

May 22, 2020

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. ER20-____-000**

**Tariff Amendment to Enhance Intertie Transaction Market
Rules, Request for Waiver of Notice Requirement, and Request
for Timely Commission Order**

Dear Secretary Bose:

The California Independent System Operator Corporation (CAISO) submits this tariff amendment to enhance its market rules regarding the treatment of energy transactions scheduled at its interties.¹ Specifically, the CAISO proposes to: (1) enhance tariff provisions regarding the treatment of intertie schedules and related rules regarding electronic tags (E-Tags); (2) strengthen the CAISO's non-delivery charge for deviations from scheduled intertie transactions; and (3) clarify several aspects of the CAISO's day-ahead intertie scheduling practices. These tariff revisions will address problems the CAISO market has experienced due to significant amounts of undelivered intertie transactions, which the CAISO's existing non-delivery charge has not addressed sufficiently.

Although each of the three sets of proposed amendments will improve the reliability of the CAISO system and the stability of prices in the CAISO market, from a substantive perspective, they are each a separate element of a multi-part filing that is severable from the others and not interrelated, interdependent, or affected by the Commission's actions on any other element. Thus, the Commission should evaluate the justness and reasonableness of each set of proposed tariff changes based on their individual merits.

¹ The CAISO submits this filing pursuant to section 205 of the Federal Power Act (FPA), 16 U.S.C. § 824d.

The CAISO requests that the Commission issue an order by September 17, 2020, accepting the tariff revisions effective as of October 1, 2020. The CAISO also requests that the Commission waive its 120-day notice requirement. This will give the CAISO and market participants regulatory certainty and ample time to implement the tariff revisions as part of the CAISO's planned software release in the fall of 2020.

I. Executive Summary

The CAISO clears a significant volume of imports and exports through its markets. These transactions at the interties between the CAISO's balancing authority area and neighboring balancing authority areas are important to meet operational needs and provide economic benefits.² The CAISO has numerous tariff rules regarding how market participants schedule intertie transactions and how the CAISO financially settles these transactions. These rules include a monthly non-delivery charge assessed to scheduling coordinators for deviations from their intertie schedules. The CAISO intended the non-delivery charge, combined with generally applicable imbalance energy settlements, to incentivize scheduling coordinators to deliver their scheduled intertie transactions.

Failure to deliver awarded intertie transactions can detrimentally affect reliability and market pricing. Imports serve up to 25 percent of the supply needed in individual hours to meet demand in the CAISO balancing authority area. Where an import is undelivered, the CAISO must take immediate steps to ensure that load is served. An undelivered export causes the CAISO to have excess supply, which can cause intertie congestion and/or exacerbate over-supply conditions. When an import is scheduled through the hour-ahead scheduling process but is not delivered, the CAISO market has reserved transmission capacity for that undelivered import and cannot schedule another import to replace it until the next hour. Meanwhile, the CAISO must make up for the missing energy through internal generation. The supply of real-time energy available to the CAISO to offset this undelivered import may be more expensive. Thus, undelivered imports detrimentally affect market pricing because they tend to increase real-time prices. In addition, especially during stressed conditions, CAISO grid operators may need to take out-of-market actions in anticipation of undelivered imports. These include increasing the real-time market's load forecast and/or dispatching additional imports outside of the market. These actions, although needed to preserve reliability, can detrimentally affect market prices.

Despite having mechanisms intended to address these problems, the CAISO has observed significant amounts of awarded but undelivered energy at

² These imports/exports are separate from energy transfers between balancing authority areas participating in the CAISO's energy imbalance market (EIM) that result from resource-specific real-time market dispatches. See *generally* existing tariff section 29 *et seq.*

the interties. To address these continued problems, the CAISO proposes two sets of market rule changes:

1. Enhance the tariff provisions regarding how the CAISO markets treat E-Tagging information to more accurately reflect intertie energy that will be delivered.
2. Revise the existing, ineffective monthly non-delivery charge with a new under/over delivery charge that applies broadly to all intertie transactions for each interval of the fifteen-minute market (FMM) and eliminates the existing 10 percent monthly threshold for non-deliveries.

