November 20, 2020

The Honorable Kimberly D. Bose
Secretary
Federal Energy Regulatory Commission
888 First Street, NE
Washington, D.C. 20246

Re: California Independent System Operator Corporation
Pseudo-Ties of Shared Resources
Docket No. ER21-____-000

Dear Secretary Bose:

The California Independent System Operator Corporation (CAISO)[1] respectfully requests the Commission accept changes to its tariff that permit a share of a resource to be pseudo-tied to the CAISO balancing authority area. This amendment removes the current tariff-based limitation that requires delivery of the entire output of a pseudo-tied resource to the CAISO balancing authority area, and provides the framework for a pseudo-tie of a shared resource to participate in the CAISO markets. Allowing pseudo-ties of shared resources will provide an alternative to the dynamic schedules that currently are the only option for participation in the CAISO markets by shared resources in other balancing authority areas and will avoid the modeling and pricing issues associated with interactions between dynamic schedules and energy imbalance market (EIM) transfers. These tariff enhancements will also expand opportunities for shared resources to participate in CAISO markets.

Pseudo-tying shared resources raises issues not present when a single owner has responsibility for all operational and financial consequences of operating the entire pseudo-tied resource. This amendment therefore includes additional requirements applicable to pseudo-ties of shared resources, including the obligation to designate a scheduling coordinator that will administer the resource allocation protocol so the resource allocation of a pseudo-tied share is consistent with CAISO requirements. These additional requirements address outage allocation, metering and telemetry, bid cost recovery, and oversight and enforcement. Stakeholder comments were supportive of the final proposal, and the initial concerns raised by Department of

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1 The CAISO submits this filing pursuant to section 205 of the Federal Power Act ("FPA"), 16 U.S.C. § 824d. Capitalized terms not otherwise defined herein have the meanings set forth in the Master Definitions Supplement, Appendix A to the currently effective ISO tariff.

Market Monitoring on earlier proposals for pseudo-ties of shared resources were addressed in the final proposal and tariff provisions.

The CAISO requests the Commission issue an order accepting these tariff changes effective January 30, 2021. The requested effective date is necessary to ensure the CAISO can have the requisite measures in place to support pseudo-ties of shared resources concurrent with the onboarding of new EIM entities that require this capability to participate starting in April of 2021. It is critical for the parallel operations period that commences on January 30, 2021 to include the network model configuration and master file registrations that will be implemented in production approximately 60 days later.[2] Having a Commission order by the requested effective date will provide the necessary certainty for the EIM entities and the CAISO concerning any pseudo-ties of shared resources at the start of parallel operations.

I. Background

The CAISO facilitated a dynamic transfer stakeholder process in 2010-2011 that established the current rules for dynamic schedules and pseudo-ties to the CAISO balancing authority area.[3] These rules permit shares of resources to dynamically schedule but not pseudo-tie. In 2014, the CAISO implemented the energy imbalance market, and that market has now expanded to include numerous balancing authorities in the Western Interconnection. Several balancing authority areas that participate in CAISO's EIM have joint ownership shares of EIM participating resources, which transfer between balancing authority areas using pseudo-ties. Some of these EIM entity balancing authority areas also have resources that dynamically schedule to the CAISO balancing authority area. Dynamic schedules and pseudo-ties are similar, with the primary distinction being that dynamic schedules remain part of the host balancing authority area's resource portfolio, whereas pseudo-ties fall under the resource portfolio of the attaining balancing authority area.

Dynamic schedules and pseudo-ties from an EIM entity balancing authority area to the CAISO balancing authority area have different implications for real-time interchange accounting and the accounting for dynamic schedules in parallel with EIM transfers. These interactions can cause data conflicts in real-time.[4] Specifically in the case of economic bidding in real-time by dynamic schedules from an EIM entity balancing authority area, there can be conflicts with EIM transfers, and the real-time

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2 *See* CAISO Tariff section 29.2(b)(4)(B) (requiring 30 days of parallel operations in support of a readiness certification filing 30 days prior to the EIM implementation date, for a total of 60 days).

3 CAISO Tariff, Appendix M (containing the rules applicable to dynamic schedules) and CAISO Tariff, Appendix N (containing the rules applicable to pseudo-ties); *California Independent System Operator Corp.,* 136 FERC ¶ 61,239 (2011).

4 Section II *infra* describes this data conflict in more detail.

interchange accounting can affect market pricing and dispatch.[5] Essentially a dynamic schedule becomes a parallel dynamic transfer that could be priced differently from the implicit price of the EIM transfer's reflection of the bids from all EIM participating resources in the EIM entity balancing authority area. This interaction could result in some inconsistency between dispatches and bids for the dynamically scheduled resources, and these inconsistencies cannot be resolved through post hoc accounting adjustments. Converting a dynamically scheduled resource to a pseudo-tie avoids the market inefficiency that could otherwise materialize if the resource continues to be dynamically scheduled. Similar data conflicts do not occur with pseudo-ties because the pseudo-tie logically transfers the resource from the EIM entity balancing authority area to the CAISO balancing authority area, and the resource is therefore no longer included in the interchange accounting between the two balancing authorities.

There are some balancing authorities preparing to join the EIM in April 2021 that host shared resources currently dynamically scheduled into the CAISO balancing authority area, which would cause the data conflicts noted above after joining the EIM because these resources economically bid in the day-ahead and real-time markets.[6] This amendment will allow resource shares currently dynamically scheduling to the CAISO balancing authority area the option to convert to a pseudo-tie and avoid these anticipated data conflicts. The CAISO recommends pseudo-ties rather than dynamic schedules from EIM entity balancing authority area resources with economic bids, and proposes this amendment to facilitate this objective.[7]

II. Need for Pseudo-Ties of Shared Resources

This section describes the sub-optimal impacts economic bidding from dynamic schedules can have on real-time interchange accounting and the data conflicts this causes for dispatch and pricing, which pseudo-ties can avoid. The figure below depicts the difference between dynamic schedules from EIM resources versus resources located in non-EIM balancing authority areas:

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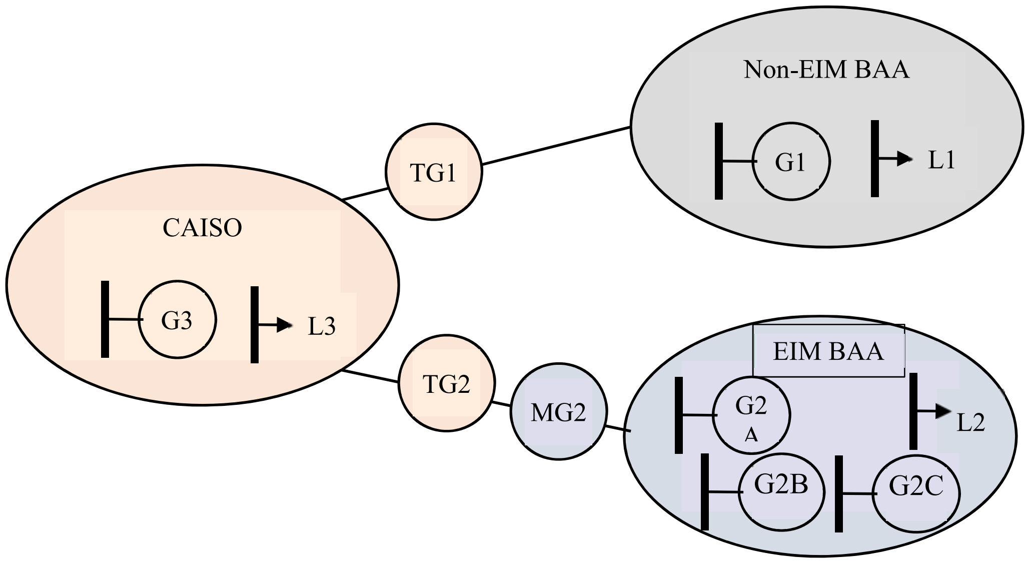
[5] These sorts of data conflicts do not affect dynamic schedules if they are self-scheduled or represent variable energy resources because telemetry determines the dispatch. These options will continue to be available for dynamic scheduling and do not cause data conflicts. Economic bidding by dynamic schedules also remains available, but scheduling coordinators representing dynamic schedules and the EIM entities that are their host balancing authority areas may be affected by the data conflicts.

[6] Los Angeles Department of Water and Power will join EIM in the spring 2021 and currently is the balancing authority for the shared ownership arrangements associated with Intermountain Power Plant and other resources, along with the Public Service Company of New Mexico, which similarly has shared ownership arrangements with some resources in its balancing authority area.

[7] This inconsistency in modeling would affect any balancing authority area in the EIM area, while the conflict with dynamic schedules does not occur with a non-EIM balancing authority area because there is no EIM transfer.



