July 30, 2019

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

Re: California Independent System Operator Corporation
Docket No. ER19-___-000

Tariff Amendment to Address Real-Time Market Settlement Neutrality

Request for Waiver of 60-Day Notice Requirement

Dear Secretary Bose:

The California Independent System Operator Corporation (CAISO) submits this tariff amendment to revise its real-time imbalance energy offset (RTIEO) calculation.[1] As a revenue-neutral market operator, the CAISO must reconcile settlement values for all real-time energy charge codes to ensure there is neither a shortage nor surplus in revenue after calculating all payments and charges.[2] The RTIEO helps recover the difference between receipts from load and payments to supply for energy in the real-time market.[3]

The CAISO proposes two distinct revisions to the RTIEO calculation. First, the CAISO proposes to modify how it values energy imbalance market (EIM) energy transfers in the RTIEO calculation. Currently the CAISO uses the system marginal energy cost in its calculation, which is the energy cost across all pricing nodes in the EIM area.[4] However, using the system marginal energy cost alone fails to account for any price separation between (1) EIM transfers among non-California balancing authority areas, which have no greenhouse gas (GHG) regulatory compliance costs, and (2) transfers including California balancing authority areas, which do. The CAISO

[1] The CAISO submits this filing pursuant to section 205 of the Federal Power Act, 16 U.S.C. § 824d. Capitalized terms not otherwise defined herein have the meanings set forth in the CAISO tariff, and references to specific sections, articles, and appendices are references to sections, articles, and appendices in the current CAISO tariff and revised or proposed in this filing, unless otherwise indicated.

[2] *See California Independent System Operator Corp.*, 136 FERC ¶ 61,214 at P 6 n.7 (2011).

[3] *California Independent System Operator Corp.*, 147 FERC 61,231 at P 49 (2014).

[4] Namely, the CAISO balancing authority area and all EIM entity balancing authority areas.

proposes to adjust the RTIEO calculation to account for the GHG compliance cost embedded within the system marginal energy cost from those energy transfers that do not have GHG compliance costs.

Second, the CAISO proposes to modify how it allocates the RTIEO charges and credits. Currently the CAISO applies an "EIM transfer adjustment" to allocate RTIEO charges more closely with demand. Recent settlement data, however, demonstrate the RTIEO is driven primarily by the way in which each balancing authority area manages and accounts for the services that can result in imbalance energy and unaccounted for energy, not by demand. The CAISO proposes to eliminate the EIM transfer adjustment to ensure that the CAISO allocates RTIEO charges consistent with what it has more recently determined to be the cost causation.

The CAISO respectfully requests waiver of the Commission's 60-day notice requirement to permit these tariff revisions to become effective on August 1, 2019, two days after the date of this filing.[5] Granting the waiver will ensure that market participants receive accurate charges and credits for real-time neutrality as soon as possible.

I. BACKGROUND

A. Overview of CAISO Markets

The CAISO administers both day-ahead and real-time wholesale electricity markets. Although the day-ahead market only includes the CAISO balancing authority area, the real-time market extends to balancing authority areas participating in the EIM, which include the CAISO and currently eight EIM entities.[6]

The interrelated day-ahead and real-time markets ensure electricity supply is sufficient to satisfy demand in the entire region while maintaining the reliability of the transmission system. Both markets commit resources and schedule and dispatch them for energy, while respecting transmission security, resource characteristics, and transmission scheduling limits. The markets produce optimal schedules, dispatches, and locational marginal prices (LMPs) used for financial settlement. The day-ahead market produces schedules for the CAISO balancing authority area, for individual internal and external resources and for non-resource-specific bids for energy at the CAISO interties, *i.e.*, imports and exports. The real-time market also produces schedules and dispatches for these resources, and for individual or aggregate

[5] Specifically, pursuant to section 35.11 of the Commission's regulations, 18 C.F.R. § 35.11, the CAISO requests waiver of the notice requirement set forth in section 35.3(a)(2) of the Commission's regulations, 18 C.F.R. § 35.3(a)(2).

[6] Including the CAISO, the following eight entities participate in the EIM: Balancing Authority of Northern California/Sacramento Municipal Utility District, Idaho Power Company, Powerex, Portland General Electric, Puget Sound Energy, Arizona Public Service, NV Energy, and PacifiCorp.

resources for EIM balancing authority areas.

These schedules and financial settlement are hourly in the day-ahead market. The real-time time market consists of fifteen minute market (FMM) 15-minute schedules settled relative to day-ahead market schedules, and the 5-minute real-time dispatch (RTD) settled relative to 15-minute schedules. Any difference between the resource's meter and their 5-minute real-time dispatch is settled at the 5-minute RTD price.

The EIM extends the CAISO's real-time market to include other balancing authority areas. EIM entities remain responsible for reliability in their balancing authority area with support from the EIM solution that determines the most economical and reliable dispatch of generation to meet load and interchange demands. EIM participants submit base schedules for supply and demand and economic bids from participating resources. The EIM economically dispatches participating resources to balance forecasted and actual supply, transfers between EIM entity balancing authority areas, and load across the EIM area, all while ensuring generation and transmission limitations are respected. One of the primary benefits of the EIM is that it leverages the geographical diversity of resources and loads across the entire EIM area, which is much larger and more diverse than any single balancing authority area. This same diversity requires that the EIM consider some differences that exist among balancing authorities participating in the EIM.[7]

The CAISO market design allows suppliers to submit separate bid components for commitment costs (*i.e.*, start-up and minimum load bids) and for market bids for energy above minimum load for individual resources. EIM participating resources that are not in California can also submit a separate bid component (*i.e.*, the EIM bid adder) to reflect their cost of complying with California Air Resources Board greenhouse gas (GHG) regulations.[8] If an EIM participating resource in a non-California EIM balancing authority area does not submit an EIM bid adder, the CAISO will not select the resource to serve demand in either the CAISO balancing authority area or in the Sacramento Municipal Utility District (SMUD) area. Resources in the CAISO balancing authority area or SMUD may reflect these costs as part of their incremental energy costs.

B. Cost of Complying with California Greenhouse Gas Regulatory Requirements

Energy generated in California or imported into the state to serve California

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[7] The expansion of the EIM has increased the volume of EIM transfers since implementation and, in turn, the associated settlements including RTIEO. *See* CAISO Western EIM Quarterly Benefits Report, First Quarter 2019, p. 9 (including a map and table showing estimated EIM transfer capacity, which is available on the CAISO website at: https://www.westerneim.com/Documents/ISO-EIMBenefitsReportQ1-2019.pdf).

[8] *See* existing CAISO Tariff Section 29.32.

demand is subject to California's GHG regulations adopted by the California Air Resources Board (CARB).[9] Under these regulations, compliance obligations apply to first deliverers – generators within California or electricity importers.[10] Under CARB's regulations, EIM participating resource scheduling coordinators are considered electricity importers if their resource(s) are dispatched to serve demand within California.[11] These entities have a GHG compliance obligation under CARB's GHG regulations and incur a compliance cost to produce power that is delivered to serve demand within California. To address CARB's regulations, at the outset of the EIM the CAISO developed the EIM bid adder that permits the CAISO to reflect GHG compliance costs within locational marginal prices for EIM participating resources serving CAISO demand.[12] This same methodology now extends to the SMUD area as well.

EIM participating resource scheduling coordinators submit the EIM bid adder separately from their energy bids. This allows the CAISO market to identify a price difference for transactions serving demand within California versus transactions serving demand outside of California. Resources in the California footprint are unable to submit a separate bid adder for GHG compliance. When dispatching resources to serve load in non-California EIM balancing authority areas, the market optimization considers only the EIM participating resource's energy bid, without the EIM bid adder. When dispatching resources to serve load inside California EIM balancing authority areas, the market optimization considers the energy bid plus the EIM bid adder.[13]

The bid adder allows the CAISO to attribute EIM transfers to serve California demand to specific EIM participating resources based on least cost dispatch. California demand pays the system marginal energy cost, which includes the GHG costs because scheduling coordinators with resources inside of California include that cost within their energy bids. Demand in non-California EIM balancing authority areas pay the system marginal energy cost minus the marginal GHG costs. If there were no transfers into the CAISO and SMUD combined area, the marginal GHG cost would be zero. If EIM transfers to serve CAISO or SMUD demand occur, the marginal GHG costs reflect the emission cost of the marginal unit attributed to support the transfers. EIM participating resources attributed as serving California demand are compensated at the system marginal energy cost. This occurs by providing an additional payment to a resource beyond its LMP at the marginal greenhouse gas cost. In this way, the GHG cost, *i.e.*, the marginal greenhouse gas cost, does not affect the LMP in the EIM entity balancing

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9 See generally California Air Resource Board website relating to Cap and Trade program: https://www.arb.ca.gov/cc/capandtrade/capandtrade.htm. See also Title 17, California Code of Regulations sections 95801-96022.

10 Title 17, California Code of Regulations section 95811(b).

11 *Id*. at section 95802 (a) definition of Electricity Importer.

12 *See* existing CAISO Tariff Section 29.32.

13 *See* existing CAISO Tariff section 29.32 (b).

authority area outside of California.

EIM participating resource scheduling coordinators may submit an hourly bid quantity to express how much of the resource's output could support an EIM transfer serving demand within California EIM balancing authority areas. The EIM participating resource can also submit an hourly price in its bid adder for each participating resource at or below the resource's daily maximum GHG cost cap as determined by CAISO, but not less than zero.[14] The hourly MW quantity of an EIM bid adder is now limited to the EIM participating resource's dispatchable bid range between the EIM participating resource's base schedule and the resource's effective upper economic bid, in that hour.[15] If the EIM participating resource scheduling coordinator does not submit a bid adder for its resource(s), or submits a bid adder with a zero MW quantity, the CAISO market will not dispatch the EIM participating resource to serve demand within California EIM balancing authority areas. Prior to this change, the quantity of non-emitting resources available in most intervals exceeded the EIM transfer quantity to the CAISO. This condition led to the marginal GHG cost being zero in many intervals, resulting in no actual price separation between the CAISO and other EIM balancing authority areas. After the CAISO implemented its changes, the quantity of non-emitting resources eligible for attribution as serving demand within California EIM balancing authority areas decreased, leading to more intervals where the marginal GHG cost was not zero.

C. Real-Time Market Neutrality

The CAISO is a revenue-neutral independent energy market operator. To facilitate sufficient and reliable electric service, the CAISO must balance energy supply and demand at all times. The CAISO maintains a detailed set of energy settlements charges and payments calculations that ensures supply and demand are compensated or charged based on their respective injections and withdrawals from the CAISO energy market, which includes all the balancing authority areas participating in the CAISO's real-time market. However, total payments and charges do not always net out, and the CAISO may have excess payments it must allocate out or insufficient funds to fully fund energy procurement.

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[14] The CAISO calculates a daily maximum GHG cost using a process similar to the process the CAISO uses to calculate the GHG cost included in the default energy bids of CAISO resources. This includes a variable cost option and a negotiated rate option. However, rather than calculating a cost curve as is done for default energy bids within the CAISO, the CAISO calculates a single daily maximum cap for the EIM participating resource. Under the variable cost option, on a daily basis, the CAISO calculates each unit's maximum GHG cost based on the unit's maximum heat rate as registered with the CAISO, the applicable GHG allowance price, and the resource's emission rate. These are the same three components that the CAISO uses to calculate the greenhouse gas cost included in the default energy bid curves of CAISO resources. The standard GHG emission rate is documented in the United States Environmental Protection Agency Subpart C default emission factors. Similar to the default energy bids of CAISO resources, the CAISO applies a 10 percent adder to the calculated maximum cost.

[15] *California Independent System Operator Corp*., 165 FERC ¶ 61,050 (2018).

The need for offsets comes from the difference between market results and actual metered energy. This difference has numerous causes, but predominantly results from the tariffs and practices of the individual balancing authority areas, including the CASIO. These primarily include differences between the estimated tariff loss rate and the physical loss rate,[16] deviations from dispatch not precisely matched by resources on automatic generation control, and metering granularity for load.

The CAISO maintains a neutrality account that tracks imbalance energy settlement dollar values based on the various components of the LMP used to settle energy transactions, and allocates out any excess revenues or insufficiencies to scheduling coordinators based on the measurements of their demand. The CAISO refers to this neutrality account as the RTIEO.[17]

The CAISO accounts for amounts in the RTIEO based on the various contributing factors. The dollar amounts in the RTIEO are attributed to the sum of various measures of differences between market results and metered results: FMM instructed imbalance energy;[18] RTD instructed imbalance energy;[19] uninstructed imbalance energy;[20] EIM bid adders and the resulting GHG emission compliance costs;[21] and unaccounted for energy.[22] Also, since the CAISO implemented the EIM, the CAISO also includes an accounting of the financial value of the EIM transfers.

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16 Which would result in unaccounted for energy.

17 *See* existing Section 11.5.4.1.

18 "The accounted for energy resulting from the difference between a resource's Day-Ahead Schedules or EIM Base Schedules and FMM Schedules determined pursuant to Section 11.5.1.1." Appendix A to the CAISO tariff.

19 "The portion of accounted for energy resulting from difference between Dispatch Instructions and the Day-Ahead Schedules and EIM Base Schedules that have not already been accounted for as FMMM Instructed Imbalance Energy determined pursuant to Section 11.5.1.2." Appendix A to the CAISO tariff.

20 "The portion of RTD Imbalance Energy that is not RTD Instructed Imbalance Energy." Appendix A to the CAISO tariff.

21 "A Bid component composed of a MW quantity and price that provides EIM Participating Resources an opportunity to recover costs of compliance with California Air Resources Board greenhouse gas regulations." Appendix A to the CAISO tariff.

