

**UNITED STATES OF AMERICA  
BEFORE THE  
FEDERAL ENERGY REGULATORY COMMISSION**

**California Independent System )  
Operator Corporation )**

**Docket No. ER21-2853-000**

**MOTION TO INTERVENE AND COMMENTS  
OF THE DEPARTMENT OF MARKET MONITORING  
OF THE CALIFORNIA INDEPENDENT SYSTEM OPERATOR CORPORATION**

Pursuant to Rules 212 and 214 of the Rules of Practice and Procedure of the Federal Energy Regulatory Commission (“FERC” or “Commission”), 18 C.F.R. §§385.212, 385.214, the Department of Market Monitoring (“DMM”), acting in its capacity as the Independent Market Monitor for the California Independent System Operator Corporation (“CAISO”), submits this motion to intervene and comment in the above-captioned proceeding.

**I. MOTION TO INTERVENE**

DMM respectfully requests that the Commission afford due consideration to these comments and motion to intervene, and afford DMM full rights as a party to this proceeding. Pursuant to the Commission’s Order 719, the CAISO tariff states “DMM shall review existing and proposed market rules, tariff provisions, and market design elements and recommend proposed rule and tariff changes to the CAISO, the CAISO Governing Board, FERC staff, the California Public Utilities Commission, Market Participants, and other interested entities.”<sup>1</sup> As this proceeding involves CAISO tariff provisions that would affect the efficiency of CAISO markets, it implicates matters within DMM’s purview.

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<sup>1</sup> CAISO Tariff Appendix P, Section 5.1.

## II. SUMMARY

In this filing, the CAISO proposes tariff changes to clarify market rules for hybrid and co-located resources.<sup>2</sup> Specifically, these proposed tariff changes include:

- Clarification that scheduling coordinators for hybrid resources will have similar roles and responsibilities as scheduling coordinators for other resources;
- The introduction of a dynamic limit functionality in the real-time market as a bidding functionality enhancement to support market participation of hybrid resources;
- Clarification of resource adequacy rules related to hybrid resources;
- Provisions to allow the use of multiple aggregate capability constraints by co-located resources at a single generating facility.

DMM supports the proposed clarifications of roles and responsibilities of scheduling coordinators for hybrid resources, the proposed dynamic limit bidding functionality enhancement for hybrid resources, and the proposal to allow the use of multiple aggregate capability constraints at a single generating facility. DMM does not oppose the proposed clarification of resource adequacy rules related to hybrid resources, but we suggest that it may be appropriate to revisit some resource adequacy rules as a future enhancement, should CAISO observe demonstrably less flexibility from a single hybrid resource than would be obtained by modeling the underlying components as separate resources.

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<sup>2</sup> *California Independent System Operator Corporation Hybrid Resources and Co-located Resources*, California Independent System Operator Corporation, Docket No. ER21-2853-000, (“Transmittal Letter”).

### III. COMMENTS

#### **Hybrid resource scheduling coordinators similar roles and responsibilities as scheduling coordinators for other resources**

CAISO's proposal clarifies that scheduling coordinators for hybrid resources will have similar roles and responsibilities as scheduling coordinators for other resources. DMM supports these tariff revisions, specifically those that require the submission of data necessary to ensure operational reliability and robust monitoring of market participation.

The proposal specifies that scheduling coordinators for hybrid resources may include various applicable operating constraints in their Master File parameters, similar to other resources. Additionally, CAISO proposes tariff rules that require scheduling coordinators for hybrid resources to provide the CAISO with data regarding the capacity and the operating characteristics of the resource's components when periodically requested by CAISO. Further, CAISO proposes more specific data requirements for hybrid resources to provide real-time operational capability data, meteorological data, and storage component state of charge.

