAP than individual requirements as long as the system as a whole is adequate. However, the CAISO is proposing a new tool, called the UCAP deficiency tool, which will impose deficiency charges on entities with deficient UCAP showings. This tool is designed to prevent leaning and to incentivize entities to show above their individual UCAP requirements. Further, the CAISO notes that deficiency charges are not a novel idea. Other ISOs and RTOs impose similar deficiency charges on LSEs that fail to procure sufficient resource adequacy capacity.

The concept of the UCAP deficiency tool is to apply a charge to resources that show less than their UCAP requirement, and distribute those collected charges to resources showing above their requirements. Without this tool, one or more entities could choose to not procure their full UCAP requirement because they suspect that showings at the system level system will be sufficient to meet aggregate requirements or that the ISO will not make a backstop designation and no additional costs will be allocated. This constitutes leaning.

Ideally, the rules for a UCAP deficiency tool would result in a streamlined and straightforward mechanism where any entity that shows less than their requirements would be charged for the amount of capacity the entity is short. This proposal includes specifications that the deficiency

price will be set at the CPM competitive solicitation soft offer cap, which is currently $6.31/kW-month. All revenue collected will be distributed to entities that show above their UCAP, in proportion to the total amount shown above requirements for all entities.

Several stakeholders objected to the UCAP deficiency tool. Some stakeholders argued that the UCAP deficiency tool could be duplicative of other penalties and charges. The issue presented is a cost causation problem and should be addressed with a uniform approach for all capacity shown across all local regulatory authorities. Under the current construct showing less capacity than required, or leaning, increases the risk of a potentially costly CPM designation. When CAISO makes CPM designations they are done strictly for reliability and may not be preferred resources for load serving entities, and they may not consider other resources that were not shown to the CAISO. This proposed tool should help reduce CPM by applying an incentive structure for all load serving entities to show capacity up to their requirements.

Some stakeholders argue that the charges related to the proposed UCAP deficiency tool would be duplicative of the charges that could come from CPM designations. The deficiency tool is designed specifically to avoid that outcome. If an individual load serving entity is charged for capacity procured through the CPM tool that capacity is credited to the entity and will not be used for charges applied through the UCAP deficiency tool. In other words, the CAISO will not procure CPM and impose a UCAP deficiency charge for the same MW of deficiency. This is illustrated further in the examples below.

Stakeholders further commented that the UCAP deficiency tool may compel resources to withhold capacity. This seems unlikely. If load serving entities are struggling to contract for capacity, it is likely that they would be willing to pay a price close to the soft offer cap to procure that capacity. Load serving entities that have excess capacity would likely desire to sell that excess capacity, for revenue certainty, rather than wait for a chance to split an unknown quantity of penalty payments. These UCAP incentive payments are distributed to any entity that is showing surplus supply. If there are multiple entities showing additional capacity, then each of those entities will only get a fraction of the incentive payment for the capacity that is short. This is also illustrated in the examples below. In the examples below, there is are financial trades between load serving entities that could take place such that the deficient load serving entity would pay less than the penalty and the LSE with surplus would be able to make more from the trade than it would from the incentive payment from the UCAP deficiency tool. This implies that the tool could be effective at incentivizing trades between load serving entities for capacity and getting those trades shown to meet resource adequacy requirements to ensure reliable grid operation.

The examples below include several scenarios that step through the details for how the UCAP deficiency tool could work in practice.

Example: UCAP Deficiency Tool, with no CAISO backstop

This set of examples presents three scenarios where CAISO would use the UCAP deficiency tool, but not make any CPM designation. The first scenario shows procurement above the UCAP requirements and therefore no CPM designation.

- In this example LSEs 1 and 2 show 10 MW and 15 MW above their 100 MW month-ahead requirements, respectively, and entity 3 shows 10 MW below its 100 MW requirement.
- Because there is no system shortfall for capacity, the CAISO will not make a CPM designation, but because the showing from LSE 3 is below the requirement, the UCAP deficiency will trigger, and LSE 3 is assessed a charge for 10 MW * $6.31/kW-month, or $63,100.
- This charge is then allocated to LSE 1 and LSE 2, where entity 1 receives 10/25 = 40% or $25,240 and entity 2 receives 15/25 = 60% or $37,860.