The CAISO optimizes the FMM assuming that a market participant will deliver a previously-awarded intertie transaction if the market participant signals it will do so through the CAISO's automated dispatch system, regardless of whether that participant has submitted the accompanying E-Tag. Through the first set of proposed rule changes, previously-awarded intertie transactions will be set to zero in the FMM if the participant does not submit E-Tags on a set timeline. Specifically, the CAISO proposes that participants must submit a valid E-Tag that matches the awarded amount by 40 minutes before the trading hour (T-40). If the scheduling coordinator has a transmission profile less than its advisory energy schedule, then the CAISO will limit the schedule for energy in the FMM so it does not exceed the quantity of the transmission profile. The energy profile on the E-Tag can be revised up to T-20, but by that point the energy profile must match the FMM award. These changes will better indicate to the CAISO's FMM whether scheduled intertie transactions will be delivered.

The CAISO's existing non-delivery charge for deviations from scheduled intertie transactions applies only in narrow circumstances. First, it only applies to hourly block schedules and variable energy resources outside the CAISO balancing authority area that use their own forecast. Fifteen-minute dispatchable intertie resources, for example, are not subject to the decline charge. Second, for hourly block schedules, it only applies if "the decline is made prior to the start of the applicable FMM interval."³ Third, the CAISO only applies the charge if the non-deliveries equal or exceed both: (i) 10 percent of the participant's monthly imports or exports; and (ii) 300 MWh. Where the charge does apply, it equals the megawatt-hours (MWh) of undelivered import or export energy multiplied by the greater of: (i) 50 percent of the locational marginal price (LMP) for the FMM; or (ii) \$10/MWh. Experience shows that the current charge creates insufficient incentives for market participants to deliver scheduled intertie transactions, and too many undelivered intertie transactions are not even subject to the charge.

³ Existing tariff sections 11.31(a) and 11.31(b).

The second set of market rule changes proposed in this filing addresses the deficiencies in the existing non-delivery charge. The CAISO proposes the following key revisions to these rules:

- The non-delivery charges will apply to all intertie transactions regardless of the bid type that created the schedule.
- Charges will apply to deviations from awarded amounts regardless of whether the deviation is an over- or under-delivery. This change recognizes that over-deliveries at the interties can also cause reliability challenges and have detrimental economic impacts.
- The CAISO will eliminate the 10 percent/300 MWh threshold and instead assess charges for each FMM interval.
- Over- and under-deliveries will be exempt only in three limited and justifiable circumstances: (1) a balancing authority or transmission service provider curtailed delivery for a reliability reason; (2) the deviation was part of a valid existing transmission contract or transmission ownership right self-schedule; or (3) the deviation was from a dynamic system resource.
- The under/over delivery price will equal the greater of: (a) 50 percent of the LMP in the corresponding FMM interval at the intertie where the resource was scheduled; (b) 50 percent of the highest LMP among the three five-minute real-time dispatch (RTD) intervals corresponding to the FMM interval at the intertie where the resource was scheduled; or (c) \$10.00 MWh. When a scheduling coordinator accepts an award in the CAISO's automated dispatch system but then fails to deliver, the values in (a) and (b) will equal 75 percent, instead of 50 percent, of the applicable price.

These revisions will establish more robust incentives for market participants to deliver their scheduled intertie transactions.

In addition to these two major sets of tariff amendments, the CAISO also proposes to clarify the tariff provisions that address day-ahead intertie scheduling practices to align them better with the CAISO's business practice manual configuration guide.

II. Background

A. Existing Tariff Provisions

1. Scheduling Intertie Transactions

The CAISO administers day-ahead and real-time wholesale electricity markets.⁴ The real-time market consists of the hour-ahead scheduling process (HASP), the FMM, and the five-minute RTD.⁵

The CAISO uses the HASP and the FMM to schedule transactions on interties, *i.e.*, imports into the CAISO balancing authority area from another balancing authority area, or exports out of the CAISO balancing authority area to another balancing authority area.⁶ Intertie schedules result from both economic bids (*i.e.*, bids which specify prices) and self-schedules (*i.e.*, price-taking bids) that scheduling coordinators submit to the real-time market under various options that include:

- Economic bids in hourly blocks (*i.e.*, bids the scheduling coordinator maintains at the same value for an entire operating hour);⁷
- Economic bids in hourly blocks with an option to make a single intra-hour schedule change;⁸

⁴ Existing tariff section 27 *et seq.*; tariff appendix A, existing definitions of “CAISO Markets” and “CAISO Markets Process.” For the sake of clarity, this transmittal letter distinguishes between existing tariff provisions (*i.e.*, provisions in the current CAISO tariff), new tariff provisions (*i.e.*, new provisions that the CAISO proposes to add to the tariff in this filing), revised tariff provisions (*i.e.*, existing tariff provisions that the CAISO proposes to revise in this filing), and deleted tariff provisions (*i.e.*, existing tariff provisions that the CAISO proposes to delete in this filing).

