



Memorandum

To: ISO Board of Governors

From: Mark Rothleder, Senior Vice President, Chief Operating Officer

Date: November 11, 2020

Re: **Decision on hybrid resources policy proposal**

This memorandum requires Board action.

EXECUTIVE SUMMARY

Interest in energy storage is significant and continues to grow as state and federal policy makers and regulators promote energy storage development to help decarbonize the grid. Throughout the West, it is expected that energy storage paired with wind and solar resources will be pursued to accommodate the retirement of natural gas and coal fired generation. In particular, the ISO has identified a potential shortfall of capacity to meet projected system net load peaks over the next few years because of pending retirements of the once-through cooled natural gas generation fleet. To address this shortfall, storage resource developers have submitted a significant number of interconnection requests and are moving quickly to fill the 3,300 MW procurement mandate from the California Public Utilities Commission prior to 2023. To meet this need, the ISO anticipates a significant amount of new storage generation capacity in California alone in 2020, 2021 and 2022.

Under the hybrid resources initiative, Management has developed two different market models for generation with different technology types located behind the same interconnection. The first option is the 'co-located' resources model and was approved by the Board in July. Under this model the resources behind the interconnection have separate resource IDs and are separately dispatched through the ISO market even though they may have a shared commercial interest. The second option, for which Management seeks Board approval now, is a model for 'hybrid' resources, where the generation resources are modeled under a single resource ID. The hybrid model allows for the underlying resources to be managed by the resource operator as opposed to the ISO. Management proposes market enhancements to allow for the effective management and dispatch under the hybrid resources model and some additional enhancements to the co-located resources model.

First, Management proposes new provisions for managing hybrid resources to allow them to provide both energy and ancillary services. The proposal also includes a dynamic limit tool that will enable the resource operators to communicate their maximum and minimum operating limits to the ISO in real-time. This tool will help the ISO ensure it is issuing feasible dispatches to hybrid resources participating in the market. Next, Management proposes additional functionality to enable co-located resources to provide ancillary services in addition to energy. Management is also expanding the co-located model to accommodate deviations from dispatch instructions under certain conditions to avoid renewable resource curtailments. Finally, Management's proposal includes a new requirement for telemetered data, called the high sustainable limit, from both hybrid and co-located resources that have a variable resource component. This information will help the ISO forecast the variable components of the hybrid and co-located resources.

This initiative falls within the advisory role of the EIM Governing Body and was presented to them during the November 4, 2020 EIM Governing Body meeting. The EIM Governing Body supports this initiative.

Management proposes the following motion:

Moved, that the ISO Board of Governors approves the tariff revisions necessary to implement the proposal for hybrid resources as described in the memorandum dated November 11, 2020; and

Moved, that the ISO Board of Governors authorizes Management to make all necessary and appropriate filings with the Federal Energy Regulatory Commission to implement the proposed deliverability methodology revisions, including any filings that implement the overarching initiative policy but contain discrete revisions to incorporate Commission guidance in any initial ruling on the proposed tariff amendment.

PROPOSAL

Ancillary service provision and expansion of the aggregate capability constraint for co-located resources

Management proposes to allow both hybrid and co-located resources to be certified to provide ancillary services. The co-located resources proposal approved by the Board in July includes new functionality for co-located resources to participate in the market where their combined energy delivery is constrained by the capability at their point of interconnection to the grid. This policy proposal expands on this capability and allows co-located resources behind a shared point of interconnection to participate in the ancillary service market. The aggregate capability constraint ensures that the combined energy output of co-located

resources does not exceed the capability of their shared point of interconnection. To allow adequate time for testing and vetting, the proposal only includes market awards for energy in the original specification of the aggregate capability constraint that will be implemented later this year. Management proposes to expand the aggregate capability constraint to also include market awards for ancillary services. This functionality will allow co-located resources to participate in both the energy and the ancillary service markets starting in the fall of 2021.

The Dynamic Limit Tool

A hybrid resource is modeled and operated as a single resource, but it can have multiple underlying generating types supporting it and operating at a single point of interconnection. Each technology type underlying a hybrid resource may have individual operational challenges. For example, variable energy resources may be unable to produce at full capability during all periods of an operating day, although these resources may have predictable operating patterns during the day. Similarly, storage resources are only capable of producing after they have been charged. A hybrid resource that has variable energy and storage components will have operational challenges given the different limitations of the underlying technology types. Management does not propose to extend the same functionality offered to independent variable energy resources to hybrid resources. For instance, unless given a curtailment instruction from the ISO, variable energy resources are allowed to produce as capable to account for variability in output, and the market software optimizes state of charge for storage resources. A hybrid resource will have neither market function, and will have requirements to submit bids to, and follow all dispatch instructions from, the ISO. Hybrid resources will be managed by their operator like other resources available for dispatch to fulfill market awards and commitments.

To account for the variable nature of hybrid resources, Management proposes to develop a new tool for hybrid resources to communicate their generating potential to the ISO. This information will support feasible dispatch instructions in real-time. Management proposes a dynamic limit tool that will be available to hybrid resources to specify the upper and lower operational limits for the resource for each five minute interval, going out three hours into the future.

Allowance for co-located storage to deviate from dispatch instruction

To ensure grid reliability by maintaining supply and demand balance, the ISO expects resources to respond and accurately follow dispatch instructions. During the stakeholder process, stakeholders requested that storage resources co-located with variable generation resources should be given an accommodation to deviate from dispatch instructions to manage the variable output of solar and wind co-located resource components. After considering this request, Management proposes to allow co-located storage resources to deviate from dispatch instructions in limited circumstances where the following criteria are met: 1) the co-located variable resource(s) are able to produce above their dispatch level, 2) additional variable generation above their dispatch level would result in violating the

aggregate capability constraint, and 3) the co-located storage resource is not providing ancillary services. Under these conditions, Management proposes to allow a co-located storage resource to deviate from its dispatch instruction and “back down” (charge more or discharge less) from its dispatch award.

