California Independent System Operator Corporation

April 17, 2020

The Honorable Kimberly D. Bose
Secretary
Federal Energy Regulatory Commission
888 First Street, NE
Washington, DC 20426

Re: California Independent System Operator Corporation
Docket No. ER20-____-000

Tariff Amendment to Clarify Resource Adequacy Obligations from the Commitment Costs Enhancements Phase 3 Initiative and Other Related Matters

Dear Secretary Bose:

The California Independent System Operator Corporation (CAISO) proposes limited amendments and clarifications to tariff provisions covering several aspects of the resource adequacy (RA) program: (1) availability requirements and exemption status under the RA Availability Incentive Mechanism (RAAIM) for resources with operational limitations that are not eligible use limits; (2) exemption status under RAAIM for run-of-river hydroelectric generators; (3) exemption status under RAAIM for storage-backed hydroelectric generators; and (4) methodology and process for determining how much flexible RA capacity a resource is eligible to provide.[1]

The first category involves amendments necessary to align the tariff with the policy intent of the third phase of the commitment costs enhancements initiative (CCE3). The second category responds to issues raised by a prior Commission order regarding CCE3.[2] The third category, similar to the first, addresses issues regarding the limitations faced by some resources with operational limitations that are not eligible use limits. These first three elements of the filing are interdependent and address common issues about RAAIM and the RA program. The Commission should evaluate the justness and reasonableness of those three elements as a complete package. The fourth category is not related to CCE3 and instead clarifies and corrects inadvertent errors and inconsistencies in the filed tariff, and does not materially change established policies or the rights and obligations of the CAISO or its market participants. This

[1] The CAISO submits this filing pursuant to section 205 of the Federal Power Act, 16 U.S.C. § 824d, and Part 35 of the Commission's Regulations, 18 C.F.R. Part 35. Capitalized terms not otherwise defined herein have the meanings set forth in Appendix A to the CAISO tariff.
[2] *Cal. Indep. Sys. Operator Corp.*, 167 FERC ¶ 61,001 (2019) (April 1 CCE3 Order).

aspect of the filing is discrete and severable from the other three elements.

The CAISO respectfully requests that the Commission issue an order accepting the proposed revisions by June 26, 2020, with an effective date for the revisions of July 1, 2020.

I. Background

A. California's Resource Adequacy Program

California's RA program, which the CAISO administers jointly with the California Public Utilities Commission (CPUC) and other local regulatory authorities in the CAISO balancing authority area, seeks to secure sufficient capacity when and where needed to support the safe and reliable operation of the CAISO grid.

Through the RA program, load serving entities (LSEs) procure two main categories of RA capacity: generic capacity and flexible capacity. Resources providing *generic RA capacity* generally must submit either an economic bid or self-schedule 24 hours a day, seven days a week,[3] although some resource types have less than a 24x7 must-offer obligation.[4] Resources providing *flexible RA capacity* must submit economic bids and may not self-schedule for designated hours and days because flexible RA capacity meets the CAISO's need for the resources' flexibility, *i.e.*, to ramp up and down as needed and start up and shut down potentially multiple times per day. If the resource submits a self-schedule during the hours in which the CAISO anticipates it will need such flexibility, it would cancel the benefit the resource was procured to provide. The hours and days in which a resource providing flexible capacity must submit an economic bid depend on the category of flexible capacity the resource provides. The CAISO has three categories of flexible capacity – base ramping (category 1 flexible capacity); peak ramping (category 2 flexible capacity); and super-peak ramping (category 3 flexible capacity). Category 1 has the most stringent requirements and category 3 has the least stringent requirements, with category 2 falling in between.

The amount of generic capacity and flexible capacity a resource can provide is established by that resource's net qualifying capacity (NQC) and effective flexible capacity (EFC) value, respectively. The starting point of both calculations is the resource's qualifying capacity (QC) value. The CPUC and other local regulatory authorities set each resource's QC value. This value represents the maximum capacity a resource theoretically

[3] LSEs must procure certain amounts of their generic capacity from resources in defined local capacity areas (*i.e.*, local capacity). The balance of their capacity can be procured from resources anywhere on the CAISO system or from imports (*i.e.*, system capacity). For purposes of this filing, it is unnecessary to distinguish between the two types of generic capacity.
[4] *See* CAISO tariff, section 40.6.4.1.

can provide. For thermal resources, the QC value essentially is the unit's nameplate capacity. For other technology types, such as wind and solar, the QC value generally is based on statistical measures of the resource's performance over time. To derive NQC values, the CAISO performs a deliverability assessment to determine how much of a resource's QC is deliverable to the aggregate CAISO load. The NQC value is the QC value adjusted downward to reflect those deliverability limitations. For EFC values, the CAISO tariff provides a formula that incorporates a resource's start-up time, ramp rate, and NQC.[5] The tariff also provides technology-specific EFC methodologies for hydroelectric, proxy demand response, energy storage, multi-stage generator, and combined heat and power resources, respectively, that the CAISO must use instead of the general formula.

The CAISO has two main mechanisms to ensure that resources providing RA capacity meet their must-offer obligation. First, the CAISO submits cost-based bids on behalf of resources providing generic RA capacity that do not meet their RA must-offer obligation. The generated bid helps ensure the CAISO market has access to energy from an RA resource even when that RA resource fails to bid as required. Second, through RAAIM, the CAISO assesses non-availability charges and provides availability incentive payments to both generic and flexible RA resources based on whether their performance falls below or above, respectively, defined performance thresholds. The CAISO tariff exempts certain resource types from bid generation and RAAIM.[6] The exemptions from bid generation, RAAIM, and the 24x7 generic RA must-offer obligation are not necessarily paired; a resource type can be exempt from one but still face the other two.

B. Commitment Costs Enhancements, Use-Limited Resources, and Conditionally Available Resources

1. Historical Treatment of Use-Limited Resources

Use-limited resources historically have been exempt from certain generally applicable RA rules. Before the CAISO implemented CCE3 on April 1, 2019, the CAISO tariff defined a use-limited resource as "[a] resource that, due to design considerations, environmental restrictions on operations, cyclical requirements, such as the need to recharge or refill, or other non-economic reasons, is unable to operate continuously."[7] Resources had to apply to the CAISO to obtain such status, although the tariff automatically granted use-limited resource status to hydroelectric generating units, proxy demand resources, reliability demand response resources, and participating load, including pumping load.

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[5] *See* CAISO tariff, section 40.10.4.1.
[6] *Id.* at sections 40.6.8 (e) & 40.9.2.
[7] *Id.* at Appendix A (prior to April 1, 2019).

Before CCE3, use-limited resources did not have a 24x7 generic RA must-offer obligation. Instead, the CAISO tariff required most use-limited resources to bid when "physically capable of operating in accordance with their operating criteria, including environmental or other regulatory requirements,"[8] with "Hydroelectric Generating Units, Pumping Load, and Non-Dispatchable Use-Limited Resources" required to bid "for their expected available Energy . . . ."[9] Use-limited resources were also exempt from bid generation, but exposed to RAAIM non-availability charges and eligible for RAAIM availability incentive payments.

2. Redefining Use-Limited Resources in Phase Three of the Commitment Costs Enhancements Initiative

The CCE3 initiative was, in part, motivated by the CAISO's significant and growing dependence on use-limited resources to meet its capacity needs. The CAISO was concerned about meeting a significant proportion of its capacity requirements with resources that did not have a 24x7 RA must-offer obligation. To address this issue, CCE3 redefined a use-limited resource as a resource with at least one limit that meets three criteria: (1) the limit impacts the resource's number of starts, run-hours, or output; (2) the CAISO market process that dispatches the resource cannot recognize the limit; and (3) the limit requires the resource to ration its limited starts, run-hours, or output.[10] Resources meeting this new definition are eligible for an opportunity cost adder to their commitment costs and energy bid costs to recognize the opportunity cost of using a limited start or run-hour now instead of later. The CAISO market optimization accounts for that opportunity cost and more optimally uses that resource's limited availability. Allowing for a market-based solution marked an improvement for both the CAISO and resources compared to other approaches to managing these limitations, such as the resource submitting self-schedules or bidding at high energy prices to capture the opportunity costs. With the opportunity cost adder, use-limited resources can bid to the market 24x7 and no longer need a special must-offer obligation based on when they are "physically capable of operating" or their "expected available Energy," as contemplated under section 40.6.4. Resources meeting the revised definition of a use-limited resource now have the generally applicable RA must-offer obligation.

3. Conditionally Available Resource Status for Limitations not Amenable to an Opportunity Cost Adder

After the CAISO filed its CCE3 proposal, but before implementation, the CAISO identified a gap in its CCE3 policy. The initial filing did not specify the must-offer obligation for resources losing use-limited resource status but that still faced limitations preventing 24x7 availability that could not be rationed through an opportunity cost. The clearest example of such a resource is a gas resource with noise permit issues that prevent it from operating at night and early in the morning. There is no opportunity cost the market can

[8] CAISO tariff, section 40.6.4.3.1 (prior to April 1, 2019).
[9] *Id.* at section 40.6.4.3.2. (prior to April 1, 2019).
[10] *Id.* at section 30.4.1.1.6.1.1.

consider to optimize such a resource's limitations. The CAISO and its stakeholders had to consider whether such resources effectively became ineligible to provide RA capacity given their inability to meet the generally applicable RA obligations even though the CAISO did not intend to make these resources ineligible to provide RA capacity.

To clarify this conditional availability issue, on January 31, 2019, the CAISO made a supplemental tariff filing that: (1) amended CAISO tariff section 40.6.4; and (2) created a new term – conditionally available resource – defined as: "A resource that has one or more regulatory or operational limits that are not eligible Use Limits . . . and that faces frequent and recurring periods of unavailability because of those limitations."[11] Before that filing, tariff section 40.6.4 addressed the must-offer obligations for use-limited resources. Through the January 2019 filing, the CAISO repurposed section 40.6.4 to address the RA must-offer obligations for resources that lost use-limited resource status under CCE3. The CAISO changed the title of this section to "Availability Requirements for Resources with Operational Limitations that are not Qualified Use-Limits." The most significant change to this section was that conditionally available resources would become eligible for the "expected energy" must-offer obligation in section 40.6.4.1. A resource can be both a use-limited resource and a conditionally available resource if some of its limitations cannot be accounted for through the opportunity cost calculations applicable to use-limited resources. The CAISO currently has 32 resources, with a total capacity of 1,581 MW, registered as conditionally available resources. Of these 32 resources, 29 are hydroelectric resources and three are gas-fired resources.