⁵ Existing tariff section 34. The CAISO implemented its current real-time market design pursuant to an amendment it filed in Docket No. ER14-480 to make tariff enhancements related to Commission Order No. 764. *Integration of Variable Energy Resources*, Order No. 764, FERC Stats. & Regs. ¶ 31,331, *order on reh’g*, Order No. 764-A, 141 FERC ¶ 61,232 (2012), *order on reh’g*, Order No. 764-B, 144 FERC ¶ 61,222 (2013) (collectively Order No. 764).

⁶ Existing tariff sections 34.2 *et seq.* and 34.4. In this filing, transactions conducted at internal nodes are sometimes referred to as internal transactions, and the resources that engage in them are sometimes referred to as internal resources. Similarly, in this filing transactions conducted on interties are sometimes referred to as intertie transactions and the resources that engage in them are sometimes referred to as intertie resources.

⁷ An operating hour means an hour during a day when the real-time market runs and energy is supplied to load. Tariff appendix A, existing definition of “Operating Hour.”

⁸ The CAISO plans to remove this option pursuant to its day-ahead market enhancements initiative, which is planned to go into effect in the fall of 2021.

- Economic bids with participation in the FMM (*i.e.*, fifteen-minute dispatchable inertie resources);
- Self-schedules in hourly blocks;
- Self-schedules by variable energy resources (*i.e.*, intermittent resources), based on forecasts produced by either the variable energy resources or the CAISO; and
- Non-EIM transfers by dynamically scheduled system resources (*i.e.*, resources located outside of the CAISO balancing authority area that are able to respond to RTD instructions).⁹

The schedules also include inertie transactions initially scheduled in the day-ahead market.¹⁰

The real-time market conducts a multi-interval optimization for each of the real-time market processes. Therefore, each real-time market run produces results for multiple market intervals. The HASP operates at the top of each hour for the next hour and produces advisory schedules for both hourly block bids and fifteen-minute dispatchable inertie bids for the next hour. The advisory HASP schedules indicate how much transmission the CAISO market has reserved for energy delivered because of a cleared import or export economic bid or self-schedule.¹¹ The FMM begins 37.5 minutes before each fifteen-minute interval and produces final schedules and prices (*i.e.*, market awards) 22.5 minutes before that interval.¹² This timeline is significant because it differs from the North American Energy Standards Board (NAESB) deadline requiring all E-Tags be submitted 20-minutes before the corresponding interval. E-Tag schedule changes are not recognized by the CAISO market when they occur between 37.5 minutes before the interval (FMM determination of final schedule) and 20 minutes before the interval (NAESB deadline). This may cause over- or under-delivery of import/export energy and may adversely affect grid reliability and efficient market pricing.

To deliver an inertie transaction, a scheduling coordinator submits an E-Tag to the CAISO and to the other balancing authority area(s) involved in the transaction.¹³ Balancing authority areas use E-Tags to track energy transfers

⁹ Existing tariff sections 30.5.1(q)-(u), 34.1.3, 34.2.1, and 34.2.2.

¹⁰ Existing tariff section 34.1.1.

¹¹ Existing tariff sections 27, 27.4.1, 34.2 *et seq.*, and 34.3 *et seq.*

¹² Existing tariff section 34.4.

¹³ Existing tariff sections 4.5.3.2.2 and 30.5.7 *et seq.*; tariff appendix A, existing definition of “E-Tag.” An inertie transaction for which there is an E-Tag is sometimes referred to as being

among themselves. E-Tags include a “transmission profile” and an “energy profile.” The transmission profile shows the amount and location of the transmission the scheduling coordinator has available to facilitate the energy transaction. The energy profile shows the amount of energy to be delivered to complete the intertie transaction.¹⁴ CAISO grid operators validate a scheduling coordinator’s E-Tag information to ensure the energy quantity on the E-Tag matches the CAISO market scheduled energy.