A dynamic schedule from generator G1 in the non-EIM balancing authority area is subject to an intertie scheduling constraint across the CAISO boundary, which is modeled as part of the non-EIM sources flowing through tie gen 1 (TG1). The EIM balancing authority area has a more complete representation, recognizing that in addition to a dynamic schedule from generator G2A, the balancing authority area also contains other generators, represented as G2B and G2C. Collectively, G2A, G2B, and G2C form an aggregation of generation which produces a locational marginal price as the weighted average price of the individual resources. Schedules to the CAISO from generators in the EIM balancing authority area and other resources wheeled through the EIM balancing authority area are subject to an intertie scheduling constraint at tie gen 2 (TG2). Resources in the EIM balancing authority area are modeled at their locations and count as supply, but because part of this supply supports exports from the EIM balancing authority area, a "mirror" resource is needed to account for the export and match TG2's imports to the CAISO (MG2).[8]

The schedules modeled at both TG1 and TG2 are part of the calculation of the CAISO's net scheduled interchange, whereas those modeled through MG2 are part of the EIM balancing authority area's net scheduled interchange. Because the non-EIM balancing authority area is not part of the EIM, the CAISO does not model its net scheduled interchange. In addition to the intertie scheduling constraints and the physical transmission limits that apply throughout the market area, EIM transfers are subject to transfer limits. If the EIM transfer limit between the CAISO and the EIM entity balancing authority area constrains the transfers, the respective power balance

[8] *See* CAISO Tariff section 29.27(c) (providing for mirror system resources); *see also California Independent System Operator Corp.,* 162 FERC ¶ 61,120 (2018) (accepting the automation of mirror system resources as a proposed enhancement to the EIM).

constraints affect the locational marginal prices of all resources within each balancing authority area.

These differences in modeling do not affect dynamic schedules if they are: (1) self-scheduled because self-schedules can be represented in base schedules and are not dispatched through EIM, or (2) variable energy resources whose dispatch uses forecasts based on their telemetered output and can be tracked in the net scheduled interchange for the EIM entity balancing authority area. On the other hand, if the market dispatches economic bids from a dynamic schedule without manual intervention from the EIM entity to adjust its EIM transfers to match the CAISO's dispatch, these modeling differences can affect settlements. However, when a resource participates as a pseudo-tie instead of a dynamic schedule, these issues do not occur because the pseudo-tie becomes part of the attaining balancing authority area subject to the physical transmission limits and intertie scheduling constraint, not the EIM transfer limit. This avoids the identified impacts on the dispatch of the resource and corresponding settlements.[9]

III. Proposed Tariff Modifications

This amendment removes the current tariff-based limitation that requires delivery of the entire output of a pseudo-tie resource to the CAISO balancing authority area,[10] and provides the framework for a pseudo-tie of a shared resource to participate in the CAISO markets.[11] The CAISO proposes to model each share of a pseudo-tied resource as a separate market resource, which would consist of a simple generator with a non-negative minimum load, start-up and minimum-load costs, and a single operating range.[12] This amendment does not address all issues of modeling raised by

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9 A pseudo-tie to the CAISO must have firm transmission between its source and the CAISO's scheduling point, so its transmission capacity would not be included in the EIM transfer limit.

10 This amendment does not restrict the ability of market participants to continue dynamically scheduling all or a portion of their resources from EIM entity balancing authority areas to the CAISO balancing authority area. The identified dispatch and pricing impacts of dynamic scheduling are real, but not unmanageable. Nonetheless, the CAISO recognizes that economic bids by dynamic scheduled resources from an EIM entity balancing authority area could create issues for both the market participant and the EIM entity.

11 CAISO Tariff, Appendix N, Sections 1.2.1.2 and 1.2.1.10 require the total output of a pseudo-tie generating unit to be telemetered to the CAISO through a pre-determined intertie where it competes in the market's congestion management. The CAISO's metering requirements at the time the dynamic transfer requirements were developed required generation, including pseudo-ties, to be directly polled, which meant that only full physical resources could be pseudo-ties because the resource was metered at the generation boundary and could not be split into multiple shares. Since then, the CAISO modified its tariff to allow scheduling coordinators to submit meter data in a form that does not require direct polling.

12 Some other independent system operators and regional transmission organizations also support market participation by pseudo-tie resources representing less than the entire output of the generating facility, including resources providing capacity for resource adequacy. *See, e.g.,* PJM Manual 12,

the sharing of physical characteristics among multiple pseudo-tied shares. Modeling of all physical characteristics requires technology development and settlement changes that will take much longer than the time available for EIM entity implementations planned for April 2021. The CAISO's market initiatives roadmap therefore includes future consideration of a comprehensive modeling solution that will allow for improved alignment of the market model with the operation of shared resources to alleviate some of the potential operational challenges and address related settlement implications.[13] Postponing the reasonable initial step proposed by this amendment would preclude stakeholders interested in a pseudo-tie for their share of a resource upon implementation of their host balancing authority into the EIM the opportunity to avoid the data conflicts outlined above while the CAISO and stakeholders worked on a more comprehensive modeling solution. The incremental step proposed in this amendment facilitates pseudo-ties of shared resources providing market benefits and meeting the immediate needs of stakeholders, while establishing a starting point for the path forward to develop future enhancements that will address other identified joint owned unit modeling and settlement issues.[14]

Creating pseudo-ties of shared resources in any event raises issues not present when a single owner has responsibility for all operational and financial consequences of operating the entire pseudo-tied resource. When there are multiple shares, the modeling and management of the resource is more complex. This amendment therefore includes additional requirements, including the obligation to designate a single scheduling coordinator that will act as the coordinator and operator of the overall resource consistent with collective expectations for the resource.[15] Designating an administrator as the representative for the set of resource shares will maintain the chain of responsibilities to follow the CAISO tariff that existing agreements provide. Each shared pseudo-tie generating unit will remain subject to all CAISO tariff requirements, contractual terms, and business practices that are applicable to generating unit participation in the CAISO markets. In addition, shared pseudo-tie

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Balancing Operations, Version 41, Attachment F, Dynamic Transfers, pgs. 100-106 (March 26, 2020) (providing for partial unit transfers).

[13] A comprehensive joint ownership modeling policy initiative is currently in the roadmap for a stakeholder initiative in 2022, for implementation in 2023. *See* CAISO Final Policy Initiatives Roadmap 2020, page 20, at http://www.caiso.com/Documents/2020FinalPolicyInitiativesRoadmap.pdf.

[14] The amendment proposes a framework for pseudo-ties of shared resources almost identical to the framework included in the split resource participation agreement between the CAISO and Calpine Sutter Energy Center, which the Commission accepted earlier this year. *California Independent System Operator Corp.,* 171 FERC ¶ 61,262 (2020). The primary difference between the amendment and the agreement concerns the addition of the noted tariff provisions that provide procedures for the CAISO suspension and termination enforcement mechanisms, whereas the agreement included the opportunity for the CAISO to file a request for termination.

[15] Designating an administrator as the representative for the set of owners, will maintain the chain of responsibilities to follow the CAISO tariff that existing agreements provide.

generating units must have an allocation protocol that provides for sharing the resource consistent with the requirements proposed in this amendment. The CAISO anticipates existing operating agreements probably already contain the required framework for this administration and translation into a protocol document as required by the tariff revisions.[16]

The following summarizes the tariff revisions proposed in this filing, primarily set forth in revised Appendix N to the CAISO tariff.

A. Shared Resource Allocation Protocol

A scheduling coordinator must represent a resource that participates in any CAISO market, including any share of a resource. Any share of a resource that will be pseudo-tied to the CAISO balancing authority area must also operate according to an allocation protocol administered by a scheduling coordinator. During the pseudo-tie implementation process, the CAISO will review, among other things, the allocation protocol to confirm compliance with specific requirements. Because the CAISO does not now propose enhancements that would allow for modeling of jointly owned and operated configurations of multiple shares of resources, the protocol administrator must ensure the resource output is consistent with the CAISO dispatch instruction separately issued to each pseudo-tie share of the resource.

Each scheduling coordinator representing an ownership share that participates in a CAISO market must assume the financial and operational responsibility for its share. Any share of a resource that will be pseudo-tied to the CAISO balancing authority area must also assume the financial consequences associated with operation as a simple generating unit. For example, the CAISO may issue a dispatch instruction to a share of a resource participating in EIM and a separate dispatch instruction to a share participating in the CAISO real-time market via pseudo-tie, which together require the resource to transition through what otherwise would have been a forbidden region, or a configuration change for a multi-stage generator.[17] The protocol administrator will be responsible for ensuring (1) the sum of the resource shares' maximum capability does not exceed the physical capability of the plant and (2) the sum of the ramp rates and any other operational characteristic of each shared resource is not beyond the capability of the plant. The collective pseudo-tie shares of such a resource may address such operational circumstances in an allocation protocol consistent with the CAISO tariff requirements, but each share will remain responsible

[16] The CAISO does not intend to make individual resource allocation protocols public as they may include confidential information. Instead, the CAISO proposes to require the shared resource to reflect key attributes in its Pseudo-Tie Participating Generator Agreement including telemetry, metered output, minimum output levels, minimum load costs, start-up costs, and maximum output levels.

[17] The protocol administrator can simultaneously receive each share's dispatch instruction using existing functionality that allows a scheduling coordinator to designate multiple recipients for copies of a resource's dispatch instructions. Owners of a resource can choose to include this in their protocol.

for the financial obligations associated with participation as an individual share of the resource.

B. Outage Management

Outages associated with a pseudo-tie of a shared resource must follow the allocation protocol. If the pseudo-tied shared resource experiences an outage or derate, the scheduling coordinator must report the outage according to the CAISO tariff outage reporting requirements, including resource adequacy substitution and availability requirements.[18] Any allocation of planned and forced outages among resource shares may necessarily be complex because such allocation must account for the specific generating unit's operational characteristics and pre-existing contractual obligations. The default outage allocation methodology anticipates outages and derates will be shared proportionally (*pro-rata* based on each owner's share of plant output at the time of the outage) between the proposed shared resources whenever possible (*i.e.*, not otherwise required by operational characteristics such as infeasible dispatches, or by pre-existing contractual obligations). Any pseudo-tied share of the resource will be subject to all requirements set forth in Section 9 of the CAISO tariff for all matters regarding the submission and approval of outages.