Figure 7: UCAP Deficiency Tool, no Backstop

LSE	Req. (MW)	Shown (MW)	Shortage (MW)	Penalty	Payment
1	100	110			$25,240
2	100	115			$37,860
3	100	90	10	$63,100	
TOTAL	300	315	10	$63,100	$63,100

The second scenario shows a system shortfall, but CAISO does not issue a CPM designation.

- In this example LSE 1 and LSE 2 show UCAP below their 100 MW requirements, at 10 MW and 15 MW respectively, and LSE 3 shows five MW above its 100 MW requirement.
- In this scenario, the CAISO could potentially procure backstop capacity to cure the 20 MW system UCAP deficiency, but chooses note to make such a designation.
- In this case, the two LSEs that are short are assessed a charge for the capacity matching the UCAP deficiency. However, the charge is limited because a maximum payment of $6.31/kW-month is reached for the payment recipient.
- Because LSE 1 is 10 MW of the 25 MW of total shortage it is assessed a charged of $6.31/kW * 5 MW * (10 MW / 25 MW) = $12,620 and LSE 2 is assessed a charge of $6.31/kW * 5 MW * (15 MW / 25 MW) = $18,930.
- Because LSE 3 is the only entity showing above the requirements, all of the collected charges are allocated back to that LSE, in this case the total amount allocated is $31,550 or $6.31/kW * 5 MW.
- Note that there is a mutually beneficial solution where LSE 3 could have paid LSE 1 less than the $63,100 it was charged and that LSE 1 would have made more than the $25,210 it received from the deficiency payment. This shows there is unlikely to be an incentive to withhold capacity under this mechanism.

Figure 8: UCAP Deficiency Tool, with Aggregate Shortfall

LSE	Req. (MW)	Shown (MW)	Shortage (MW)	Penalty	Payment
1	100	90	10	$12,620	
2	100	85	15	$18,930	
3	100	105			$31,550
TOTAL	300	280	25	$31,550	$31,550

In the third example LSE 2 and LSE 3 both show below their 100 MW month-ahead requirements and LSE 1 shows exactly at its 100 MW requirement.

- In this scenario, the aggregate amount of UCAP shown is below the aggregate amount of UCAP required for the UCAP requirements.
- In this case, CAISO could potentially procure backstop capacity to cure the system UCAP deficiency.
- Irrespective of any CPM designation, CAISO will not charge any market participants for the shortfall, as there is no entity to allocate those charges.

Figure 9: UCAP Deficiency Tool, no Award Recipients

LSE	Req. (MW)	Shown (MW)	Shortage (MW)	Penalty	Payment
1	100	100			
2	100	80	20		
3	100	95	5		
TOTAL	300	275	25	$0	$0

Example: UCAP Deficiency Tool with CAISO backstop

In this example LSE 1 and LSE 2 both show below their 100 MW month-ahead requirements and LSE 3 shows above the 100 MW requirement.

- In this scenario, LSE 1 is again short 10 MW and LSE 2 is short 15 MW. Additionally, because LSE 3 only procures five MW above its requirement, there is a shortage between the aggregate amount of UCAP shown and the aggregate requirement.
- This shortfall triggers a CAISO CPM designation, for the 20 MW deficiency.
- CAISO then allocates eight MW of the CPM procurement to LSE 1 and 12 MW to LSE 2.
- The shortfall persists even with the adjustment for the CPM allocation, and the shortfall equals five MW or exactly the capacity that that LSE 1 showed above its requirement.
- Therefore, the remaining shortfall, inclusive of the CPM allocation, is two MW for LSEs 1 and three MW for LSE 2, which is then subject to the UCAP deficiency tool penalty.

- Penalties assessed are for $12,620 for LSE 1 and $18,930 for LSE 2.
- The $31,550 of the collected revenues are then credited to LSE 3.