Under both Western Electricity Coordinating Council (WECC) and CAISO rules, final E-Tags supporting scheduling coordinators’ intertie transactions, including both the transmission and energy profiles, are due by 20 minutes before the applicable trading hour or fifteen-minute interval (T-20).¹⁵ The existing rules also require the transmission profile to equal or exceed the energy profile (or, for a fifteen-minute dispatchable economic bid, to equal or exceed the maximum bid-in capacity for the trading hour¹⁶), and require the energy profile to equal the market award resulting from the economic bid or self-schedule. The CAISO may modify the energy profile for reliability-related curtailments.¹⁷

Imports and exports are financially settled in the day-ahead market and in the FMM. An import or export scheduled in the FMM that is not delivered is also settled in the five-minute real-time market. As described above, the HASP operates at the top of each hour for the next hour and produces advisory schedules for the next hour. These are based on the HASP price, but imports and exports scheduled in HASP are settled at the FMM price, with any deviations from the FMM schedule settled at the five-minute RTD price. Similarly, where an intertie resource has a day-ahead award, the day-ahead award quantity is settled

“tagged,” and an intertie transaction for which there is no E-Tag is sometimes referred to as being “untagged.”

¹⁴ Business practice manual (BPM) for market operations (version 63) at section 8.4.1. This document is available at <https://bpmcm.caiso.com/Pages/BPMDetails.aspx?BPM=Market%20Operations>. For example, an E-Tag may depict a 100 megawatt (MW) transaction whose energy source is in the Bonneville Power Administration balancing authority area and whose energy sink is in the CAISO balancing authority area across the MALIN500 intertie for HE10. In this example, the E-Tag has an energy profile of 100 MW to match the CAISO market award. The E-Tag also has a transmission profile of at least 100 MW to indicate that the scheduling coordinator has procured sufficient transmission to accommodate the energy transfer across the specified intertie for the hour ending at 10:00 a.m.

¹⁵ Existing tariff sections 30.5.7 – 30.5.7.5; BPM for market operations at section 8.5.2; NERC Tagging Requirements, CAISO Operating Procedure No. 2510 (version 8.4) at 4, 7, which is available at <http://www.caiso.com/Documents/2510.pdf>. The North American Energy Standards Board (NAESB) establishes the required specifications for E-Tags.

¹⁶ A trading hour is any hour during which trades are conducted in a CAISO market. Tariff appendix A, existing definition of “Trading Hour.”

¹⁷ Existing tariff sections 30.5.7.1 – 30.5.7.5.

at the day-ahead price, with differences between the day-ahead and FMM schedules paid or charged at the FMM schedule.

The exposure to imbalance energy settlement only partially incentivizes intertie resources to deliver on their import and export intertie schedules, and experience shows it has not deterred under-deliveries at the interties. All else being equal, an intertie resource that does not deliver in real-time would have to buy back its schedule at a higher price than it was paid because the later markets would have to make up the missing energy from a smaller pool of resources or from resources with higher bids. The imbalance energy settlement, however, is not fully effective when an import or export only schedules in the CAISO's real-time market process. The HASP produces schedules, but it does not produce financial settlements for imbalance energy. It is possible for an import or export to be scheduled in the HASP without having received a DAM award. If the import or export fails to deliver the scheduled HASP energy, it is too late for the FMM to account for that non-delivery in the first two fifteen-minute intervals of that hour, and the FMM cannot zero out the market schedule until the third and fourth fifteen-minute intervals of the hour. Thus, only the first and second intervals have an imbalance settlement; the third and fourth do not. Absent other measures (such as the existing non-delivery charge), there is no financial consequence in half of the hour for having failed to deliver on the HASP schedule. This differs from the treatment accorded generation resources internal to the ISO balancing area, which are always subject to imbalance energy charges.

2. Non-Delivery Charge for Intertie Transactions

Besides imbalance energy settlement, the existing CAISO tariff includes a monthly non-delivery charge for deviations from scheduled intertie transactions.¹⁸ To determine the non-delivery charge, the CAISO first calculates separate "decline potential charges" for import schedules and for export schedules resulting from the hourly block options described above. The CAISO does not, however, calculate decline potential charges (and thus does not calculate non-delivery charges) for fifteen-minute dispatchable economic intertie bids, self-schedules by variable energy resources located outside of the CAISO balancing authority area based on forecasts produced by the CAISO, or dynamically scheduled transfers.¹⁹ For each settlement interval during the month, the decline

¹⁸ Existing tariff section 11.31 *et seq.* The CAISO's Draft Final Proposal, included as Attachment C, provides detailed examples of how the existing decline charge interacts with the existing E-Tagging rules and market timelines. Attachment C, at 20-27.