C. Metering and Telemetry

The protocol administrator will provide separate telemetry data for the entire resource and for each share of the resource, plus any other telemetry data that may be required for CAISO market participation. The parties will test and confirm the transmission of the specified data points, prior to the shared resources participating in CAISO markets, including ongoing testing and validation that the CAISO tariff requires for all supply resources. Similarly, the protocol administrator will establish a logical metering plan, which will be subject to approval by the CAISO through existing CAISO processes. The logical metering calculation must reflect an expectation for partial resources that metering will reflect and follow the dispatch instruction to the extent feasible. The logical metering calculation also must clearly explain how deviations will be handled, and account for the outage allocation methodology. The metering plan will confirm that uninstructed deviations assigned to shares delivered to the CAISO balancing authority area will not exceed a *pro-rata* allocation proportional to instructed energy in each settlement interval, consistent with existing CAISO market rules and processes.

Each scheduling coordinator that represents a pseudo-tied share will separately report its meter data consistent with the allocation protocol. At the same time, the EIM entity will directly report meter data for market settlements of resources located in its

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[18] Each resource share participating in a CAISO market will register as a separate resource and have its own resource ID.

balancing authority area, along with the telemetry data for each shared resource owner, and e-tags will report the hourly production for the other shares for interchange accounting. It would also be advisable for meter data of shares pseudo-tied outside of the EIM area to follow the logical metering process documented in the logical metering plan. The protocol administrator may certainly assist in computing the meter data for each scheduling coordinator, but each scheduling coordinator of a share participating in a CAISO market must individually report the meter data for its share.

D. Bid Cost Recovery

Bid cost recovery provisions of the CAISO tariff are designed to ensure market revenues over the course of a day provide at least the revenue the resource owner would receive if the resource was settled at its submitted bids. Factors that can cause a revenue shortfall include changes in real-time market conditions from the time when a start-up instruction is given, or when the most optimal solution in the market optimization does not fully compensate start-up and minimum load costs when settlements are at marginal energy prices. When a shared resource's operating conditions are like single ownership pseudo-tie arrangements, existing tariff rules should provide the needed bid cost recovery.

Bid cost recovery will apply separately to each pseudo-tied share as a separate resource, based upon each share's resource characteristics and costs, commitment, and bid in costs. Start-up and minimum load costs should be equitably allocated among the owners based on the proportion of costs. Under the revised tariff provisions, the sum of the shares' costs must not exceed the total costs that would be represented if the shared resource were participating as a single resource. If there are circumstances that affect the allocation of the overall resource's costs, they should be described in the allocation protocol. Finally, the proportions for sharing of minimum load and start-up costs must be documented in the protocol, and the protocol must identify how compliance will be monitored and verified in comparison to the resource's overall costs.

E. Monitoring and Enforcement

The CAISO recognizes there are concerns the allocation of start-up and minimum load costs and bid cost recovery can be implemented in a manner designed to improperly benefit the participants, but the CAISO also recognizes cost responsibility among owners can vary considerably and does not wish to inefficiently impede market participation by unnecessarily constraining commercial agreements among market participants. Accordingly, the CAISO can require the scheduling coordinator appointed as the protocol administrator to submit documentation demonstrating compliance with the allocation protocol. The allocation protocol may also provide for an auditable self-monitoring compliance mechanism, such as regular reporting to the CAISO to explain any significant matters concerning administration of the allocation protocol.

If the CAISO finds a pseudo-tie generating unit materially deviates from its allocation protocol, the CAISO will notify the responsible scheduling coordinator and suspend participation in the CAISO markets as a shared generating unit pending a final determination of the CAISO's finding(s).[19] Within five business days of the CAISO's notification, the scheduling coordinator must either object to the CAISO's determination and seek resolution of the disputed facts through the CAISO alternative dispute resolution procedures or admit to the findings. The suspension will remain in place until the dispute has been resolved. During the suspension period, the resource share may participate in the CAISO markets as a system resource, *i.e.*, submitting dynamic schedules or traditional hourly or 15-minute schedules, provided it has successfully registered as such with the CAISO and meets all the associated requirements. If the scheduling coordinator admits to the CAISO findings or the final determination resulting from the CAISO's dispute resolution procedures confirms the CAISO's findings, the CAISO will terminate participation as a pseudo-tie generating unit within two business days. Following termination, the resource share may participate in the CAISO markets as a system resource, provided it has successfully registered as such with the CAISO and meets all the associated requirements. If the final determination resulting from the dispute resolution procedures does not support the CAISO's findings, the CAISO will reinstate participation as a pseudo-tied generating unit.

If the CAISO finds the pseudo-tie generating unit's participation in the CAISO markets, even if consistent with the allocation protocol, is exploiting or may exploit the bid cost recovery mechanism inappropriately to the benefit of the scheduling coordinator or is causing inequitable allocation of bid cost recovery, the CAISO will notify the responsible scheduling coordinator and will suspend the pseudo-tie generating unit's participation in the CAISO markets pending a final determination of the CAISO's finding(s).[20] Inappropriate benefit or inequitable allocation should be based upon information that the bid costs recovered through the allocation protocol compared with the bid costs that otherwise would have been recovered in the market resulted in a greater than expected recovery of bid costs or otherwise disadvantaged market participants. During the suspension period, the pseudo-tie generating unit may participate in the CAISO markets as a system resource, provided it has successfully registered as such with the CAISO and meets all the associated requirements. The suspension mechanism would therefore provide an opportunity for further consideration of bid cost recovery concerns while allowing the resource to continue participation in the CAISO markets.

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[19] *See* proposed CAISO Tariff, Appendix N, sections 3.2.4 and 3.2.5.

[20] As noted *infra* in section IV, this feature was not part of the original proposal and was added to address concerns raised by the Department of Market Monitoring.

IV. Stakeholder Process

The CAISO hosted a process to obtain stakeholder input concerning the proposed tariff changes included in this filing. The CAISO published several proposals and accepted written comments that shaped the elements included in this filing.[21] The CAISO appreciates the efforts of stakeholders to provide input to this process and help develop these rules. The stakeholder process resulted in several changes to the CAISO's proposal that are reflected in this filing and helped clarify the parameters of the proposed requirements for pseudo-ties of shared resources.

During the stakeholder process, stakeholders raised two main areas of concern that the CAISO addressed. The first related to the opportunity for dynamically scheduled resources to continue participation as they do today. In response, the CAISO made it clear the new tariff rules proposed in this amendment apply only to pseudo-ties of shared resources and do not apply to dynamically scheduled resources. The CAISO explained shares of a resource collectively may need to follow the allocation protocol to ensure that a pseudo-tied share is able to do so, but CAISO was not proposing to extend the protocol requirements beyond the pseudo-tied share. With this and other more minor clarifications, stakeholders supported the proposal as a mechanism to enhance the available options for resources to participate in the CAISO markets.

The Department of Market Monitoring (DMM) raised a second matter regarding the monitoring and enforcement of the allocation protocol, particularly regarding bid cost recovery. In response, the CAISO proposed that the Pseudo-Tie Participating Generator Agreement identify key attributes of the allocation protocol. This should provide the transparency DMM seeks without compromising potentially sensitive commercial information that may be included in the allocation protocol. In any event, DMM would have access to the allocation protocol, and this enhancement effectively makes the key allocation attributes public information because they will be included in a *pro forma* service agreement on file with the Commission. In addition, as described above, the CAISO proposed detailed and specific suspension and termination procedures to address potential circumstances where a scheduling coordinator does not follow the allocation protocol or the protocol results in an inequitable allocation of bid cost recovery revenue. With these changes, DMM raised no further objection and expressed support for the proposal.

V. Effective Date

The CAISO requests the Commission issue an order accepting these tariff changes effective January 30, 2021. The requested effective date will support pseudo-

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[21] A record of the CAISO's stakeholder process and comments received is available at the following website: https://stakeholdercenter.caiso.com/StakeholderInitiatives/Pseudo-ties-shared-resources.

ties of shared resources concurrent with the implementation of EIM entities with participation starting in April of 2021. It is critical for the parallel operations period that commences on January 30, 2021 to include the network model configuration and master file registrations that will be implemented in production approximately 60 days later. Having a Commission order by the requested effective date will provide the necessary certainty for the EIM entities and the CAISO concerning any pseudo-tie of shared resources at the start of parallel operations.

VI. Communications

Please address communications regarding this filing to the following individual, whose name the CAISO requests the Commission place on the official service list established with respect to this submittal:

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*Individuals designated for service pursuant to Rule 203(b)(3).[22]

VII. Service

The CAISO has served copies of this transmittal letter, and all attachments, on the California Public Utilities Commission, the California Energy Commission, and parties with effective scheduling coordinator service agreements under the CAISO tariff. In addition, the CAISO is posting this transmittal letter and all attachments on the CAISO Web site.

VIII. Materials Provided In This Filing

The following documents, in addition to this transmittal letter, support this filing:

Attachment A	Clean tariff sheets incorporating the revisions described in this filing

[22] 18 C.F.R. § 385.203(b)(3).