Figure 10: UCAP Deficiency Tool, with Backstop

LSE	Req. (MW)	Shown (MW)	Shortage (MW)	CPM Alloc (MW)	Adj Short (MW)	Penalty	Payment
1	100	90	10	8	2	$12,620	
2	100	85	15	12	3	$18,930	
3	100	105					$31,550
TOTAL	300	280	25	20	5	$31,550	$31,550

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BACKSTOP: 20 MW

5. Implementation Plan

The CAISO is planning a three-phased implementation. The first phase includes elements that can be implemented relatively quickly. The second phase includes elements that are needed to align with the day-ahead market enhancements and the extended day-ahead market. The third phase includes counting rules that must be coordinated with the CPUC and the portfolio analysis which would allow time for the analysis to be demonstrated prior to becoming part of the RA requirements.

Phase One: (2020 for RA year 2021)

- MIC Enhancements (New initiative)
- Portfolio analysis to ensure system sufficiency – Develop and test and production simulation platform for manual testing and analysis (no changes to tariff authority)
- Slow demand response

Phase Two: (2021 for RA year 2022)

- RA Import provisions
- Portfolio analysis, including CPM authority for portfolio deficiencies
- Planned outage process enhancements
- Local studies with availability limited resources CPM clarifications
- Must offer obligations and bid insertion rules
- Flexible resource adequacy

Phase Three: (2022 for RA year 2023)

- Capacity counting rules and forced outage assessments

CAISO seeks stakeholder feedback on the proposed phases, including the order these policies must roll out and the feasibility of the proposed implementation schedule.

6. EIM Governing Body Role

For this initiative, the CAISO plans to seek approval from the CAISO Board only. This initiative falls outside the scope of the EIM Governing Body's advisory role because the initiative does not propose changes to either real-time market rules or rules that govern all CAISO markets. This initiative is focused on the CAISO's RA planning, procurement, and performance obligations. This process applies only to LSEs serving load in CAISO's BAA and the resources procured to serve that load, and does not apply to LSEs outside CAISO's BAA. The CAISO did not receive any specific feedback from stakeholders regarding the initial proposed EIM classification for this initiative. The CAISO continues to seek stakeholder feedback on this proposed decisional classification for the initiative.

7. Next Steps

The CAISO will discuss this fourth revised straw proposal with stakeholders during a stakeholder call on March 24, 2020. Stakeholders are asked to submit written comments by April 7, 2020 to initiativecomments@caiso.com. A comment template will be posted on the CAISO's initiative webpage here: http://www.caiso.com/informed/Pages/StakeholderProcesses/ResourceAdequacyEnhancements.aspx

8. Appendix: Resource Adequacy Enhancements: Principles and Objectives

Principles

The resource adequacy framework must reflect the evolving needs of the grid

As the fleet transitions to a decarbonized system where fuel backed resources are replaced with clean, variable, and/or energy-limited resources, traditional measures of resource adequacy must be revisited to include more than simply having sufficient capacity to meet peak demand. The RA products procured and the means to assess resource adequacy must be re-examined and refreshed to remain relevant. Any proposed changes must assure that RA accounting methods effectively evaluate the RA fleet's ability to meet the CAISO's operational and reliability needs all hours of the year. The evolving fleet is altering the CAISO's operational needs. As more variable supply and demand interconnects to the system, the CAISO requires resources that are more flexible and can quickly and flexibly respond to greater levels of supply and demand uncertainty. RA requirements and assessments must reflect the evolving needs of the grid and the RA framework must properly evaluate and value resources that can meet these evolving needs.

RA counting rules should promote procurement of the most dependable, reliable, and effective resources

Both RA and non-RA resources should be recognized and rewarded for being dependable and effective at supporting system reliability. If a non-RA resource has a higher availability and is more effective at relieving local constraints relative to other similar RA resources, then such information should be publicly available to enable load-serving entities (LSEs) to compare and contrast the best, most effective resources to meet their procurement needs. Having this information publicly available to load-serving entities will improve opportunities for the most dependable and effective resources to sell their capacity. Thus, in principle, RA counting rules should incentivize and ensure procurement of the most dependable, reliable, and effective resources.

