



# **Commitment Cost Enhancements Tariff Clarifications**

**Draft Final Proposal**

**January 28, 2020**

**Market & Infrastructure Policy**

## Table of Contents

1.	Introduction .....	3
2.	Background .....	4
3.	EIM Classification .....	8
4.	Proposal .....	9
4.1	Stakeholder Comments and Updates .....	9
4.2	Conditionally Available Resources .....	11
4.3	RAAIM Application .....	12
4.4	Run-of-River Hydro .....	13
4.5	Hydro Resource Counting Rules .....	16
4.6	Other Tariff Clarifications.....	17
5.	Next Steps.....	18

## 1. Introduction

The purpose of this proposal is to clarify policy discussed in the third phase of the commitment cost enhancements (CCE3) initiative and to clearly reflect those clarifications in the ISO tariff. These clarifications are focused on use limited and conditionally available resources. This paper also includes a discussion of run-of-river hydro resources, offers a new tariff definition for these resources, and proposes that they be exempt from the resource adequacy availability incentive mechanism (RAAIM). This paper also includes details about an alternative qualifying capacity counting methodology for hydro resources with storage capability that would be RAAIM exempt, subject to CPUC approval in its resource adequacy proceeding. The paper covers bidding obligations, notification of outage requirements to the ISO, and RAAIM obligations for the resource types discussed in this paper.

The principle driver in the commitment costs enhancement initiative was to allow for expanded market participation from all use limited resources, including the hydro fleet. Market rule changes that promote more frequent participation of these resources in the ISO market allows for greater system flexibility, increased competition, and more efficient market outcomes.

This is a continuation of an earlier public discussion with stakeholders. This included discussions about rule changes immediately after the implementation of phase three of the commitment cost enhancements policy in 2019. The ISO formally published tariff clarifications stating that conditionally available resources would no longer have access to a RAAIM exempt outage card on September 26, 2019. These clarifications were followed by a public stakeholder call to discuss the changes on October 10, 2019. During the stakeholder call, in written comments in response to the call, and after the call, certain stakeholders voiced concern about the changes outlined in the tariff clarifications. The ISO agreed to open a formal stakeholder process to discuss these issues and think about potential solutions that could accommodate most resources on the California system. Specifically, Southern California Edison (SCE) requested that the ISO review the counting methodology for hydro resources. Although this methodology is outside of ISO purview, the ISO discusses the possibility of supporting these changes at the California Public Utilities Commission (CPUC) where these rules are set.

This ISO published a formal straw proposal and hosted an accompanying stakeholder call in December, 2019. This discussion focused on the proposed treatment of conditionally available resources and the treatment of run-of-river resources. The window to receive stakeholder comments on this proposal remained open until January 2020.

The ISO published this draft final proposal on January 28, 2020. The draft final proposal includes a summary of the discussion from the previous version of the paper, additional details about the treatment of run-of-river resources, and an update on the strategy for developing a new counting methodology for hydro resources with storage and application of RAIM for those resources. There will be a public stakeholder call on February 4, followed by a final window for comments open until February 18. The ISO plans to take this policy to the ISO Board of Governors meeting planned for March 25 and 26.

## 2. Background

### Use limited resources

The third phase of the commitment costs enhancements initiative formulated a new definition for use limited resources that could be applied to most resources operating with specific use limitations on the ISO grid.<sup>1</sup> A use limited resource cannot start and run indefinitely and these restrictions on usage could be the result of regulatory restrictions or facility design limitations. For example, a gas resource may have an air permit that only allows the resource to start a particular number of times per year, or a hydro resource may have a certain amount of water stored and can only produce a certain amount of energy (MWh) with the limited amount of water available.