Attachment B	Sheets showing, in redline format, the changes to the currently effective tariff described in this filing
Attachment C	EIM Governing Body memorandum dated October 28, 2020
Attachment D	CAISO Board of Governors memorandum dated November 11, 2020

IX. Conclusion

In this filing, the CAISO proposes to allow pseudo-ties of shared resources. The CAISO's tariff revisions will provide an option for shares of resources located in an EIM entity balancing authority area to pseudo-tie to the CAISO balancing authority area. This option will allow market participants another means to participate in the CAISO markets and avoid modeling and pricing issues that could result from economic bidding from dynamic schedules of shared resources. The CAISO requests that the Commission accept these tariff amendments effective January 30, 2021.

Please do not hesitate to contact the undersigned if you have any questions.

Respectfully submitted,

By: *<u>/s/ John C. Anders</u>*

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Counsel for the California Independent
System Operator Corporation

Dated: November 20, 2020

Attachment A – Clean Tariff

Pseudo-Ties of Shared Resources

California Independent System Operator Corporation

November 20, 2020

Appendix N

Pseudo-Tie Protocols

1. Pseudo-Ties of Generating Units to the CAISO Balancing Authority Area

1.1 Consistency with NERC/WECC Requirements

1.1.1 Operation of Pseudo-Tie functionalities must comply with all applicable NERC, WECC, and North American Energy Standards Board (NAESB) reliability standards, policies, requirements, and guidelines regarding inter-Balancing Authority Area scheduling. A Pseudo-Tie must be registered as a "Point Of Delivery" (POD) with the NAESB Electric Industry Registry (EIR). All (off-system) static scheduling associated with Pseudo-Tie functionality must be consistent with NERC Reliability Standards for interchange scheduling and coordination.

1.2 CAISO Operating, Technical, and Business Requirements

1.2.1 Operating Requirements

1.2.1.1 The CAISO shall establish and specify the location of any Pseudo-Tie between the CAISO Balancing Authority Area and the Native Balancing Authority Area. All Dynamic Schedules and delivered Energy from a Pseudo-Tie Generating Unit shall be subject to the standard CAISO Transmission Loss calculation as described in Section 27.5.1.1 and Appendix C of the CAISO Tariff.

1.2.1.2 A Pseudo-Tie Generating Unit must transfer dynamically its entire output of its Real-Time Generation production into the CAISO Balancing Authority Area at the associated pre-determined CAISO Intertie, regardless of whether the Pseudo-Tie Generating Unit represents the entire Generating Unit that is Pseudo-Tied into the CAISO Balancing Authority Area in accordance with Section 1 of this Appendix N or only a share of a Generating Unit that is Pseudo-Tied into the CAISO Balancing Authority Area in accordance with Section 3 of this Appendix N. A Pseudo-Tie Generating Unit must be permanently associated with a particular pre-determined CAISO Intertie. Any dynamic transfers of Energy, and/or Energy associated with Ancillary Services will be subject to Congestion mitigation at the associated pre-determined CAISO Intertie. The CAISO may, from time to time and at its discretion, allow for a change in such pre-established association of the Pseudo-Tie Generating Unit with a particular CAISO Intertie. Any change to the designated path is subject to approval by all applicable transmission providers.

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1.2.1.9 Off-system sales pursuant to a Pseudo-Tie Participating Generator Agreement shall only be delivered from the Pseudo-Tie Generating Unit. The maximum allowable off-system sales of Energy from a Pseudo-Tie Generating Unit may not exceed the Pseudo-Tie Generating Unit's scheduled output. Off-system sales shall be treated as a firm fixed static export from the CAISO Balancing Authority Area.

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2. Pseudo-Ties of Generating Units out of the CAISO Balancing Authority Area

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2.3 Operating Agreements

2.3.1 A Pseudo-Tie of a generating unit out of the CAISO Balancing Authority Area shall be conditional on the facilitation by the Balancing Authority for the Attaining Balancing Authority Area of the Pseudo-Tie functionality in accordance with an operating agreement to be entered into between the Balancing Authority for the Attaining Balancing Authority Area and the CAISO specific to Pseudo-Tie functionality.

2.3.2 The owner of a Pseudo-Tie generating unit shall comply with its contractual obligations with the owners of the facilities to which the Pseudo-Tie generating unit is interconnected and/or the Attaining Balancing Authority Area that affect in any way the ability of the owner of the Pseudo-Tie generating unit to perform its obligations under the CAISO Tariff and an agreement to be entered into between the owner of the Pseudo-Tie generating unit and the CAISO.

3. Pseudo-Ties of Shared Resources to the CAISO Balancing Authority Area

3.1 Eligibility

3.1.1 An eligible Pseudo-Tie Generating Unit may qualify as a Pseudo-Tie of a shared Generating Unit if, in addition to all other applicable requirements, the shared Generating Unit also fulfills the requirements of this Section 3 of Appendix N. A shared Generating Unit that fulfills the additional requirements of this Section 3 of Appendix N may register as a Pseudo-Tie Generating Unit. Nothing in this Section 3 of Appendix N restricts a shared Generating Unit registered as a Pseudo-Tie Generating Unit from transitioning its participation in the CAISO Markets from a Pseudo-Tie Generating Unit to a System Resource, or vice versa, provided it has successfully registered as such with the CAISO and meets all the requirements of a System Resource.

3.1.2 A Scheduling Coordinator must represent each Generating Unit share according to the rules applicable to the CAISO Market in which it will participate. A Scheduling Coordinator that represents a share of a Multi-Stage Generating Resource will not be required to register that share in accordance with Section 27.8, and the CAISO will not model any specific resource characteristic that it otherwise would model if the resource were registered as a Multi-Stage Generating Resource, or that represents a Forbidden Operating Region.

3.1.3 A Scheduling Coordinator must separately register each Generating Unit share with the CAISO as an independent Generating Unit according to the rules applicable to the CAISO Market in which it will participate. If a resource share is located in a Native Balancing Authority Area that is an EIM Entity Balancing Authority Area and the share is not Pseudo-Tied to the CAISO Balancing Authority Area, the share must also register as an EIM Resource unless it is Pseudo-Tied to a Balancing Authority Area outside of the EIM Area or otherwise excluded from the EIM Entity Balancing Authority Area.

3.1.4 The registration of the Pseudo-Tie Generating Unit must identify the allocation of key attributes in Schedule 1 of its Pseudo-Tie Participating Generator Agreement consistent with the allocation protocol methodology, including the allocation of telemetry, metered output, non-negative values for minimum output, Minimum Load Costs, Start-up Costs, and maximum output levels.

3.2 Allocation Protocol

3.2.1 Each Scheduling Coordinator that represents a Generating Unit share participating in a CAISO Market as a Pseudo-Tie Generating Unit must operate in accordance with an allocation protocol. The resource owners must agree upon a shared resource allocation protocol that satisfies the CAISO allocation protocol requirements of this Section 3 of Appendix N, and they must appoint a Scheduling Coordinator as the protocol administrator. The Scheduling Coordinator appointed as the protocol administrator will provide telemetry to CAISO, coordinate the shared logical metering procedure, and ensure that the combined operational characteristics of the shares do not exceed the associated physical capability of the resource. The obligations of the Scheduling Coordinator appointed as the protocol administrator are in addition to the obligations of a Scheduling Coordinator that represents any individual share.

3.2.2 The CAISO will review the allocation protocol according to the timelines and implementation details established in the Business Practice Manuals, and will approve the allocation protocol prior to participation in a CAISO Market by the shared Generating Unit as a Pseudo-Tied Generating Unit if the allocation protocol meets the requirements of this Section 3 of Appendix N and the Business Practice Manuals. Any modifications proposed to the shared resource allocation protocol will only be effective following subsequent approval by the CAISO in accordance with the timelines and implementation details established in the Business Practice Manuals.

3.2.3 The CAISO will have the right to require the Scheduling Coordinator appointed as the protocol administrator to submit documentation that demonstrates compliance with the allocation protocol. Each Scheduling Coordinator that represents a Generating Unit share that participates in a CAISO Market will remain individually responsible for compliance with the allocation protocol. The allocation protocol may also provide for an auditable self-monitoring compliance mechanism, such as regular reporting to CAISO to explain any matters of significance concerning administration of the allocation protocol.

3.2.4 If the CAISO finds that the Pseudo-Tie Generating Unit materially deviates from its allocation protocol, the CAISO will notify the responsible Scheduling Coordinator and will suspend the Pseudo-Tie Generating Unit's participation in the CAISO Markets as a shared Generating Unit pursuant to this Section 3 of Appendix N pending a final determination of the CAISO's finding(s). Within five business days of the CAISO's notification, the Scheduling Coordinator must either: (1) object to the CAISO's determination and seek resolution of the disputed facts through the CAISO ADR Procedures; (2) or admit to the CAISO's findings. The suspension will remain in place until the dispute has been resolved. During the suspension period, the Pseudo-Tie Generating Unit may participate in the CAISO Markets as a System Resource, provided it has successfully registered as such with the CAISO and meets all the requirements of a System Resource. If the Scheduling Coordinator admits to the CAISO's findings or the CAISO ADR Procedures confirm the CAISO's findings, the CAISO will terminate the Pseudo-Tie Generating Unit from the Pseudo-Tie Participating Generator Agreement within two Business Days of the date on which either the Scheduling Coordinator admits to the CAISO's findings in writing, or CAISO ADR Procedures have reached a final determination supporting the CAISO's findings. Following termination, the Pseudo-Tie Generating Unit may participate in the CAISO Markets as a System Resource, provided it has successfully registered as such with the CAISO and meets all the requirements of a System Resource. If the final determination resulting from the CAISO ADR Procedures does not support the CAISO's findings, the CAISO will reinstate participation as a Pseudo-Tied Generating Unit consistent with the CAISO's procedures and requirements for participation in the CAISO Markets pursuant to this Section 3 of Appendix N.