The RA program should incentivize showing all RA resources

Modifications to the existing RA structure should encourage showing as much contracted RA capacity as possible and not create disincentives or barriers to showing excess RA capacity. Although it may be appropriate to apply additional incentive mechanisms for availability, CAISO must balance the impact that such incentives may have on an LSE's willingness to show all of its contracted RA capacity.

LSE's RA resources must be capable of meeting its load requirements all hours of the year

RA targets should be clear, easily understood and based on reasonably stable criteria applied uniformly across all LSEs. For example, to date, the CAISO has relied on a planning reserve margin that is met through a simple summation of the shown RA resources' Net Qualifying

Capacity (NQC) values. Most Local Regulatory Authorities (LRAs) set a planning reserve margin at fifteen percent above forecasted monthly peak demand. However, some LRAs have set lower planning reserve margins. It is not possible to determine if those LSEs with lower planning reserve margins impair the CAISO system without comparing the attributes of the underlying resources in LSE's portfolios, relative to resources' attributes in other portfolios. In other words, the simple summation of NQC values in a LSE's portfolio does not does not guarantee there will be adequate resources and does not assure an LSE can satisfy its load requirements all hours of the year. As California Public Utilities Code section 380 states, "Each load-serving entity shall maintain physical generating capacity and electrical demand response adequate to meet its load requirements, including, but not limited to, peak demand and planning and operating reserves (emphasis added)."[29] In other words, resource adequacy also encompasses LSEs meeting their load requirements all hours of the year, not just meeting peak demand.

Objectives

In evaluating RA enhancements, CAISO is reviewing NQC rules, forced outage rules, adequacy assessments, and availability obligations and incentive provisions. These existing rules are inextricably linked and require a holistic review and discussion. This review includes considering assessing the reliability and dependability of resources based on forced outage rates. Incorporating forced outages into the CAISO's RA assessment will help inform which resources are most effective and reliable at helping California decarbonize its grid.

Based on the CAISO's review of best practices and the diverse stakeholder support for further exploration of these matters, CAISO is proposing a new resource adequacy framework to assess the forced outage rates for resources and conduct RA adequacy assessments based on both the unforced capacity of resources and the RA portfolio's ability to ensure CAISO can serve load and meet reliability standards.

The CAISO's proposal seeks to remain aligned with the CPUC process. However, CAISO notes that solely relying on an installed-capacity-based PRM as the basis for resource adequacy, as is the case today, is not sustainable into the future given the transforming grid and the new resource mix and its operational characteristics.

The CAISO must consider the express intent of the original legislated RA mandate: to ensure each load-serving entity maintains physical generating capacity and electrical demand response adequate to meet its load requirements. This is essential as California transitions to greater reliance on more variable, less predictable, and energy limited resources that may have sufficient capacity to meet a planning reserve margin, but may not have sufficient energy to meet reliability needs and load requirements all hours of the year. Given this growing concern, CAISO is proposing to develop a new resource adequacy test that will ensure there is sufficient

[29] California Public Utilities Code Section 380: http://leginfo.legislature.ca.gov/faces/codes_displayText.xhtml?lawCode=PUC&division=1.&title=&part=1.&chapter=2.3.&article=6.

capacity to not only meet peak load needs, but, just as importantly, to ensure sufficient energy is available within the RA fleet to meet load requirements all hours of the year.

As noted above, the current RA practices rely heavily on the existing NQC counting rules. CAISO believes that resources' NQC values will continue to be an important aspect of the RA program in the future. CAISO envisions Must Offer Obligations being tied to NQC values. However, CAISO is also considering how to incorporate resource forced outage rates into system, flexible, and local RA assessments. Similar to the current provisions of other ISOs, the CAISO proposes calculating and publishing both installed capacity (NQC) and unforced capacity (UCAP) values and utilizing both figures in the CAISO's RA processes.