Use limitations create an interesting challenge for ISO market design and participation. The principle market design allows resource owners to bid true costs into the market. The market then generates a least cost solution to operate the grid given expected conditions. This process leads to an elegant solution where least cost resources are dispatched first before more expensive units when solving for system needs. If use limited resources only include fuel costs in their bids, *i.e.*, their bids do not include the *opportunity cost* of using one of the resource's limited starts or run hours, these resources could quickly reach their use limitation even though the resource may have been more valuable for system operations later in the month or year.<sup>2</sup> This issue can be

---

<sup>1</sup> ISO completed and closed stakeholder initiatives:  
<http://www.caiso.com/informed/Pages/StakeholderProcesses/CompletedClosedStakeholderInitiatives/Default.aspx>.

<sup>2</sup> The market could potentially internalize these costs, if the market were expanded and run for a longer time horizon. In addition to monthly and annual limitations, many resources on the system have daily limitations. These limitations are considered by the market model, which optimizes use given all of the market constraints, including daily use limitations, when calculating dispatch instruction and market results.

particularly problematic for hydro resources because their marginal cost, without accounting for opportunity costs, is generally very low.

Opportunity costs capture the idea that if a resource starts or runs now, it may be unable to do so in the future because of a use limitation. The ISO's opportunity cost adder measure how much the resource is giving up if it should run at a sub-optimal time. For example, if a hydro resource has enough water stored to only run for three hours per day, and the expected energy prices for the top three hours are \$70/MWh, \$60/MWh and \$55/MWh, then the opportunity cost for the resource to run would be \$55/MWh, or the revenue that the resource would give up if it ran at an earlier time. The same resource may incur an actual cost of \$5/MWh when generating.<sup>3</sup> If the resource is bid into the market at \$5/MWh cost, it may be dispatched very early in the day, and may not have water available to serve load later in the day when the prices (and system needs for energy) are highest.

There are ways for a use limited resources to manage this issue on their own. A resource might elect to self-schedule energy into the market only during the times it expects prices to be highest, or it could bid into the market at extremely high prices during the periods it expects that market prices will be low, so that the ISO does not exhaust the use limitations prematurely. These approaches to managing use limitations are imperfect from the perspective of both market-wide efficiency and the resource's self-interests. If the resource self-schedules into the market, then the ISO loses all flexibility from the resource. Resource flexibility is becoming more critical as net load ramps and load and generation forecasting uncertainty continue to increase year-over-year with the increase of solar generation. If the resource bids at very high prices, it might trigger the market power mitigation process which reduces the resource's bids to their expected cost to run. Further, if the resource takes either of these actions, it may miss capturing market rents during the highest priced hours of the day. These opportunities can be particularly valuable to hydro resources as they are generally fast ramping resources and can respond quickly to price spikes in the 5-minute market.

An elegant solution to these challenges was outlined in the third phase of the Commitment Cost Enhancements initiative. This policy allowed use limited resources to include an opportunity cost adder, which is determined with the ISO, in addition to operating costs to set the default energy bids used when local market power mitigation is triggered. Further, if resources bid in such a way that included the opportunity cost adders, the resources would be dispatched when prices were above those costs and,

---

<sup>3</sup> These costs might include operations and maintenance costs related to running the resource and grid management charges.

therefore, enhance rents earned when additional dispatches were made. This solution allows a use limited resource to bid its capacity into the market during all hours, enabling the ISO to respect the resource's use limitations and dispatch it most efficiently and effectively.

Creating opportunity cost adders also have implications for use limited resources providing resource adequacy capacity. Units providing resource adequacy capacity generally have a 24x7 must offer obligation. However, use limited resources providing resource adequacy capacity historically only were required to submit bids for periods when their use limitations allowed them to operate. This has been problematic because use limited resources are a growing percentage of the resource adequacy fleet and they may not be available to meet ISO reliability needs when and where needed. Specifically, use limited resources that were hydroelectric, pumping load, and non-dispatchable use limited resources that provided resource adequacy capacity had to bid "their expected available Energy or their expected as-available Energy" into the market, while all other types of use limited resources that had to bid into the market were able to do so per the limitations specified in their use plans, which were filed with the ISO.