Hybrid resources with a variable energy component, and co-located eligible intermittent resources, must provide their high sustainable limit through telemetry. As CAISO states in the Transmittal Letter, the high sustainable limit is a real-time estimate of the maximum output capability of a variable energy resource or the variable component of a hybrid resource based on the resource's physical properties and the fuel available to the resource based on current weather conditions.<sup>3</sup> CAISO also proposes that hybrid resources with variable energy components will need to provide meteorological and other information similar to that required of eligible intermittent resources. These data allow the CAISO to forecast the likely output of hybrid resource renewable components. Finally, CAISO proposes

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<sup>3</sup> Transmittal Letter, pg. 9

that hybrid resources that include an energy storage component must provide the energy storage component's state of charge to the CAISO through telemetry.

DMM supports the specific data requirements proposed for scheduling coordinators of hybrid resources to fully assess operational capabilities, including meteorological and forecast data, storage component state-of-charge data, and the high sustainable limit. These data will provide maximum transparency to ensure operational reliability and facilitate robust monitoring of hybrid resource market participation and are especially important for monitoring purposes in the context of the proposed dynamic limit functionality discussed below.

### **Proposed bidding functionality enhancements**

CAISO proposes to enhance bidding functionality for hybrid resources by allowing scheduling coordinators to submit a dynamic limit in the real-time market. CAISO proposes this dynamic limit functionality to better reflect the operating capability of the hybrid resource in the real-time market.

DMM supports this enhancement, but notes the proposed dynamic limit affords significant flexibility to scheduling coordinators. Because of this flexibility, the data requirements proposed by CAISO, and discussed in the previous section of these comments, will be especially important to facilitate monitoring of dynamic limits submitted by scheduling coordinators.

CAISO clarifies in the Transmittal Letter that hybrid resources will be expected to submit bids and self-schedules and also follow all dispatch instructions, as is expected of other generating resources. However, CAISO recognizes that hybrid resources may face

operating limitations at different points in the day that may not be well reflected in the market.

To allow hybrid resource operators to better reflect the near term capability of the hybrid resource in the CAISO market optimization, CAISO proposes to implement dynamic limit functionality for hybrid resources. As described in the Transmittal Letter, this functionality will allow scheduling coordinators to specify the upper and lower operational limits for the resource for each five-minute interval, over a rolling six-hour forward time horizon. Scheduling coordinators will update dynamic limits once every five minutes.<sup>4</sup> CAISO states that dynamic limits should reflect the physical capabilities of the resource, but may also be used to manage onsite charging of energy storage components.<sup>5</sup>

DMM supports the CAISO's proposed dynamic limit functionality. However, this scheduling coordinator submitted value allows significant latitude for hybrid resource operators to reflect a variety of resource limitations. While the degree of flexibility provided by the dynamic limit may be necessary to capture all constraints and operational objectives of hybrid resources, the flexibility afforded by the dynamic limit functionality also creates significant potential for its use to strategically withhold capacity. Because of this, DMM views CAISO's proposed requirements to provide operational capability data for individual hybrid resource components as especially important. These data will help to ensure transparency and integrity of values submitted by hybrid resource operators.

As a future enhancement, DMM suggests that CAISO could consider automating the dynamic limit by using data on hybrid resource component physical generating

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<sup>4</sup> Transmittal Letter, pg. 14.

<sup>5</sup> Ibid.

capabilities, and data flags to indicate when the hybrid resource operator engages in, or projects to engage in, onsite charging of energy storage components.

The dynamic limit submitted by scheduling coordinators as proposed does not distinguish when the limit is a true physical limitation or when the limit is in place to facilitate onsite charging. Automating the hybrid dynamic limit as a future enhancement would improve transparency while also indicating to CAISO operators when the hybrid dynamic limit could potentially be relaxed if needed for reliability purposes.

### **Resource adequacy rules related to hybrid resources**

CAISO proposes two clarifications to resource adequacy rules for hybrid resources. First, CAISO proposes to exempt hybrid resources from exposure to resource adequacy availability incentive mechanism (RAAIM) penalties. Second, CAISO proposes that the effective flexible capacity (EFC) value of a hybrid resource, used to determine a resource's flexible resource adequacy capacity value, will be the sum of what the EFC values of the constituent components of the hybrid resource would be if those components were each a distinct generating unit.