22 "The difference in Energy, for each utility Service Area and Settlement Period, between the net Energy delivered into the utility Service Area, adjusted for utility Service Area Transmission Losses, and the total Measured Demand within the utility Service Area adjusted for distribution losses using Distribution System loss factors approved by the Local Regulatory Authority. This difference is attributable to meter measurement errors, power flow modeling errors, energy theft, statistical Load profile errors, and distribution loss deviations. For EIM Market Participants, the CAISO will calculate Unaccounted For Energy based on the EIM Entity Balancing Authority Area instead of the utility Service Area." Appendix A to the CAISO tariff.

With the addition of flows through and from participating EIM balancing authority areas, *i.e*., EIM transfers, in its valuation of RTIEO amounts, the CAISO must also attribute some of the remaining amounts to the flows between EIM balancing authority areas resulting from CAISO dispatches. Because EIM transfers are not expressly settled as imports and exports between balancing authority areas in the EIM,[23] the CAISO calculates the financial value and includes it in the initial RTIEO calculation. Without this calculation, even if the total market were revenue neutral, the individual balancing authority areas would not be because exporting balancing authority areas' supply would be greater than the load, and importing balancing authority areas' supply would be less than load.

The CAISO calculates the real-time market $/MWh value of EIM transfers, namely, the energy flows among balancing authority areas in the EIM that result from CAISO market dispatch.[24] The CAISO calculates the value of these EIM transfers as the product of the MWh transferred[25] and the system marginal energy cost.[26]

When the CAISO developed the EIM, the CAISO and stakeholders sought to balance payments and charges in a manner similar to how they are balanced in the existing CAISO real-time market. The EIM thus used the CAISO's existing settlement mechanisms: the real-time congestion offset, the real-time marginal cost of losses offset, and the RTIEO.[27]

The RTIEO excludes dollar values associated with the marginal cost of congestion or marginal cost of losses because the CAISO calculates separate offset

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[23] The EIM design allows for flows between participating EIM areas based on available transmission capacity. However, the CAISO does not settle individual transfers and instead allows for settlement of actual resource schedules from participating resources. From an operational perspective, however, because each EIM entity remains its own balancing authority area, there are actual interchange exchanges between the balancing authority areas. The CAISO models and manages EIM transfers like it does all five minute dynamic schedules, on a 5-minute basis and not as hourly interchange schedules. *See* existing section 29.7 (e).

[24] The CAISO determines the quantity of EIM transfers between balancing authority areas based on the transfer capacity available, the transfer constraints, and the transfer schedule cost. *See* existing section 29.17(d)-(g); *see also* Business Practice Manual for the Energy Imbalance Market, section 11.1.5 and Appendix A (explaining the procedures for the submission of e-tag information associated with EIM transfers and the mathematical formulation for energy transfer system resources).

[25] Positive or negative.

[26] Section 11.5.4.1(a) of the CAISO tariff. The System Marginal Energy Cost is the component of the Locational Marginal Price that reflects the marginal cost of providing Energy from a designated reference Location, namely, the CAISO. *See* "System Marginal Energy Cost," Appendix A to the CAISO tariff. The precise calculation and referenced location is described in Section C of Appendix C to the CAISO tariff.

[27] *See California Independent System Operator Corp*., 147 FERC ¶ 61,231 at PP 49 *et seq.* (2014).

accounts based on the respective congestion and losses component of the LMP.[28] To incentivize EIM base schedules to exclude unresolved congestion, the CAISO calculates the real-time congestion offset by balancing authority area and allocates all charges to that balancing authority area.[29] Likewise, because modeled losses vary based upon the transmission system of the balancing authority area, the CAISO calculates the real-time marginal cost of losses offset by balancing authority area and allocates all charges to that balancing authority area.[30]

Accordingly, the CAISO performs the initial calculation of the RTIEO for each balancing authority area by summing the financial value of the EIM transfers and the settlement amounts for FMM and RTD instructed imbalance energy, uninstructed imbalance energy, GHG emission compliance costs using EIM bid adders, and unaccounted for energy.[31] The CAISO then subtracts the real-time congestion offset and the real-time marginal cost of losses offset amounts from the initial calculation. [32]

After the CAISO performs the initial calculation, the CAISO adjusts the RTIEO for each balancing authority area by an EIM transfer adjustment. The CAISO created the EIM transfer adjustment to align the flows among EIM entities with demand.[33] The CAISO calculates the EIM transfer adjustment by

a) Dividing the sum of net EIM transfers out of an EIM entity balancing authority area by the sum of the absolute value of uninstructed imbalance energy due to demand, the absolute value of uninstructed imbalance energy due to supply, the absolute value of unaccounted for energy, and the net EIM transfers out of the balancing authority area;
b) Multiplying the initial calculation of the RTIEO by the ratio calculated in step (a); and
c) Reducing the RTIEO of the EIM entity balancing authority area with the net transfer out by the amount calculated in step (b), and adding that amount to the EIM entity balancing authority area with the net transfer in

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28 *See* existing Tariff section 11.5.4.1.1 and 11.5.4.1.2. The CAISO separates out the offset amounts attributed to the marginal cost of congestion or marginal cost of losses because the CAISO tariff requires these amounts are allocated to scheduling coordinators based on different billing determinations to account for differing cost causation principles.

29 *Id*.; Section 11.5.4.1.1 of the CAISO tariff. Charges can be positive or negative. The CAISO generally refers to charges or offsets rather than "charges and payments" for concision.

30 *Id*. Section 11.5.4.1.2 of the CAISO tariff.

31 For the CAISO balancing authority area only, the CAISO also adds the real-time virtual bid settlement, plus the real-time ancillary services congestion revenues, and virtual awards settlements in the real-time market in accordance with section 11.3.

32 Section 11.5.4.1(b) of the CAISO tariff.

33 *See California Independent System Operator Corp.*, 149 FERC ¶ 61,064 at P 3 (2014).

to determine the final RTIEO.[34]

The CAISO included the additional step that re-allocates a portion of the offsets among balancing authority areas because these offsets were originally thought to be the result of serving demand.[35]

Finally, the CAISO allocates the financial value (either positive or negative payments) to scheduling coordinators as follows. For the RTIEO that pertains to the CAISO balancing authority area, the CAISO allocates the amounts to scheduling coordinators into the scheduling coordinator's measured demand, which consists of their metered load and exports. For RTIEO that pertains to the individual EIM balancing authority areas, the CAISO allocates the amounts to the relevant EIM entity scheduling coordinator.[36] The EIM entity scheduling coordinator handles the assigned RTIEO through its own tariff.[37]

D. Need for Tariff Amendment

1. The current methodology for financial valuation of EIM transfers assigns California GHG compliance related requirements to non-California EIM entities.

As discussed above, because the CAISO does not settle the EIM transfers as imports and exports between balancing authority areas within the EIM, the CAISO calculates the financial value of EIM transfers when it calculates the RTIEO to capture any neutrality amounts created by such transfers by multiplying the system marginal energy cost by the MWh quantity of the EIM transfers in and out of each balancing authority area. This calculation allows the CAISO to balance imbalance supply and imbalance demand for each balancing authority area. [38]

After review of the current methodology through the stakeholder process preceding this filing, the CAISO has determined that using the system marginal energy cost effectively assigns some California GHG compliance-related costs to non-California

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[34] *See* existing section 11.5.4.1(c) of the CAISO tariff.

[35] *Id*. Sections 11.5.4.1 and 11.8.6 of the CAISO tariff. Demand is metered load within a balancing authority area, exports from it, and EIM transfers out of it. *See* Declaration of Donald G. Tretheway, February 28, 2014, Attachment C to the CAISO Transmittal Letter in FERC Docket No. ER14-1386-000.

[36] The CAISO allocates this value to CAISO load serving entities based on measured demand. *See* Section 11.5.4.1(d) of the CAISO tariff.

[37] *California Independent System Operator Corp.*, 147 FERC ¶ 61,231 at P 49 (2014).

[38] The sum of the financial value across the EIM footprint is zero because all EIM transfers out have a corresponding EIM transfer in. The financial value replicates what would have been the energy settlement of EIM transfers in order to have imbalance supply and demand balanced for each balancing authority area.

EIM entities. The system marginal energy cost is the same for all pricing nodes in the combined EIM area because the CAISO enforces the system level power balance constraint in the real-time market over the entire EIM area, which includes the CAISO balancing authority area and all of the other EIM entities' balancing authority areas.[39] Although the CAISO allows participating resources in the non-CAISO EIM areas to submit a separate EIM bid component, the CAISO does not provide a separate bid component to CAISO generators to reflect their GHG compliance costs. However, resources in California that are subject to GHG compliance costs factor such costs into their incremental energy bids. Such bids may set the LMP, and therefore also set the system marginal energy cost on the system.

Valuing the EIM transfers at the system marginal energy cost is problematic because the value of the energy transferred to EIM areas outside of California does not include GHG regulatory compliance costs and is therefore lower. EIM participating resources submit economic bids to offer output across the combined CAISO and EIM footprint. To offer output to serve demand in the CAISO or SMUD, EIM participating resources also submit EIM bid adders with a MW quantity and a price that reflects the EIM participating resource's costs to comply with California's GHG regulations.[40] Submitting this bid adder is voluntary and reflects the willingness of the EIM participating resource to serve demand in the CAISO and SMUD. Based on a least-cost dispatch methodology, EIM bid adders allow the CAISO to attribute which EIM participating resources support EIM transfers to serve CAISO and SMUD demand. The market then compensates the EIM participating resource for its costs of California GHG compliance when its resource is attributed to serving load in California.

The EIM bid adder can cause price separation between (1) transfers only in non-California areas, which have no GHG compliance costs, and (2) transfers including the California area, which do.[41] This means the value of energy in non-California areas is less because there are no GHG costs to account for given that they are paid for separately through the EIM bid adder component. However, using the system marginal energy cost to value all of the EIM transfers reflects a total system-wide price, which captures the cost of complying with GHG costs in California. The incremental energy costs in non-California EIM balancing authority areas are less than those in the California balancing authority areas. Therefore, the EIM transfers in those areas should be valued at a system marginal energy cost that accounts for this cost difference.

Consider the following example:

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39 *See* Appendix C of the CAISO tariff part C.

40 *See* Section 29.32 of the CAISO tariff.

41 More specifically, price separation will occur when there are net imports into the California area because the GHG cost of serving California transfers is non-zero.

Example 1 – Current EIM Transfer Financial Value

	$/MWh
SMEC	$10.00
GHG Price	$4.00

	CA BAA1	CA BAA2	CA BAA3	BAA4	BAA5	BAA6	BAA7
Net Scheduled Interchange (MWh)	-100	50	-25	100	-50	0	25
GHG Award (MWh)	0	0	0	25	25	25	0

Assume the system marginal energy cost is $10/MWh and the GHG compliance cost is $4 per MWh. The $10/MWh captures the cost of compliance by resources in the CAISO balancing authority area that inherently include the cost of GHG compliance in their incremental energy bids. Assume there are three California balancing authority areas (CA BAA1, CA BAA 2, and CA BAA 3) and four EIM balancing authority areas (EIM BAA 4, EIM BAA 5, EIM BAA 6, and EIM BAA 7). CA BAA 1 imports 100 MWh from the EIM areas, CA BAA 2 exports 50 MWh to the EIM areas, and CA BAA 3 imports 25 MWh from the EIM areas. The three California balancing authority areas collectively are thus net importers of 75 MWh of energy from the EIM balancing authority areas.

When EIM transfers into the California balancing authority areas occur, EIM participating resources are attributed, through the market optimization, as serving the EIM transfer into California. BAA 4, BAA 5, and BAA 6 have each been attributed 25 MWh of the EIM transfers into the California balancing authority areas. However, these figures only account for the EIM balancing authority area exports to California. Each EIM area also has a net scheduled interchange accounting for the total energy transferred into and from it. A positive number means that the EIM area exported more energy than it imported. Here, assume the net scheduled interchange is 100 MWh for EIM BAA 4, -50 MWh for EIM BAA 5, zero for EIM BAA 6, and 25 MWh for EIM BAA 7.

	CA BAA1	CA BAA2	CA BAA3	BAA4	BAA5	BAA6	BAA7
Energy within BAA	$1,000	$ -500	$250	$ -600	300	0	$ -150
GHG Award	N/A	N/A	N/A	$ -100	$ -100	$ -100	0
Financial Value Transfers	$ -1,000	$500	$ -250	$1,000	$ -500	$0	$250
Neutrality:	$0	$0	$0	$300	$ -300	$ -100	$100

The marginal cost of GHG results in price separation between California balancing authority areas and non-California balancing authority areas. This reflects the

difference in the value of energy between California and non-California consumed energy. Appropriately, in settling for imbalance energy, load within California balancing authority areas pays $10/MWh and load outside of California balancing authority areas pays $6/MWh. Also appropriately, generation within California balancing authority areas receive $10/MWh and generation outside California balancing authority areas receive $6/MWh.