These units also are exempt from ISO bid generation, but generally are not exempt from RAAIM. To the extent they do not submit bids during RAAIM availability assessment hours, they are exposed to non-availability charges. Use limited resources do, however, have access to RAAIM exempt outage cards to use in the event that the resource exhausted, or is in danger of exhausting its use limitations.<sup>4</sup>

### **Conditionally available resources**

The commitment cost enhancements initiative narrowed the scope of units that could qualify as "use limited" resources. The initial proposal and filing, however, did not provide clarity about the bidding obligations for the units that were losing use limited status. The existing rules required these resources to bid 24x7, however it was likely that these resources would continue to have difficulty meeting a 24x7 must offer obligation because of the limitations that originally classified the resources as use

---

<sup>4</sup> This card may be used infrequently because of the design of the opportunity cost adder. The adder is recalculated by the ISO generally on a monthly basis and is updated based on historic use of the limitations facing a resource. For example, if a resource is limited to 100 starts at the beginning of the year and uses 50 in January, the opportunity cost adder is recalculated at a new value considering that there are only 50 starts available for the remainder of the year, prior to February. This should result in a significantly high opportunity cost adder that prevents the resource from running too frequently for the remainder of the year.

limited. A question arose if the commitment cost enhancements policy had effectively made these resources ineligible to provide resource adequacy capacity because they could not meet the bidding obligations.

Prior to the commitment costs enhancements policy, the ISO submitted a supplemental tariff filing clarifying this issue.<sup>5</sup> This filing included details that the same must-offer obligation would continue to apply to units that could not qualify as use limited under the new policy. The ISO also created a new resource category called “conditionally available resource” that would also qualify for the as-available must-offer obligation.

The logic of creating the designation for conditionally available resources was to prevent resource types not covered under the prior version of the must-offer obligation from being ineligible for resource adequacy by implication. One example was a generating unit with a noise permit issue that prohibited it from operating during certain hours of the day. Another was a hydroelectric resource that had limitations on its maximum output that could not be modelled by opportunity cost adders, such as regulatory obligations. There was no intent to create RAAIM exemptions for the resources that could model constraints with the use limited framework.

### **Run-of-river resources**

Scheduling coordinators representing run-of-river hydro have argued that run-of-river hydro is similar to variable energy resources (VERs) and should also be exempt from RAAIM. Both kinds of resources must estimate how much energy they can produce during each hour, and they often are unable to produce beyond these estimates because of fuel limitations. One distinction between run-of-river hydro and wind/solar VERs is the forecast data that is needed to properly forecast the resources is different. Run-of-River resources require hydrology flow models that take into consideration precipitation quantity, precipitation type, precipitation rates, geology of the basins the rivers are flowing down, river and reservoir levels, as well as accurate estimates of snow and density of snow. At this time the ISO does not have a hydrology flow model or the appropriate inputs to build a model to forecast for hydro resources. For this reason, the ISO maintains that run-of-river resources cannot be treated identically to existing variable energy resource because of a limited ability to generate accurate forecasts for these resources. However, the ISO believes it is appropriate to not subject run-of-river

---

<sup>5</sup> The filing was made in FERC docket no. ER19-951-000, filed on April 1, 2019. This filing included changes to tariff section 40.6.4.1.

resources to RAAIM for the same reasons variable energy resources are not subject to RAAIM.<sup>6</sup>

### **Additional hydro considerations**

Staff at the California ISO recognize that each hydroelectric facility is unique. Some of these resources are relatively simple to model but others are incredibly complex. These complexities can cause challenges in modelling, which may not be possible or practical for the ISO to generate internally. The ISO is supportive of adopting an alternative resource adequacy counting rule for hydro resources with storage that accounts for historic water availability. The ISO would also support exempting resources that adopted such an accounting rule from RAAIM for water-availability related outages. These ideas are expanded below in the proposal section of the paper.