DMM does not oppose either of these proposed clarifications. However, DMM notes that an alternative approach to calculating EFC for hybrid resources may be appropriate as a future enhancement, should CAISO observe loss of flexibility when separate generation components are modeled as a single resource.

### ***Exempting hybrid resources from RAAIM penalties***

As CAISO notes in the Transmittal Letter, the California Public Utilities Commission (CPUC) established that the resource adequacy capacity value for hybrid

resources is the combined value of the resource adequacy capacity values of the underlying generation components.<sup>6</sup> The resource adequacy capacity of variable energy resources is based on historical performance, and accounts for their variable nature. Poor performance will ultimately affect the resource adequacy capacity credit available to these resources. Therefore, a hybrid resource that includes a variable energy resource component would have a resource adequacy capacity value at least partially impacted by past poor performance by way of the variable energy resource component.

DMM agrees with the CAISO that subjecting these resources to RAIM could double penalize a portion of the hybrid resource capacity. DMM also appreciates that appropriate determination of RAIM penalties for hybrid resources could be significantly complicated by the fact that, under the current CAISO tariff, variable energy resources are not subject to RAIM while energy storage resources are subject to RAIM. Therefore, DMM does not oppose CAISO's proposal to exempt hybrid resources from RAIM penalties.

### ***Proposed calculation of effective flexibility capacity (EFC) for hybrid resources***

CAISO proposes to determine the flexible resource adequacy capacity of a hybrid resource by calculating the EFC value of a hybrid resource as the sum of the EFC values for each of the separate generating components. CAISO states that this is appropriate because it is analogous to the EFC treatment of co-located resources and energy storage resources.<sup>7</sup> Energy storage resources can typically count flexible resource adequacy

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<sup>6</sup> Transmittal Letter, pg. 16

<sup>7</sup> Ibid

capacity for the full operational range of the resource, and CAISO states that hybrid resources may provide flexibility similar to energy storage resources.

DMM does not oppose CAISO's proposed approach to calculating EFC for hybrid resources, where hybrid resources provide flexibility equal to the sum of the flexibility provided by the individual generation components. However, should CAISO observe hybrid resources that have demonstrably less flexibility than would be obtained from modeling the underlying hybrid resource components as separate generators, it may be appropriate for CAISO to consider an alternative calculation of EFC as a future enhancement.

### **Multiple aggregate capability constraints at a single generating facility**

DMM supports CAISO's proposal to allow multiple aggregate capability constraints (ACCs) at a single generating facility. This proposal facilitates the market participation of multiple sets of co-located resources located behind a single point of interconnection with different project off-takers. The proposal balances the benefits of ensuring that dispatch instructions to hybrid resources are within private contractual limitations with the need to ensure that physical transmission system and equipment limits are also enforced. The proposal balances these objectives in a way that protects reliability and is designed to maximize efficient use of available interconnection and resource capacity during tight system conditions.

### ***Relaxation of aggregate capability constraints***

CAISO's proposal for allowing multiple ACCs at a single generating facility or point of interconnection is constructed of "master" and "subordinate" ACCs. The master ACC



ensures reliability by protecting the total interconnection limit. CAISO proposes that the master ACC not be subject to relaxation by the market optimization. However, CAISO proposes that following an initial implementation period, subordinate ACCs may be subject to relaxation at a high penalty price, above the energy bid cap, in order to avoid power supply shortages.

DMM supports the ISO's proposed approach to allow relaxation of subordinate ACCs to resolve power supply shortages. DMM understands that parties may have entered contractual arrangements to prevent one off-taker from utilizing more than its allotted share of the total interconnection limit, as this could prevent other off-takers from accessing their full share of the interconnection limit. As DMM understands, CAISO's proposal to allow relaxation of subordinate ACCs would not threaten parties' access to contractually allocated shares of interconnection rights.