The example shows load has been charged $300 more than supply has been paid for energy[42] because the market has collected from California load the cost necessary to pay the GHG awards for EIM participating resources attributed to serving load in California. To balance the load and generation settlements on the entire EIM area, the CAISO assesses neutrality offsets to the EIM balancing authority areas even though the commonly expected causes of neutrality may be absent. In this case, the CAISO has identified that using the system marginal energy price to account for the EIM transfers in the RTIEO, overvalues the cost of energy in the EIM areas because it fails to account for the presence or absence of GHG compliance costs in EIM transfers that do not include California. This over-valuation of energy costs for non-California EIM transfers results in neutrality offsets that are then allocated to the EIM entities as well, which was never intended. This issue was magnified last year when the quantity of non-emitting resources eligible for attribution as serving CAISO demand decreased, leading to more intervals where the marginal GHG cost was not zero.[43]

2. Recent observations reveal the current EIM transfer adjustment does not reflect cost causation.

As described above, once the CAISO has calculated the initial RTIEO for each balancing authority area in the EIM, the CAISO then applies an EIM transfer adjustment to redistribute shares of the RTIEO among the EIM balancing authority areas based on the premise that real-time imbalance energy was proportional to each balancing authority area's demand. This step in the calculation was based on the CAISO's experience within its own balancing authority area after implementation of Order No. 764, which allowed real-time scheduling on a 15-minute basis and resolved numerous structural issues that had contributed to RTIEO within the CAISO balancing authority area.[44] Because any remaining imbalance energy was not directly attributable to any particular balancing authority area practice, market participants found it sensible simply

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[42] BAA6 has a net scheduled interchange of zero; however, it has received a 25 MWh GHG award. This is because the market optimization does not require incremental energy dispatch to be attributed to serve an EIM transfer into California balancing authority areas. Because the net schedules interchange is zero, there must be an offsetting 25 MWh EIM transfer-in from a non-California balancing authority area.

[43] *Supra,* Section I.B, Cost of Complying with California Greenhouse Gas Regulatory Requirements, pgs. 3-5.

[44] *California Independent System Operator Corp.*, 146 FERC ¶ 61,205 (2014).

to distribute any costs based on demand.[45]

Recent settlement data demonstrate the RTIEO is now driven primarily by the way in which each balancing authority area manages and accounts for the services that can result in uninstructed imbalance energy and unaccounted for energy. For example, based on settlement data over the 2018 and 2019 period, the percentage of unaccounted for energy as a contribution to each balancing authority area's total RTIEO charges differs significantly in both magnitude and variability among balancing authority areas. The CAISO and one of the other balancing authority areas' unaccounted for energy charges represent a single-digit percentage of their annual RTIEO charges. Other balancing authority areas' unaccounted for energy is a much larger share of their RTIEO charges, with the bulk of balancing authority areas' unaccounted for energy charges representing the vast majority share of their RTIEO charges. These data indicate that the way in which each balancing authority area manages and accounts for its services directly correlate to the RTIEO; not EIM transfers between EIM balancing authority areas.[46] For these reasons, any neutrality offset—positive or negative—should remain in the balancing authority area where it originated. Because EIM transfers are found not to be the primary contributor to the RTIEO the current redistribution of the RTIEO between balancing authority areas based on demand is no longer appropriate.

Consider the following example:

Example 2 – Current RTIEO Allocation with EIM Transfer Adjustment

	$/MWh
SMEC	$10.00

	BAA1	BAA2
Instructed Energy – Generation (MWh)	-50	-175
Load Forecast Used in Market (MWh)	100	125
EIM Transfer (MWh)	-50	50

Assume the system marginal energy cost is $10/MWh. Assume that BAA 1 and BAA 2 are both EIM balancing authority areas outside of California. BAA 1 receives EIM transfers from BAA 2. The market optimization balances supply and demand

[45] *See* DMM Comments on EIM Draft Final Proposal, October 25, 2013, p. 9 (observing that the proposed RTIEO transfer adjustment may not always be aligned with the cause of the neutrality, suggesting that the CAISO monitor the extent to which the transfer adjustment is allocating RTIEO according to cost causation principles, and recommending the CAISO eliminate the transfer adjustment if problems are detected; *available at* http://www.caiso.com/Documents/DMMComments_EnergyImbalanceMarket-DraftFinalProposal.pdf.)

[46] *I.e.*, imbalance energy, uninstructed imbalance energy, and unaccounted for energy.

across the entire EIM footprint. The 100 MWh of load in BAA1 is met by the 50 MWh of BAA 1's internal generation and the 50 MWh external generation located in BAA 2. But the EIM transfer between BAA 1 and BAA 2 is not settled separately in the market because load and generation are settled at their respective locations.

	BAA1	BAA2
Uninstructed Imbalance Energy (Generation)	$ -20	$50
Uninstructed Imbalance Energy (Load)	$ -20	$20
Unaccounted for Energy	$60	$30
Transfer Adjustment	$83	$ -83
Neutrality:	$103	$17

Because the market always balances supply and demand, only deviations from the market dispatch results should cause neutrality offsets (in the forms of uninstructed imbalance energy, unaccounted for energy, etc.).[47] In the example above, metered generation in BAA 1 exceeded its dispatched energy schedule by 2 MWh (resulting in a $20 charge for UIE), load is 2 MWh below the forecast market (same), and there was 6 MWh of unaccounted for energy (resulting in a $60 credit). These offsets are simply endemic to balancing authority area services. They do not result from EIM transfers in or out. However, the EIM transfer adjustment moves neutrality from exporting areas to importing areas under the premise that neutrality offsets correspond to serving demand (*i.e.*, generation). In this case, the EIM transfer adjustment unnecessarily shifts 83% of BAA 2 neutrality to BAA 1 because BAA 2 serves more demand and exports energy.[48] But doing so was not an independent cause of any neutrality offset.

II. PROPOSED TARIFF REVISIONS

The CAISO proposes to revise the RTIEO to address both inadequacies in its current calculation: (a) misallocating GHG compliance costs; and (b) misallocating the RTIEO among EIM balancing authority areas. The CAISO proposes to do so by (a) adding a credit for the value of EIM transfers that do not incur GHG compliance costs to

[47] As explained in Section I.C, price separation due to EIM transfers' GHG compliance costs also is inadvertently resulting in neutrality offsets.

[48] As explained in Section I.B, the CAISO calculates the EIM transfer adjustment by (a) dividing the sum of net EIM Transfers out of an EIM entity balancing authority area (here, 50) by the sum (60) of the absolute value of uninstructed imbalance energy due to demand (2), the absolute value of uninstructed imbalance energy due to supply (2), the absolute value of unaccounted for energy (3), and the net EIM transfers out of the balancing authority area (50); then (b) multiplying the initial calculation of the RTIEO ($20 for BAA1, $100 for BAA2) by the ratio (50/60 = 83.33%) calculated in step (a); then reducing the RTIEO of the EIM entity balancing authority area with the net transfer out (BAA2) by the amount calculated in step (b), and adding that amount to the EIM entity balancing authority area with the net transfer in to determine the final RTIEO ($103.33 for BAA1, $16.67 for BAA2).

the system marginal energy cost used to produce the financial value of EIM transfers in the RTIEO calculation for EIM areas, and (b) removing the EIM transfer adjustment. These revisions will ensure the RTIEO better reflects the cause of neutrality offsets and then allocates those offsets more justly and reasonably. The CAISO notes that each proposal is distinct and would independently improve the quality of the RTIEO. The CAISO has included them together because without both, the RTIEO may continue to be less efficient. The CAISO discusses each proposal in turn.

A. EIM Transfer Financial Value

To correctly value EIM transfers in terms of $/MWh in calculating the RTIEO, the CAISO proposes to add a credit to the system marginal energy cost used for EIM transfers that do not include California. The credit will reflect the value of EIM transfers that do not incur GHG compliance costs.[49] This simple change will ensure that EIM areas no longer incur GHG compliance costs for EIM transfers where no GHG compliance costs exist. The CAISO proposes to calculate this credit as the product of the portion of EIM transfers that do not correspond to a GHG compliance obligation and the "Marginal Greenhouse Gas Cost."[50] The marginal greenhouse gas cost is a current component of the locational marginal price for EIM entities that accounts for the marginal cost of EIM resources' GHG compliance costs.[51] As such, in calculating the financial value of EIM transfers used in the RTIEO calculation, the CAISO will calculate the value of EIM transfers as the product of the MWh transferred and the system marginal energy cost, plus the Marginal Greenhouse Gas Cost.[52]

This revision is just and reasonable because it accounts for the price separation between (1) transfers only in non-California areas, which have no GHG compliance costs, and (2) transfers including the California area, which do. Accounting for this difference thereby allows the CAISO to determine the correct $/MWh for EIM transfers in the RTIEO calculation, helping to ensure the CAISO assesses the correct neutrality offsets to each EIM balancing authority area.

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49 Proposed change to section 11.5.4.1(a) of the CAISO Tariff.

50 *Id*.; *see also, infra,* fn. 51.

51 More specifically, the Marginal Greenhouse Gas Cost is the component of LMP for EIM entities representing the value of imbalance energy imported into the CAISO from EIM entity areas. Today the CAISO tariff refers to this value as "the marginal cost of the EIM Bid Adder in dispatching Energy from the relevant EIM Participating Resources to serve load in the CAISO." *See* Section B of Appendix C to the CAISO tariff (represented as *MCGi)*. The EIM Bid Adder is "A Bid component composed of a MW quantity and price that provides EIM Participating Resources an opportunity to recover costs of compliance with California Air Resources Board greenhouse gas regulations." "EIM Bid Adder," Appendix A to the CAISO tariff. Rather than repeat the above verbiage in the RTIEO calculation, the CAISO proposes to create the new term, "Marginal Greenhouse Gas Cost." Proposed Appendix A; Sections B and F of Appendix C to the CAISO tariff.

52 (MWh x SMEC) + MGC.

The CAISO does not compute a separate marginal cost of greenhouse compliance by resources in California because, as explained above, such resources do not submit a separate bid adder. Therefore, the CAISO cannot calculate a marginal GHG cost by California resources that are otherwise reflected in the system marginal energy price. The marginal GHG cost derived from the EIM bid adder is a reasonable proxy of the market clearing price for such costs. First, as explained above, the formula used to calculate the EIM bid adder is similar to the GHG component the CAISO uses in calculating the default energy bids for California resources. Second, the marginal GHG cost component derived from the EIM bid adder is a market clearing cost that reflects the going rate of resources participating in the EIM, including resources in the CAISO balancing authority area. The CAISO clears the real-time market over the entire EIM area, which means resources with the EIM bid adder are competing with all resources participating in the real-time market. Therefore, using the marginal greenhouse gas cost component that reflects the greenhouse gas compliance costs by EIM participating resources to credit the financial valuation of EIM transfers is just and reasonable.

Further, using the same figures as Example 1, above, the following example demonstrates that the CAISO's proposal accounts for any price separation and thereby eliminates unnecessary neutrality offsets.

Example 3 – Proposed EIM Transfer Value Settlement

	$/MWh
SMEC	$10.00
GHG Price	$4.00

	CA BAA1	CA BAA2	CA BAA3	BAA4	BAA5	BAA6	BAA7
Net Scheduled Interchange (MWh)	-100	50	-25	100	-50	0	25
GHG Award (MWh)	0	0	0	25	25	25	0

Again, assume the system marginal energy cost is $10 per MWh, and the Marginal Greenhouse Gas Cost is $4 per MWh. CA BAA 1 imports 100 MWh from the EIM areas, CA BAA 2 exports 50 MWh to the EIM areas, and CA BAA 3 imports 25 MWh from the EIM areas (collectively importing 75 MWh). BAA 4, BAA 5, and BAA 6 have each been attributed 25 MWh of the EIM transfers into the California balancing authority areas. The net scheduled interchange is 100 MWh for EIM BAA 4, -50 MWh for EIM BAA 5, zero for EIM BAA 6, and 25 MWh for EIM BAA 7.

	CA BAA1	CA BAA2	CA BAA3	BAA4	BAA5	BAA6	BAA7
Energy within BAA	$1,000	$ -500	$250	$ -600	300	0	$ -150
GHG Award	N/A	N/A	N/A	$ -100	$ -100	$ -100	0
Financial Value Transfers	$ -1,000	$500	$ -250	$1,000	$ -500	$0	$250
Proposed GHG Accounting	N/A	N/A	N/A	$ -300	$300	$100	$ -100
Neutrality:	$0	$0	$0	$0	$0	$0	$0

Under the CAISO's proposal, the CAISO will account for the value of GHG compliance costs in EIM transfers. BAA 4, for example, has 100 MWh of EIM transfers out. Of this 100 MWh, 25 MWh are attributed to an EIM transfer into the California balancing authority areas, and 75 MW to transfers in the EIM balancing authority areas. The financial value of the total 100 MWh transfer at the system marginal energy cost is $1,000 ($10/MWh x 100 MWh). But because 75 MWh is not subject to GHG compliance costs, the financial credit for GHG on the transfers now results in a payment of $300 ($4/MWh x 75 MWh).[53] This results in the correct financial value of the EIM transfers by recognizing that supply supporting transfers to California balancing authority areas is paid $10/MWh ($6/MWh for energy + $4/MWh for its GHG award) and supply supporting transfers to non-California balancing authority areas is paid $6/MWh (for energy only). Finally, the CAISO's proposal is balanced because the credits and charges result from the same mechanism, thus eliminating any need to recover revenue from other charges.

B. EIM Transfer Adjustment

The CAISO also proposes to eliminate the EIM transfer adjustment it currently performs before allocating the RTIEO by balancing authority area.[54] This revision will end the practice of transferring real-time market neutrality from one balancing authority

[53] As described above, BAA 6 is a more complex example used to illustrate how a balancing authority area can still have GHG compliance costs even if its net scheduled interchange comes to zero. Although BAA6 has a net scheduled interchange of zero, it has received a 25 MWh GHG award. This is because the market optimization does not require incremental energy dispatch to be attributed to serve an EIM transfer into California balancing authority areas. Because the net schedules interchange is zero, there must be an offsetting 25 MWh EIM transfer-in from a non-California balancing authority area. Although not settled, the EIM transfer-out with the California balancing authority areas is a payment of $250 ($10/MWh x 25 MWh) and the EIM transfer-in with the EIM balancing authority area charge of $150 ($6/MWh x 25 MWh). The combined settlement of the two transfers is equal to the financial credit for GHG transfers of $100 ($4/MWh x 25 MWh), which ensures that BAA 6 is revenue neutral based upon the market results.