4. Conditionally Available Resources and the Resource Adequacy Availability Incentive Mechanism

The CAISO did not intend for the January 31 filing to provide any unique RAAIM treatment or exemption for the resources covered by section 40.6.4.1. The intent was to assess RAAIM for such units based on their full RA capacity during availability assessment hours unless a RAAIM-exempt outage card applied. For example, a conditionally available resource shown for 100 MW of RA capacity may only be available for 20 MW at a particular time because of the regulatory limit it cited to qualify for conditionally available status. The intent was for RAAIM calculations to be based on the 100 MW of shown capacity, rather than the 20 MW of availability due to conditional limitations. This treatment reasonably recognizes that resources with conditional availability constraints should not be excluded from the RA program, but also recognizes that RAAIM should properly discount the capacity value of a resource with availability constraints over one without such constraints.

The CAISO's intent, unfortunately, was not clearly reflected in the tariff. Under tariff section 40.9.3.1(b), the CAISO calculates RAAIM by comparing: (1) the MW of capacity a RA resource offered into the day-ahead and real-time market; and (2) the MW of capacity for which a resource held "a performance obligation to submit Economic Bids or Self-Schedules in the CAISO Markets under the must-offer requirements applicable under

[11] The filing was made in FERC docket no. ER19-951.

Section 40.6 on a given day." Section 40.6.4 creates the "expected energy" must-offer obligation for conditionally available resources. At least one market participant argued that if a conditionally available resource offered its expected energy to the market, then it should face no RAAIM exposure because the resource met its must-offer obligation under section 40.6. This was not the intent of the January 31 filing. The purpose of the must-offer obligation is to ensure reliability in all hours of the day, which would not be achieved under the market participant's interpretation. Unfortunately, the CAISO had to concede that a plain reading of its tariff provisions supported the market participant's argument.

As an interim measure, pending further tariff amendments, which are presented here, the CAISO temporarily revised section 3.4 of its business practice manual for outage management to allow resources subject to the expected energy must-offer obligation in section 40.6.4 to use the RAAIM-exempt "Ambient Not Due to Temp" outage type "to notify the CAISO that the resource's expected available energy or expected as-available energy will be below the shown RA Capacity for the unit."[12]

C. Storage-Backed Hydroelectric Resources as Use-Limited Resources and Conditionally Available Resources

From inception of the use-limited resource concept, hydroelectric resources have been an exemplar of a use-limited resource. That is why, before CCE3, the CAISO tariff made hydroelectric resources use-limited by default. There was no need to require an application because the CAISO felt assured that every hydroelectric unit would meet the requirements. Although hydroelectric resources lost their default use-limited status from CCE3, the CAISO anticipated that storage-backed hydroelectric resources would be especially well-suited to avail themselves of the new opportunity cost methodology under CCE3—any hydroelectric resource without unlimited water faces an inherent tradeoff between generating electricity in the present and generating it in the future.

In developing the conditionally available resource concept, the CAISO came to understand that the opportunity cost methodology cannot capture all of the regulatory and operational limitations hydroelectric resources face. For example, environmental regulations can either obligate a given hydroelectric resource to release water or forbid it from releasing water, respectively, at different times, in order to protect flora and fauna downriver. Similarly, obligations for recreational use may require a resource to hold back water to maintain water levels for boating in the reservoir, or alternatively, to release water for rafting downriver. The opportunity cost model cannot account for these limitations because they do not relate to rationing and optimizing limited starts, run-hours, or output. The CAISO's understanding is that these issues have led many hydroelectric resources to seek status as both a use-limited resource and a conditionally available resource.

[12] These changes were made in Proposed Revisions Requests 1168, 1169, and 1170, as part of the CAISO's BPM change management process.

D. Status of Run-of-River Hydroelectric Resources as a Variable Energy Resource

The initial tariff language implementing RAAIM exempted "Variable Energy Resources" from RAAIM when providing generic capacity. To this point, and consistent with its tariff, the CAISO has only recognized wind and solar resources as meeting the definition of a variable energy resource. At least one scheduling coordinator representing run-of-river hydroelectric resources has argued that run-of-river qualifies as a variable energy resource and thus should be exempt from RAAIM. The CAISO's consistent response that has been that the existing tariff cannot be interpreted to give run-of-river that same exemption because, among other reasons, the CAISO market does not require a forecast for run-of-river resources as it does for wind and solar resources.

The CAISO proposed in the January 2019 filing to clarify that run-of-river resources were not variable energy resources and were subject to RAAIM. Based on statements from the CAISO's initial filing implementing RAAIM, the Commission rejected the CAISO's amendment but offered no guidance whether the CAISO's longstanding application of the tariff was problematic.

II. Proposed Tariff Revisions

A. Clarifying and Updating Availability Requirements for Resource Adequacy Resources with Limitations that do not Qualify for Opportunity Costs

The CAISO proposes to amend its tariff to clarify that RA resources subject to the expected energy must-offer obligation in section 40.6.4.1 will be subject to RAAIM for the RA capacity they show in the RA process as if they had the standard 24x7 RA must-offer obligation. This change is reflected in proposed amendments to section 40.9.3.1(b)(2), which state: "Conditionally Available Resources will have RAAIM assessed as if the resource's performance obligation were defined in Sections 40.6.1 and 40.6.2 and irrespective of their expected available Energy or their expected as-available Energy." This amendment memorializes the CAISO's original policy intent that conditionally available resources enjoy the expected energy must-offer obligation but not special RAAIM treatment.

Ensuring that conditionally available resources are subject to RAAIM serves the purposes for which RAAIM was created. RAAIM serves two purposes. First, it incentivizes resources providing RA capacity to participate in the market to the greatest degree possible. If an RA resource cannot meet a defined performance threshold, it faces non-availability charges. Second, exposure to RAAIM charges signals LSEs to consider a resource's performance and availability when making procurement decisions, which should foster procurement of better performing resources. If a resource expects it will face RAAIM charges, all else being equal, it would need to contract for a higher capacity payment from its LSE counterparty to account for the anticipated charges. This makes a lower-performing capacity resource relatively more expensive

than a comparable resource that need not factor in expected RAAIM charges in bilateral RA contract negotiations. Making such a resource more expensive in the RA process signals that the capacity is relatively less helpful towards meeting the CAISO's capacity and reliability needs. Exposing conditionally available resources to RAAIM promotes the second purpose of RAAIM, *i.e*., signaling the relative value of capacity and the preference for less constrained, higher availability resources.

Exposing conditionally available resources to RAAIM also follows the CAISO's need to grant only limited exemptions from RAAIM. In a 2019 Commission filing, the CAISO explained that:

> parsimony in granting RAAIM exemptions is critical to maintaining the integrity and usefulness of the resource adequacy program as a tool for providing grid reliability. When a resource is shown as providing a certain megawatt value of RA capacity through the RA showings process, the CAISO counts on that capacity actually being available to meet the CAISO's reliability needs. Each megawatt of RA capacity permitted to take an outage without RAAIM exposure and without having a substitution requirement increases the likelihood that the CAISO will face reliability concerns even if, from an RA accounting standpoint, the CAISO theoretically had sufficient RA capacity. Creating additional megawatts of RAAIM-exempt capacity also raises equity concerns as to the RA capacity that remains exposed to RAAIM non-availability charges. For these reasons, the CAISO must be judicious [in] extend[ing] RAAIM exemptions . . . .[13]

These considerations still apply. The CAISO generally must limit RAAIM exemptions so as not to undercut RAAIM's efficacy and ensure equity across the RA resource fleet.

Relatedly, the CAISO also proposes to limit the scope of resources subject to the expected energy must-offer obligation in section 40.6.4.1 and make several conforming changes to sections 40.6.4.2 and 40.6.4.3. Currently, hydroelectric units, pumping load, non-dispatchable resources, and conditionally available resources can receive this special treatment. The CAISO proposes to amend section 40.6.4.1 to restrict application of the expected energy must-offer obligation to conditionally available resources and resources that qualify for the new "run-of-river resource" category. Limiting the categories of resources that qualify for this treatment is not necessarily meant to limit the absolute number of resources that qualify for the expected energy must-offer obligation. The CAISO anticipates these resources could qualify as a conditionally available resource if they applied. By having them apply and having their must-offer obligation set by their registration, rather than their fuel type or inherent operating type, the CAISO will have a clearer picture of which resources operate under

[13] *Cal. Indep. Sys. Operator Corp.*, Answer to Comments, at 4, FERC docket no. ER19-1562 (May 17, 2019).

a special requirement. Having fewer exemption categories also makes the RA rules less complex, which benefits both the CAISO and its market participants.

Importantly, consistent with existing requirements, any resource that holds the expected energy must-offer obligation must report to the CAISO any outage or derate.[14] This generally applicable rule applies irrespective of RA status. Compliance with this outage reporting obligation will help ensure the CAISO knows when a resource subject to the expected energy must-offer obligation will not be capable of performing up to its RA value. Absent a reported outage, the CAISO will assume that the resource is available for its full RA capacity.

Section 40.6.4.2 establishes the bidding obligations into the residual unit commitment (RUC) process for resources that hold the expected energy must-offer obligations defined in section 40.6.4.1, and for several other resource types, such as reliability demand response resources, combined heat and power, and regulatory must-take generation. Consistent with the proposed changes in section 40.6.4.1, the CAISO proposes to remove references to hydroelectric generating units and non-dispatchable resources from this section and add a reference to run-of-river resources. The CAISO is not proposing to remove pumping load from section 40.6.4.2 because that resource type cannot participate in RUC.[15]

Section 40.6.4.3 addresses the RA obligations for participating load that is pumping load. Pumping load has a unique market participation model in which its participation as a generator is limited to bidding non-spin ancillary services in the day-ahead market and then submitting economic bids in the real-time market for any ancillary services awarded from the day-ahead market.[16] Because that is the extent of its market participation, its RA obligations are similarly limited to covering its RA capacity with day-ahead market bids for non-spin ancillary services and corresponding bids in the real-time market if awarded from the day-ahead market. Section 40.6.4.3 states that participating load that is pumping load must submit such ancillary services bids but it is not clear this is the only RA bidding obligation such resources hold. The CAISO proposes to clarify this point by amending section 40.6.4.3 to state: "The must-offer obligation for Participating Load that is Pumping Load is limited to submitting, for hours where underlying Load permits, Non-Spin Ancillary Services Bids and/or a Submission to Self-Provide Non-Spin Ancillary Services in the Day-Ahead Market . . . and Economic Bids for Energy in the Real-Time Market for its Non-Spinning Reserve Capacity that receives an Ancillary Service Award in the Day-Ahead Market."