### **Local capacity**

Since the commitment cost enhancements initiative, the ISO learned more about stakeholders concerns regarding showings for resource adequacy capacity in local areas. One concern is that local area requirements are set at peak (August) monthly requirements for each local area for all twelve months. One potential method for addressing this problem is with the use of planned outage cards, which are available for use by all resources, including hydro. Planned outage cards must be approved by the ISO, but during particular times of the year when loads and the need for capacity are lower, resources that are shown for resource adequacy may be approved for planned outages. These outages may reflect reduced availability of hydro resources during some months, or specific date ranges when historic hydro generation is low. Generally, less planned outages are approved during the periods of the year when loads are highest, as there is generally little residual capacity available at this time.

## **3. EIM Classification**

This initiative proposes to clarify the market rules for how the resource adequacy availability incentive mechanism applies to conditionally available and run-of-river hydro resources. The proposed clarifications to rules would apply to conditionally available

---

<sup>6</sup> FERC docket no. ER19-951-000 included language that prohibited run-of-river hydro resources from being variable energy resources, and continued to expose them to RAAIM. The Commission's order on this issue rejected the CAISO's amendments but offered no guidance about whether run-of-river hydro should be exempt from RAAIM. Notably, the order provided an incomplete account of the CAISO's initial rationale for the RAAIM exemption and did not address the arguments made for expanding the exemption to run-of-river hydro.



resources and run of river hydro resources with RA obligations in the ISO's balancing authority area. Since the resource adequacy rules do not apply to the EIM, Staff believes there is not a role for the EIM Governing Body in this policy.

The rules that govern decisional classification were amended in March 2019 when the Board adopted changes to the Charter for EIM Governance and the Guidance Document. An initiative proposing to change rules of the real-time market now falls within the primary authority of the EIM Governing Body either if the proposed new rule is EIM-specific in the sense that it applies uniquely or differently in the balancing authority areas of EIM Entities, as opposed to a generally applicable rule, or for proposed market rules that are generally applicable, if "an issue that is specific to the EIM balancing authority areas is the primary driver for the proposed change."

Here, the EIM Governing Body does not have an advisory role because the market rule clarifications do not apply to EIM resources. Moreover, this initiative is not driven by a perceived need to address EIM issues, but rather a desire to refine the rules governing conditionally available and run-of-river hydro resource adequacy resources, to improve the market participation from a fleet with potential use limitations.

This EIM classification reflects the current state of this initiative and may change as the stakeholder process moves forward. If any stakeholder disagrees with this proposed classification, please include in your written comments a justification of which classification is more appropriate.

## 4. Proposal

### 4.1 Stakeholder Comments and Updates

Updates from the Straw Proposal

- Summary of comments from stakeholders
- EIM classification
- Additional detail about treatment for run-of-river resources
- Agreement to participate in the CPUC's resource adequacy process to determine and propose alternate counting rules for hydro resources with storage

Five parties filed written comments on the straw proposal for this initiative, including California Department of Water Resources (CDWR), Los Angeles Department of Water

and Power (LADWP), Northern California Power Agency (NCPA), Pacific Gas and Electric (PG&E), Six Cities, and Southern California Edison (SCE).

Comments received were relatively favorable for the proposed treatment of run-of-river hydro resources proposed. CDWR supports the concept of run-of-river hydro resources and allowing those resources to be exempt from RAAIM, Six Cities supports the exemption of run-of-river resources from RAAIM, and PG&E supports the general approach to run-of-river resources.

CDWR asked that the proposal clarify that run-of-river hydro resources be exempt from RAAIM for flexible RA capacity. This proposal would include limiting all RAAIM exposure for run-of-river resources, similar to the exemptions provided to variable energy resources on the system today. CDWR further asked about calculations for qualifying capacity for run-of-river resources in the future. Today, there are different hydro counting rules established by the CPUC for hydro resources that are “dispatchable” compared to resources that are “non-dispatchable.” The ISO presumes that run-of-river hydro resources would generally be non-dispatchable hydro and that the counting rules used for that classifications of resources, where three years of historic availability are considered, would continue to be used as the counting methodology in the future.