¹⁹ Existing tariff section 11.31; tariff appendix A, existing definitions of "Decline Potential Charge – Imports" and "Decline Potential Charge – Exports." The word "decline" in the term "decline potential charge" (and in the term "define monthly charge" discussed below) refers to scheduling

potential charge equals the megawatt-hours (MWh) of undelivered import or export energy multiplied by the greater of (i) 50 percent of the locational marginal price (LMP) for the FMM or (ii) \$10/MWh.²⁰

At the end of the month, the CAISO calculates “decline monthly charges” for imports and exports equal to the total decline potential charges for the month multiplied by a ratio that represents the portion of the scheduling coordinator’s declined schedules that exceeded a specified exemption threshold. Specifically, the decline monthly charges only apply if the scheduling coordinator’s undelivered amount of imports or exports for the month equals or exceeds both: (i) 10 percent of the total scheduling coordinator’s monthly imports or exports; and (ii) 300 MWh.²¹ When the CAISO first proposed the decline potential charges in 2008, the CAISO explained this threshold was necessary because some declines were outside a scheduling coordinator’s control, *e.g.*, reliability-related curtailments ordered by a balancing authority area.²² The CAISO considered providing exemptions from the charge in such cases but found that “it would be impossible as a practical matter to evaluate the circumstances of numerous individual declines, as would be necessary if the rule contained exceptions for declines based on certain specific causes.”²³ The CAISO settled on these threshold amounts as a reasonable way to account for declines outside the scheduling coordinator’s control.

The CAISO distributes whatever charges it assesses to measured demand. On the settlement statements the CAISO issues for the last day of the month, each scheduling coordinator receives a credit for its share of the total of all decline monthly charges for imports and exports assessed to scheduling coordinators for the month. The CAISO allocates the credits according to the proportion of each scheduling coordinator’s measured CAISO demand to total measured CAISO demand for the CAISO balancing authority area during the month.²⁴

When the Commission accepted the CAISO’s 2008 tariff filing proposing the decline monthly charge in 2008, it found the “CAISO’s proposed penalty

coordinators fully or partially declining (*i.e.*, not delivering on) dispatches for import or export energy.

²⁰ Existing tariff section 11.31(d).

²¹ Existing tariff sections 11.31.1 – 11.31.2; tariff appendix A, existing definitions of “Decline Monthly Charge – Imports,” “Decline Monthly Charge – Exports,” “Decline Threshold Percentage – Imports/Exports,” and “Decline Threshold Quantity – Imports/Exports.”

²² *Cal. Indep. Sys. Operator Corp.*, Transmittal Letter, FERC Docket No. ER09-628-000 (Feb. 29, 2008).

²³ *Id.* at 6.

²⁴ Existing tariff section 11.31.3.

mechanism for minimizing excessive pre-dispatched bid declines reasonably balances market flexibility with the need to maintain reliable grid operations.”²⁵ The Commission also accepted the monthly 10 percent threshold, but stated it:

expect[s] CAISO will continue to monitor the level of pre-dispatched bid declines. If the situation does not improve, we will remain open to further remedies, including a tightening of the threshold, an increase in the level of charges assessed, or a more granular approach to the basis for the threshold.²⁶

When the monthly decline charge was originally implemented in 2008, it was impossible for the CAISO to identify if a curtailment occurred due to reliability reasons. Because the CAISO could not identify reliability curtailments, the 10 percent threshold was necessary and appropriate.

3. Measures to Address Intertie Scheduling Practices

Separate from the “decline potential charges,” the existing tariff specifies several actions the CAISO will take regarding schedules that clear the day-ahead market at the interties and are wholly or partially reversed through an FMM schedule.²⁷ One of these tariff provisions states that the CAISO will charge a scheduling coordinator the positive difference between the day-ahead market price and the FMM LMP applicable to any imports that clear the day-ahead market and are reduced through a bid to the real-time market, if the scheduling coordinator withdraws an E-Tag more than 45 minutes before the trading hour.²⁸ This tariff rule reduces the economic incentive for implicit virtual bidding.