3.2.5 If the CAISO finds that the Pseudo-Tie Generating Unit's participation in the CAISO Markets, even if consistent with the allocation protocol, is exploiting or may exploit the Bid Cost Recovery mechanism to the benefit of the Scheduling Coordinator or is causing inequitable allocation of Bid Cost Recovery between the affected Balancing Authority Areas, the CAISO will notify the responsible Scheduling Coordinator and will suspend the Pseudo-Tie Generating Unit's participation in the CAISO Markets as a shared Generating Unit pursuant to this Section 3 of Appendix N pending a final determination of the CAISO's finding(s). During the suspension period, the Pseudo-Tie Generating Unit may participate in the CAISO Markets as a System Resource, provided it has successfully registered as such with the CAISO and meets all the requirements of a System Resource.

3.3 Telemetry

3.3.1 The Scheduling Coordinator appointed as the protocol administrator must provide separate telemetry data for each Pseudo-Tie Generating Unit, EIM Resource or other resource share, in addition to telemetry data for the entire resource and any other telemetry data required for participation in the CAISO Markets, which will be tested and confirmed prior to participation in the CAISO Markets. Resource shares located in Balancing Authority Areas outside of the EIM Area that do not participate in a CAISO Market should also follow the telemetry process documented in the allocation protocol, in addition to any other telemetry requirements of the Native Balancing Authority Area.

3.4 Metering

3.4.1 Generating Unit shares participating in a CAISO Market must establish a SQMD plan, which will be subject to approval by CAISO pursuant to the requirements for Scheduling Coordinator Metered Entities. The SQMD plan must:

(i) ensure that the sum of the calculated logical metered resource shares match the total output of the resource;
(ii) reflect that the logical metering for each share will follow the Dispatch Instruction to the extent feasible;
(iii) explain how a resource share deviation from a Dispatch Instruction will be managed, and confirm that Uninstructed Deviations assigned to a Generating Unit share delivered to the CAISO Balancing Authority Area will not exceed a pro-rata allocation proportional to the Instructed Imbalance Energy in each Settlement Interval; and
(iv) account for the allocation of Outages among the resource shares.

3.4.2 The native EIM Entity will report its Meter Data for Settlement and E-Tags for Interchange accounting according to the general requirements applicable to EIM Entities. Meter Data for resource shares located in Balancing Authority Areas outside of the EIM Area that do not participate in a CAISO Market should follow the logical metering process documented in the SQMD plan submitted by the associated Pseudo-Tie Generating Unit, in addition to any other metering requirements of the Native Balancing Authority Area.

3.5 Outages

3.5.1 If a Generating Unit participating in a CAISO Market experiences an Outage, each Scheduling Coordinator will be required to report the Outage for the Generating Unit share it represents according to the Outage reporting requirements of Section 9 or Section 29.9, as applicable. Allocation of an Outage among shares other than a proportional sharing of the Outage (*i.e.,* pro-rata based on the PMax of each share at the time of the Outage) must be supported by operational characteristics or pre-existing contractual obligations. The allocation protocol must identify the operational characteristics or pre-existing contractual obligations that may lead to disproportionate Outage allocation and describe the Outage allocation under such conditions and requirements, including the formula for calculating the Outage allocation among the shares.

3.6 Start-up Costs and Minimum Load Costs

3.6.1 Start-Up Costs and Minimum Load Costs should be equitably allocated among the Generating Unit and the other shares based on the proportion of costs. The cost sharing proportions must be documented in the allocation protocol and include a description of how compliance will be monitored and verified in comparison to the overall costs. In general, the sum of the costs for each Generating Unit and the other shares must not exceed the total costs that would be represented if the shared resource were participating in a CAISO Market as a single resource.

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<u>Appendix B.16 Pseudo-Tie Participating Generator Agreement</u>

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SCHEDULE 1

(The following is a placeholder for Schedule 1 information, which contains the GENERATING UNIT, PSEUDO-TIE, AND NATIVE BALANCING AUTHORITY AREA Technical Information and Other Unique Characteristics)

[Sections 4.1.2 and 4.1.3]

(The following is a placeholder for Schedule 1 information associated with a Pseudo-Tie Generating Unit participating in the CAISO Markets pursuant to Section 3 of Appendix N]

[Section 4.1.2]

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Attachment B –Tariff Redlines

Pseudo-Ties of Shared Resources

California Independent System Operator Corporation

November 20, 2020

Appendix N

Pseudo-Tie Protocols

1. Pseudo-Ties of Generating Units to the CAISO Balancing Authority Area

1.1 Consistency with NERC/WECC Requirements

1.1.1 Operation of Pseudo-Tie functionalities must comply with all applicable NERC, WECC, and North American Energy Standards Board (NAESB) reliability standards, policies, requirements, and guidelines regarding inter-Balancing Authority Area scheduling. A Pseudo-Tie must be registered as a "Point Of Delivery" (POD) with the NAESB Electric Industry Registry (EIR). All (off-system) static scheduling associated with Pseudo-Tie functionality must be consistent with NERC Reliability Standards for interchange scheduling and coordination.

1.2 CAISO Operating, Technical, and Business Requirements

1.2.1 Operating Requirements

1.2.1.1 The CAISO shall establish and specify the location of any Pseudo-Tie between the CAISO Balancing Authority Area and the Native Balancing Authority Area. All Dynamic Schedules and delivered Energy from a Pseudo-Tie Generating Unit shall be subject to the standard CAISO Transmission Loss calculation as described in Section 27.5.1.1 and Appendix C of the CAISO Tariff.

1.2.1.2 A Pseudo-Tie Generating Unit must transfer dynamically its entire output of its Real-Time Generation production into the CAISO Balancing Authority Area at the associated pre-determined CAISO Intertie, regardless of whether the Pseudo-Tie Generating Unit represents the entire Generating Unit that is Pseudo-Tied into the CAISO Balancing Authority Area in accordance with Section 1 of this Appendix N or only a share of a Generating Unit that is Pseudo-Tied into the CAISO Balancing Authority Area in accordance with Section 3 of this Appendix N. A Pseudo-Tie Generating Unit must be permanently associated with a particular pre-determined CAISO Intertie. Any dynamic transfers of Energy, and/or Energy associated with Ancillary Services will be subject to Congestion mitigation at the associated pre-determined CAISO Intertie. The CAISO may, from time to time and at its discretion, allow for a change in such pre-established association of the Pseudo-Tie Generating Unit with a particular CAISO Intertie. Any change to the designated path is subject to approval by all applicable transmission providers.

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1.2.1.9 Off-system sales pursuant to a Pseudo-Tie Participating Generator Agreement shall only be delivered from the Pseudo-Tie Generating Unit. The maximum allowable off-system sales of Energy from a Pseudo-Tie Generating Unit may not exceed the Pseudo-Tie Generating Unit's scheduled output~~ for the respective hour~~. Off-system sales shall be treated as a firm fixed static export from the CAISO Balancing Authority Area.

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2. Pseudo-Ties of Generating Units out of the CAISO Balancing Authority Area

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2.3 Operating Agreements

2.3.1 A Pseudo-Tie of a generating unit out of the CAISO Balancing Authority Area shall be conditional on the facilitation by the Balancing Authority for the Attaining Balancing Authority Area of the Pseudo-Tie functionality in accordance with an operating agreement to be entered into between the Balancing Authority for the Attaining Balancing Authority Area and the CAISO specific to Pseudo-Tie functionality.

2.3.2 The owner of a Pseudo-Tie generating unit shall comply with its contractual obligations with the owners of the facilities to which the Pseudo-Tie generating unit is interconnected and/or the Attaining Balancing Authority Area that affect in any way the ability of the owner of the Pseudo-Tie generating unit to perform its obligations under the CAISO Tariff and an agreement to be entered into between the owner of the Pseudo-Tie generating unit and the CAISO.

3. Pseudo-Ties of Shared Resources to the CAISO Balancing Authority Area

3.1 Eligibility

3.1.1 An eligible Pseudo-Tie Generating Unit may qualify as a Pseudo-Tie of a shared Generating Unit if, in addition to all other applicable requirements, the shared Generating Unit also fulfills the requirements of this Section 3 of Appendix N. A shared Generating Unit that fulfills the additional requirements of this Section 3 of Appendix N may register as a Pseudo-Tie Generating Unit. Nothing in this Section 3 of Appendix N restricts a shared Generating Unit registered as a Pseudo-Tie Generating Unit from transitioning its participation in the CAISO Markets from a Pseudo-Tie Generating Unit to a System Resource, or vice versa, provided it has successfully registered as such with the CAISO and meets all the requirements of a System Resource.

3.1.2 A Scheduling Coordinator must represent each Generating Unit share according to the rules applicable to the CAISO Market in which it will participate. A Scheduling Coordinator that represents a share of a Multi-Stage Generating Resource will not be required to register that share in accordance with Section 27.8, and the CAISO will not model any specific resource characteristic that it otherwise would model if the resource were registered as a Multi-Stage Generating Resource, or that represents a Forbidden Operating Region.