PG&E asked how the ISO would determine and verify that a specific resource was run-of-river. This process will be conducted through submission of documentation through the ISO Master File process, where scheduling coordinators are required to submit truthful information about operating characteristics of resources to the ISO. PG&E also asked about the ability for a run-of-river resources to be categorized as conditionally available resources. In this proposal we clarify how run-of-river resources may be treated. The run-of-river resources will be exempt from RAAIM for all outages that are entered, similar to VER resources, and may submit self-schedules or bids to the ISO at levels up to their forecast capability. Because it is possible that run-of-river resources may also have outages similar to conditionally available resources, they may also apply for this status. As with other resources, this will allow these resources access to outage cards related to conditional availability.

CDWR supports leaving the existing counting methodologies in place and allowing resources to determine qualifying capacity either by using the proposed methodology for counting hydro resources or the existing methodology. NCPA also supports allowing net qualifying capacity values to reflect either methodology.

Six Cities does not agree with the proposal that conditionally available resources should not have access to a RAAIM exempt outage card. PG&E does not support the elimination of the RAAIM exempt outage card for conditionally available resources.

## 4.2 Conditionally Available Resources

The commitment cost enhancements policy allows resources with legitimate operational or regulatory limitations to register as use limited resources and utilize opportunity costs to manage their use limitations. The ISO created conditionally available resources to fill a policy gap for certain resources that could not always operate at full operating range due to certain limitations that the ISO could not model and resolve through market optimization. If non-dispatchable resources, hydro, or pumping load face limitations that cannot be captured through the ISO's opportunity cost modeling, they can seek conditionally available resource status.

When a conditionally available resource is unable to offer into the market because of conditionally available limitations, the ISO expects that the scheduling coordinator to reflect that reduced availability with an outage ticket submitted to the ISO through the outage management system. This obligation to report reductions in output capability is a generally applicable requirement for all resources in the ISO market.<sup>7</sup>

A resource can potentially be both a use limited resource and a conditionally available resource. Resources with both designations will be permitted to submit outage cards available to both designations.

However, the underlying limitations that qualify the resource for each of these designations cannot be the same. One of the criteria for use limited status is that the limitation does not restrict the hours of operation of the resource, and that the resource limitation usage needs to be rationed over a fixed period of time. If the resource has one or more operational or regulatory limits that do not qualify as use limitations, but still impose frequent and recurring periods of unavailability, the resource may apply to the ISO for conditionally available status.

Resources with both designations will be permitted to submit outage cards available to both designations. For example, a gas resource with an air permit limiting its annual starts and a noise permit restricting its availability in certain hours of the day can

---

<sup>7</sup> Tariff section 9.3.10.3.1. <http://www.caiso.com/rules/Pages/Regulatory/Default.aspx>.

register the air permit limitation for use limited status, and register the noise permit limitation for a conditionally available status.<sup>8</sup>

Scheduling coordinators are responsible for submitting the appropriate outage card when conditions arise that prevent the full dispatch of the resource. In the above example, if a resource is both use limited and conditionally available, the resource may enter an outage card reserved for use limited resources if the reduced availability is driven specifically by a use limit that justified its use limited resource status. This is consistent with existing rules for resources submitting outages, in that outage cards need to reflect actual conditions limiting or preventing a resource from participating in the market.

### 4.3 RAAIM Application

The CAISO did not intend any unique RAAIM treatment for conditionally available resources. The policy intent was for these resources to be assessed RAAIM based on their full resource adequacy capacity – not their conditionally available capacity – during the availability assessment hours. That is, a conditionally available resource that is shown for 100 MW of RA capacity may only be available for 20 MW at a particular time because of the regulatory limit that 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.