B. RAAIM Status for Run-of-River Hydroelectric Resources

The Commission's order rejecting the CAISO's proposed clarifications on run-of-river resources' status as variable energy resources prompted the CAISO to reconsider

[14] CAISO Tariff, sections 9.3.2 and 9.3.10.3.
[15] Business Practice Manual for Market Operations, section 6.7.2.7, exhibit 6-6.
[16] *See id.* at section 2.1.6.

its position. The CAISO did not identify feasible methods of forecasting power production for run-of-river resources based on hydrological conditions in the same way the CAISO creates production forecasts for wind and solar resources based on meteorological data. For this reason, the CAISO confirmed its position that run-of-river resources cannot be treated as variable energy resources under the CAISO tariff. The CAISO has, however, determined that run-of-river resources are sufficiently similar to wind and solar in other relevant respects to merit a RAAIM exemption, notwithstanding the above-noted interest in limiting such exemptions. The CAISO thus proposes to define the term "Run-of-River Resource" in Appendix A of the CAISO tariff and amend section 40.9.2(b)(1) of the tariff to exempt such resources from RAAIM when providing local or system RA capacity.

1. Why Exempt Run-of-River Resources from RAAIM?

When the CAISO initially proposed RAAIM, it offered four reasons for exempting variable energy resources:

(1) They face inherent variability in their output because of their fuel source.
(2) They would always be eligible for RAAIM incentive payments regardless of their performance because they are dispatched to their forecast which means they will show as 100% available.
(3) Their QC is set based on prior performance so applying RAAIM would have created a potential double penalty for limited availability.
(4) Their power purchase agreements were assumed to have availability penalties so applying RAAIM might have created a contractual double penalty.[17]

The first and third factors apply to run-of-river hydro. Run-of-river hydro faces variability in its fuel source, and thus in its output, that is beyond its control. RAAIM does not necessarily create performance incentives for run-of-river hydro. As with wind and solar, the threat of having RAAIM charges does not influence run-of-river hydro resources' day-to-day participation in the market. For run-of-river, the QC value (which is the basis for the amount of RA capacity for which a unit may be shown) is based on three-year historical performance. Unlike thermal or storage-backed hydroelectric resources, the QC for run-of-river is not based on a nameplate value. This approach is more similar to the effective load carrying capability methodology used to establish the QC for wind and solar. As with wind and solar, a run-of-river resource's poor performance in the past will reduce its future QC value. This creates an incentive, independent of RAAIM, for a run-of-river resource to maximize its performance. This is the same incentive the CAISO uses as one rationale for exempting wind and solar from RAAIM. For these resources, RAAIM is also unnecessary to send signals regarding their relative value in meeting capacity needs because the QC is already set based on prior performance; that lowered QC already sends the appropriate signals. As with

[17] *Cal. Indep. Sys. Operator Corp.*, Transmittal Letter, at 75-76, FERC docket no. ER15-1825 (May 29, 2015).

variable energy resources, the CAISO only proposes that run-of-river resources be exempt from RAAIM when providing system or local capacity. They will still be subject to RAAIM if they qualify to provide flexible RA capacity. Because variable energy resources are not exempt when providing flexible RA capacity, the CAISO is not proposing to exempt run-of-river resources from RAAIM if they provide flexible RA capacity either.

2. Defining "Run-of-River Resource"

Exempting run-of-river resources from RAAIM requires the CAISO to define what differentiates run-of-river resources from other types of hydroelectric generators. The CAISO proposes the following definition: "A hydroelectric Generating Unit that has demonstrated to the CAISO's reasonable satisfaction that it has no physical ability to control or store its fuel source for generation beyond whatever pondage is necessary to maintain sufficient head pressure to operate the Generating Unit consistent with Good Utility Practice." The CAISO intends to base run-of-river resource registration on an attestation submitted by the resource's scheduling coordinator. The CAISO will defer the specific details of that process to the relevant business practice manual.

In defining run-of-river, the CAISO must address two issues: (1) how much pondage should disqualify a resource from being run-of-river; and (2) how should the CAISO account for cases where the operator of a run-of-river resource also controls releases from a reservoir directly upriver.

The distinguishing feature of run-of-river compared to other hydro resources is that hydrological conditions at one time do not influence the run-of-river resource's generation capability at a later point. If a reservoir-backed hydroelectric resource does not release water now to generate electricity, then it will have stored more water that it can use to generate electricity later. Run-of-river resources, however, have a "use it or lose it" fuel supply. In principle the distinction between these two classes of hydroelectric resource is clear. In practice, however, the distinction is not as simple as defining run-of-river as a hydroelectric resource with no storage capability. The CAISO understands that all resources commonly thought of as run-of-river have some minimal storage, which is generally an amount of pondage necessary to generate sufficient head pressure to operate the generating unit. In the CAISO's view, once that pondage is large enough to permit the resource to make a trade-off between generating now and generating later, then the element of inherent variability is lost and a broad RAAIM exemption is no longer appropriate.

A second issue the CAISO considered is that a single run-of-river resource frequently can be part of a linked system consisting of multiple reservoir-backed and run-of-river hydroelectric resources under the same operator's control. Where the operator of a run-of-river unit also controls water releases from a reservoir directly upriver, there is a question whether the run-of-river operator actually lacks control over the unit's output. The CAISO saw this as a legitimate concern but concluded that trying to address it either in defining a run-of-river resource or creating the RAAIM exemption raised too many

additional complications. For example, a resource's exemption status could change based on a change in ownership of a separate resource and that separate resource's unique operating characteristics. Another complication is that because of environmental or other regulatory requirements, the upriver storage-backed resource may not always have control over when it must release water from the reservoir. There, the operation of the putative run-of-river resource arguably would be out of the operator's control. The CAISO did not believe it reasonably could administer a RAAIM exemption that accounts for these varied and complex scenarios. For that reason, the CAISO will not seek to define a run-of-river resource referring to any factors beyond the specific resource's parameters.

Based on the information available to it, the CAISO anticipates that applying this definition will cover a relatively small proportion of the CAISO's RA capacity. Under existing practice, the CPUC applies the three-year historical performance QC methodology to hydroelectric resources that have the "Dispatchable" flag in the CAISO master file marked as "No." There are 121 such resources, with a total installed capacity of 1,078 MW. For 2020, the total monthly MW of NQC from these resources ranges from 153 MW in November to 420 MW in May. The full monthly results are in the chart below. For at least two reasons, these results are only an approximation of the resources covered by this proposed tariff amendment. First, some resources may have the dispatchable flag marked as no for reasons besides being run-of-river. Second, not all resources that meet this new definition will necessarily register with the CAISO as run-of-river, particularly if they do not provide RA capacity.

Sum of Monthly NQC MW from Non-Dispatchable Hydro in 2020

Jan.	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep	Oct	Nov	Dec
238.43	278.43	374.83	401.84	420.67	397.94	293.61	249.75	200.41	162.94	153.6	163.87

C. RAAIM Status for Storage-Backed Hydroelectric Resources

1. Relationship Between RAAIM Status for Conditionally Available Resources and Water Management Issues for Hydroelectric Resources with Storage

In the CAISO's stakeholder engagement with the RAAIM issues for conditionally available resources, some stakeholders expressed concern about potentially losing a RAAIM exemption for their resources. These concerns were particularly expressed by CPUC-jurisdictional load serving entities that own or control storage-backed hydroelectric resources registered as (or capable of being registered as) conditionally available resources. These stakeholders explained that from their perspective, the limitations that qualify them for conditionally available resource status, as compared to the limitations that qualify them for use-limited resource status, are exogenous fuel limitations that cannot be controlled, and thus, RAAIM is inappropriate because it does not establish performance incentives. For example, the opportunity cost model can optimize the limited run hours a given hydroelectric resource may have given its current amount of water storage. But the

CAISO cannot calculate an opportunity cost where that same resource, for example, is prevented from releasing water because it would interfere with seasonal wildlife migration.

The CAISO explained its position, noted above, that RAAIM serves two purposes – setting performance incentives and signaling relative value of capacity. RAAIM exposure for hydroelectric resources with difficult-to-manage water restrictions serves the latter purpose. That these resources were at risk of RAAIM charges signaled that they were not meeting the capacity needs their RA values suggested they could provide. In such a case, an appropriate way to manage this RAAIM exposure would be to claim less capacity from these resources during the monthly and annual RA showings process. Doing so not only would mitigate RAAIM risk, but it would also provide the CAISO a more realistic picture of how capable RA capacity will be of meeting reliability needs.

The affected stakeholders responded that, in their view, managing the issue by claiming less of the capacity in the RA showings process was not practical. Among other reasons, these stakeholders explained that failing to use a hydroelectric resource up to its full NQC exposed parties to regulatory scrutiny from the CPUC over whether an entity: (a) was withholding scarce RA capacity from the bilateral RA market to the detriment of other load serving entities; or (b) should face cost disapprovals for failing to use capacity in the RA showings process that it had already procured.

2. Revising the Qualifying Capacity Methodology for Storage-Backed Hydroelectric Resources

The CAISO's discussions with stakeholders on RAAIM issues for hydroelectric resources prompted all sides to consider whether revisions to the existing QC methodology for storage-backed hydroelectric resources were appropriate. Under the CPUC's rules, these resources' QC values are set based on nameplate capacity. The CAISO and the affected stakeholders generally agreed this methodology can overstate the true contributions such resources make towards meeting the CAISO's capacity needs.

To address this concern, the CAISO agreed to work with the utilities in the CPUC's RA track 2 process to develop an alternate QC counting rule that would discount the RA capacity attributed to a hydroelectric resource based on the resource's expected production in years with limited precipitation.[18] Resources would also have the opportunity to keep their QC value under the existing methodology. This topic has been considered actively in the CPUC's ongoing proceeding and the parties have consensus on the appropriate next steps.

The CAISO expects that the CPUC will issue its order for this part of the RA proceeding in June, effective starting for the 2021 RA year. Given the consensus on this topic, the CAISO is hopeful the CPUC will adopt changes to the QC methodology for these resources.

[18] *See* CPUC docket no. R.19-11-009.

3. Revisions to the Qualifying Capacity Methodology Justify Changes in RAAIM Exposure

Assuming the CPUC changes the methodology to account for historical hydrological conditions, the CAISO proposes to grant a limited RAAIM exemption for all hydroelectric resources whose QC is set under this new methodology.[19] This change is reflected in the proposed amendments to section 40.9.3.4(d). Specifically, the CAISO proposes that "a hydroelectric Generating Unit whose Qualifying Capacity was established pursuant to a CPUC or Local Regulatory Authority methodology under which the Qualifying Capacity is calculated to reflect historical hydrological conditions" could take a RAAIM-exempt outage where necessary for "management of water-related operational or regulatory limitations."

Similar to the rationale for exempting run-of-river resources, the basis of this exemption is that where future QC values are affected by current performance, the resource has an incentive, independent of RAAIM, to perform as well as possible. This approach is just and reasonable and benefits both the CAISO and the affected generators. An enhanced counting methodology would provide the CAISO a more realistic view of its capacity, and the market participants would have greater certainty about their RAAIM exposure.