[54] Proposed Section 11.5.4.1(c) of the CAISO tariff (removing subsection (c) and renumbering 11.5.4.1).

area to another. Rather than being re-allocated real-time neutrality offsets based on demand, each balancing authority area will simply be responsible for its own real-time neutrality offsets.

The revised RTIEO calculation will allocate real-time neutrality offsets consistent with cost causation. As discussed above, RTIEO is now driven primarily by the way in which each balancing authority area manages and accounts for the services that can result in imbalance energy and unaccounted for energy and not by EIM transfers between balancing authority areas in the EIM.

Using the same figures as Example 2, above, the following example demonstrates that the CAISO's proposal would no longer inappropriately shift real-time neutrality offsets.

Example 4 – Proposed RTIEO Allocation

	$/MWh
SMEC	$10.00

	BAA1	BAA2
Instructed Energy – Generation (MWh)	-50	-175
Load Forecast Used in Market (MWh)	100	125
EIM Transfer (MWh)	-50	50

Assume the system marginal energy cost is $10/MWh. Assume that BAA 1 and BAA 2 are both EIM balancing authority areas outside of California. BAA 1 receives EIM transfers from BAA 2. The market optimization balances supply and demand across the entire EIM footprint. The 100 MWh of load in BAA1 is met by the 50 MWh of BAA 1's internal generation and the 50 MWh external generation located in BAA 2. The EIM transfer between BAA 1 and BAA 2 is not settled separately in the market because load and generation are settled at their respective locations.

	BAA1	BAA2
Uninstructed Imbalance Energy (Generation)	$ -20	$50
Uninstructed Imbalance Energy (Load)	$ -20	$20
Unaccounted for Energy	$60	$30
Neutrality:	$20	$100

Under the CAISO's proposal, each balancing authority area is assessed the sum of its imbalance energy and unaccounted for energy. The CAISO will not re-allocate neutrality offsets based on EIM transfers and demand because those inputs do not drive the costs necessitating neutrality offsets. In addition to making the RTIEO calculation more consistent with cost causation, eliminating the EIM transfer adjustment dramatically increases the simplicity of the RTIEO calculation.

IV. STAKEHOLDER PROCESS

The CAISO initiated the stakeholder process to examine neutrality offsets at the request of stakeholders in the EIM balancing authority areas. The CAISO examined neutrality offsets regarding EIM transfers, including their calculations, meter data, and settlement data. This stakeholder process resulted in the instant proposals to revise the RTIEO calculation. Stakeholders generally support the CAISO's proposals. For example, the CAISO's Department of Market Monitoring's stakeholder comments state that the CAISO's proposal will be consistent with cost causation and "will make the calculation consistent with the originally intended market design."[55]

Although stakeholders support the CAISO's proposed revisions to the RTIEO calculation, some stakeholders raised concerns during the stakeholder process regarding the CAISO's neutrality offsets generally. First, stakeholders have requested that the CAISO comprehensively review all neutrality offsets, including the CAISO's business practices, to mitigate any future settlement issues. Second, stakeholders requested that the CAISO assess the feasibility of conducting a retroactive settlement based on the revised RTIEO calculation proposed here. The CAISO intends to engage stakeholders to discuss a more comprehensive review of neutrality offsets, and to ensure market confidence in CAISO settlement processes. The CAISO proposes the revisions in this filing prospectively only; however, the CAISO will examine its tariff authority to re-settle any incorrect applications of its filed rates.

The stakeholder process that resulted in this filing included:

- An issue paper and draft final proposal issued by the CAISO;
- Developing draft tariff provisions;
- Three stakeholder meetings and conference calls to discuss the CAISO papers, including to develop tariff revisions; and
- Four opportunities to submit written comments on the CAISO papers and

[55] CAISO Department of Market Monitoring, Comments on Real-time Market Neutrality Settlement Issue, (June 13, 2019) *available at* https://www.westerneim.com/Documents/DecisiononReal-TimeMarketNeutralitySettlementProposal-DMMComments-Jun2019.pdf.

the draft tariff provisions.[56]

The proposal was presented to the EIM Governing Body on June 21, 2019, and the CAISO Governing Board on July 25, 2019. Both bodies voted unanimously to support this filing.[57]

V. EFFECTIVE DATE AND REQUEST FOR WAIVER OF NOTICE REQUIREMENT

The CAISO respectfully requests waiver of the Commission's 60-day notice requirement to permit these tariff revisions to become effective on August 1, 2019, two days after the date of this filing.[58] If the Commission denies the CAISO's requested waiver of the notice period, the CAISO requests that the Commission grant the CAISO an effective date of October 1, 2019, sixty-three days after this filing.[59]

Granting the requested waiver will ensure that market participants receive RTIEO charges and credits that better reflect cost causation as soon as possible. Granting the waiver will not impose undue hardship on market participants because the CAISO announced its proposed changes and its intent to request the waiver in the draft final proposal dated May 30, 2019, which was further discussed in the stakeholder and approval process. From a practical perspective, the CAISO will be implementing these changes in its fall implementation of settlement charge code changes based on the Commission's approved effective date. If the Commission grants the waiver, the CAISO will apply the settlement charges effective August 1, 2019. If not, the CAISO will apply the changes as of the Commission-accepted effective date.

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[56] Materials regarding the stakeholder process are available on the CAISO website at http://www.caiso.com/informed/Pages/StakeholderProcesses/Real-TimeMarketNeutralitySettlement.aspx.

[57] Materials related to the Board's authorization to prepare and submit this filing are available on the CAISO website at http://www.caiso.com/informed/Pages/BoardCommittees/BoardGovernorsMeetings.aspx. The Memoranda provided to the Board is provided in attachment D to this filing.

[58] Specifically, pursuant to section 35.11 of the Commission's regulations, 18 C.F.R. § 35.11, the CAISO requests waiver of the notice requirement set forth in section 35.3(a)(2) of the Commission's regulations, 18 C.F.R. § 35.3(a)(2).

[59] In the event that the Commission denies the CAISO's requested waiver of the notice period, the CAISO will submit the tariff records with the actual effective date in compliance with the Commission's final order.

VI. COMMUNICATIONS

In accordance to Rule 203(b)(3) to the Commission's Rules of Practice and Procedure,[60] the CAISO respectfully requests that correspondence and other communications regarding this filing should be directed to the following:

Roger E. Collanton
General Counsel
Anna McKenna
Assistant General Counsel
John Anders
Assistant General Counsel
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The CAISO also requests waiver of Rule 203(b)(3) of the Commission's Rules of Practice and Procedure,[61] to allow more than two persons to be added to the service list in this proceeding.

VII. SERVICE

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

VIII. CONTENTS OF FILING

In addition to this transmittal letter, this filing includes the following attachments:

Attachment A — Clean CAISO tariff sheets incorporating this tariff amendment;

60 18 C.F.R. § 385.203(b)(3).

61 *Id.*

Attachment B	Red-lined document showing the revisions in this tariff amendment;
Attachment C	Draft final proposal on this tariff amendment;
Attachment D	Board memoranda; and

IX. CONCLUSION

The CAISO respectfully requests that the Commission grant its request for waiver of the Commission's notice requirements, and accept the tariff revision in this filing as just and reasonable effective August 1, 2019.

Respectfully submitted,

/s/ William H. Weaver
Roger E. Collanton
General Counsel
Anna McKenna
Assistant General Counsel
John Anders
Assistant General Counsel
William H. Weaver
Senior Counsel

Counsel for the California Independent System Operator Corporation

Attachment A – Clean Tariff

Real-Time Neutrality Settlement Tariff Amendment

California Independent System Operator Corporation

11.5.4 Imbalance Energy Pricing; Non-Zero Offset Amount Allocation

11.5.4.1 Real-Time Imbalance Energy Offset

(a) **Financial Value of EIM Transfers.** For each Balancing Authority Area in the EIM Area, the CAISO will calculate the Real-Time Market financial value of EIM Transfers as the product of the EIM Transfer MWh, either positive or negative, and the System Marginal Energy Cost, plus a greenhouse gas financial value credit calculated as the product of the portion of the EIM Transfers that do not correspond to a greenhouse gas compliance obligation under the regulations administered by the California Air Resources Board and the Marginal Greenhouse Gas Cost.

(b) **Initial Calculation.** The CAISO will initially calculate the Real-Time Imbalance Energy Offset to be recovered on a 5-minute basis for each Balancing Authority Area in the EIM Area as the sum of the financial value of EIM Transfers and the Settlement amounts for FMM Instructed Imbalance Energy and RTD Instructed Imbalance Energy, Uninstructed Imbalance Energy, Greenhouse Gas Emissions Cost Revenue, and Unaccounted For Energy, and for the CAISO, Real-Time Virtual Bid Settlement, plus the Real-Time Ancillary Services Congestion revenues and Virtual Awards settlements in the Real-Time Market in accordance with Section 11.3, less the Real-Time Congestion Offset and less the Real-Time Marginal Cost of Losses Offset.

(c) **Allocation.** The CAISO will allocate the adjusted Real-Time Imbalance Energy Offset:

(1) for the CAISO Balancing Authority Area, to Scheduling Coordinators in the CAISO Balancing Authority Area according to Measured Demand; and

(2) for EIM Entity Balancing Authority Areas, to the applicable EIM Entity Scheduling Coordinator.

(d) **Residual Neutrality Amounts.** The CAISO will allocate any residual Real-Time Imbalance Energy Offset amount to Scheduling Coordinators in the EIM Area based upon EIM Measured Demand.

* * * * *

29.32 Greenhouse Gas Regulation and EIM Bid Adders.

(a) **EIM Bid Adders.**

(1) **In General.** EIM Participating Resources will have an opportunity to recover costs of compliance with California Air Resources Board greenhouse gas regulations, which may include the cost of allowances, uncertainty on the final resource specific emission factor, and other costs of greenhouse gas regulation compliance.

(2) **EIM Bid Adder.**

(A) **Bid Submission.** EIM Participating Resource Scheduling Coordinators for EIM Participating Resources located in an EIM Entity Balancing Authority Area outside of California may submit an EIM Bid Adder as a separate hourly Bid component to recover costs of compliance with California Air Resources Board greenhouse gas regulations, which must include a price and quantity and the price portion of which must be equal to or less than 110% of the EIM Participating Resource's greenhouse gas maximum compliance cost as determined in accordance with section 29.32(a)(3).

(B) **Default Treatment.** If an EIM Participating Resource located in an EIM Entity Balancing Authority Area outside of California does not submit an EIM Bid Adder, the CAISO will assume that the EIM Participating Resource will not be selected for delivery to the CAISO Balancing Authority Area.

(3) **Determination of EIM Greenhouse Gas Maximum Cost.** Each day the CAISO will determine the greenhouse gas maximum compliance cost for each EIM Participating Resource located in an EIM Entity Balancing Authority Area outside of California as set forth in the EIM Business Practice Manual, based on:

(A) the EIM Resource's highest incremental heat rate; the applicable

Greenhouse Gas Allowance Price; and the EIM Participating Resource's emission rate, as set forth in the applicable U.S. Environmental Protection Agency publication and registered in the Master File; or

(B) a price determined in accordance with the negotiated rate option procedures in section 39.7.1.3.1; or,

(C) with respect to, and only with respect to, Bids at EIM External Interties, the carbon dioxide equivalent emission rate of the resource with the highest such rate in the WECC region and the applicable Greenhouse Gas Allowance Price index.

(4) **EIM Bid Adder Price.** The price included in the EIM Bid Adder shall not be less than $0/MWh and the sum of the price component of the EIM Bid Adder and the Energy cost portion of the Bid cannot exceed $1000/MWh.

(b) **Consideration of EIM Bid Adders in Market Clearing.**

(1) **Dispatch of EIM Participating Resources with Nonzero Bid Adders.** The CAISO's Security Constrained Economic Dispatch in the Real-Time Unit Commitment and Real-Time Dispatch shall take into account EIM Bid Adders in selecting Energy produced by EIM Participating Resources located in an EIM Entity Balancing Authority Area outside of California for import into the CAISO Balancing Authority Area or other EIM Entity Balancing Authority Areas in California up to the associated MW quantity included in the EIM Bid Adder, but not when selecting EIM Participating Resources to serve Load outside of the combined area of the CAISO Balancing Authority Area and other EIM Entity Balancing Authority Areas within California.

(2) **EIM Participating Resources EIM Bid Adder MW Quantity.** The CAISO's Real-Time Unit Commitment and Real-Time Dispatch will limit the maximum EIM Bid Adder MW quantity of an EIM Participating Resource to a value equal to the EIM Participating Resource's dispatchable Bid range between the EIM Participating Resource's Base Schedule and the EIM Participating Resource's

effective upper economic Bid, considering any applicable derates and ancillary services capacity reservations, for the relevant Operating Hour.

(3) **Dispatch of EIM Participating Resources Bid Adders of Zero.** The CAISO's Security Constrained Economic Dispatch in the Real-Time Unit Commitment and Real-Time Dispatch shall not dispatch EIM Participating Resources outside the combined area of the CAISO Balancing Authority Area and other EIM Entity Balancing Authority Areas within California for delivery into the CAISO Balancing Authority Area or other EIM Entity Balancing Authority Areas in California if the MW quantity included in the EIM Bid Adder is zero.