As an interim measure, the ISO allowed use of the RAAIM-exempt outage card for certain resources.<sup>9</sup> Use of this outage card is temporary and, pending the clarifications in this proposal, will no longer be allowed. As a result of these changes, the must-offer obligation and RAAIM exposure may not align for conditionally available resources during some hours.

To create a more durable solution, the CAISO will further explore how resources with uncertain availability should establish net qualifying capacity (NQC) values. The effective load carrying capacity (ELCC) methodology addresses this for wind and solar, and CAISO will continue to refine methods for other resource types, including hydro and hybrid resources. This process will involve more in-depth stakeholder engagement and coordination with the CPUC and other local regulatory authorities.

---

<sup>8</sup> For purposes of opportunity cost calculation, only the air permit limitation will be considered.

<sup>9</sup> These changes were made in PRRs 1168, 1169, and 1170.

## 4.4 Run-of-River Hydro

The output from run-of-river hydro is variable in some of the same ways as wind and solar resources. Market bids for wind and solar resources are capped at their expected energy forecast, have limited control on their maximum output, and are not subject to RAAIM. The CAISO finds that run-of-river resources should be treated in a similar fashion.

Run-of-river resources have very limited control of their output from one interval to the next. For example, a run-of-river hydro resource with a maximum output of 10 MW may be capable of producing anywhere between 0 MW and 7 MW given current river flow conditions. In the next interval, the resource may only be capable of producing between 0 MW and 3 MW based on existing flows. The resource producing at any point in the range of 0 MW and 7 MW during the earlier interval generally has no impact on the resource's output capability, of between 0 MW and 3 MW, in the next interval.

The ISO expects that run-of-river hydro resources will generally act as price takers and offer all generation capability into the market. Generally, when water is available, the resource will generate and earn market revenues, and when water is not available, the resource will not generate. These resources can generally respond to ISO dispatches to reduce energy output below the maximum possible allowed by current hydro flow conditions. The ISO often experiences low or even negative prices during spring months when solar is online, hydro generation is high, and loads are relatively low. During periods with negative prices, these resources may choose to 'spill' (not run) and forego negative revenue (charges) for generating energy not needed.

Run-of-river hydro resources are similar in nature to variable energy resources. Variable energy resources, such as wind and solar resources, are also generally considered price takers, in that when the wind is blowing or the sun is shining they produce energy and sell it in the market. These resources may also have the capability reduce their output in response to ISO dispatch instructions. These resources are required to bid into the market at their expected energy output, and bid flexibility in the downward direction, if possible. Like variable energy resources, run-of-river hydro resources are allowed to count for net qualifying capacity in the resource adequacy process, but do not count for their full nameplate capacity. Qualifying capacity for these resources is reduced based on historical performance, which is similar to how capacity is set for variable energy using the effective load carrying capacity methodology. As with wind and solar, a run-of-river unit that has reduced availability in recent years will be eligible to sell a reduced amount of capacity in the future. This creates an incentive, independent of RAAIM, for run-of-river resources to maximize availability. Counting rules will not change for run-of-river resources in this proposal compared to the current paradigm. Today run-of-

river resources determine qualifying capacity using the methodology for ‘non-dispatchable’ hydro resources, where three years of historic output is considered.

These factors are significant enough to qualify run-of-river resources for a RAAIM exemption. The ISO proposes new tariff language to define run-of-river hydro resources as RAAIM exempt. Run-of-river resources providing resource adequacy capacity will not, by default, have a unique must-offer obligation.

Similar to some wind and solar resources, run-of-river resources may also be shown as flexible resource adequacy. This is acceptable when these resources can curtail output when generating and can consistently bid their flexibility into the market.