The nature of this exemption differs from that proposed for run-of-river. For storage-backed hydroelectric resources, the RAAIM exemption would be limited to cases where the resource could not perform due to hydrological conditions or restrictions. They would still be subject to RAAIM for outages driven by other issues, such as mechanical failures or plant maintenance. For example, assume a fully deliverable hydroelectric unit (*i.e.*, QC equals NQC) with a "nameplate" QC of 150 MW and a "historically-based" QC of 100 MW. If that resource is shown in the RA process for 100 MW of RA capacity but actual water conditions limit it to 90 MW, then that 10 MW of undelivered capacity will be exempt from RAAIM provided the resource reports the outage using the allowable RAAIM-exempt outage type. However, if that same resource were only available for 90 MW because of a mechanical issue, then those 10 MW of undelivered capacity are subject to RAAIM. This contrasts with the proposed treatment of run-of river resources, which would be fully exempt from RAAIM for generic capacity regardless of the outage category. The rationale for this slightly differing treatment is that run-of-river has its QC value set purely on historical performance without regard to whether that performance was driven by mechanical issues as opposed to hydrological conditions.[20] Other hydroelectric resources,

[19] Under the proposed tariff provisions, the CAISO would extend similar treatment if other local regulatory authorities make similar changes in their QC methodology. If no LRA adopts QC methodologies for storage-backed hydroelectric resources that account for historic hydrological conditions, then the new tariff provisions would be in effect but would not be triggered and the status quo would remain for storage-backed hydroelectric resources providing RA capacity.

[20] Also relevant is that the run-of-river exemption is meant to parallel the variable energy resource

however, would have QC values set based on expected hydrological conditions. Expected water limitations would be "baked in" under the new methodology but other reasons for performance below nameplate capacity would not be factored into the new QC value.

As noted above, nearly all of the resources currently registered as conditionally available are hydroelectric units. For this reason, the net impact of taking away RAAIM-exempt outages for conditionally available resources, while simultaneously granting RAAIM-exempt outages to hydroelectric resources facing water limitations, should be limited, at least in terms of impacted RA resources.[21]

As also noted above, the CPUC order is expected in June 2020, but it would not be effective until the 2021 RA year. Thus, the lower QC values would not be in effect until January 1, 2021. To cover the gap period from July 1, 2020, through December 31, 2020, the CAISO proposes to grant this RAAIM exemption for water management issues to any storage-backed hydroelectric resource that can demonstrate to the CAISO's reasonable satisfaction that it is only showing the resource for the capacity value either that it would hold under the new methodology or that is supported by actual hydrological conditions.

Under the proposed amendments to section 40.9.3.4(d), for the balance of 2020 "a hydroelectric Generating Unit that has limited the capacity it has shown on the monthly Supply Plan corresponding to the day of the Outage to reflect historical hydrological conditions or actual hydrological conditions in 2020" could take a RAAIM-exempt outage for water management issues, provided that "[t]he limitations based on hydrological conditions [are] mutually agreed upon with the unit's Scheduling Coordinator and the CAISO." Those tariff provisions would sunset as of January 1, 2021, at which point the exemption would apply based on the CPUC-established QC values. To provide further time for the CPUC to finalize its new rules, the provisions that would be in effect for the second half of 2020 are not dependent on the CPUC having issued a final ruling. They would be in effect for the balance of 2020 regardless.

D. Clarifying and Correcting Errors in the Rules Governing how Resources can Provide Flexible RA Capacity

Section 40.10.4.1 of the CAISO tariff establishes how the CAISO calculates resources' EFC values. The CAISO proposes four non-substantive amendments to this tariff section to clarify the overall process.

The first amendment is to section 40.10.4.1(a)(2), which describes how the CAISO calculates the EFC of a resource with a start-up time at or below 90 minutes. The tariff currently states that the EFC is the "weighted average ramp rate of the resource calculated from zero to Net Qualifying Capacity multiplied by 180 minutes."

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exemption, which applies for generic RA capacity regardless of the outage type.

[21] Because of the change in QC rules, the net impact in terms of MW may even show that the total exempt MW is reduced.

The CAISO proposes to clarify this statement so that the value will be "the resource's PMin plus the weighted average ramp rate of the resource calculated from PMin to Net Qualifying Capacity multiplied by the difference between 180 minutes and the resource's Start-Up Time." This reflects the approach the CAISO has implemented in its calculations, so a resource that can start in 90 minutes or less has its pmin as flexible capacity automatically and then has additional capacity granted for whatever ramping it can accomplish in however many of the 180 minutes remain.

The second amendment is to section 40.10.4.1(b). This section addresses how the CAISO calculates EFC for hydroelectric resources. The current tariff defines the value in terms of "the amount of capacity from which the resource can produce Energy consistently for 6 hours based upon the resource's physical storage capacity . . . ." This provision is unclear about whether the reference to the storage capacity is to the reservoir's maximum theoretical capacity or its actual capacity at a point in time, such as when the annual EFC process is run. To clarify that this provision refers to the former option, the CAISO proposes to define the value as "the amount of capacity from which the resource can produce Energy consistently for 6 hours assuming that the resource's physical storage is at maximum capacity at the beginning of that six-hour period."

The third amendment is in section 40.10.4.1(f). This section addresses how the CAISO calculates EFC for combined heat and power resources. The existing provision defines the EFC as the difference between the maximum output and minimum operating level, capped at both the resource's NQC and what it can provide in a three-hour period. For some combined heat and power resources, the practical equivalent of the minimum operating level is captured by the existing tariff-defined term of "RMTMax." This is defined, in part, as "minimum operating level at which the Generating Unit can safely and reliably meet host requirements . . . ." This value can be different than the resource's physical minimum level and where a resource has such an RMTMax value established, that is the more relevant value in calculating EFC.

The fourth amendment is to section 40.10.4.2(a), which addresses the CAISO process for posting the draft list of EFC values. The CAISO does not have a tariff-mandated deadline for posting the draft list. Section 40.10.4.2(a) does, however, give scheduling coordinators a September 1 deadline to object to values on the draft list. Some stakeholders raised concerns that the CAISO does not always post the draft list sufficiently before September 1 to provide meaningful review. Rather than create a tariff-defined deadline for the CAISO to post the list, the CAISO believes a better approach for this implementation detail is to specify the specific deadlines in the relevant business practice manual. This approach also follows section 40.4.2, which sets the process for posting the NQC draft and final reports.

III. Stakeholder Engagement

The CAISO's stakeholder engagement leading to this filing largely occurred on two tracks: (a) EFC clarifications; and (b) all other topics.

A. Engagement on Effective Flexible Capacity

The CAISO presented the EFC issues to stakeholders, including draft tariff language, during a May 14, 2019, teleconference. Eight stakeholders submitted comments that covered eight distinct topics. Of those eight topics, four relate to the tariff changes proposed in this filing: (1) clarifying the general EFC formula; (2) setting EFC for hydroelectric resources; (3) setting EFC for combined heat and power resources; and (4) the timeline of the annual EFC process.

On the first issue of the general EFC formula, one stakeholder commented that adding the clarifications to the tariff was unnecessary, and that they could simply be reflected in a business practice manual. The details the CAISO proposes to add to the tariff clarify existing practice and the existing tariff language. The CAISO is including them in the tariff out of an abundance of caution.

On the second topic, the CAISO initially offered changes to the hydroelectric EFC tariff section so that the general EFC formula would apply to hydroelectric resources provided they have sufficient storage to produce for six continuous hours. The CAISO saw this as a way of reframing the existing tariff rule, which states that hydroelectric EFC "will be the amount of capacity from which the resource can produce Energy consistently for 6 hours based upon the resource's physical storage capacity, which shall not exceed its Net Qualifying Capacity." Stakeholders had two concerns. First, they were concerned that the CAISO's proposed language would make hydroelectric resources ineligible to provide flexible capacity if they did not have six hours of water in storage. Second, they were concerned that the proposed language was ambiguous about whether the six hours of storage referred to a specific point of time (*e.g.*, when the EFC value is set) or referred to the resource's capabilities assuming it had sufficient water in its storage. In response to these concerns, the CAISO revised its proposed language so it was clear the EFC would be set assuming a resource's storage were full.

The CAISO initially proposed no changes to the tariff provisions covering EFC for combined heat and power. One stakeholder commented that the existing tariff language does not account for the fact that some combined heat and power resources have an RMTMax value that establishes the resource's minimum operating level. The stakeholder requested the CAISO modify the tariff to acknowledge this reality. The CAISO agreed with this suggestion and it is included in this filing.

Finally, one stakeholder noted that the tariff requires the CAISO to post the final EFC list by September 1 of the year prior. This stakeholder suggested the deadline be moved to a business practice manual because in some years the CAISO cannot publish the draft list until close to September 1. The CAISO agreed this would allow for a better, more flexible process and ensure the CAISO and stakeholders have sufficient time to review the draft EFC values before they become final.

B. Engagement on Conditionally Available Resources, Run-of-River Resources, and Hydroelectric Qualifying Capacity

The CAISO first presented its proposed tariff amendments on conditionally available resources and run-of-river resources during an October 10, 2019, teleconference.[22] The CAISO intended to present these changes to stakeholders in a single teleconference covering both policy and tariff. Several stakeholders were concerned about considering these changes through abbreviated stakeholder engagement and requested that the CAISO consider these matters through a full stakeholder process.

In response to these concerns, the CAISO agreed to consider these changes through a full stakeholder process.[23] On December 6, 2019, the CAISO published a straw proposal and draft tariff language covering the same topics.[24] The CAISO simultaneously published a straw proposal from Southern California Edison Co. covering new QC counting methodologies for hydroelectric resources that would account for seasonality and uncertainty. This was followed by a stakeholder teleconference on December 10, 2019, and written comments. After reviewing comments, the CAISO published a draft final proposal on January 28, 2020, with a teleconference to discuss that document on February 4, 2020. The CAISO governing board approved these proposed changes and authorized the CAISO to move forward with this filing on March 25, 2020.

Two stakeholders opposed the CAISO's proposed tariff language regarding RAAIM treatment of conditionally available resources. One stakeholder argued that the CAISO should not expose conditionally available resources to RAAIM until the CPUC and other local regulatory authorities create improved QC counting approaches for hydroelectric resources. The CAISO disagrees with this comment because the RAAIM treatment for conditionally available resources and hydroelectric QC rules are not directly related, and not all conditionally available resources are hydroelectric resources. Some are gas-fired resources with hard regulatory limits, such as noise permits that prevent operation in certain hours, that are unaffected by changes to hydroelectric QC rules. Furthermore, allowing resources to show RA capacity that is knowingly unrealistic and over-stated is problematic and jeopardizes reliability.