3.1.3 A Scheduling Coordinator must separately register each Generating Unit share with the CAISO as an independent Generating Unit according to the rules applicable to the CAISO Market in which it will participate. If a resource share is located in a Native Balancing Authority Area that is an EIM Entity Balancing Authority Area and the share is not Pseudo-Tied to the CAISO Balancing Authority Area, the share must also register as an EIM Resource unless it is Pseudo-Tied to a Balancing Authority Area outside of the EIM Area or otherwise excluded from the EIM Entity Balancing Authority Area.

3.1.4 The registration of the Pseudo-Tie Generating Unit must identify the allocation of key attributes in Schedule 1 of its Pseudo-Tie Participating Generator Agreement consistent with the allocation protocol methodology, including the allocation of telemetry, metered output, non-negative values for minimum output, Minimum Load Costs, Start-up Costs, and maximum output levels.

3.2 Allocation Protocol

3.2.1 Each Scheduling Coordinator that represents a Generating Unit share participating in a CAISO Market as a Pseudo-Tie Generating Unit must operate in accordance with an allocation protocol. The resource owners must agree upon a shared resource allocation protocol that satisfies the CAISO allocation protocol requirements of this Section 3 of Appendix N, and they must appoint a Scheduling Coordinator as the protocol administrator. The Scheduling Coordinator appointed as the protocol administrator will provide telemetry to CAISO, coordinate the shared logical metering procedure, and ensure that the combined operational characteristics of the shares do not exceed the associated physical capability of the resource. The obligations of the Scheduling Coordinator appointed as the protocol administrator are in addition to the obligations of a Scheduling Coordinator that represents any individual share.

3.2.2 The CAISO will review the allocation protocol according to the timelines and implementation details established in the Business Practice Manuals, and will approve the allocation protocol prior to participation in a CAISO Market by the shared Generating Unit as a Pseudo-Tied Generating Unit if the allocation protocol meets the requirements of this Section 3 of Appendix N and the Business Practice Manuals. Any modifications proposed to the shared resource allocation protocol will only be effective following subsequent approval by the CAISO in accordance with the timelines and implementation details established in the Business Practice Manuals.

3.2.3 The CAISO will have the right to require the Scheduling Coordinator appointed as the protocol administrator to submit documentation that demonstrates compliance with the allocation protocol. Each Scheduling Coordinator that represents a Generating Unit share that participates in a CAISO Market will remain individually responsible for compliance with the allocation protocol. The allocation protocol may also provide for an auditable self-monitoring compliance mechanism, such as regular reporting to CAISO to explain any matters of significance concerning administration of the allocation protocol.

3.2.4 If the CAISO finds that the Pseudo-Tie Generating Unit materially deviates from its allocation protocol, the CAISO will notify the responsible Scheduling Coordinator and will suspend the Pseudo-Tie Generating Unit's participation in the CAISO Markets as a shared Generating Unit pursuant to this Section 3 of Appendix N pending a final determination of the CAISO's finding(s). Within five business days of the CAISO's notification, the Scheduling Coordinator must either: (1) object to the CAISO's determination and seek resolution of the disputed facts through the CAISO ADR Procedures; (2) or admit to the CAISO's findings. The suspension will remain in place until the dispute has been resolved. During the suspension period, the Pseudo-Tie Generating Unit may participate in the CAISO Markets as a System Resource, provided it has successfully registered as such with the CAISO and meets all the requirements of a System Resource. If the Scheduling Coordinator admits to the CAISO's findings or the CAISO ADR Procedures confirm the CAISO's findings, the CAISO will terminate the Pseudo-Tie Generating Unit from the Pseudo-Tie Participating Generator Agreement within two Business Days of the date on which either the Scheduling Coordinator admits to the CAISO's findings in writing, or CAISO ADR Procedures have reached a final determination supporting the CAISO's findings. Following termination, the Pseudo-Tie Generating Unit may participate in the CAISO Markets as a System Resource, provided it has successfully registered as such with the CAISO and meets all the requirements of a System Resource. If the final determination resulting from the CAISO ADR Procedures does not support the CAISO's findings, the CAISO will reinstate participation as a Pseudo-Tied Generating Unit consistent with the CAISO's procedures and requirements for participation in the CAISO Markets pursuant to this Section 3 of Appendix N.

3.2.5 If the CAISO finds that the Pseudo-Tie Generating Unit's participation in the CAISO Markets, even if consistent with the allocation protocol, is exploiting or may exploit the Bid Cost Recovery mechanism to the benefit of the Scheduling Coordinator or is causing inequitable allocation of Bid Cost Recovery between the affected Balancing Authority Areas, the CAISO will notify the responsible Scheduling Coordinator and will suspend the Pseudo-Tie Generating Unit's participation in the CAISO Markets as a shared Generating Unit pursuant to this Section 3 of Appendix N pending a final determination of the CAISO's finding(s). During the suspension period, the Pseudo-Tie Generating Unit may participate in the CAISO Markets as a System Resource, provided it has successfully registered as such with the CAISO and meets all the requirements of a System Resource.

3.3 Telemetry

3.3.1 The Scheduling Coordinator appointed as the protocol administrator must provide separate telemetry data for each Pseudo-Tie Generating Unit, EIM Resource or other resource share, in addition to telemetry data for the entire resource and any other telemetry data required for participation in the CAISO Markets, which will be tested and confirmed prior to participation in the CAISO Markets. Resource shares located in Balancing Authority Areas outside of the EIM Area that do not participate in a CAISO Market should also follow the telemetry process documented in the allocation protocol, in addition to any other telemetry requirements of the Native Balancing Authority Area.

3.4 Metering

3.4.1 Generating Unit shares participating in a CAISO Market must establish a SQMD plan, which will be subject to approval by CAISO pursuant to the requirements for Scheduling Coordinator Metered Entities. The SQMD plan must:

(i) ensure that the sum of the calculated logical metered resource shares match the total output of the resource;
(ii) reflect that the logical metering for each share will follow the Dispatch Instruction to the extent feasible;
(iii) explain how a resource share deviation from a Dispatch Instruction will be managed, and confirm that Uninstructed Deviations assigned to a Generating Unit share delivered to the CAISO Balancing Authority Area will not exceed a pro-rata allocation proportional to the Instructed Imbalance Energy in each Settlement Interval; and
(iv) account for the allocation of Outages among the resource shares.

3.4.2 The native EIM Entity will report its Meter Data for Settlement and E-Tags for Interchange accounting according to the general requirements applicable to EIM Entities. Meter Data for resource shares located in Balancing Authority Areas outside of the EIM Area that do not participate in a CAISO Market should follow the logical metering process documented in the SQMD plan submitted by the associated Pseudo-Tie Generating Unit, in addition to any other metering requirements of the Native Balancing Authority Area.

3.5 Outages

3.5.1 If a Generating Unit participating in a CAISO Market experiences an Outage, each Scheduling Coordinator will be required to report the Outage for the Generating Unit share it represents according to the Outage reporting requirements of Section 9 or Section 29.9, as applicable. Allocation of an Outage among shares other than a proportional sharing of the Outage (*i.e.*, pro-rata based on the PMax of each share at the time of the Outage) must be supported by operational characteristics or pre-existing contractual obligations. The allocation protocol must identify the operational characteristics or pre-existing contractual obligations that may lead to disproportionate Outage allocation and describe the Outage allocation under such conditions and requirements, including the formula for calculating the Outage allocation among the shares.

3.6 Start-up Costs and Minimum Load Costs

3.6.1 Start-Up Costs and Minimum Load Costs should be equitably allocated among the Generating Unit and the other shares based on the proportion of costs. The cost sharing proportions must be documented in the allocation protocol and include a description of how compliance will be monitored and verified in comparison to the overall costs. In general, the sum of the costs for each Generating Unit and the other shares must not exceed the total costs that would be represented if the shared resource were participating in a CAISO Market as a single resource.

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Appendix B.16 Pseudo-Tie Participating Generator Agreement

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SCHEDULE 1

(The following ~~page~~ is a placeholder for Schedule 1 information, which contains the GENERATING UNIT, PSEUDO-TIE, AND NATIVE BALANCING AUTHORITY AREA Technical Information and Other Unique Characteristics)

[Sections 4.1.2 and 4.1.3]

(The following is a placeholder for Schedule 1 information associated with a Pseudo-Tie Generating Unit participating in the CAISO Markets pursuant to Section 3 of Appendix N]

[Section 4.1.2]

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Attachment C – EIM Governing Body Memorandum dated October 28, 2020

Pseudo-Ties of Shared Resources

California Independent System Operator Corporation

November 20, 2020

Memorandum

To: Energy Imbalance Market Governing Body

From: Mark Rothleder, Vice President, Market Policy and Performance

Date: October 28, 2020

Re: **Decision on pseudo-ties of shared resources proposal**

This memorandum requires EIM Governing Body action.

EXECUTIVE SUMMARY

Management proposes to allow the ISO market to model a portion of a resource's output that is outside of the California ISO balancing authority area (CAISO BAA) as connected to the CAISO BAA as a "pseudo-tie." A pseudo-tie is a mechanism that allows a resource that connects to transmission in one BAA to be a supply resource for another BAA. Modeling a portion of a resource's output as a pseudo-tie is useful when a portion of a resource is owned or contracted to a market participant in another BAA.

Resources already participate in the energy imbalance market (EIM) using pseudo-ties to connect shares of a resource's output to multiple BAAs other than the CAISO BAA. However, the current ISO market rules only allow the full output of a resource to be connected as a pseudo-tie to the CAISO BAA.