(c) **Effect on Locational Marginal Price.** Using the methodology described in Appendix C, the CAISO will include the Marginal Greenhouse Gas Cost as a negative component in the Locational Marginal Prices for EIM Entity Balancing Authority Areas not subject to a greenhouse compliance obligation under the regulations administered by the California Air Resources Board in addition to those specified in Appendix C and Section 27.

(d) **Notice to EIM Participating Resource.** The CAISO will notify the EIM Participating Resource Scheduling Coordinator through the Dispatch Instruction of the megawatt quantity of any Energy of an EIM Participating Resource located in an EIM Entity Balancing Authority Area outside of California that is deemed to have been imported into the CAISO Balancing Authority Area or other EIM Entity Balancing Authority Areas in California as a result of the Market Clearing of the Real-Time Market.

(e) **Compensation.** The CAISO will allocate the Net Imbalance Energy Export optimally to EIM Participating Resource Scheduling Coordinators and will distribute Greenhouse Gas Emission Cost Revenues to EIM Participating Resources pursuant to that allocation.

(f) **Reporting Requirements.** The CAISO will report to each EIM Participating Resource Scheduling Coordinator the portion of the FMM Energy Schedule and the portion of RTD Energy Dispatch that is associated with Energy deemed to have been imported to the CAISO Balancing Authority Area or other EIM Entity Balancing Authority Areas in

California from all EIM Resources as part of the Real-Time Market results publication from each of its EIM Resources.

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Appendix A

Master Definitions Supplement

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- Greenhouse Gas Emission Cost Revenue

The revenues associated with the MWh compensation paid to an EIM Participating Resource that has Energy deemed delivered to a GHG compliance area priced at the Marginal Greenhouse Gas Cost multiplied by -1.

* * * * *

- Marginal Greenhouse Gas Cost

The marginal cost of GHG compliance when serving load in a GHG compliance area by an EIM Participating Resource not located within the GHG compliance area.

* * * * *

Appendix C

Locational Marginal Price

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B. LMP Composition in the Real-Time Market

In each 15-minute interval and each 5-minute interval of the Fifteen Minute Market and Real-Time Dispatch, respectively, the CAISO calculates the LMP for each PNode, based on the Bids of sellers and buyers selected in those markets as specified in the FMM Schedule and 5-minute Real-Time Dispatch Instructions. The CAISO designates a Reference Bus, r, for calculation of the System Marginal Energy

Cost (*SMECr*), which is the shadow price of the system power balance constraint. The CAISO uses the distributed load in the EIM Area as the Reference Bus to calculate loss sensitivities and shift factors used to linearize the power balance and Transmission Constraints. Resources that have constraints that prevent them from being marginal are not eligible to set the Locational Marginal Price. For each bus other than the Reference Bus, the CAISO determines separate components of the LMP for the marginal cost of Energy, Marginal Cost of Congestion, Marginal Cost of Losses, and Marginal Greenhouse Gas Cost relative to the Reference Bus, consistent with the following equation:

$LMP_i = SMEC_r + MCC_i + MCL_i + MCG_i$

$LMP_r = SMEC_r$

where:

- MCG_i is the LMP component representing Marginal Greenhouse Gas Cost.

For each PNode within an EIM Entity Balancing Authority Area, the LMP shall include a fourth component, the EIM Bid Adder component.

* * * * *

F. Marginal Greenhouse Gas Cost Component Calculation

For EIM Participating Resources within an EIM Entity Balancing Authority Area and Energy imported to or exported from an EIM Entity Balancing Authority Area, the CAISO will include the Marginal Greenhouse Gas Cost in dispatching Energy from the relevant EIM Participating Resources to serve load in the CAISO Balancing Authority Area. The CAISO will allocate the Net Imbalance Energy Export optimally to EIM Participating Resources. This allocation does not depend on the location of the EIM Entity Participating Resource; *i.e.* the CAISO does not use a shift factor in the allocation. If the Net Imbalance Energy Export from all EIM Entity Balancing Authority Areas as a group is negative or zero, there is no associated Net Imbalance Energy Export allocation or Marginal Greenhouse Gas Cost. Otherwise the Net Imbalance Energy Export constraint is binding with a Shadow Price (ψ). The market-clearing process produces a Shadow Price for the Net Imbalanced Energy Export constraint only when the relaxation of the constraint would result in reduction in the total cost to operate the system. The CAISO determines the Marginal

Greenhouse Gas Cost component of the LMP at a PNode in an EIM Entity Balancing Authority Area and LMPs for imports and exports between that EIM Entity Balancing Authority Area and a non-EIM Balancing Authority Area as the negative of the Shadow Price of the Net Imbalance Energy Export constraint.

$$MCG_i = - \psi$$

Attachment B – Marked Tariff

Real-Time Neutrality Settlement Tariff Amendment

California Independent System Operator Corporation

11.5.4 Imbalance Energy Pricing; Non-Zero Offset Amount Allocation

11.5.4.1 Real-Time Imbalance Energy Offset

(a) **Financial Value of EIM Transfers.** For each Balancing Authority Area in the EIM Area, ~~T~~the CAISO will calculate the Real-Time Market financial value of EIM Transfers as the product of the EIM Transfer MWh, either positive or negative, and the System Marginal Energy Cost, plus a greenhouse gas financial value credit calculated as the product of the portion of the EIM Transfers that do not correspond to a greenhouse gas compliance obligation under the regulations administered by the California Air Resources Board and the Marginal Greenhouse Gas Cost.

(b) **Initial Calculation.** The CAISO will initially calculate the Real-Time Imbalance Energy Offset to be recovered on a 5-minute basis for each Balancing Authority Area in the EIM Area as the sum of the financial value of EIM Transfers and the Settlement amounts for FMM Instructed Imbalance Energy and RTD Instructed Imbalance Energy, Uninstructed Imbalance Energy, ~~EIM Bid Adders~~Greenhouse Gas Emissions Cost Revenue, and Unaccounted For Energy, and for the CAISO, Real-Time Virtual Bid Settlement, plus the Real-Time Ancillary Services Congestion revenues and Virtual Awards settlements in the Real-Time Market in accordance with Section 11.3, less the Real-Time Congestion Offset and less the Real-Time Marginal Cost of Losses Offset.

(c) ~~**Adjustment.** The CAISO will adjust the initial calculation of the Real-Time Imbalance Energy Offset by-~~

~~(1) dividing the sum of net EIM Transfers out of an EIM Entity Balancing Authority Area by the sum of the absolute value of Uninstructed Imbalance Energy due to Demand, the absolute value of Uninstructed Imbalance Energy due to Supply, the absolute value of Unaccounted For Energy, and the net EIM Transfers out of the Balancing Authority Area;~~

~~(2) multiplying the initial calculation of the Real-Time Imbalance Energy Offset by the ratio calculated in Section 11.5.4.1(c)(1); and~~

~~(3) reducing the Real-Time Imbalance Energy Offset of the EIM Entity Balancing Authority Area with the net transfer out by the amount calculated in Section 11.5.4.1(c)(2) and~~

~~adding that amount to the EIM Entity Balancing Authority Area with the net transfer in to determine the final Real-Time Imbalance Energy Offset.~~

~~(d)~~ **Allocation.** The CAISO will allocate the adjusted Real-Time Imbalance Energy Offset:~~-~~

(1) for the CAISO Balancing Authority Area, to Scheduling Coordinators in the CAISO Balancing Authority Area according to Measured Demand; and

(2) for EIM Entity Balancing Authority Areas, to the applicable EIM Entity Scheduling Coordinator.

(d~~e~~) **Residual Neutrality Amounts.** The CAISO will allocate any residual Real-Time Imbalance Energy Offset amount to Scheduling Coordinators in the EIM Area based upon EIM Measured Demand.

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29.32 Greenhouse Gas Regulation and EIM Bid Adders.

(a) **EIM Bid Adders.**

(1) **In General.** EIM Participating Resources will have an opportunity to recover costs of compliance with California Air Resources Board greenhouse gas regulations, which may include the cost of allowances, uncertainty on the final resource specific emission factor, and other costs of greenhouse gas regulation compliance.

(2) **EIM Bid Adder.**

(A) **Bid Submission.** EIM Participating Resource Scheduling Coordinators for EIM Participating Resources located in an EIM Entity Balancing Authority Area outside of California may submit an EIM Bid Adder as a separate hourly Bid component to recover costs of compliance with California Air Resources Board greenhouse gas regulations, which must include a price and quantity and the price portion of which must be equal to or less than 110% of the EIM Participating Resource's greenhouse gas

maximum compliance cost as determined in accordance with section 29.32(a)(3).

(B) **Default Treatment.** If an EIM Participating Resource located in an EIM Entity Balancing Authority Area outside of California does not submit an EIM Bid Adder, the CAISO will assume that the EIM Participating Resource will not be selected for delivery to the CAISO Balancing Authority Area.

(3) **Determination of EIM Greenhouse Gas Maximum Cost.** Each day the CAISO will determine the greenhouse gas maximum compliance cost for each EIM Participating Resource located in an EIM Entity Balancing Authority Area outside of California as set forth in the EIM Business Practice Manual, based on:

(A) the EIM Resource's highest incremental heat rate; the applicable Greenhouse Gas Allowance Price; and the EIM Participating Resource's emission rate, as set forth in the applicable U.S. Environmental Protection Agency publication and registered in the Master File; or

(B) a price determined in accordance with the negotiated rate option procedures in section 39.7.1.3.1; or,

(C) with respect to, and only with respect to, Bids at EIM External Interties, the carbon dioxide equivalent emission rate of the resource with the highest such rate in the WECC region and the applicable Greenhouse Gas Allowance Price index.

(4) **EIM Bid Adder Price.** The price included in the EIM Bid Adder shall not be less than $0/MWh and the sum of the price component of the EIM Bid Adder and the Energy cost portion of the Bid cannot exceed $1000/MWh.

(b) **Consideration of EIM Bid Adders in Market Clearing.**

(1) **Dispatch of EIM Participating Resources with Nonzero Bid Adders.** The CAISO's Security Constrained Economic Dispatch in the Real-Time Unit Commitment and Real-Time Dispatch shall take into account EIM Bid Adders in

selecting Energy produced by EIM Participating Resources located in an EIM Entity Balancing Authority Area outside of California for import into the CAISO Balancing Authority Area or other EIM Entity Balancing Authority Areas in California up to the associated MW quantity included in the EIM Bid Adder, but not when selecting EIM Participating Resources to serve Load outside of the combined area of the CAISO Balancing Authority Area and other EIM Entity Balancing Authority Areas within California.

(2) **EIM Participating Resources EIM Bid Adder MW Quantity.** The CAISO's Real-Time Unit Commitment and Real-Time Dispatch will limit the maximum EIM Bid Adder MW quantity of an EIM Participating Resource to a value equal to the EIM Participating Resource's dispatchable Bid range between the EIM Participating Resource's Base~~ASE~~ Schedule and the EIM Participating Resource's effective upper economic Bid, considering any applicable derates and ancillary services capacity reservations, for the relevant Operating Hour.

(3) **Dispatch of EIM Participating Resources Bid Adders of Zero.** The CAISO's Security Constrained Economic Dispatch in the Real-Time Unit Commitment and Real-Time Dispatch shall not dispatch EIM Participating Resources outside the combined area of the CAISO Balancing Authority Area and other EIM Entity Balancing Authority Areas within California for delivery into the CAISO Balancing Authority Area or other EIM Entity Balancing Authority Areas in California if the MW quantity included in the EIM Bid Adder is zero.

(c) **Effect on Locational Marginal Price.** Using the methodology described in Appendix C, the CAISO will include the ~~m~~Marginal Greenhouse Gas Cost~~EIM Bid Adder~~ as a negative component in the Locational Marginal Prices for EIM Entity Balancing Authority Areas not subject to a greenhouse compliance obligation under the regulations administered by the California Air Resources Board in addition to those specified in Appendix C and Section 27.

(d) **Notice to EIM Participating Resource.** The CAISO will notify the EIM Participating Resource Scheduling Coordinator through the Dispatch Instruction of the megawatt quantity of any Energy of an EIM Participating Resource located in an EIM Entity Balancing Authority Area outside of California that is deemed to have been imported into the CAISO Balancing Authority Area or other EIM Entity Balancing Authority Areas in California as a result of the Market Clearing of the Real-Time Market.

(e) **Compensation.** The CAISO will allocate the Net Imbalance Energy Export optimally to EIM Participating Resource Scheduling Coordinators and will distribute Greenhouse Gas Emission Cost R~~r~~evenues ~~from the EIM Bid Adder~~ to EIM Participating Resources pursuant to that allocation.

(f) **Reporting Requirements.** The CAISO will report to each EIM Participating Resource Scheduling Coordinator the portion of the FMM Energy Schedule and the portion of RTD Energy Dispatch that is associated with Energy deemed to have been imported to the CAISO Balancing Authority Area or other EIM Entity Balancing Authority Areas in California from all EIM Resources as part of the Real-Time Market results publication from each of its EIM Resources.

* * * * *

Appendix A

Master Definitions Supplement

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- Greenhouse Gas Emission Cost Revenue

The revenues associated with the MWh compensation paid to an EIM Participating Resource that has Energy deemed delivered to a GHG compliance area priced at the Marginal Greenhouse Gas Cost multiplied by -1.

* * * * *

- Marginal Greenhouse Gas Cost

The marginal cost of GHG compliance when serving load in a GHG compliance area by an EIM Participating Resource not located within the GHG compliance area.