The second stakeholder that opposed the conditionally available resource tariff changes questioned the CAISO's proposal because the CAISO already exempts other

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[22] Details of that stakeholder teleconference are available at: http://www.caiso.com/informed/Pages/MeetingsEvents/MiscellaneousStakeholderMeetings/Default.aspx.
[23] Details of the stakeholder initiative are available at: http://www.caiso.com/StakeholderProcesses/Commitment-cost-enhancements-tariff-clarifications.
[24] The CAISO initially presented stakeholders with several potential amendments to reconcile apparent inconsistencies between sections 40.9.3.6.4 and 40.9.3.6.5. Due to a technological glitch those inconsistencies appeared in the tariff posted on www.caiso.com but are not present in the CAISO's eTariff records. The CAISO has corrected the posting issue on its website but no tariff amendment filing is necessary to address those issues.

resource types, like wind and solar, based on their uncontrollable fuel-based unavailability. In this stakeholder's view, conditionally available resources face uncontrollable limitations on their availability and thus should be exempt from RAAIM. The CAISO disagrees with this argument because it provides an incomplete account of why wind and solar resources are exempt from RAAIM. As explained in the discussion about run-of-river resources, an uncontrollable fuel source is only one factor supporting a RAAIM exemption. Another important factor is that the resource's QC be set based on some measure of historical performance. This helps ensure that the QC value reflect the resource's actual contributions to meeting reliability needs. Also important is that each conditionally available resource has unique regulatory or operational limitations that are not equivalent to the exogenous fuel-related limitations that wind, solar, and run-of-river resources face.

During the stakeholder process, several stakeholders expressed support for the CAISO's proposed definition for run-of-river resources and its proposal to exempt such resources from RAAIM. One participant noted that the CAISO's proposed definition of run-of-river resources focused on upstream limitations but explained its view that some hydroelectric resources face downstream limitations on water flow that also limit electric generation. This stakeholder commented that the CAISO should extend the RAAIM exemption to these hydroelectric resources. The CAISO considered this feedback but does not think it is an appropriate change. Nearly every hydroelectric resource faces downstream limitation on releasing water. These limitations would qualify a resource for conditionally available resource status. But granting a broad RAAIM exemption solely on this basis would collapse the distinction between run-of-river resources and other hydroelectric resources and would undermine the CAISO's important policy goal of making conditionally available resources generally subject to RAAIM (absent qualifying for some other exemption). This could harm reliability and it sends the wrong signal by potentially disadvantaging less constrained and more dependable resources in the RA procurement process.

Finally, the proposed access to RAAIM-exempt outage types for storage-backed hydroelectric resources was a direct response to stakeholder concerns. This was not initially within the initiative's scope. In response to these concerns, the CAISO collaborated with several of the impacted stakeholders to jointly present hydroelectric QC methodology changes to the CPUC.

IV. Effective Date

The CAISO respectfully requests that the Commission issue an order accepting the proposed revisions by June 26, 2020, with an effective date for the revisions of July 1, 2020. A Commission order by that date will provide the CAISO and its market participants needed regulatory certainty before the planned implementation.

V. Communications

Under Rule 203(b)(3),[25] the CAISO respectfully requests that all correspondence and other communications about this filing be served upon:

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VI. Service

The CAISO has served copies of this filing on the California Public Utilities Commission, the California Energy Commission, and all parties with scheduling coordinator agreements under the CAISO tariff. In addition, the CAISO has posted a copy of the filing on the CAISO website.

VII. Contents of Filing

Besides this transmittal letter, this filing includes these attachments:

Attachment A	Clean CAISO tariff sheets incorporating this tariff amendment; and
Attachment B	Red-lined document showing the revisions in this tariff amendment.

[25] 18 C.F.R. § 385.203(b)(3).

VIII. Conclusion

For the reasons set forth in this filing, the CAISO respectfully requests that the Commission issue an order by June 26, 2020, accepting the tariff revisions in this filing effective July 1, 2020.

Respectfully submitted,

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40.6.4 Availability Requirements for Resources with Operational Limitations that are not Qualified Use-Limits

40.6.4.1 Must-Offer Obligation in DAM and RTM

Conditionally Available Resources (irrespective of Use-Limited Resource qualification) and Run-of-River Resources that provide Resource Adequacy Capacity and that are physically capable of operating must submit Self-Schedules or Bids in the Day-Ahead Market for their expected available Energy or their expected as-available Energy, as applicable, in the Day-Ahead Market and RTM up to the quantity of Resource Adequacy Capacity the resource is providing. Such resources shall also revise their Self-Schedules or submit additional Bids in RTM based on the most current information available regarding Expected Energy deliveries.

An Eligible Intermittent Resource providing Resource Adequacy Capacity may, but is not required to, submit Bids in the Day-Ahead Market.

40.6.4.2 RUC Availability Bids

The following resource types providing Resource Adequacy Capacity are not required to submit RUC Availability Bids for that capacity, but any such bids they do submit must be $0/MW RUC Availability Bids: Pumping Load, Reliability Demand Response Resources, Combined Heat and Power Resources, Regulatory Must-Take Generation, Non-Generator Resources using Regulation Energy Management, Conditionally Available Resources, Run-of-River Resources, and Eligible Intermittent Resources.

40.6.4.3 Ancillary Services Bids from Participating Loads that is Pumping Load

The must-offer obligation for Participating Load that is Pumping Load is limited to submitting, for hours where underlying Load permits, Non-Spin Ancillary Services Bids and/or a Submission to Self-Provide Non-Spin Ancillary Services in the Day-Ahead Market for its Resource Adequacy Capacity that is certified to provide Non-Spinning Reserve Ancillary Service, and Economic Bids for Energy in the Real-Time Market for its Non-Spinning Reserve Capacity that receives an Ancillary Service Award in the Day-Ahead Market.

40.6.4.4 Proxy Demand Resources

(a) Short Start and Medium Start Proxy Demand Resources that provide Resource Adequacy Capacity shall submit $0/MW RUC Availability Bids for all of their Resource

Adequacy Capacity for all hours of the month the resource is physically available; however, any RUC schedule for these resources will not be binding.

(b) Long Start Proxy Demand Resources are not required to submit Bids or Self Schedules in the RUC for their Resource Adequacy Capacity.

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40.6.8 Use of Generated Bids

(a) **Day-Ahead Market.** Prior to completion of the Day-Ahead Market, the CAISO will determine if Resource Adequacy Capacity subject to the requirements of Section 40.6.1 and for which the CAISO has not received notification of an Outage has not been reflected in a Bid and will insert a Generated Bid for such capacity into the CAISO Day-Ahead Market.

(b) **Real-Time Market.** Prior to running the Real-Time Market, the CAISO will determine if Resource Adequacy Capacity subject to the requirements of Section 40.6.2 and for which the CAISO has not received notification of an Outage has not been reflected in a Bid and will insert a Generated Bid for such capacity into the Real-Time Market.

(c) **Partial Bids for RA Capacity.** If a Scheduling Coordinator for an RA Resource submits a partial bid for the resource's RA Capacity, the CAISO will insert a Generated Bid only for the remaining RA Capacity. In addition, the CAISO will determine if all dispatchable Resource Adequacy Capacity from Short Start Units, not otherwise selected in the IFM or RUC, is reflected in a Bid into the Real-Time Market and will insert a Generated Bid for any remaining dispatchable Resource Adequacy Capacity for which the CAISO has not received notification of an Outage.

(d) **Calculation of Generated Bids.** A Generated Bid for Energy will be calculated pursuant to Sections 30.7.3.4 and 30.7.3.5. A Generated Bid for Ancillary Services will equal zero dollars ($0/MW-hour).

(e) **Exemptions.** Notwithstanding any of the provisions of Section 40.6.8, for the following resource types providing Resource Adequacy Capacity, the CAISO only inserts a Bid in the Day-Ahead Market or Real-Time Market where the generally applicable bidding rules

in Section 30 call for bid insertion: Use-Limited Resource, Non-Generator Resource, Variable Energy Resource, Hydroelectric Generating Unit (including Run-of-River resources), Proxy Demand Resource, Reliability Demand Response Resource, Participating Load, including Pumping Load, Combined Heat and Power Resource, Conditionally Available Resource, Non-Dispatchable Resource, and resources providing Regulatory Must-Take Generation.

(f) **NRS-RA Resources.** The CAISO will submit a Generated Bid in the Day-Ahead Market or Real-Time Market for a non-Resource Specific System Resource in each RAAIM assessment hour, to the extent that the resource provides Resource Adequacy Capacity subject to the requirements of Sections 40.6.1 or 40.6.2 and does not submit an outage request or Bid for the entire amount of that Resource Adequacy Capacity.

* * *

40.9.2 Exemptions

(a) **Capacity Exempt from RAAIM – All Provisions.** The entire capacity of a resource in any of the following categories is exempt from the RAAIM provisions in Section 40.9 –

(1) Resources with a PMax less than 1.0 MW;

(2) Non-specified resources that provide Resource Adequacy Capacity under contracts for Energy delivered within the CAISO Balancing Authority Area;

(3) Participating Load that is also Pumping Load; and

(4) RMR Units.

(b) **Capacity Exempt from RAAIM – Local/System**

(1) The entire capacity of a resource in any of the following categories is exempt from the RAAIM provisions in Section 40.9 applicable to local and system Resource Adequacy Capacity –

(A) Variable Energy Resources;

(B) Combined Heat and Power Resources; and

(C) Run-of-River Resources.

(2) The capacity of a resource with a Load-following MSS as its Scheduling

Coordinator that is designated on a Load-following MSS's monthly Resource Adequacy Plan is exempt from the RAAIM provisions in Section 40.9 applicable to local and system Resource Adequacy Capacity, to the extent that the resource's capacity is also designated as Resource Adequacy Capacity on the monthly Supply Plan of that Load-following MSS or another Load-following MSS.

(3) Resources with Existing QF Contracts or Amended QF Contracts that are Resource Adequacy Resources are exempt from the RAAIM provisions in Section 40.9 applicable to local and system capacity --

(A) if the QF resource previously provided Resource Adequacy Capacity pursuant to an Existing QF Contract that was executed prior to August 22, 2010 and remained in effect pursuant to California Public Utilities Commission Decision 07-09-040 that extended the term of expiring contracts until such time as the new contracts resulting from that decision are available; or

(B) until the QF Resource's Existing QF Contract or Amended QF Contract terminates or if requested by the Scheduling Coordinator for the resource, whichever is earlier.