Implementation of this option to connect a share of a resource with a pseudo-tie to the CAISO BAA involves two key provisions to ensure the ISO market accurately models the shares and equitably financially settles them. The first provision is submission of a meter data plan that details how the energy output meter readings of a shared resource will be allocated to the resource shares and reported to the ISO for financial settlement. The second provision requires the submission of a written protocol that describes how the shared resource will be operated, and documents its operating characteristics. This protocol also includes how costs used for ISO settlement of bid cost recovery provisions are allocated among the shares and how resource outages affecting the shares will be reported to the ISO.

The primary driver for the proposal is EIM-specific, but the tariff provision will apply to bidding into both the day-ahead market and the real-time market from resources in EIM and non-EIM balancing authority areas. Therefore, Management has classified this initiative as hybrid, and is seeking approval from both the EIM Governing Body and the Board of Governors for the entire initiative.

Management proposes the following motion:

> ***Moved, that the EIM Governing Body, under its Hybrid Authority, approves the proposal for pseudo-ties of shared resources proposal described in the memorandum dated October 28, 2020; including any associated Federal Energy Regulatory Commission filings, including such filings that implement the overarching initiative policy but contain discrete revisions to incorporate Commission guidance in any initial ruling on the proposed tariff amendment.***

BACKGROUND

The ISO's EIM implementation has accommodated pseudo-tie arrangements between several EIM entities' BAAs that have joint ownership shares. The ISO also allows dynamic schedules of shared resources coming into the CAISO BAA, and proposes no changes to its provisions for dynamic scheduling. Dynamic schedules and pseudo-ties are the two mechanisms for dynamic transfers of resources between BAAs and are very similar, with the primary distinction being that dynamic schedules remain part of the host BAA's resource portfolio while pseudo-ties become resources under the attaining BAA's control. This distinction has different implications for real-time interchange accounting.

The implementation of pseudo-ties in the EIM has been workable for transfers of existing EIM participating generation resources between non-ISO EIM Entities. Some BAAs that will begin EIM participation in 2021 or later host resources that currently have dynamic schedules for resources into the CAISO BAA. Modeling these resources as pseudo-ties will simplify and improve their modeling for EIM participation.

Dynamic schedules and pseudo-ties from an EIM Entity BAA to the CAISO BAA have implications for real-time interchange accounting that differ from the accounting for dynamic schedules in parallel with EIM transfers. These interactions can cause data conflicts in real time. Specifically in the case of economic bidding in real time by dynamic schedules from EIM Entity BAAs, there can be conflicts with EIM transfers and the real-time interchange accounting that may have an effect on market pricing and dispatch. In essence, a dynamic schedule over an EIM transfer path could be priced differently than the transfer path market price. The transfer path market price is established by the bids from the participating resources in the EIM Entity BAA. This interaction could result in inconsistency between dispatches and bids for the dynamically scheduled resources, which cannot be resolved through accounting adjustments. At the same time, converting a dynamically scheduled resource to a pseudo-tie avoids the market inefficiency that could otherwise materialize if the resource continues to dynamically schedule. Similar data conflicts do not occur with pseudo-ties because the pseudo-tie logically transfers the resource from the EIM entity BAA to the CAISO BAA and it is no longer included in the interchange accounting between the two balancing authorities.

The current requirement that only an entire resource could be connected to the CAISO BAA as a pseudo-tie, as opposed to just a share of the resource, stemmed from a previous rule that generation in the ISO market have energy production meters that the ISO reads directly. That rule has since changed, allowing a resource operator to calculate and submit meter readings for only a share of a generator's output.

Management's proposal would allow resource shares currently dynamically scheduling to the CAISO BAA the option to convert to a pseudo-tie and avoid the data conflicts. The ISO will continue to support dynamic schedules, including economic bidding, and pseudo-ties to the CAISO BAA as it does today.

PROPOSAL

The ISO market will model each share of a partially pseudo-tied resource as a separate market resource. Each resource share will consist of a simple generator with a non-negative minimum load, start-up and minimum-load cost, and a single operating range, like the similar EIM participating generation resources. Different resource owners may make separate decisions about whether and when to register using a pseudo-tie participating generator agreement to become eligible to submit bids in the market and receive separate dispatch instructions. Each share of a pseudo-tied resource will remain subject to all existing ISO tariff requirements, contractual terms, and business practices that are applicable to generating unit participation in the ISO market.

When there are multiple owners of a generator, the ISO market's modeling and financial settlement is more complex than when a single owner has responsibility for all operational and financial consequences of operating the resource. A primary consideration is to ensure there are neither gaps nor overlaps in the resource data reported to the ISO for resource operation and financial settlement.

Management proposes to address this complexity by requiring that the multiple entities with shares of a resource associated with one or more pseudo-ties to the CAISO BAA designate a single entity to act as a coordinator, which Management's proposal calls the "protocol administrator." Management proposes that the protocol administrator be responsible for developing and submitting a plan to the ISO that details how the energy output meter readings of the resource will be allocated to the resource shares and reported to the ISO for financial settlement. An additional requirement is the submission of a written "allocation protocol" that describes how the shared resource will be operated, documents its operating characteristics, and describes how costs used for ISO settlement make-whole payment provisions will be allocated among the shares, and how resource outages affecting the shares will be reported to the ISO. Management proposes that the *pro forma* agreement associated with a pseudo-tie of a shared resource document key allocation attributes for transparency.

Management proposes that ISO review and approval of both the metering plan and allocation protocol be required before the resource shares can participate in the ISO market. In addition, the resource must be operated and data reported to the ISO in accordance with these documents. Management also proposes market rules that will provide for suspension of participation or require modification of the shared pseudo-tie arrangement if the pseudo tied share of a resource does not follow its protocol, either repeatedly or on any occasion that significantly affects market outcomes.

Metering and Telemetry

Although submission of meter data plans is an existing ISO market rule, Management proposes that the protocol administrator for a shared resource be required to develop a meter data plan that addresses "logical metering" calculations for the resource shares. Logical metering refers to predefined calculations of shares of a resource's output based on the overall resource's metered output.

This meter data plan will be required to ensure that the sum of the calculated logical metering shares of a resource will match the resource's total output and conform to the ISO's published metering standards. It will also be required to ensure that metering will reflect the ISO market dispatch instructions to the respective shares to the extent feasible, clearly explain how deviations will be handled, and account for the outage allocation methodology. To ensure equitable energy settlement, Management proposes a requirement that the uninstructed deviations assigned to a share delivered to the CAISO BAA must not exceed a pro-rata allocation proportional to instructed energy in each settlement interval.

Management proposes that the protocol administrator will also be required to provide telemetry signals to the ISO that represent separate output values for the entire resource and for each share of the resource, in addition to any other telemetry data that may be required for ISO market participation. The host EIM Entity BAA will report electronic tags for the hourly production of other shares for interchange accounting.

Outage Management and Reporting

If the partially pseudo-tied resource experiences an outage or derate, the scheduling coordinators for pseudo-tied shares will be required to report the outage of their market resource's share according to the ISO's existing outage reporting requirements. Resource adequacy capacity availability and substitution requirements will also apply.

The allocation of planned and forced outages between each share of a resource must account for the specific generating unit's operational characteristics and pre-existing contractual obligations. Management proposes a default methodology for proportional allocations of outages. However, the individual submitted allocation protocols may need to include specific details. In this case, Management proposes that the protocol will be required to identify conditions that could lead to disproportionate outages, and describe how outages will be allocated in these conditions, including the formula for calculating the outage allocation among the shares.

Treatment of Minimum Load and Start-up Costs

The ISO market's bid cost recovery provisions provide for a make-whole payment in the event that market revenues over the course of a day do not cover a resource's submitted energy, minimum load, start-up, and ancillary services bids. Management proposes that bid cost recovery will apply separately to each pseudo-tied share as a separate resource, based upon each share's resource characteristics and bid costs.

Management proposes that the allocation protocol for a resource pseudo-tied to the CAISO BAA describe the equitable allocation of start-up and minimum load costs to the various resource shares. The allocation protocol will determine how to allocate the total resource costs among the resource shares. The protocol will document these proportions and describe any unique circumstances affecting the allocation of the resource's overall costs. The sum of the shares' costs must not exceed the total costs that would be represented if the shared resource were participating in the market as a single resource. Finally, the allocation protocol must also identify how compliance will be monitored and verified in comparison to the resource's overall costs.

The cost responsibility among resource shares can vary considerably. Management's proposal addresses this by not unnecessarily constraining commercial agreements for allocation of costs of shared resources. However, designs for allocation of start-up and minimum load costs may improperly benefit the participants. Management proposes to address this by explicitly stating in the ISO tariff that the provisions to suspend participation or require modification of the shared pseudo-tie arrangement apply to circumstances involving exploiting the ISO market's bid cost recovery provisions or inequitably allocating bid cost recovery payments between BAAs.

STAKEHOLDER POSITIONS

Stakeholders support Management's proposal and Management made several changes that were reflected in its final proposal in response to stakeholder suggestions.

In response to stakeholder comments, Management clarified that this proposal broadens the options for market participants to use pseudo-ties as a flexible option for EIM participation of shared resources, and Management does not propose to limit dynamic scheduling of resources from EIM Entity BAAs to the ISO BAA. Although using pseudo-ties for shared resources removes market inefficiencies that can result from using dynamic schedules for shared resources, using dynamic schedules is the only practical option for certain circumstances.

Also in response to stakeholder comments, Management added a requirement that the allocation protocol include the formula for the outage allocation if it could lead to disproportionate outages or derates, and added the provisions for suspending or modifying pseudo-tie arrangements for variances from the protocol.