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Appendix C

Locational Marginal Price

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B. LMP Composition in the Real-Time Market

In each 15-minute interval and each 5-minute interval of the Fifteen Minute Market and Real-Time Dispatch, respectively, the CAISO calculates the LMP for each PNode, based on the Bids of sellers and buyers selected in those markets as specified in the FMM Schedule and 5-minute Real-Time Dispatch Instructions. The CAISO designates a Reference Bus, r, for calculation of the System Marginal Energy Cost ($SMECr$), which is the shadow price of the system power balance constraint. The CAISO uses the distributed load in the EIM Area as the Reference Bus to calculate loss sensitivities and shift factors used to linearize the power balance and Transmission Constraints. Resources that have constraints that prevent them from being marginal are not eligible to set the Locational Marginal Price. For each bus other than the Reference Bus, the CAISO determines separate components of the LMP for the marginal cost of Energy, Marginal Cost of Congestion, Marginal Cost of Losses, and Marginal Greenhouse Gas Cost~~EIM Bid Adder~~ relative to the Reference Bus, consistent with the following equation:

$$LMP_i = SMEC_r + MCC_i + MCL_i + MCG_i$$

$$LMP_r = SMEC_r$$

where:

- MCG_i is the LMP component representing ~~the marginal cost of the EIM Bid Adder in Dispatching Energy from the relevant EIM Participating Resources to serve load in the CAISO Balancing Authority Area (~~Marginal Greenhouse Gas Cost~~)~~.

For each PNode within an EIM Entity Balancing Authority Area, the LMP shall include a fourth component, the EIM Bid Adder component.

* * * * *

F. Marginal Greenhouse Gas Cost Component Calculation

For EIM Participating Resources within an EIM Entity Balancing Authority Area and Energy imported to or exported from an EIM Entity Balancing Authority Area, the CAISO will include the ~~m~~Marginal Greenhouse Gas ~~c~~Cost ~~of the EIM Bid Adder~~ in dispatching Energy from the relevant EIM Participating Resources to serve load in the CAISO Balancing Authority Area. The CAISO will allocate the Net Imbalance Energy Export optimally to EIM Participating Resources. This allocation does not depend on the location of the EIM Entity Participating Resource; *i.e.* the CAISO does not use a shift factor in the allocation. If the Net Imbalance Energy Export from all EIM Entity Balancing Authority Areas as a group is negative or zero, there is no associated Net Imbalance Energy Export allocation or ~~EIM Bid Adder~~ Marginal Greenhouse Gas ~~c~~Cost. Otherwise the ~~n~~Net ~~i~~Imbalance ~~e~~Energy ~~e~~Export ~~allocation~~ constraint is binding with a Shadow Price (ψ). ~~If t~~The market-clearing process ~~would create~~ produces a Shadow Price for the ~~Marginal Greenhouse Gas Cost~~ Net Imbalanced Energy Export constraint only when the relaxation of the constraint would result in reduction in the total cost to operate the system. The CAISO determines the Marginal Greenhouse Gas Cost component of the LMP at a PNode in an EIM Entity Balancing Authority Area and LMPs for imports and exports between that EIM Entity Balancing Authority Area and a non-EIM Balancing Authority Area as the negative of the Shadow Price of the ~~n~~Net ~~i~~Imbalance ~~e~~Energy ~~e~~Export ~~allocation~~ constraint.

$$MCG_i = - \psi$$

Attachment C – Draft Final Proposal

Real-Time Neutrality Settlement Tariff Amendment

California Independent System Operator Corporation

Real-Time Market Neutrality Settlement

Draft Final Proposal

May 30, 2019

Real-Time Market Neutrality Settlement
Draft Final Proposal

Table of Contents

1. Purpose

The purpose of this initiative is to review proposed changes to the settlement of real-time market neutrality. Currently, real-time market neutrality is calculated as the sum of instructed imbalance energy, uninstructed imbalance energy, unaccounted for energy, and greenhouse gas (GHG) awards for both generation and load. To allocate any amounts owed or received from the real-time market neutrality, the CAISO calculates three offsets based on the components of the locational marginal price. There are currently three offsets: (1) real-time marginal loss offset, (2) real-time congestion offset, and (3) real-time imbalance energy offset. These offsets ensure that the market operator, who is settling the market, is revenue neutral.

2. Background & Issue

Idaho Power and PacifiCorp provided comments in the mid-year update to the market initiatives catalog requesting the ISO review the real-time imbalance energy offset. In response to these comments, the CAISO commenced an internal review of the issue identified in their comments. The CAISO believes the issues point to changes needed to address real-time market neutrality, not specifically the real-time imbalance energy offset.

When the original EIM design was developed, through the stakeholder process the CAISO concluded it best to address neutrality and uplift costs in a manner similar to the existing CAISO real-time market. These settlement accounts included the real-time congestion offset, the real-time marginal loss offset, real-time imbalance energy offset and the bid cost recovery allocation.

In order to incentivize EIM entities to submit base schedules that do not have unresolved congestion, through the stakeholder process the CAISO decided to calculate the real-time congestion offset by balancing authority area and allocate all charges/payments to that balancing authority area. Since the modeled losses vary based upon the transmission system of the balancing authority area, through the stakeholder process the CAISO also decided to calculate the real-time marginal loss offset by balancing authority area and allocate all charges/payments to that balancing authority area.

During the original EIM stakeholder process, it was determined that the real-time imbalance energy offset and the bid cost recovery cost allocation should have an additional step that moves a portion of these charges/revenues between balancing authority areas because these revenues/charges are the result of serving demand. Demand was defined as metered load within the balancing authority area, exports from the balancing authority area and EIM transfers out of the balancing authority area. For the bid cost recovery allocation, cost causation due to EIM transfers was considered to be more direct than the real-time imbalance energy offset. If in order to support an EIM transfer out of the balancing authority area it was economic to incur commitment costs, then to the extent the resource committed does not fully recover its costs, those EIM transfers out should be allocated a portion of the bid cost recovery payment to the resource. The cost causation is direct because this is an uplift cost, which is directly attributable to producing energy that happens to not be recovered through the locational marginal price.

On the other hand, neutrality amounts are different than an uplift as they do not simply represent costs not recovered through the locational marginal price. Neutrality amounts occur when payments and charges to scheduling coordinators do not net to zero in a settlement interval for various reasons that are described below. The real-time imbalance energy offset is one such neutrality charge. It results from the imbalance energy settlement of the system marginal energy cost and greenhouse gas marginal cost. Therefore, the cost causation for allocating the real-time imbalance energy offset to demand is indirect.

Real-time market neutrality occurs when there are deviations between the market results and actual metered energy. It has numerous causes that are based predominantly on decisions and practices of the individual balancing authority area. For example:

1. Differences between the OATT loss rate and market loss rate results in unaccounted for energy,
2. Precision by which deviations from dispatch are balanced by resources on automatic generation control,
3. Metering granularity for load.

These causes of real-time market neutrality are not caused by EIM transfers[1] between balancing authority areas in the EIM. Therefore, any neutrality offset (charge or credit) caused by the balancing authority should remain in that balancing authority area. This is currently the case for the real-time marginal loss offset and the real-time congestion offset. This is not the case for the real-time imbalance energy offset.

Since EIM transfers are not explicitly settled as an import and export between balancing authority areas in EIM, the financial value of EIM transfers is calculated and included in the initial calculation of the real-time imbalance energy offset calculation. The financial value of the EIM transfer is calculated by multiplying the system marginal energy cost by the MW quantity of the EIM transfers in and out of the balancing authority area. The sum of the financial value across the EIM footprint is zero because all EIM transfers out have a corresponding EIM transfer in. The financial value replicates the effect if the EIM transfers were settled in order to have imbalance supply and demand equal for each balancing authority area. However, using the system marginal energy cost is not appropriate for transfers that occur between non-California balancing authority areas. This is because the value of the energy transferred is lower outside of California because these transfers should include the greenhouse gas (GHG) component of the LMP. When there are net imports into the California area price separation will occur when the marginal GHG cost of serving California transfers is non-zero.

The current settlement design[2] is that after the real-time energy imbalance offset is initially calculated, a share of the offset is transferred between balancing authority areas in the EIM based upon the EIM

[1] EIM transfers are the energy flows between balancing authority areas in the EIM that result from the market dispatch. The tagged energy does not deviate from the market dispatch and therefore no real-time market neutrality is created.

[2] Detailed information on the currently calculation of the real-time imbalance energy offset is available in the following settlement configuration guides: BPM - CG CC 6477 Real Time Imbalance Energy Offset v 5.9
BPM - CG CC 64770 Real Time Imbalance Offset EIM 5.1a

transfer out as a proportion of the sum of the EIM transfer out, uninstructed imbalance energy, and unaccounted for energy of the source balancing authority area. This procedure results in the transfer of the real-time market neutrality from one balancing authority area being inappropriately moved to another balancing authority area because the financial value of the EIM transfers already accounted for the imbalance settlement from transfers between balancing authority areas. Therefore, the second movement of offset charges is not needed.

Based on the CAISO's review of the settlement of real-time market neutrality it proposes the following changes to the calculation of the real-time imbalance energy offset:

1. No longer transfer a portion of the real-time imbalance energy offset between balancing authority areas in the EIM
2. For each Balancing Authority Area in the EIM Area, the CAISO will calculate the Real-Time Market financial value of EIM Transfers as the product of the MWh, either positive or negative, and the System Marginal Energy Cost, plus a greenhouse gas financial value credit calculated as the product of the portion of the EIM Transfers not corresponding to a greenhouse gas compliance obligations under CARB and the Marginal Greenhouse Gas Cost.
3. Clarify the submission of EIM transfer system resource (ETSR) 5-minute schedules to ensure uniformity across EIM entities and develop validation rules.

The CAISO has analyzed settlement data for Q1 2019 to calculate impact of the changes in the real-time imbalance energy offset by make the first two changes. The CAISO has provided monthly data to EIM entities that have requested the data. In aggregate, eliminating the transfer adjustment results in the redistribution of $11.1 million between balancing authority areas in EIM. Out of the 9 balancing authority areas participating in Q1 19, 5 would have received a higher charge and 4 would have received a lower charge. By eliminating the transfer adjustment and correcting the financial value of EIM transfers, the redistribution amount drops to $9.2 million between balancing authority areas in the EIM. Out of the 9 balancing authority areas participating in Q1 19, 5 would have received a higher charge and 4 would have received a lower charge.

3. Proposal

At the request of stakeholders, the CAISO held a technical workshop on May 21, 2019 to review more detailed examples of the proposed changes. The CAISO developed an excel spreadsheet[3] that illustrated the current and proposed settlement for each of the three issues identified. Each example will be discussed in more detail below. Items 1 and 2 require tariff changes and will be brought to the EIM Governing Body for decision. Item 3 will be addressed through the business practice manual process to develop the standardized approach for submitting ETSR values.

[3] The spreadsheet is available at http://www.caiso.com/Pages/documentsbygroup.aspx?GroupID=585D51B0-6322-42F7-8933-91B153F09630

3.1 Eliminate EIM Transfer Adjustment

The current settlement of the real-time imbalance energy offset performs an additional step which transfers a portion of the initial neutrality calculated from balancing authority areas in EIM with EIM transfers out to balancing authority areas in the EIM with EIM transfers in. The CAISO proposes to eliminate that step as discussed above.

In the example in table 1, BAA1 has EIM transfers in from BAA2. The market optimization balances supply and demand across the entire EIM footprint. The 100 MWh of load in BAA1 is met by 50 MWh of internal generation and 50 MWh external generation located in BAA2. The EIM transfer between BAA1 and BAA2 is not settled in the market because load and generation are settled at its location. However, if the financial value of the EIM transfers is not considered neutrality would occur in the within each BAA. For example, BAA1 load was charged $1000 and BAA1 generation was paid $500. If the financial value of the EIM transfer was not consider, BAA would have neutrality equal to $500. But, BAA1 actually paid $500 to generation located in BAA2 to balance its supply and demand through the market optimization. The financial value of the EIM transfers ensures that each BAA has balanced supply and demand. This correctly reflects that the market results should not cause neutrality because all supply is equal to demand.

Table 1 – Eliminate EIM Transfer Adjustment Example

	$/MWh
System Marginal Energy Cost	$ 10.00

MWh	BAA1	BAA2
Instructed Energy - Generation	-50	-175
Load Forecast Used in Market	100	125
EIM Transfer	-50	50
Sum	0	0
Balanced	Yes	Yes

Proposed Settlement	BAA1	BAA2	BAA1	BAA2
Instructed Energy - Generation	-50	-175	$ (500.00)	$ (1,750.00)
Load Forecast Used in Market	100	125	$ 1,000.00	$ 1,250.00
EIM Transfer Financial Value	-50	50	$ (500.00)	$ 500.00
Uninstructed Energy - Generation	-2	5	$ (20.00)	$ 50.00
Difference Between Load Forecast and Meter	-2	2	$ (20.00)	$ 20.00
Unaccounted for Energy	6	3	$ 60.00	$ 30.00
Neutrality			$ 20.00	$ 100.00

Current Settlement	BAA1	BAA2	BAA1	BAA2
Instructed Energy - Generation	-50	-175	$ (500.00)	$ (1,750.00)
Load Forecast - Market	100	125	$ 1,000.00	$ 1,250.00
EIM Transfer	-50	50	$ (500.00)	$ 500.00
Uninstructed Energy - Generation	-2	5	$ (20.00)	$ 50.00
Difference Between Load Forecast and Meter	-2	2	$ (20.00)	$ 20.00
Unaccounted for Energy	6	3	$ 60.00	$ 30.00
Transfer Adjustment	-	-	$ 83.33	$ (83.33)
Neutrality			$ 103.33	$ 16.67

Because the market balances supply and demand and the financial value of the EIM transfers is considered, only deviations from the market dispatch result can cause neutrality. In the example above, generation in BAA1 exceeds its dispatched energy by 2 MWh, load is 2 MWh below the forecast used in the market, and unaccounted energy is 6 MWh higher. These are the causes the imbalance energy neutrality and not the EIM transfer in or out. This represents the imbalance energy neutrality for each of the balancing authority areas.