(c) **Capacity Exempt from RAAIM – Flexible Capacity.**

(1) The capacity of Use-Limited Resources in a combination under Section 40.10.3.2(b), 40.10.3.3(b) or 40.10.3.4(b) is exempt from the RAAIM provisions in Section 40.9 applicable to Flexible RA Capacity to the extent that the resources are committed to provide Flexible RA Capacity as a combination on their respective monthly Supply Plans.

(2) The Capacity of a resource with a Load-following MSS as its Scheduling Coordinator that is designated on a Load-following MSS's monthly Flexible RA Plan is exempt from the RAAIM provisions in Section 40.10 applicable to Flexible RA Capacity, to the extent that the resource's capacity is also designated as Flexible RA Capacity on the monthly Supply Plan of that Load-following MSS or

another Load-following MSS.

*** * ***

40.9.3 Availability Assessment

40.9.3.1 Local and System RA Capacity Availability

(a) **Availability Assessment Hours**

(1) Prior to the start of each Resource Adequacy Compliance Year, the CAISO shall establish and publish in the Business Practice Manual the Availability Assessment Hours applicable for resources providing local and/or system Resource Adequacy Capacity for each month of that year.

(2) The Availability Assessment Hours shall be a pre-defined set of five consecutive hours for each month that –

(A) correspond to the operating periods when high demand conditions typically occur and when the availability of Resource Adequacy Capacity is most critical to maintaining system reliability:

(B) vary by season as necessary so that the coincident peak load hour typically falls within the five-hour range each day during the month, based on historical actual load data; and

(C) apply to each Trading Day that is a weekday and not a federal holiday.

(b) **Must-Offer Availability Assessment.** The CAISO shall determine the extent to which each resource providing local and/or system Resource Adequacy Capacity made that capacity available to the CAISO each day during the Availability Assessment Hours by comparing –

(1) the MWs of local and/or system Resource Adequacy Capacity for which the Scheduling Coordinator for the resource submitted Economic Bids or Self-Schedules in the Day-Ahead Market and the Real-Time Market on a given day; and

(2) the MWs of local and/or system Resource Adequacy Capacity for which the Scheduling Coordinator for the resource had a performance obligation to submit

Economic Bids or Self-Schedules in the CAISO Markets under the must-offer requirements applicable under Section 40.6 on a given day, provided that Conditionally Available Resources will have RAAIM assessed as if the resource's performance obligation were defined in Sections 40.6.1 and 40.6.2 and irrespective of their expected available Energy or their expected as-available Energy.

* * *

40.9.3.4 Treatment of Outages

(a) **RA Substitute Capacity Not Required.** The RAAIM Availability Assessment for a Resource Adequacy Resource excludes the capacity, duration, and must-offer requirements for Resource Adequacy Capacity on an Outage during the Resource Adequacy month that does not require RA Substitution Capacity under Section 9.3.1.3.3.

(b) **RA Substitute Capacity Required and Provided.** For each Outage that requires RA Substitute Capacity under Section 40.9.3.6 to avoid imposition of RAAIM charges –

(1) the RAAIM Availability Assessment for the resource excludes the capacity, duration, and must-offer requirement for Resource Adequacy Capacity on outage to the extent the resource provides RA Substitute Capacity for that outage as required under Section 40.9.3.6; and

(2) the RAAIM Availability Assessment for the substitute resource includes the capacity, duration, and must-offer requirement for the RA Substitute Capacity commitment. For each day the substitute resource is committed to provide Flexible RA Capacity and/or RA Substitute Capacity in more than one Flexible Capacity Category, the RAAIM Availability Assessment applies the must-offer obligation for the highest quality Flexible Capacity Category to the total MWs of the flexible capacity requirement. For the purposes of this Section 40.9, base ramping resources (as defined in section 40.10.3.2) are considered to be a higher quality of Flexible Capacity Category than either peak ramping resources (as defined in section 40.10.3.3) or super-peak ramping resources (as defined in

section 40.10.3.4). Additionally, peak ramping resources (as defined in section 40.10.3.3) are considered to be a higher quality of Flexible Capacity Category than super-peak ramping resources (as defined in section 40.10.3.4).

(c) **RA Substitute Capacity Required not Provided.** For each Outage that requires RA Substitute Capacity under Section 40.9.3.6 to avoid imposition of RAAIM charges, the RAAIM Availability Assessment for the resource includes the capacity, duration, and must-offer requirement for Resource Adequacy Capacity on an outage to the extent the resource does not provide RA Substitute Capacity for the outage as required under Section 40.9.3.6.

(d) **Exclusions from RAAIM for certain Outage types.** The RAAIM Availability Assessment excludes the capacity, duration, and must-offer requirement for local and/or system Resource Adequacy Capacity or Flexible RA Capacity on an Outage in a nature of work category specified in the Business Practice Manual that relates to: (i) an administrative action by the resource owner; (ii) a cause outside of the control of the resource owner; (iii) a short-term use limitation; or (iv) a non-Run-of-River Resource hydroelectric Generating Unit's management of water-related operational or regulatory limitations. Through the December 31, 2020, Trading Day, item (iv) of this Section 40.9.3.4(d) applies only to a hydroelectric Generating Unit that has limited the capacity it has shown on the monthly Supply Plan corresponding to the day of the Outage to reflect historical hydrological conditions or actual hydrological conditions in 2020. The limitations based on hydrological conditions must be mutually agreed upon with the unit's Scheduling Coordinator and the CAISO. Starting with the January 1, 2021, Trading Day, item (iv) of this Section 40.9.3.4(d) applies only to a hydroelectric Generating Unit whose Qualifying Capacity was established pursuant to a CPUC or Local Regulatory Authority methodology under which the Qualifying Capacity is calculated to reflect historical hydrological conditions. (e) **Derates on Generating Units Providing system RA Capacity and Listed Local RA Capacity.** If a Generating Unit providing both system RA Capacity and Listed Local RA Capacity is on Forced Outage, then for purposes of

RAAIM and RA Substitute Capacity the quantity of the Forced Outage will be apportioned first to the system RA Capacity provided from that Generating Unit. If the quantity of the Forced Outage exceeds the quantity of system RA Capacity provided by the Generating Unit, then the remainder of the Forced Outage shall be apportioned to the Listed Local RA Capacity provided by the Generating Unit.

* * *

40.10.4 Effective Flexible Capacity

The CAISO shall calculate the Effective Flexible Capacity value for each resource. The CAISO shall publish the draft and final lists of the Effective Flexible Capacity values for such resources and the Flexible Capacity Categories for which each resource qualifies to provide Flexible Capacity on the CAISO Website each year in accordance with the schedule for publishing the Net Qualifying Capacity values, as set forth in the BPM, for use in the next calendar year.

40.10.4.1 Effective Flexible Capacity Calculation

(a) **Flexible Resources.** The CAISO will calculate the Effective Flexible Capacity value of a resource, for use (i) if a Local Regulatory Authority has not established criteria for calculating the Effective Flexible Capacity value for eligible resource types, and (ii) for determining if a cumulative deficiency exists under Sections 43.2.7(a) and (b), as follows, except as provided in Sections 40.10.4.1 (b) through (f) –

(1) If the Start-Up Time of the resource is greater than 90 minutes, the Effective Flexible Capacity value shall be the weighted average ramp rate of the resource calculated from PMin to Net Qualifying Capacity multiplied by 180 minutes. The Effective Flexible Capacity shall not exceed the difference between the PMin and PMax of the resource.

(2) If the Start-Up Time of the resource is less than or equal to 90 minutes, the Effective Flexible Capacity value shall be the resource's PMin plus the weighted average ramp rate of the resource calculated from PMin to Net Qualifying Capacity multiplied by the difference between 180 minutes and the resource's

Start-Up Time. The Effective Flexible Capacity shall not exceed the Net Qualifying Capacity of the resource.

(b) **Hydroelectric Generating Unit.** The Effective Flexible Capacity of a hydroelectric generating unit will be the amount of capacity from which the resource can produce Energy consistently for 6 hours assuming that the resource's physical storage is at maximum capacity at the beginning of that six-hour period. The Effective Flexible Capacity of a hydroelectric generation unit cannot, however, exceed its Net Qualifying Capacity.

(c) **Proxy Demand Resource.** The Effective Flexible Capacity of a Proxy Demand Resource will be based on the resource's actual MWs of load modification in response to a dispatch by the CAISO during a test event. In determining the Effective Flexible Capacity of a Proxy Demand Resource, the CAISO will –

(1) conduct the test at a random time during the flexible capacity must-offer obligation period for the resource;

(2) use the applicable baseline load data, as described in the CAISO Tariff or Business Practice Manual, to measure the load modification of the Proxy Demand Resource being tested; and

(3) pay the resource's bid price for the testing period.

(d) **Energy Storage Resource.** The Effective Flexible Capacity value for an energy storage resource will be determined as follows –

(1) for an energy storage resource that provides Flexible RA Capacity but not Regulation Energy Management, the Effective Flexible Capacity value will be the MW output range the resource can provide over three hours of charge/discharge while constantly ramping.

(2) for an energy storage resource that provides Flexible RA Capacity and Regulation Energy Management, the Effective Flexible Capacity value will be the resource's 15-minute energy output capability.

(e) **Multi-Stage Generating Resource.** The Effective Flexible Capacity value for a Multi-

Stage Generating Resource will be calculated using the longest Start-Up Time of the resource's configuration that has the lowest PMin.

(f) **Combined Heat and Power Resource.** The Effective Flexible Capacity value of a Combined Heat and Power Resource will be the lesser of (i) the resource's Net Qualifying Capacity, or (ii) the MW difference between the CHP resource's maximum output and its RMTMax, if the resource has a RMTMax, or its minimum operating level, such quantity not to exceed the quantity of generating capacity capable of being delivered over a three-hour period.

40.10.4.2 EFC Omission or Correction

(a) **Draft List.** The posted draft list of Effective Flexible Capacity values may be modified only as follows –

(1) If the Scheduling Coordinator for a resource that was not included on the draft list of Effective Flexible Capacity values seeks to have the resource included on the list, it must no later than the deadline set forth in the Business Practice Manual submit a request to the CAISO either showing that the resource meets the criteria in Section in 40.10.4.1 or is capable of meeting the criteria, and provide documentation to enable the CAISO to determine the resource's Effective Flexible Capacity pursuant to the criteria in Section 40.10.4.1.

(2) If the Scheduling Coordinator for a resource that was included on the draft list of Effective Flexible Capacity values seeks to change the value for that resource, it must submit documentation by the deadline set forth in the Business Practice Manual that supports such a change.

(3) The CAISO will review the information submitted and notify the Scheduling Coordinator whether the change was accepted at least 15 days prior to posting the final list of Effective Flexible Capacity values on the CAISO Website.