Following these changes, no comments stated concerns with the final proposal.

The ISO Department of Market Monitoring supports Management's proposal and notes that the provisions to suspend or modify a shared pseudo-tie arrangement for exploiting the ISO market's bid cost recovery provisions or inequitably allocating bid cost recovery payments between BAAs addresses their earlier concerns.

CONCLUSION

Management recommends the EIM Governing Body approve the proposal for pseudo-ties of shared resources. The proposal increases market efficiency and allows for more flexible EIM participation options by allowing shared resources to be connected to the CAISO BAA through pseudo-ties.

Attachment D – CAISO Board of Governors Memorandum dated November 11, 2020

Pseudo-Ties of Shared Resources

California Independent System Operator Corporation

November 20, 2020

California ISO

California Independent System Operator Corporation

Memorandum

To: ISO Board of Governors

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

Date: November 11, 2020

Re: **Decision on Pseudo-Ties of Shared Resources**

This memorandum requires Board of Governors action.

EXECUTIVE SUMMARY

Management proposes to allow the ISO market to model a portion of a resource's output that is outside of the California ISO balancing authority area (CAISO BAA) as connected to the CAISO BAA as a "pseudo-tie." A pseudo-tie is a mechanism that allows a resource that connects to transmission in one BAA to be a supply resource for another BAA. Modeling a portion of a resource's output as a pseudo-tie is useful when a portion of a resource is owned or contracted to a market participant in another BAA.

Resources already participate in the Energy Imbalance Market (EIM) using pseudo-ties to connect shares of a resource's output to multiple BAAs other than the CAISO BAA. However, the current ISO market rules only allow the full output of a resource to be connected as a pseudo-tie to the CAISO BAA.

Implementation of this option to connect a share of a resource with a pseudo-tie to the CAISO BAA involves two key provisions to ensure the ISO market accurately models the shares and equitably financially settles them. The first provision is submission of a meter data plan that details how the energy output meter readings of a shared resource will be allocated to the resource shares and reported to the ISO for financial settlement. The second provision requires the submission of a written protocol that describes how the shared resource will be operated, and documents its operating characteristics. This protocol also includes how costs used for ISO settlement of bid cost recovery provisions are allocated among the shares and how resource outages affecting the shares will be reported to the ISO.

The primary driver for the proposal is EIM-specific, but the tariff provision will apply to bidding into both the day-ahead market and the real-time market from resources in EIM and non-EIM balancing authority areas. Therefore, Management has classified this initiative as hybrid, and is seeking approval from both the EIM Governing Body and the Board of Governors for the entire initiative.

The EIM Governing Body approved this proposal at its November 4, 2020 meeting.

Management proposes the following motions:

> ***Moved, that the ISO Board of Governors approves the proposal for pseudo-ties of shared resources 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 proposal described in the memorandum, 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.***

BACKGROUND

The ISO's EIM implementation has accommodated pseudo-tie arrangements between several EIM entities' BAAs that have joint ownership shares. The ISO also allows dynamic schedules of shared resources coming into the CAISO BAA, and proposes no changes to its provisions for dynamic scheduling. Dynamic schedules and pseudo-ties are the two mechanisms for dynamic transfers of resources between BAAs and are very similar, with the primary distinction being that dynamic schedules remain part of the host BAA's resource portfolio while pseudo-ties become resources under the attaining BAA's control. This distinction has different implications for real-time interchange accounting.

The implementation of pseudo-ties in the EIM has been workable for transfers of existing EIM participating generation resources between non-ISO EIM Entities. Some BAAs that will begin EIM participation in 2021 or later host resources that currently have dynamic schedules for resources into the CAISO BAA. Modeling these resources as pseudo-ties will simplify and improve their modeling for EIM participation.

Dynamic schedules and pseudo-ties from an EIM Entity BAA to the CAISO BAA have implications for real-time interchange accounting that differ from the accounting for dynamic schedules in parallel with EIM transfers. These interactions can cause data conflicts in real-time. Specifically in the case of economic bidding in real time by dynamic schedules from EIM Entity BAAs, there can be conflicts with EIM transfers and the real-time interchange accounting that may have an effect on market pricing and dispatch. In essence, a dynamic schedule over an EIM transfer path could be priced differently than the transfer path market price. The transfer path market price is established by the bids from the participating resources in the EIM Entity BAA. This interaction could result in inconsistency between dispatches and bids for the dynamically scheduled resources, which cannot be resolved through accounting adjustments. At the same time, converting a dynamically scheduled resource to a pseudo-tie avoids the market inefficiency that could otherwise materialize if the resource continues to dynamically schedule. Similar data conflicts do not occur with pseudo-ties because the pseudo-tie logically transfers the resource from the EIM entity BAA to the CAISO BAA and it is no longer included in the interchange accounting between the two balancing authorities.

The current requirement that only an entire resource could be connected to the CAISO BAA as a pseudo-tie, as opposed to just a share of the resource, stemmed from a previous rule that generation in the ISO market have energy production meters that the ISO reads directly. That rule has since changed, allowing a resource operator to calculate and submit meter readings for only a share of a generator's output.

Management's proposal would allow resource shares currently dynamically scheduling to the CAISO BAA the option to convert to a pseudo-tie and avoid the data conflicts. The ISO will continue to support dynamic schedules, including economic bidding, and pseudo-ties to the CAISO BAA as it does today.

PROPOSAL

The ISO market will model each share of a partially pseudo-tied resource as a separate market resource. Each resource share will consist of a simple generator with a non-negative minimum load, start-up and minimum-load cost, and a single operating range, like the similar EIM participating generation resources. Different resource owners may make separate decisions about whether and when to register using a pseudo-tie participating generator agreement to become eligible to submit bids in the market and receive separate dispatch instructions. Each share of a pseudo-tied resource will remain subject to all existing ISO tariff requirements, contractual terms, and business practices that are applicable to generating unit participation in the ISO market.

When there are multiple owners of a generator, the ISO market's modeling and financial settlement is more complex than when a single owner has responsibility for all operational and financial consequences of operating the resource. A primary consideration is to ensure there are neither gaps nor overlaps in the resource data reported to the ISO for resource operation and financial settlement.

Management proposes to address this complexity by requiring that the multiple entities with shares of a resource associated with one or more pseudo-ties to the CAISO BAA designate a single entity to act as a coordinator, which Management's proposal calls the "protocol administrator." Management proposes that the protocol administrator be responsible for developing and submitting to a plan to the ISO that details how the energy output meter readings of the resource will be allocated to the resource shares and reported to the ISO for financial settlement. An additional requirement is the submission of a written "allocation protocol" that describes how the shared resource will be operated, documents its operating characteristics, and describes how costs used for

ISO settlement make-whole payment provisions will be allocated among the shares, and how resource outages affecting the shares will be reported to the ISO. Management proposes that the *pro forma* agreement associated with a pseudo-tie of a shared resource document key allocation attributes for transparency.

Management proposes that ISO review and approval of both the metering plan and allocation protocol be required before the resource shares can participate in the ISO market. In addition, the resource must be operated and data reported to the ISO in accordance with these documents. Management also proposes market rules that will provide for suspension of participation or require modification of the shared pseudo-tie arrangement if the pseudo tied share of a resource does not follow its protocol, either repeatedly or on any occasion that significantly affects market outcomes.

Metering and Telemetry

Although submission of meter data plans is an existing ISO market rule, Management proposes that the protocol administrator for a shared resource be required to develop a meter data plan that addresses "logical metering" calculations for the resource shares. Logical metering refers to predefined calculations of shares of a resource's output based on the overall resource's metered output.

This meter data plan will be required to ensure that the sum of the calculated logical metering shares of a resource will match the resource's total output and conform to the ISO's published metering standards. It will also be required to ensure that metering will reflect the ISO market dispatch instructions to the respective shares to the extent feasible, clearly explain how deviations will be handled, and account for the outage allocation methodology. To ensure equitable energy settlement, Management proposes a requirement that the uninstructed deviations assigned to a share delivered to the CAISO BAA must not exceed a pro-rata allocation proportional to instructed energy in each settlement interval.

Management proposes that the protocol administrator will also be required to provide telemetry signals to the ISO that represent separate output values for the entire resource and for each share of the resource, in addition to any other telemetry data that may be required for ISO market participation. The host EIM Entity BAA will report electronic tags for the hourly production of other shares for interchange accounting.

Outage Management and Reporting

If the partially pseudo-tied resource experiences an outage or derate, the scheduling coordinators for pseudo-tied shares will be required to report the outage of their market resource's share according to the ISO's existing outage reporting requirements. Resource adequacy capacity availability and substitution requirements will also apply.

The allocation of planned and forced outages between each share of a resource must account for the specific generating unit's operational characteristics and pre-existing contractual obligations. Management proposes a default methodology for proportional allocations of outages. However, the individual submitted allocation protocols may need to include specific details. In this case, Management proposes that the protocol will be required to identify conditions that could lead to disproportionate outages, and describe how outages will be allocated in these conditions, including the formula for calculating the outage allocation among the shares.

Treatment of Minimum Load and Start-up Costs

The ISO market's bid cost recovery provisions provide for a make-whole payment in the event that market revenues over the course of a day do not cover a resource's submitted energy, minimum load, start-up, and ancillary services bids. Management proposes that bid cost recovery will apply separately to each pseudo-tied share as a separate resource, based upon each share's resource characteristics and bid costs.

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CONCLUSION

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