However, the current settlement makes a transfer adjustment which moved neutrality form exporting BAAs to importing BAAs. In this case 83% (50/(50+5+2+3))of BAA2 neutrality is shifted to BAA1. The CAISO proposes to eliminate the transfer adjustment.

3.2 Correct Financial Value of EIM Transfers

As illustrated above, the market results have balanced supply and demand which leads to no neutrality. Since EIM transfers out equal EIM transfers in across the EIM footprint there is no neutrality incurred. However, in order to have each balancing authority in the EIM be balanced the financial value of the EIM transfer must be included. Currently, the system marginal energy cost is multiplied by the EIM transfers amount to calculate the financial value of EIM transfers. This is accurate for transfers between California balancing authority areas and other California balancing authority areas or non-California balancing authority areas. However, the financial value of EIM transfers between non-California balancing authorities should use the system marginal energy cost plus the GHG component of the LMP outside California.

Table 2 – Correct Financial Value of EIM Transfers

	$/MWh
SMEC	$ 10.00
GHG Price	$ 4.00

MWh	CA BAA1	CA BAA2	CA BAA3	BAA4	BAA5	BAA6	BAA7	Sum
Net Scheduled Interchange	-100	50	-25	100	-50	0	25	0
GHG Award	0	0	0	25	25	25	0	0

Proposed Settlement	CA BAA1	CA BAA2	CA BAA3	BAA4	BAA5	BAA6	BAA7	Footprint
Energy within BAA	$ 1,000.00	$ (500.00)	$ 250.00	$ (600.00)	$ 300.00	$ -	$ (150.00)	$ 300.00
GHG Award	N/A	N/A	N/A	$ (100.00)	$ (100.00)	$ (100.00)	$ -	$ (300.00)
Financial Value Energy Transfers	$ (1,000.00)	$ 500.00	$ (250.00)	$ 1,000.00	$ (500.00)	$ -	$ 250.00	$ -
Financial Credit GHG Transfers	N/A	N/A	N/A	$ (300.00)	$ 300.00	$ 100.00	$ (100.00)	$ -
Neutrality	$ -	$ -	$ -	$ -	$ -	$ -	$ -	$ -

Current Settlement	CA BAA1	CA BAA2	CA BAA3	BAA4	BAA5	BAA6	BAA7	Footprint
Energy within BAA	$ 1,000.00	$ (500.00)	$ 250.00	$ (600.00)	$ 300.00	$ -	$ (150.00)	$ 300.00
GHG Award	N/A	N/A	N/A	$ (100.00)	$ (100.00)	$ (100.00)	$ -	$ (300.00)
Financial Value Transfers	$ (1,000.00)	$ 500.00	$ (250.00)	$ 1,000.00	$ (500.00)	$ -	$ 250.00	$ -
Neutrality	$ -	$ -	$ -	$ 300.00	$ (300.00)	$ (100.00)	$ 100.00	$ -

In the example above, BAA1, BAA3 and BAA5 are importing from the other EIM BAAs and the net scheduled interchange across the footprint is zero. The three California balancing authority areas (BAA1, BAA2, and BAA3) are collectively importing 75 MWh from non-California BAAs. When EIM transfers into the California BAAs occurs, EIM participating resources are attributed, through the market optimization, as serving the EIM transfer into California. BAA4, BAA5, and BAA6 have each been attributed 25 MWh of the EIM transfers into the California balancing authority areas and are compensated at the GHG price of $4.00 to cover the compliance costs with California cap and trade program. The marginal cost of GHG results in price separation between California balancing authority areas and non-California balancing authority areas. Load within California balancing authority areas pays $10/MWh and load outside of California balancing authority areas pays $6/MWh. Generation within California balancing authority areas are paid $10/MWh and generation outside California balancing authority areas are paid $6/MWh. As the example shows, load has been charged $300 more than supply has be paid for energy. This is because the market has collected from California load the cost necessary to pay the GHG awards for EIM participating resources attributed to serving load in

California. By considering both the energy settlement and the GHG payments, the market results across the EIM footprint are revenue neutral.

In order to ensure each balancing authority area is revenue neutral, the financial value of EIM transfers must be calculated. Since supply outside of California balancing authority areas that is supporting load outside of California balancing authority areas, does not include the cost of GHG compliance those transfers need be valued at the system marginal energy cost plus the marginal GHG cost. For example, BAA4 has 100 MWh of EIM transfers out. 25 MWh have be attributed to supporting an EIM transfer into the California balancing authority areas and 75 MWh are supporting and EIM transfer. The financial value of the EIM transfer at the system marginal energy cost is $1000 ($10/MWh x 100 MWh). Since 75 MWh is not subject to GHG costs, the financial credit for GHG on the transfers is a payment of $300 ($4/MWh x 75 MWh). This results in the correct financial value of the EIM transfers by recognizing that supply supporting transfers to California balancing authority areas is paid $10/MWh ($6/MWh for energy + $4/MWh for its GHG award) and supply supporting transfers to non-California balancing authority areas is paid $6/MWh for energy only.

BAA6 has a net scheduled interchange of zero; however, it has received a 25 MWh GHG award. This is because the market optimization does not require incremental energy dispatch to be attributed to serve an EIM transfer into California balancing authority areas. Since the net schedules interchange is zero, there must be an offsetting 25 MWh EIM transfer in from a non-California balancing authority area. While not settled, the EIM transfer out with the California balancing authority areas is a payment of $250 ($10/MWh x 25 MWh) and the EIM transfer in with the non-California balancing authority area charge of $150 ($6/MWh x 25 MWh). The combined settlement of the two transfers is equal to the financial credit for GHG transfers of $100 ($4/MWh x 25 MWh) which ensures that BAA 6 is revenue neutral based upon the market results.

3.3 BPM Change to Clarify Submission of ETSR Schedules

The CAISO proposes to work with stakeholders through the business process manual change process to clarify the submission of ETSR 5-minute schedules to ensure uniformity across EIM entities and validation rules. These changes do not require tariff changes. The CAISO is considering three options:

1. RTD EIM Transfer Schedules are deemed delivered.
2. EIM BAA with ETSR tagging responsibility, submits ALL ATF EIM Transfer Values (MW) to Settlements through EIM Real Time Interchange Schedule. These values should be shaped to reflect RTD ETSR Dispatches.
3. Current tagging requirements remain in effect. Settlement shapes the submitted ETSR ATF values to reflect RTD ETSR Dispatches.

The CAISO requests stakeholder to include in their written comments their preference for standardizing the submission of 5-minute ETSR data.

Table 3 - Submission of ETSR Schedules

$/MWh	Int 1	Int 2	Int 3	Int 4	Int 5	Int 6	Int 7	Int 8	Int 9	Int 10	Int 11	Int 12	
SMEC	$ 10.00	$ 10.00	$ 10.00	$ 10.00	$ 10.00	$ 10.00	$ 15.00	$ 15.00	$ 15.00	$ 15.00	$ 15.00	$ 15.00	
EIM Transfer (MWh)	Int 1	Int 2	Int 3	Int 4	Int 5	Int 6	Int 7	Int 8	Int 9	Int 10	Int 11	Int 12	Total
CAISO	-10	-9	-10	-12	-8	-10	12	10	14	10	12	11	10
EIM BAA	10	9	10	12	8	10	-12	-10	-14	-10	-12	-11	-10
Energy Settlement within BAA	Int 1	Int 2	Int 3	Int 4	Int 5	Int 6	Int 7	Int 8	Int 9	Int 10	Int 11	Int 12	Total
CAISO	$ 100.00	$ 90.00	$ 100.00	$ 120.00	$ 80.00	$ 100.00	$ (180.00)	$ (150.00)	$ (210.00)	$ (150.00)	$ (180.00)	$ (165.00)	$ (445.00)
EIM BAA	$ (100.00)	$ (90.00)	$ (100.00)	$ (120.00)	$ (80.00)	$ (100.00)	$ 180.00	$ 150.00	$ 210.00	$ 150.00	$ 180.00	$ 165.00	$ 445.00
Proposed EIM Transfer Financial Value	Int 1	Int 2	Int 3	Int 4	Int 5	Int 6	Int 7	Int 8	Int 9	Int 10	Int 11	Int 12	Total
CAISO	$ (100.00)	$ (90.00)	$ (100.00)	$ (120.00)	$ (80.00)	$ (100.00)	$ 180.00	$ 150.00	$ 210.00	$ 150.00	$ 180.00	$ 165.00	$ 445.00
EIM BAA	$ 100.00	$ 90.00	$ 100.00	$ 120.00	$ 80.00	$ 100.00	$ (180.00)	$ (150.00)	$ (210.00)	$ (150.00)	$ (180.00)	$ (165.00)	$ (445.00)
Proposed Neutrality	Int 1	Int 2	Int 3	Int 4	Int 5	Int 6	Int 7	Int 8	Int 9	Int 10	Int 11	Int 12	Total
CAISO	$ -	$ -	$ -	$ -	$ -	$ -	$ -	$ -	$ -	$ -	$ -	$ -	$ -
EIM BAA	$ -	$ -	$ -	$ -	$ -	$ -	$ -	$ -	$ -	$ -	$ -	$ -	$ -
Current EIM Transfer Financial Value	Int 1	Int 2	Int 3	Int 4	Int 5	Int 6	Int 7	Int 8	Int 9	Int 10	Int 11	Int 12	Total
CAISO	$ 8.33	$ 8.33	$ 8.33	$ 8.33	$ 8.33	$ 8.33	$ 12.50	$ 12.50	$ 12.50	$ 12.50	$ 12.50	$ 12.50	$ 125.00
EIM BAA	$ (8.33)	$ (8.33)	$ (8.33)	$ (8.33)	$ (8.33)	$ (8.33)	$ (12.50)	$ (12.50)	$ (12.50)	$ (12.50)	$ (12.50)	$ (12.50)	$ (125.00)
Current Neutrality	Int 1	Int 2	Int 3	Int 4	Int 5	Int 6	Int 7	Int 8	Int 9	Int 10	Int 11	Int 12	Total
CAISO	$ 108.33	$ 98.33	$ 108.33	$ 128.33	$ 88.33	$ 108.33	$ (167.50)	$ (137.50)	$ (197.50)	$ (137.50)	$ (167.50)	$ (152.50)	$ (320.00)
EIM BAA	$ (108.33)	$ (98.33)	$ (108.33)	$ (128.33)	$ (88.33)	$ (108.33)	$ 167.50	$ 137.50	$ 197.50	$ 137.50	$ 167.50	$ 152.50	$ 320.00

The table above illustrates that revenue neutrality is created when the 5-minute ETSR values do not reflect the 5-minute market results. Currently for ETSRs with the CAISO, the integrated hourly value of the dynamic schedule. In most instances, this results in the financial value of EIM transfers with the CAISO being settled at the average 5-minute prices versus the weighted average 5-minute price. But as the example below illustrates that in hours where there are both EIM transfers in and EIM transfers out these quantities are netted.

4. Stakeholder Engagement and Next Steps

Stakeholder input is critical for developing market design policy. The schedule proposed below allows several opportunities for stakeholder's involvement and feedback.

4.1 Schedule

Table 1 lists the planned schedule for the *Real-Time Market Neutrality Settlement* stakeholder process. The ISO proposes to present its proposal to EIM Governing Body at the June meeting and the ISO Board of Governors at the July meeting.

Table 4- Proposed schedule for the Real-Time Market Neutrality Settlement stakeholder process

Milestone	Date
Post Draft Final Proposal and Tariff Language	May 30, 2019
Stakeholder Conference Call	June 6, 2019
Stakeholder Comments Due	June 13, 2019

EIM Governing Body Meeting	June 28, 2019
Board of Governors Meeting	July 24-25, 2019
Requested Effective Date	August 1, 2019

The ISO will discuss this paper during a stakeholder conference call on June 6. The ISO requests that stakeholders submit written comments by June 13, 2019 to InitiativeComments@caiso.com.

4.2 Planned FERC Filing Process

Assuming approval by the EIM Governing Body and CAISO Board of Governors, the CAISO intends to file the proposed changes with FERC on July 31, 2019. The CAISO intends to propose an effective date of the proposed changes for August 1, 2019, and will request waiver of the notice period normally required under Section 205 of the Federal Power Act. The proposed changes are planned for implementation in the Fall 2019 market release. Upon FERC approval of the proposed changes and effective date, the CAISO will re-settle the real-time imbalance energy offset according to the new rules back to August 1.

4.3 EIM Governing Body Role

This initiative proposes to change two market rules. First, it would change how neutrality charges for the real-time market are allocated among balancing authority areas so that the offset for real-time imbalance energy is not adjusted between balancing authority areas. Second, it would modify how the CAISO will determine the financial value of EIM transfers between balancing authority areas that are not subject to a greenhouse gas compliance obligation and those that are. These two proposed changes are severable for decisional purposes, because even if one of the two changes were not approved, Management would proceed with other change on its own. Staff believes the EIM Governing Body should have primary authority over both proposed changes.

The rules that govern decisional classification were amended in March 2019 when the Board adopted changes to the Charter for EIM Governance and the Guidance Document. An initiative proposing to change rules of the real-time market now falls within the primary authority of the EIM Governing Body either if the proposed new rule is 1) EIM-specific in the sense that it applies uniquely or differently in the balancing authority areas of EIM Entities, as opposed to a generally applicable rule, or 2) is generally applicable but is being primarily driven by "an issue that is specific to the EIM balancing authority areas."