B. Reasons for Revising the Existing Tariff Provisions

The CAISO market has experienced significant amounts of undelivered intertie transactions over several years. Failure to deliver awarded intertie transactions can have detrimental impacts on both reliability and pricing for the CAISO markets.

²⁵ *Cal. Indep. Sys. Operator Corp.*, 123 FERC ¶ 61,097, at P 27 (2008) (2008 Order). The 2008 Order conditionally accepted the CAISO’s tariff revisions subject to a further compliance filing, which the Commission accepted by letter order issued on October 15, 2008 in Docket No. ER08-628-001. The CAISO made conforming changes to the decline charge tariff provisions in Docket No. ER14-480 as part of implementing its FMM.

²⁶ 2008 Order at PP 27, 30. Further, the Commission expressly approved the 300 MWh threshold. *Id.* at P 32.

²⁷ Existing tariff section 11.32. These tariff provisions are sometimes collectively referred to as the “HASP reversal settlement rule.” The Commission accepted the tariff provisions (as subsequently revised) as “an important deterrent against implicit virtual bidding.” *Cal. Indep. Sys. Operator Corp.*, 146 FERC ¶ 61,204, at P 56 (2014).

²⁸ Existing tariff section 11.32(i).

Regarding reliability impacts, the CAISO relies on intertie transactions for up to 25 percent of the supply needed in individual hours to meet demand in the CAISO balancing authority area. An undelivered *import* causes the CAISO to be short of that needed supply. An undelivered *export* causes the CAISO to have excess supply, which can cause intertie congestion and/or exacerbate over-supply conditions.

Undelivered imports are a particular concern because the CAISO market has reserved transmission capacity for the undelivered import and may not be able to schedule another import to replace it until the next hour. Hourly imports are scheduled through the HASP, so if an hourly import is not delivered, the HASP cannot schedule another import because once the market recognizes the shortage, the HASP has already been completed and will not run again until the following hour. The CAISO balancing authority area operator may elect to schedule hourly energy on the interties manually. This process, however, is time consuming, and additional energy may not be available. Also, often it is too late to manually schedule energy on the interties because there is insufficient time for the operator to verbally agree with the scheduling coordinator on the manual schedule and for the scheduling coordinator to submit an E-Tag. The FMM may be able to dispatch fifteen-minute dispatchable imports to compensate, but it will not do this until the last two fifteen-minute intervals in the hour, and only if additional fifteen-minute dispatchable imports are available.

So when imports are not delivered, the five-minute RTD may have to compensate for the undelivered import by dispatching replacement supply from a smaller overall supply of five-minute dispatchable resources. The overall supply available to the five-minute RTD is smaller than the supply available to the FMM because the vast majority of intertie energy resources cannot participate in the five-minute RTD. Only internal generators, EIM participating resources, and dynamically scheduled intertie energy resources can participate in the CAISO's five-minute RTD market.

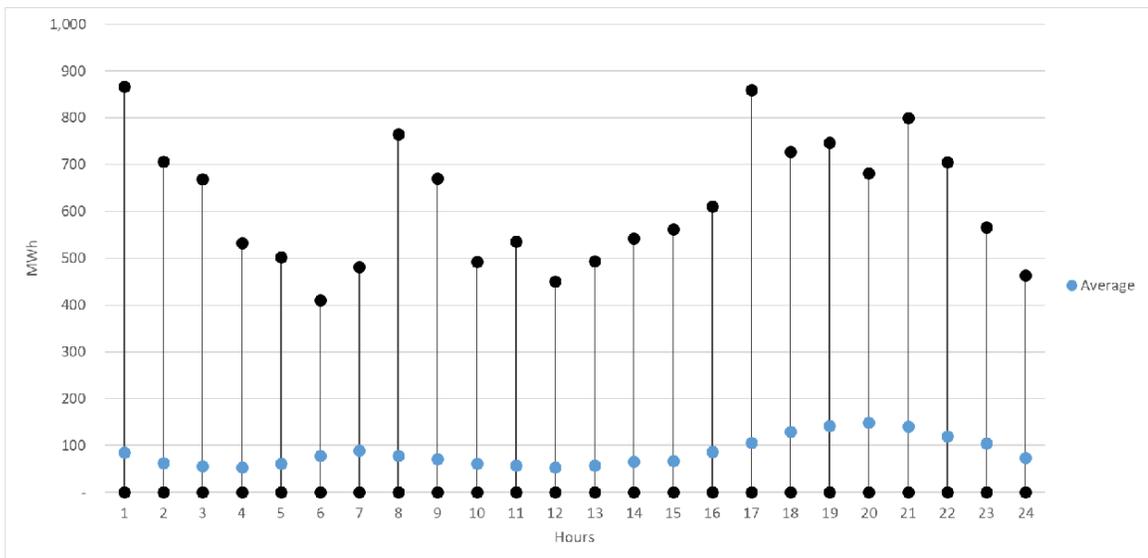
Undelivered imports are detrimental to market pricing because the smaller supply of energy from which the RTD can dispatch may be more expensive, thus increasing RTD prices, all other things being equal.²⁹ These increased prices affect all market participants and likely cause higher prices than would occur if the market could have selected from a broader range of resources in the HASP and the FMM. Despite causing a detrimental impact to the CAISO's reliability and market pricing, the undelivered intertie schedule is not currently charged for the decline charge unless the scheduling coordinator exceeds the ten percent monthly threshold. Additionally, the import or export that caused the deviation may not receive imbalance energy settlements for half of the hour if, as