Data Collection and the High Sustainable Limit

Management proposes a new obligation for co-located and hybrid resources with a wind or solar component to provide certain data to the ISO to help the ISO better operate these unique resources. Co-located resources are modelled as two independent resources, and they have data requirements as if they are stand-alone resources. Today, the ISO requires a suite of meteorological data submitted from variable energy resources, wind and solar, including forecast data that is used to estimate the output of these variable resources at any given time. Similarly, the ISO requires that storage resources provide state of charge data to the ISO, which the ISO uses to manage and accurately account for the state of charge for these resources. This policy will require hybrid resources that include either a variable energy or storage resource component submit relevant information about the hybrid resource to the ISO. For example, if a hybrid resource has a solar and storage component, the scheduling coordinator for that resource would be responsible for submitting both meteorological data for the solar component and state of charge data for the storage component of the resource.

Additionally, the ISO proposes to collect a new data field, called the high sustainable limit, for all co-located variable resources and each variable component of hybrid resources. The high sustainable limit estimates the maximum capability for a solar or wind resource at any specific time. This data point will help the ISO produce better forecasts for these resources. Today forecasts are partially based on the actual output of the variable resource and do not consider when the output is dispatched below full capability by the market. Once the high sustainable limit data is available, the ISO will have better visibility into the capability of the co-located resource throughout the operating day.

Application of the resource adequacy availability incentive mechanism to hybrid and co-located resources

Resources shown by load serving entities as resource adequacy resources are subject to the resource adequacy availability incentive mechanism. This provision compares a resource’s monthly availability to the fleet average availability. Resource adequacy resources that are available significantly less than the fleet average incur a charge, while resources that are available more than the fleet average receive a payment based on the charges collected. The intent of the resource adequacy incentive mechanism is to provide an incentive for resource adequacy resources to maximize their availability during months they are designated as resource adequacy resources. Variable energy resources are exempt from the resource adequacy mechanism. The primary reason for the exemption is that their resource adequacy capacity value is based on their historical output (expected load carrying capability methodology) which accounts for their variable nature. Applying the

resource adequacy incentive mechanism would result in double penalizing these resources for their availability.

For co-located resources, the application of the resource adequacy availability incentive mechanism is straightforward. The variable energy resource component is exempt while the incentive mechanism is applied to the storage component. On the other hand, complications arise for hybrid resources which have a single resource ID for the aggregated resources. The CPUC has established the hybrid resources resource adequacy capacity value as the combined value of the variable energy resource and the storage resource. The variable energy resource component capacity value is discounted through the expected load carrying capability methodology and is then combined with the storage component capacity value. Applying the resource adequacy incentive mechanism to hybrid resources would result in potentially double penalizing the variable energy resource component for its availability. Moreover, it would require complex settlement provisions that the ISO would have to implement to separate the application of the incentive mechanism to the storage component of a hybrid resource. Therefore, Management proposes to exempt hybrid resources from the resource adequacy incentive mechanism. This exemption will be in place until the resource adequacy incentive mechanism is replaced with the unforced capacity value methodology (UCAP) currently be developed in the resource adequacy enhancements initiative.

STAKEHOLDER POSITIONS

Stakeholders are generally supportive of the hybrid resources policy and also agree with Management's proposal to move quickly to adopt the proposed hybrid resources models so that new resources coming onto the market will be able to utilize these tools upon interconnection or shortly thereafter. Further, stakeholder feedback was integral for developing provisions to allow co-located storage resources the ability to deviate from dispatch instructions and for determining how best to use the dynamic limit tool to reduce the reliance on the outage management system. However, stakeholders continue to make requests to enhance the functionality proposed in this initiative.

Stakeholders requested allowances for co-located storage to deviate from dispatch instructions to provide additional energy when on-site renewables are producing less than forecast. This would be an additional allowance to what is already included in this proposal. Management understands the desire for additional functionality but is concerned that this specific request could result in reliability concerns. Allowing storage resources to deviate from dispatch and charge less or discharge more in any given interval will potentially result in lower state of charge values for storage resources than anticipated by our market software, which could in turn lead to reliability issues.

Stakeholders also asked a number of questions and for additional clarity around the treatment of hybrid resources within the resource adequacy construct. In particular, several stakeholders raised concerns about the different application of the resource adequacy availability incentive mechanism to co-located and hybrid resources.

Management believes that the different application is justified to not double penalize the variable energy resource component of the hybrid resources and to avoid complex and costly implementation of settlement provisions that would be required to apply the incentive mechanism to hybrid resources. Moreover, the exemption is only expected to be in place for a short period until new availability incentives are implemented as part of the resource adequacy enhancements initiative. This policy will consider how all resources, including hybrid and co-located resources, will count for unforced capacity, or UCAP, values applied under the new paradigm. This policy also will determine bidding rules and obligations for all resources in the future. Management encourages stakeholders engaged in the hybrid resources initiative to also follow policy development in the resource adequacy enhancement initiative for details about treatment of these resources in the resource adequacy market in the future.

CONCLUSION

The ISO is experiencing rapid growth in the amount of storage resources on the system, many of which will be modeled as either co-located or hybrid resources. It is essential that the ISO develop and implement market rules for these resources quickly to accommodate the influx of new resources. This policy advances models for both configurations and puts necessary tools in place for reliable operation of these resources on the grid.