Here, the EIM Governing Body has primary authority over the first proposed change, which eliminates the adjustment between balancing authority areas of the real-time imbalance energy offset, because the primary driver was an issue specific to the EIM balancing authority areas. Although the new rule would be generally applicable to the entire real-time market, the CAISO has pursued this change because eliminating the adjustment in real-time imbalance energy offset would more accurately reflect cost causation. More specifically, the primary driver for this change is the need to ensure that EIM balancing authority areas are receiving a more accurate allocation based on proper cost causation principles. While

the change will have impacts on all balancing authority areas, the issue that was the primary driver was specific to EIM and was raised by EIM Entities. This connection is illustrated by the unusual process through which this initiative began – i.e., on an urgent basis that was identified in the catalogue update process and bypassed the annual ranking process.

SCE disputes the proposed classification for this change in its comments on the Issue Paper, on the grounds that the proposed changes "do[ ] not originate from the EIM's interactions with the CAISO in the RT markets," but instead "on account of the CAISO's failure to implement an appropriate settlement mechanism consistent with the regulatory principle of cost causation." Staff respectfully disagrees with this narrow reading of the new "primary driver" test for the EIM Governing Body's primary authority. The primary driver for this refinement of the neutrality rule is an issue specific to EIM Entities that resulted from the excessive costs they were assessed through real-time neutrality.

The second proposed change, which would establish the financial value of EIM transfers between balancing authority areas not subject to a greenhouse gas compliance obligation as the system marginal energy cost plus the GHG component of the LMP, falls within the primary authority of the EIM Governing Body because this rule is EIM-specific. The proposed rule would apply only between balancing authorities in the EIM that are not subject to a greenhouse gas compliance obligation with CARB, meaning that it would not apply to the CAISO and BANC/SMUD.

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

Attachment D – Board Memo

Real-Time Neutrality Settlement Tariff Amendment

California Independent System Operator Corporation

Memorandum

To: ISO Board of Governors

From: Roger Collanton, Vice President, General Counsel, and Corporate Secretary

Date: July 17, 2019

Re: **Decision on consent agenda**

This memorandum requires Board action.

Pursuant to the ISO bylaws and the Charter for Energy Imbalance Market Governance, the EIM Governing Body has primary authority, as delegated by the Board of Governors, over changes to market rules that are specific to the energy imbalance market and changes to market rules that are generally applicable to the entire real-time market for which issues specific to EIM balancing authority areas are a primary driver. The Charter specifies that such market rules changes go first to the EIM Governing Body for approval, and then to the Board for approval via consent agenda. In its general session meeting on June 28, 2019, the EIM Governing Body took the following action that is subject to Board approval via consent agenda:

- Approved, in a 4-0 vote, Management's proposed changes to the real-time imbalance energy offset calculation.

Management proposes the following motions:

> ***Moved, that the ISO Board of Governors approves the July 24, 2019 consent agenda comprised of proposed changes to the real-time imbalance energy offset calculation, 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 to the EIM Governing Body dated June 21, 2019, 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.***

Management’s memorandum to the EIM Governing Body detailing the changes and the EIM Governing Body’s corresponding motion approving the changes are included as attachment A.

Memorandum

To: Energy Imbalance Market Governing Body

From: Keith Casey, Vice President, Market & Infrastructure Development

Date: June 21, 2019

Re: **Decision on Real-Time Market Neutrality Settlement Proposal**

This memorandum requires EIM Governing Body action.

EXECUTIVE SUMMARY

Real-time market neutrality settlement ensures that the ISO is revenue neutral. Without the real-time market neutrality settlement, the ISO would not be market revenue neutral because the payments to supply are not equal to the charges to demand. The ISO allocates any amounts owed or received resulting from real-time market neutrality accounting based on the components of the locational marginal price. This consists of three separate offset calculations: (1) real-time marginal loss offset, (2) real-time congestion offset, and (3) real-time imbalance energy offset.

In the mid-year update to the policy initiatives catalog, Idaho Power and PacifiCorp requested the ISO review the real-time imbalance energy offset. In response, Management initiated internal review of the settlement amounts and design and identified changes needed to address issues with the current real-time market neutrality settlement. Management thus proposes two changes to the calculation of the real-time imbalance energy offset to more accurately reflect the offset amount for individual balancing authority areas in the EIM area:

1. No longer transfer a portion of the real-time imbalance energy offset between balancing authority areas in the EIM, and

2. Modify the financial value of EIM transfers between non-California balancing authority areas from the system marginal energy cost to the system marginal energy cost less the greenhouse gas (GHG) marginal cost.

Both of these changes fall under the EIM Governing Body's primary decisional authority as explained further below.

Management proposes the following motion:

Moved, that the EIM Governing Body approves the proposed changes to the real-time imbalance energy offset calculation as described in the memorandum dated June 21, 2019.

DISCUSSION AND ANALYSIS

Real-time market neutrality settlement is needed to ensure the ISO is market revenue neutral. In clearing and settling the outcomes of the real-time market, the payments (and charges) to supply do not equal the charges (and payments) by demand. This is a result of several factors including: (1) settlement of losses at the marginal rate versus the average rate, (2) unresolved congestion in day-ahead or base schedules, (3) differences between the load forecast and metered load, (4) deviations from dispatch by generation, and (5) unaccounted for energy. The ISO allocates any amounts owed or received resulting from real-time market neutrality settlement based on the components of the locational marginal price using three separate offset accounting methods: real-time marginal loss offset, real-time congestion offset, and real-time imbalance energy offset.

Management proposes two changes to the real-time imbalance energy offset:

1. No longer transfer a portion of the real-time imbalance energy offset between balancing authority areas in the EIM, and

2. Modify the financial value of EIM transfers between non-California balancing authority areas from the system marginal energy cost to the system marginal energy cost less the greenhouse gas (GHG) marginal cost.

Management does not, however, propose any changes to the real-time marginal loss offset or the real-time congestion offset. These offsets are currently calculated for each individual balancing authority area in the EIM area.

Eliminate EIM transfer adjustment

During the original EIM stakeholder process, it was determined that the real-time imbalance energy offset and the bid cost recovery cost allocation should have an additional step to move a portion of these charges and revenues between balancing authority areas because they are the result of serving demand. Demand was defined as metered load within the balancing authority area, exports from the balancing authority area, and EIM transfers out of the balancing authority area.

For the bid cost recovery allocation, which includes costs not covered by the locational marginal price and primarily reflects costs of committing a resource, cost causation due to EIM transfers was considered to be more direct than the real-time imbalance energy offset. In this case it is economic to incur commitment costs to support the transfer. Therefore, to the extent the resource committed does not fully recover its costs, EIM transfers out should

be allocated a portion of the bid cost recovery payments to the resource. The cost causation is direct because this is an uplift cost, which is directly attributable to producing energy that happens to not be recovered through the locational marginal price.

On the other hand, neutrality amounts are different than bid cost recovery amounts as they do not simply represent costs not recovered through the locational marginal price. Neutrality amounts occur when payments and charges to scheduling coordinators do not net to zero in a settlement interval for various reasons as discussed above. Therefore, the cost causation for allocating the real-time imbalance energy offset to demand is indirect.

Under the current settlement design when there are transfers between EIM balancing areas, a share of the real-time imbalance energy offset is transferred between the balancing authority areas. This provision was established at the time because these offset amounts were seen as charges and credits related to serving demand. The ISO's experience within its balancing authority area, after implementation of FERC Order 764, was that the real-time imbalance energy offset was small and largely driven by how closely resources on regulation responded to uninstructed deviations. However, more recent information has shown that real-time imbalance energy offset is now primarily driven by the way in which each balancing authority area manages and accounts for their balancing area services. As a result, Management finds that it is no longer appropriate to transfer real-time market neutrality from one balancing authority area to another. Therefore, Management proposes to eliminate the transfer adjustment so each balancing authority area is responsible for its own real-time imbalance energy offset.

Financial value of EIM transfers between non-California balancing authority areas

Since EIM transfers are not explicitly settled as an import and export between balancing authority areas in the EIM area, the financial value of EIM transfers is included in the initial calculation of the real-time imbalance energy offset. The financial value of the EIM transfer is calculated by multiplying the system marginal energy cost by the MWh quantity of the EIM transfers in and out of the balancing authority areas. The system marginal energy cost is the same for all nodes in the EIM area. The sum of the financial value across the EIM footprint is zero because all EIM transfers out have a corresponding EIM transfer in. The financial value replicates the energy settlement of EIM transfers in order to have imbalance supply and demand resulting from the market optimization be equal for each balancing authority area.

However, using the system marginal energy cost, which includes GHG costs, is not appropriate for transfers that occur between non-California balancing authority areas. This is because the value of the energy transferred is lower outside of California because these transfers do not include GHG costs. When there are net imports into the California area, price separation will occur when the GHG marginal cost of serving California transfers is non-zero. This results in higher prices in the California area than in non-California areas.

Management proposes that for EIM transfers between non-California balancing authority areas, the financial value will be at the system marginal energy cost less the GHG marginal cost. This aligns the financial value of the EIM transfer out with the payments made to generation that support the EIM transfer.

DECISIONAL CLASSIFICATION

The EIM Governing Body has primary authority over the first proposed change, which eliminates the transfer adjustment between balancing authority areas of the real-time imbalance energy offset, because the primary driver is an issue specific to the EIM balancing authority areas. Although the new rule would be generally applicable to the entire real-time market, the ISO has pursued this change because eliminating the adjustment in real-time imbalance energy offset would more accurately reflect cost causation. More specifically, the primary driver for this change is the need to ensure that EIM balancing authority areas are receiving a more accurate allocation based on proper cost causation principles. While the change will have impacts on all balancing authority areas, the issue that is the primary driver is specific to EIM and was raised by EIM Entities. One stakeholder, Southern California Edison Company, expressed concern about the decisional classification for this component of the proposal in comments on the initial issue paper and straw proposal. Management responded to those comments and further explained the basis for its classification determination. Southern California Edison Company did not submit further comments in response to the draft final proposal.

The second proposed change, which would establish the financial value of EIM transfers between balancing authority areas not subject to a greenhouse gas compliance obligation as the system marginal energy cost less the cost of GHG, falls within the primary authority of the EIM Governing Body because this rule is EIM-specific.

POSITIONS OF THE PARTIES

Stakeholders generally support the two proposed changes and the accelerated process to implement the corrections as soon as possible. However, stakeholders have concerns in three areas: (1) the need for a comprehensive review of offsets and uplifts, (2) an assessement of business processes to mitigate future settlement issues, and (3) an assessment of the feasibility of conducting a retroactive settlement.

Stakeholders highlighted the complexity involved in calculation of real-time market neutrality. Some stakeholders argued that this justifies a new stakeholder initiative to further review the calculation of offsets and cost allocation. Other stakeholders questioned if the implementation approach for the financial value of EIM transfers is scalable if additional GHG programs must be supported. In response, Management commits to conduct a comprehensive review of the real-time settlement charge codes

associated with interactions between balancing authority areas in the real-time market enhancements initiative scheduled for next year. In addition, Management is committed to ensuring that the financial value of EIM transfers is scalable to multiple GHG programs in the West. To that end, Management will include within the scope of the multi-GHG areas initiative currently planned to commence later this year, assuming an additional GHG program would need to be supported, a validation that the current implementation is scalable to the additional GHG programs.

Market issues are identified by the ISO, stakeholders and the Department of Market Monitoring through a number of different avenues, and once identified, Management prioritizes addressing the market issues over other market design changes. The ISO has internal processes to review market results and tracks market issues through resolution. Stakeholders can identify and communicate market issues by submitting issue tickets, disputes, and through discussion with ISO Management and staff. Likewise, the Department of Market Monitoring works closely with the ISO to identify and resolve market issues. While the market issues in this initiative were not immediately identified, Management believes the existing processes worked to ensure a quick resolution once the market issues had been identified.

Lastly, some stakeholders argued that the ISO has not given sufficient consideration to retroactive correction of the real-time imbalance energy offset. Management conducted a thorough analysis of whether any of the issues addressed by the proposal could be subject to retroactive settlement treatment. First, regarding the elimination of the transfer adjustment, the current policy in place was established based on information at the time that supported the transfer adjustment. This issue was considered during the Federal Energy Regulatory Commission's process to approve the EIM design. FERC found the proposal to be just and reasonable. The ISO implemented the transfer adjustment consistent with the approved tariff. Since that time, new information has indicated that under current EIM operations, eliminating the transfer adjustment would be more a accurate method for allocating real-time imbalance energy offset amounts. For these reasons, Management concluded that the elimination of the transfer adjustment is not approporiate for retroactive settlement. Similarly, for the financial value of EIM transfers change, Management finds that this was also implemented consistent with the FERC-approved tariff and therefore not appropriate for retroactive settlement.

CONCLUSION

Management requests the EIM Governing Body approve Management's proposed changes to the real-time imbalance energy offset. Eliminating the EIM transfer adjustment will more appropriately reflect the offset amount for individual balancing authority areas in the EIM area. In addition, calculating the financial value of EIM transfers between non-California balancing authority areas at the system marginal

energy cost less the GHG marginal cost will accurately reflect the payment to generation supporting the EIM transfer.

EIM Governing Body **June 28, 2019** **Decision on Real-Time Market Neutrality Settlement Proposal**

General Session

Motion

Moved, that the EIM Governing Body approves the proposed changes to the real-time imbalance energy offset calculation as described in the memorandum dated June 21, 2019.

Moved: Fong **Second: Kavulla**

EIM Governing Body Action: **Passed**	Vote Count: **4-0**
Fong	Y
Kavulla	Y
Linvill	Y
Prescott	Y

Motion Number: 2019-06-G7