(b) **Final List.** The CAISO will post on the CAISO Website the final list of Effective Flexible Capacity values for resources that are in service and the Flexible Capacity Categories for which each resource qualifies to provide Flexible Capacity. The final list shall be used for

the next calendar year and shall not be changed during that year, except as follows –

(1) If the Net Qualifying Capacity or PMax of a resource included on the final list increases or decreases during the year, and that value is changed in the Master File, the Scheduling Coordinator for the resource may request that the Effective Flexible Capacity value be recalculated to account for the change; or

(2) If a new resource, achieves commercial operation during the year, the Scheduling Coordinator for the resource may request that the CAISO calculate and add its Effective Flexible Capacity value and the Flexible Capacity Categories for which the resource qualifies to provide Flexible Capacity to the final list as an in-service resource.

(c) **Disputes.** Any disputes as to the CAISO's determination regarding Effective Flexible Capacity shall be subject to the CAISO ADR Procedure.

* * *

- Conditionally Available Resource

A resource that has demonstrated to the CAISO's reasonable satisfaction that it has one or more regulatory or operational limits that are not eligible use imits pursuant to Section 30.4.1.1.6.1.1 and that faces frequent and recurring periods of unavailability because of those limitations. A resource can be both a Conditionally Available Resource and a Use-Limited Resource if it has eligible use limits and also meets the definition of a Conditionally Available Resource.

* * *

- Run-of-River Resource

A hydroelectric Generating Unit that has demonstrated to the CAISO's reasonable satisfaction that it has no physical ability to control or store its fuel source for generation beyond whatever pondage is necessary to maintain sufficient head pressure to operate the Generating Unit consistent with Good Utility Practice.

Attachment B – Marked CAISO Tariff

Tariff Amendment to Clarify Resource Adequacy Obligations from the Commitment Costs Enhancements Phase 3 Initiative and Other Related Matters

California Independent System Operator Corporation

April 17, 2020

40.6.4 Availability Requirements for Resources with Operational Limitations that are not Qualified Use-Limits

40.6.4.1 Must-Offer Obligation in DAM and RTM

~~Any Hydroelectric Generating Unit, Pumping Load, Non-Dispatchable Resource, or~~ Conditionally Available Resource~~s~~ (irrespective of Use-Limited Resource qualification) and Run-of-River Resources that provide~~s~~ Resource Adequacy Capacity and that are physically capable of operating must submit Self-Schedules or Bids in the Day-Ahead Market for their expected available Energy or their expected as-available Energy, as applicable, in the Day-Ahead Market and RTM up to the quantity of Resource Adequacy Capacity the resource is providing. Such resources shall also revise their Self-Schedules or submit additional Bids in RTM based on the most current information available regarding Expected Energy deliveries.

An Eligible Intermittent Resource providing Resource Adequacy Capacity may, but is not required to, submit Bids in the Day-Ahead Market.

40.6.4.2 RUC Availability Bids

The following resource types providing Resource Adequacy Capacity are not required to submit RUC Availability Bids for that capacity, but any ~~suck~~ such bids they do submit must be $0/MW RUC Availability Bids: ~~Hydroelectric Generating Units,~~ Pumping Load, Reliability Demand Response Resources, Combined Heat and Power Resources, Regulatory Must-Take Generation, ~~Non-Dispatchable Resources,~~ Non-Generator Resources using Regulation Energy Management, Conditionally Available Resources, Run-of-River Resources, and Eligible Intermittent Resources.

40.6.4.3 Ancillary Services Bids from Participating Loads that is Pumping Load

The must-offer obligation for Participating Load that is Pumping Load ~~shall submit~~is limited to submitting, for hours where underlying Load permits, Non-Spin Ancillary Services Bids and/or a Submission to Self-Provide Non-Spin Ancillary Services in the Day-Ahead Market for its Resource Adequacy Capacity that is certified to provide Non-Spinning Reserve Ancillary Service, and Economic Bids for Energy in the Real-Time Market for its Non-Spinning Reserve Capacity that receives an Ancillary Service Award in the Day-Ahead Market.

40.6.4.4 Proxy Demand Resources

(a) Short Start and Medium Start Proxy Demand Resources that provide Resource Adequacy Capacity shall submit $0/MW RUC Availability Bids for all of their Resource Adequacy Capacity for all hours of the month the resource is physically available; however, any RUC schedule for these resources will not be binding.

(b) Long Start Proxy Demand Resources are not required to submit Bids or Self Schedules in the RUC for their Resource Adequacy Capacity.

*** * ***

40.6.8 Use of Generated Bids

(a) **Day-Ahead Market.** Prior to completion of the Day-Ahead Market, the CAISO will determine if Resource Adequacy Capacity subject to the requirements of Section 40.6.1 and for which the CAISO has not received notification of an Outage has not been reflected in a Bid and will insert a Generated Bid for such capacity into the CAISO Day-Ahead Market.

(b) **Real-Time Market.** Prior to running the Real-Time Market, the CAISO will determine if Resource Adequacy Capacity subject to the requirements of Section 40.6.2 and for which the CAISO has not received notification of an Outage has not been reflected in a Bid and will insert a Generated Bid for such capacity into the Real-Time Market.

(c) **Partial Bids for RA Capacity.** If a Scheduling Coordinator for an RA Resource submits a partial bid for the resource's RA Capacity, the CAISO will insert a Generated Bid only for the remaining RA Capacity. In addition, the CAISO will determine if all dispatchable Resource Adequacy Capacity from Short Start Units, not otherwise selected in the IFM or RUC, is reflected in a Bid into the Real-Time Market and will insert a Generated Bid for any remaining dispatchable Resource Adequacy Capacity for which the CAISO has not received notification of an Outage.

(d) **Calculation of Generated Bids.** A Generated Bid for Energy will be calculated pursuant to Sections 30.7.3.4 and 30.7.3.5. A Generated Bid for Ancillary Services will equal zero dollars ($0/MW-hour).

(e) **Exemptions.** Notwithstanding any of the provisions of Section 40.6.8, for the following

resource types providing Resource Adequacy Capacity, the CAISO only inserts a Bid in the Day-Ahead Market or Real-Time Market where the generally applicable bidding rules in Section 30 call for bid insertion: Use-Limited Resource, Non-Generator Resource, Variable Energy Resource, Hydroelectric Generating Unit (including Run-of-River resources), Proxy Demand Resource, Reliability Demand Response Resource, Participating Load, including Pumping Load, Combined Heat and Power Resource, Conditionally Available Resource, Non-Dispatchable Resource, and resources providing Regulatory Must-Take Generation.

(f) **NRS-RA Resources.** The CAISO will submit a Generated Bid in the Day-Ahead Market or Real-Time Market for a non-Resource Specific System Resource in each RAAIM assessment hour, to the extent that the resource provides Resource Adequacy Capacity subject to the requirements of Sections 40.6.1 or 40.6.2 and does not submit an outage request or Bid for the entire amount of that Resource Adequacy Capacity.

* * *

40.9.2 Exemptions

(a) **Capacity Exempt from RAAIM – All Provisions.** The entire capacity of a resource in any of the following categories is exempt from the RAAIM provisions in Section 40.9 –

(1) Resources with a PMax less than 1.0 MW;

(2) Non-specified resources that provide Resource Adequacy Capacity under contracts for Energy delivered within the CAISO Balancing Authority Area;

(3) Participating Load that is also Pumping Load; and

(4) RMR Units.

(b) **Capacity Exempt from RAAIM – Local/System**

(1) The entire capacity of a resource in any of the following categories is exempt from the RAAIM provisions in Section 40.9 applicable to local and system Resource Adequacy Capacity –

(A) Variable Energy Resources; ~~and~~

(B) Combined Heat and Power Resources; and

(C) Run-of-River Resources.

(2) The capacity of a resource with a Load-following MSS as its Scheduling Coordinator that is designated on a Load-following MSS's monthly Resource Adequacy Plan is exempt from the RAAIM provisions in Section 40.9 applicable to local and system Resource Adequacy Capacity, to the extent that the resource's capacity is also designated as Resource Adequacy Capacity on the monthly Supply Plan of that Load-following MSS or another Load-following MSS.

(3) Resources with Existing QF Contracts or Amended QF Contracts that are Resource Adequacy Resources are exempt from the RAAIM provisions in Section 40.9 applicable to local and system capacity --

(A) if the QF resource previously provided Resource Adequacy Capacity pursuant to an Existing QF Contract that was executed prior to August 22, 2010 and remained in effect pursuant to California Public Utilities Commission Decision 07-09-040 that extended the term of expiring contracts until such time as the new contracts resulting from that decision are available; or

(B) until the QF Resource's Existing QF Contract or Amended QF Contract terminates or if requested by the Scheduling Coordinator for the resource, whichever is earlier.

(c) **Capacity Exempt from RAAIM – Flexible Capacity.**

(1) The capacity of Use-Limited Resources in a combination under Section 40.10.3.2(b), 40.10.3.3(b) or 40.10.3.4(b) is exempt from the RAAIM provisions in Section 40.9 applicable to Flexible RA Capacity to the extent that the resources are committed to provide Flexible RA Capacity as a combination on their respective monthly Supply Plans.

(2) The Capacity of a resource with a Load-following MSS as its Scheduling Coordinator that is designated on a Load-following MSS's monthly Flexible RA Plan is exempt from the RAAIM provisions in Section 40.10 applicable to Flexible

RA Capacity, to the extent that the resource's capacity is also designated as Flexible RA Capacity on the monthly Supply Plan of that Load-following MSS or another Load-following MSS.

*** * ***

40.9.3 Availability Assessment

40.9.3.1 Local and System RA Capacity Availability

(a) **Availability Assessment Hours**

(1) Prior to the start of each Resource Adequacy Compliance Year, the CAISO shall establish and publish in the Business Practice Manual the Availability Assessment Hours applicable for resources providing local and/or system Resource Adequacy Capacity for each month of that year.

(2) The Availability Assessment Hours shall be a pre-defined set of five consecutive hours for each month that –

(A) correspond to the operating periods when high demand conditions typically occur and when the availability of Resource Adequacy Capacity is most critical to maintaining system reliability:

(B) vary by season as necessary so that the coincident peak load hour typically falls within the five-hour range each day during the month, based on historical actual load data; and

(C) apply to each Trading Day that is a weekday and not a federal holiday.

(b) **Must-Offer Availability Assessment.** The CAISO shall determine the extent to which each resource providing local and/or system Resource Adequacy Capacity made that capacity available to the CAISO each day during the Availability Assessment Hours by comparing –

(1) the MWs of local and/or system Resource Adequacy Capacity for which the Scheduling Coordinator for the resource submitted Economic Bids or Self-Schedules in the Day-Ahead Market and the Real-Time Market on a given day; and

(2) the MWs of local and/or system Resource Adequacy Capacity for which the Scheduling Coordinator for the resource had a performance obligation to submit Economic Bids or Self-Schedules in the CAISO Markets under the must-offer requirements applicable under Section 40.6 on a given day, provided that Conditionally Available Resources will have RAAIM assessed as if the resource's performance obligation were defined in Sections 40.6.1 and 40.6.2 and irrespective of their expected available Energy or their expected as-available Energy.