Today, the ISO has third party software that computes forecast estimates for wind and solar resources. These forecast values are used to cap the dispatch instructions variable energy resources receive from the real-time market software. In addition to third party forecasts, the ISO also allows variable energy resources to submit their own forecasts to for expected output. It is unlikely that the ISO adopts a third party software for run-of-river hydro forecasting at any point in the future, because of the complexity of run-of-river resources, but might consider allowing scheduling coordinators to submit forecasts to the ISO.

The forecasts for variable energy resources today limit the upper end bound of where a resource can be dispatched in the real-time market. To indicate reduced ability to generate at the full capability of a resources, run-of-river resources will continue to have access to outage cards, the ability to update bids, and the ability to self-schedule generation into the market. Bids and self-schedules can be somewhat challenging to use because they must be submitted 75 minutes prior to the beginning of the operating hour, and are fixed over the course of the entire hour. Forecasts for variable energy resources are updated in real-time, and information that is calculated as little as 8 minutes prior to an operating interval may be applied to resource bids and ISO expectation for energy delivery. If a tool to accept run-of-river forecasts was implemented, this could allow the same functionality for run-of-river resources.

In defining run-of-river, the CAISO must address two issues: (1) how much pondage would disqualify a resource from being designated 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 upstream that can materially impact the generator’s operation.

**Pond storage**

The distinguishing feature of run-of-river compared to other hydro generating facilities is that electricity production from run-of-river at one point in time does not influence its generation capability at a later point. If a reservoir-backed hydro resource does not release water now to generate electricity, then it will have more water with which to generate electricity later.

This distinction, however, is not as simple as defining run-of-river as a hydro resource with no storage capability. The ISO understands all resources commonly thought of as run-of-river have some level of water storage. A minimal amount of storage is necessary to generate sufficient head pressure to operate the generating unit. Once the pond is large enough to “store energy” and permit the resource to make a trade-off between generating now or generating later, then the element of inherent variability is lost and the resource does not qualify as run-of-river.

### **Common control of water system**

A second issue is run-of-river resources are often part of a larger hydro system with multiple reservoir-backed hydro 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, then there is a question as to whether the run-of-river operator really lacks control over the unit’s output.

First, it would be difficult to define any generating resource based on the characteristics of a separate upstream resource. For example, if a reservoir-backed hydro resource upriver changes ownership, would that change whether the downstream resources under a different owner still qualify as run-of-river? The CAISO found it would raise too many other questions to allow run-of-river to be defined based on the ownership and operating characteristics of upstream, reservoir-backed generating units.

Second, the common operator of the run-of-river and reservoir-backed hydro units may not always have control over when it must release water from the reservoir. Sometimes the operator may hold regulatory requirements to hold or release water from the reservoir. Also, it would not necessarily control the flow of water into the reservoir. If it must release water because there is too much water flowing into the reservoir from natural waterways, then the release of water that influenced the generating output on the run-of-river unit arguably is beyond the operator’s control.

The CAISO does not believe it can administer a RAAIM exemption that accounts for these varied scenarios. The CAISO will not seek to define run-of-river hydro or determine its RAAIM exemption based on what other resources the operator of a given run-of-river resource may control.

**Proposed run-of-river definition**

Based on these considerations, the ISO proposes the following definition for run-of-river hydro.<sup>10</sup>

“A hydroelectric Generating Unit that 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.”

**Net qualifying capacity**

Similar to solar and wind resources, run-of river hydro resource can be beneficial to the system and reliable operations. They can also reduce the need to procure other resource adequacy resources. The ISO uses net qualifying capacity as an upper bound for the amount of capacity that resources can be shown for in the resource adequacy construct. The ISO will continue discussing how the net qualifying capacity for run-of-river hydro resources should be set. This will ensure that run of river resources do not qualify for more capacity than may be reasonable for them to provide, so that system reliability can be maintained given the shown resources through the resource adequacy process administered by the CPUC.