²⁹ Undelivered imports can also necessitate exceptional dispatches, which, per CAISO tariff section 43A, can trigger capacity procurement mechanism designations when issued to non-resource adequacy capacity.

discussed above in Section II.A.1, it scheduled in the HASP as opposed to the DAM.

The CAISO has documented the large amounts of undelivered inertia energy the markets have experienced. For example, Figure 1 below depicts the range of undelivered inertia import supply from July 2017 through June 2018 for each hour of the set of days within that year-long period.³⁰ The trends reflected in this figure have continued to the present.

Figure 1



For each hour of the set of days within the year-long period, as shown in the horizontal axis of Figure 1, the black circle at the top of the vertical segment represents the largest amount of undelivered inertia import supply, the black circle at the bottom of the vertical segment represents the smallest amount of undelivered inertia import supply, and the blue circle within the vertical segment represents the average amount of undelivered inertia import supply. Figure 1 shows that the range of undelivered inertia supply can reach significant amounts, with average non-delivery increasing during peak load hours when the CAISO has the greatest need for the energy, *i.e.*, in the morning hours and to a greater extent in the evening hours. CAISO balancing authority area operators must plan for the worst case scenario, and often must take manual actions in anticipation of large quantities of undelivered inertia schedules during peak hours. If they fail to do so and the worst case scenario materializes, it can be impossible to schedule or dispatch additional supply. This may cause

³⁰ Figure 1 and Figure 2 are drawn from the CAISO's Draft Final Proposal provided in attachment C to this filing.

emergency situations. In summary, even if a grid operator is capable of managing the average amount of undelivered import or export energy, the operator must prepare for the worst case scenario to avoid potential grid emergencies.

Undelivered inertia supply also has contributed to system emergency situations and threatened grid stability. For example, the CAISO declared an “Emergency Stage 1” on May 3, 2017, in part because of undelivered imports during the peak load hours. This is the type of emergency the CAISO declares when contingency reserve shortfalls exist, or when such shortfalls are forecasted to occur, and market and non-market resources cannot maintain contingency reserve requirements.³¹ In addition, on September 1-2, 2017, the CAISO and many surrounding balancing authority areas experienced a heat wave that triggered high regional loads. When tight regional conditions occur, market participants can be more likely to sell their energy outside of the CAISO even if the import energy has been bid and scheduled into the CAISO. The market participant may elect not to deliver the energy to the CAISO and instead sell at a higher price somewhere else. This exacerbates potential reliability emergencies for the CAISO because the CAISO depended on the import energy.

CAISO grid operators often must take action in anticipation of undelivered inertia transactions to ensure adequate supply is available to meet real-time system needs. These measures include increasing the load forecast the market uses for the HASP and/or FMM to schedule additional imports and exceptionally dispatching additional imports out of the market. Although grid operators take these measures to assure system reliability, they can also introduce pricing differences between the DAM, FMM, and RTD. This can diminish incentives for scheduling coordinators to deliver their scheduled inertia transactions because the market initially schedules them in the HASP based on its prices, but they are financially settled at FMM and/or RTD prices.