* * *

40.9.3.4 Treatment of Outages

(a) **RA Substitute Capacity Not Required.** The RAAIM Availability Assessment for a Resource Adequacy Resource excludes the capacity, duration, and must-offer requirements for Resource Adequacy Capacity on an Outage during the Resource Adequacy month that does not require RA Substitution Capacity under Section 9.3.1.3.3.

(b) **RA Substitute Capacity Required and Provided.** For each Outage that requires RA Substitute Capacity under Section 40.9.3.6 to avoid imposition of RAAIM charges –

(1) the RAAIM Availability Assessment for the resource excludes the capacity, duration, and must-offer requirement for Resource Adequacy Capacity on outage to the extent the resource provides RA Substitute Capacity for that outage as required under Section 40.9.3.6; and

(2) the RAAIM Availability Assessment for the substitute resource includes the capacity, duration, and must-offer requirement for the RA Substitute Capacity commitment. For each day the substitute resource is committed to provide Flexible RA Capacity and/or RA Substitute Capacity in more than one Flexible Capacity Category, the RAAIM Availability Assessment applies the must-offer obligation for the highest quality Flexible Capacity Category to the total MWs of the flexible capacity requirement. For the purposes of this Section 40.9, base ramping resources (as defined in section 40.10.3.2) are considered to be a

higher quality of Flexible Capacity Category than either peak ramping resources (as defined in section 40.10.3.3) or super-peak ramping resources (as defined in section 40.10.3.4). Additionally, peak ramping resources (as defined in section 40.10.3.3) are considered to be a higher quality of Flexible Capacity Category than super-peak ramping resources (as defined in section 40.10.3.4).

(c) **RA Substitute Capacity Required not Provided.** For each Outage that requires RA Substitute Capacity under Section 40.9.3.6 to avoid imposition of RAAIM charges, the RAAIM Availability Assessment for the resource includes the capacity, duration, and must-offer requirement for Resource Adequacy Capacity on an outage to the extent the resource does not provide RA Substitute Capacity for the outage as required under Section 40.9.3.6.

(d) **Exclusions from RAAIM for certain Outage types.** The RAAIM Availability Assessment excludes the capacity, duration, and must-offer requirement for local and/or system Resource Adequacy Capacity or Flexible RA Capacity on an Outage in a nature of work category specified in the Business Practice Manual that relates to~~relating to~~: (i) an administrative action by the resource owner;~~,~~ (ii) a cause outside of the control of the resource owner;~~, or~~ (iii) a short-term use limitation; or (iv) a non-Run-of-River Resource hydroelectric Generating Unit's management of water-related operational or regulatory limitations. Through the December 31, 2020, Trading Day, item (iv) of this Section 40.9.3.4(d) applies only to a hydroelectric Generating Unit that has limited the capacity it has shown on the monthly Supply Plan corresponding to the day of the Outage to reflect historical hydrological conditions or actual hydrological conditions in 2020. The limitations based on hydrological conditions must be mutually agreed upon with the unit's Scheduling Coordinator and the CAISO. Starting with the January 1, 2021, Trading Day, item (iv) of this Section 40.9.3.4(d) applies only to a hydroelectric Generating Unit whose Qualifying Capacity was established pursuant to a CPUC or Local Regulatory Authority methodology under which the Qualifying Capacity is calculated to reflect historical hydrological conditions. ~~, as those categories are specified in the Business Practice~~

~~Manual.~~

(e) **Derates on Generating Units Providing system RA Capacity and Listed Local RA Capacity.** If a Generating Unit providing both system RA Capacity and Listed Local RA Capacity is on Forced Outage, then for purposes of RAAIM and RA Substitute Capacity the quantity of the Forced Outage will be apportioned first to the system RA Capacity provided from that Generating Unit. If the quantity of the Forced Outage exceeds the quantity of system RA Capacity provided by the Generating Unit, then the remainder of the Forced Outage shall be apportioned to the Listed Local RA Capacity provided by the Generating Unit.

* * *

40.10.4 Effective Flexible Capacity

The CAISO shall calculate the Effective Flexible Capacity value for each resource. The CAISO shall publish the draft and final lists of the Effective Flexible Capacity values for such resources and the Flexible Capacity Categories for which each resource qualifies to provide Flexible Capacity on the CAISO Website each year in accordance with the schedule for publishing the Net Qualifying Capacity values, as set forth in the BPM, for use in the next calendar year.

40.10.4.1 Effective Flexible Capacity Calculation

(a) **Flexible Resources.** The CAISO will calculate the Effective Flexible Capacity value of a resource, for use (i) if a Local Regulatory Authority has not established criteria for calculating the Effective Flexible Capacity value for eligible resource types, and (ii) for determining if a cumulative deficiency exists under Sections 43.2.7(a) and (b), as follows, except as provided in Sections 40.10.4.1 (b) through (f) –

(1) If the Start-Up Time of the resource is greater than 90 minutes, the Effective Flexible Capacity value shall be the weighted average ramp rate of the resource calculated from PMin to Net Qualifying Capacity multiplied by 180 minutes. The Effective Flexible Capacity shall not exceed the difference between the PMin and PMax of the resource.

(2) If the Start-Up Time of the resource is less than or equal to 90 minutes, the Effective Flexible Capacity value shall be the resource's PMin plus the weighted average ramp rate of the resource calculated from PMin to Net Qualifying Capacity multiplied by the difference between 180 minutes and the resource's Start-Up Time. ~~the weighted average ramp rate of the resource calculated from zero to Net Qualifying Capacity multiplied by 180 minutes.~~ The Effective Flexible Capacity shall not exceed the Net Qualifying Capacity of the resource.

(b) **Hydroelectric Generating Unit.** The Effective Flexible Capacity of a hydroelectric generating unit will be the amount of capacity from which the resource can produce Energy consistently for 6 hours assuming that~~based upon~~ the resource's physical storage is at maximum capacity at the beginning of that six-hour period. The Effective Flexible Capacity of a hydroelectric generation unit cannot, however, ~~which shall not~~ exceed its Net Qualifying Capacity.

(c) **Proxy Demand Resource.** The Effective Flexible Capacity of a Proxy Demand Resource will be based on the resource's actual MWs of load modification in response to a dispatch by the CAISO during a test event. In determining the Effective Flexible Capacity of a Proxy Demand Resource, the CAISO will –

(1) conduct the test at a random time during the flexible capacity must-offer obligation period for the resource;

(2) use the applicable baseline load data, as described in the CAISO Tariff or Business Practice Manual, to measure the load modification of the Proxy Demand Resource being tested; and

(3) pay the resource's bid price for the testing period.

(d) **Energy Storage Resource.** The Effective Flexible Capacity value for an energy storage resource will be determined as follows –

(1) for an energy storage resource that provides Flexible RA Capacity but not Regulation Energy Management, the Effective Flexible Capacity value will be the MW output range the resource can provide over three hours of charge/discharge

while constantly ramping.

(2) for an energy storage resource that provides Flexible RA Capacity and Regulation Energy Management, the Effective Flexible Capacity value will be the resource's 15-minute energy output capability.

(e) **Multi-Stage Generating Resource.** The Effective Flexible Capacity value for a Multi-Stage Generating Resource will be calculated using the longest Start-Up Time of the resource's configuration that has the lowest PMin.

(f) **Combined Heat and Power Resource.** The Effective Flexible Capacity value of a Combined Heat and Power Resource will be the lesser of (i) the resource's Net Qualifying Capacity, or (ii) the MW difference between the CHP resource's maximum output and its RMTMax, if the resource has a RMTMax, or its minimum operating level, such quantity not to exceed the quantity of generating capacity capable of being delivered over a three-hour period.

40.10.4.2 EFC Omission or Correction

(a) **Draft List.** The posted draft list of Effective Flexible Capacity values may be modified only as follows –

(1) If the Scheduling Coordinator for a resource that was not included on the draft list of Effective Flexible Capacity values seeks to have the resource included on the list, it must no later than the deadline set forth in the Business Practice Manual ~~September 1~~ submit a request to the CAISO either showing that the resource meets the criteria in Section in 40.10.4.1 or is capable of meeting the criteria, and provide documentation to enable the CAISO to determine the resource's Effective Flexible Capacity pursuant to the criteria in Section 40.10.4.1.

(2) If the Scheduling Coordinator for a resource that was included on the draft list of Effective Flexible Capacity values seeks to change the value for that resource, it must submit documentation by the deadline set forth in the Business Practice Manual ~~no later than September 1~~ that supports such a change.

(3) The CAISO will review the information submitted and notify the Scheduling

Coordinator whether the change was accepted at least 15 days prior to posting the final list of Effective Flexible Capacity values on the CAISO Website.

(b) **Final List.** The CAISO will post on the CAISO Website the final list of Effective Flexible Capacity values for resources that are in service and the Flexible Capacity Categories for which each resource qualifies to provide Flexible Capacity. The final list shall be used for the next calendar year and shall not be changed during that year, except as follows –

(1) If the Net Qualifying Capacity or PMax of a resource included on the final list increases or decreases during the year, and that value is changed in the Master File, the Scheduling Coordinator for the resource may request that the Effective Flexible Capacity value be recalculated to account for the change; or

(2) If a new resource, achieves commercial operation during the year, the Scheduling Coordinator for the resource may request that the CAISO calculate and add its Effective Flexible Capacity value and the Flexible Capacity Categories for which the resource qualifies to provide Flexible Capacity to the final list as an in-service resource.

(c) **Disputes.** Any disputes as to the CAISO's determination regarding Effective Flexible Capacity shall be subject to the CAISO ADR Procedure.

* * *

- Conditionally Available Resource

A resource that has demonstrated to the CAISO's reasonable satisfaction that it has one or more regulatory or operational limits that are not eligible uUse Limits pursuant to Section 30.4.1.1.6.1.12 and that faces frequent and recurring periods of unavailability because of those limitations. A resource can be both a Conditionally Available Resource and a Use-Limited Resource if it has eligible uUse Limits and also meets the definition of a Conditionally Available Resource.

* * *

- Run-of-River Resource

A hydroelectric Generating Unit that has demonstrated to the CAISO's reasonable satisfaction that it has no physical ability to control or store its fuel source for generation beyond whatever pondage is necessary

to maintain sufficient head pressure to operate the Generating Unit consistent with Good Utility Practice.