## 4.5 Hydro Resource Counting Rules

Each hydro resource in California is unique. Some of these resources are relatively simple to model and some are incredibly complex. Complications may include downstream or upstream flow requirements, environmental standards, water rights considerations and linkages with other hydro resources. It follows that models used by scheduling coordinators to optimize these resources may also be complex to the point that it is unrealistic, or potentially impossible, for ISO pricing models to capture the actual requirements for these resources to run. Such resources may not fit a use limited model. Further, if these resources were shown for full capacity in the resource adequacy process, they may be exposed to considerable financial penalties from the RAAIM mechanism. These concerns can arise even within the construct of the use limited resources with default energy bid adders.

---

<sup>10</sup> The CAISO considered the definitions from other ISOs/RTOs but did not find these met its specific needs. The New York ISO defines a “Limited Control Run-of-River Hydro Resource” as “A Generator above 1 MW in size that has demonstrated to the satisfaction of the ISO that its Energy production depends directly on river flows over which it has limited control and that such dependence precludes accurate prediction of the facility’s real-time output.”



SCE proposed a methodology to assign capacity values to hydro resources with storage, and proposed that this be computed by a 3-year weighted average of historical hydro availability. This suggestion was coupled with the understanding that hydro resources with these counting rules applied would not be subject to RAAIM penalties for conditions when water was unavailable to the resource for electricity production.

In the straw proposal the ISO suggested that if a suitable calculation could be agreed upon by interested parties, these counting rules could be proposed in the CPUC's resource adequacy proceeding for application in the 2021 RA compliance year. Further, the ISO supported allowing scheduling coordinators the ability to either select this new counting methodology, with the new RAAIM treatment, or using the current counting methodology with the existing RAAIM treatment.

In the straw proposal, the ISO suggested that this stakeholder process and working groups could be used to develop the counting rules. PG&E requested that any additional discussion about an alternate counting methodology for hydro resources occur with CPUC leadership. The ISO understands the optics of this suggestion and is willing to pursue these alternate counting rules in working groups organized and overseen by the CPUC. The ISO continues to advocate for an alternate counting methodology that considers past hydro performance and allowing resources that apply such a counting methodology RAAIM exemption for water availability related outages.

Treatment of outages related to mechanical failures at hydro resources that have the alternate counting methodology applied may continue to be subject to RAAIM. If these outages are not included in the calculations for the historic hydro resource availability, they should continue to be subject to RAAIM penalties.

## 4.6 Other Tariff Clarifications

The ISO will also update tariff language regarding how multiple internal resources can provide substitute capacity.<sup>11</sup> The rules for inclusion of external resources as substitute capacity for forced outages will be updated as well.<sup>12</sup>

---

<sup>11</sup> The updated language is in section 40.9.3.6.4 (d). Current language is identical to the language in 40.9.3.6.4 (c), which discusses substitution from a single resource, but should not be.

<sup>12</sup> The updated language is in section 40.9.3.6.5(d) of the tariff and will mirror language in section 9.2.3.2 of the Reliability Requirements BPM.

## 5. Next Steps

The ISO will host a public stakeholder call on February 4, 2020 beginning at 1:00pm. This call will be to review the clarifications outlined in this paper and associated tariff clarifications. The ISO will allow verbal comments during the call and written comments shortly afterwards so stakeholders can seek additional clarifications. All written comments are required by February 18. The ISO is planning to take this initiative to the ISO Board of Governors meeting for approval on March 25 and 26.

The ISO will work with the CPUC to set up an RA working group meeting, where an alternate counting methodology for hydro resources with storage can be discussed. The ISO will plan to attend these meetings and actively engage with the goal of developing a counting methodology that may be proposed by multiple parties as a recommendation for consideration within the RA proceeding. Accompanying approval of such a recommendation, the ISO will plan to allow resources that adopt this counting methodology RAAIM exemption for outages related to water availability.

Comments can be submitted in regard to this paper or the proposed tariff language to: [initiativecomments@caiso.com](mailto:initiativecomments@caiso.com).