As DMM understands CAISO's proposal, relaxation of subordinate ACCs would not result from the bidding behavior of a given set of co-located resources. Further, DMM understands that the amount of the relaxation of a subordinate ACC should not exceed the amount by which other co-located resources at the same point of interconnection are unable to produce output up to their respective subordinate ACC limits. When all co-located resources behind a point of interconnection are physically available and have economic bids up to the limit of the applicable subordinate ACC, subordinate ACCs will not be relaxed by the market optimization. A subordinate ACC could only be relaxed when needed to achieve power balance and the capacity of another set of co-located resources behind the same point of interconnection is not physically available, or does not have economic bids or self-schedules up to the limit of its subordinate ACC.

### ***Efficiency implications of subordinate aggregate capability constraints***

As contractual constraints that may not reflect the full physical capability of co-located resources, subordinate ACCs have potential to impact the efficient market dispatch of co-located resources. This can occur, for example, when resources behind a subordinate ACC have additional physical output capability, but have their output limited by a subordinate ACC. In this situation, a portion of the resources' physical capacity is stranded by the ACC.

When a subordinate ACC cannot be relaxed by the market optimization for purposes of economic optimization, this situation may lead to the dispatch of a higher cost resource to provide an amount of energy equivalent to that which could have been provided at lower cost by the resources that are contractually constrained by the subordinate ACC.

Because of this potential for inefficiency, DMM believes it will be important to closely monitor the impact of subordinate ACCs on market dispatch of co-located resources. Should these impacts on market dispatch lead to significant observed inefficiency, DMM suggests that it may be appropriate for CAISO to revisit the details of the subordinate ACC design at a later date.

While contractually driven subordinate ACCs have the potential to create market inefficiencies as described above, DMM ultimately supports CAISO's proposal as a tool to facilitate the integration of new resource technologies and much needed new capacity on the CAISO grid.

DMM acknowledges that under current market rules, in the absence of CAISO's proposed subordinate ACCs, physically separate resources controlled by different off-

takers could instead enforce contractual limitations by establishing a maximum output value (P<sub>MAX</sub>) on their resources that may be less than the full physical capability of the resources. In this situation, the established P<sub>MAX</sub> value would then be appropriately reflected in the resource adequacy capacity value of the resource, aligning with the amount of capacity the resource can provide to the CAISO grid.

Compared to the alternative of establishing restricted P<sub>MAX</sub> values for each co-located resource, subordinate ACCs may ultimately result in more efficient use of co-located resource capacity when the combined output of a pair of co-located resources exceeds the contractually allocated share of the total interconnection rights at the generating facility.

Analogous to the case of a single set of co-located resources behind a single ACC, the use of ACCs allows the sum of P<sub>MAX</sub> values on a set of co-located resources to exceed the allotted interconnection rights, while still respecting an interconnection rights limit. This is more efficient than the alternative of restricting the sum of P<sub>MAX</sub> values to the contractually allocated portion of the interconnection rights limit. Like the master ACC in the case of a single set of co-located resources, the subordinate ACC allows production from any combination of the co-located resources that may be available at a given time, up to the ACC limit. This approach avoids stranding capacity from any of the individual resources behind a shared ACC as may result when the sum of P<sub>MAX</sub> values for co-located resources must be limited to the interconnection rights limit.

A subordinate ACC is intended to respect a contractual share of interconnection rights, rather than the total interconnection limit enforced by the master ACC. However, both types of constraint create efficiency gains by helping to avoid stranded capacity on

resources that may otherwise restrict their PMAx values in order to honor interconnection rights.

#### **IV. CONCLUSION**

DMM respectfully requests that the Commission afford due consideration to these comments as it evaluates the proposed tariff provisions before it.

Respectfully submitted,

**By: /s/ Adam Swadley**

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Independent Market Monitor for the  
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Dated: September 29, 2021

## CERTIFICATE OF SERVICE

I hereby certify that I have served the foregoing document upon the parties listed on the official service lists in the above-referenced proceedings, in accordance with the requirements of Rule 2010 of the Commission's Rules of Practice and Procedure (18 C.F.R. § 385.2010).

Dated at Folsom, California this 29<sup>th</sup> day of September, 2021.

*Jennifer Shirk*

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