A negative feedback loop occurs when operators adjust the load forecast in HASP, but not FMM, in anticipation of undelivered hourly imports because this can result in HASP prices being greater than FMM prices. As described earlier, the real-time market dispatches hourly imports based on HASP prices, but they are settled at the FMM prices. If HASP prices are significantly greater than the FMM price, this can create an incentive for importers not to deliver because they may be paid less than their bid. This can result in a negative feedback loop, in which undelivered imports cause operators to further increase the load forecast in HASP in anticipation of undelivered imports, making HASP prices even higher in relation to FMM prices, and incenting even more imports to not be delivered.

³¹ See CAISO Operating Procedure No. 4420 (version 12.1) at 9, available at <http://www.caiso.com/Documents/4420.pdf>.

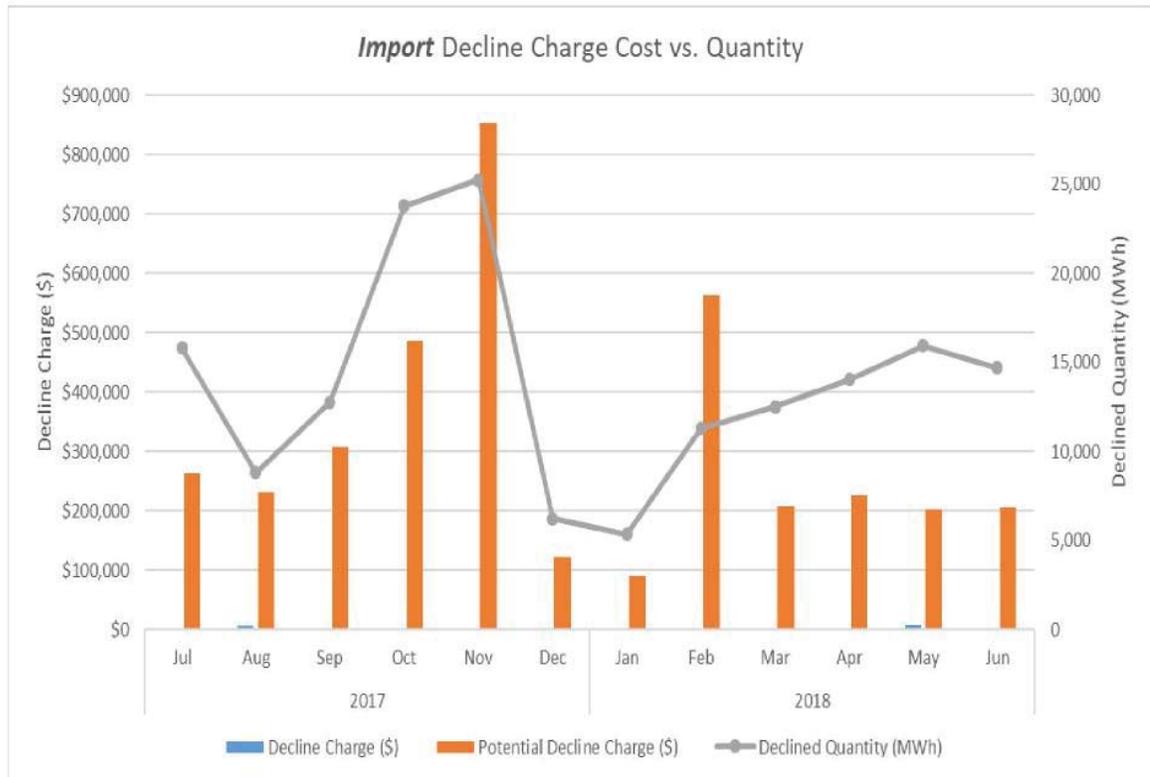
Measures that reduce schedule deviations at the interties and alleviate the need for grid operators to undertake these actions are needed.

The existing monthly non-delivery charge creates an insufficient incentive for scheduling coordinators to deliver their scheduled intertie transactions. There are two related reasons for this. First, the calculation of undelivered intertie transactions rarely exceeds the 10 percent threshold in the tariff and, as such, market participants are rarely charged for under-deliveries. Because of this threshold, the existing non-delivery charge does not set effective incentives for scheduling coordinator to deliver their scheduled volumes at the interties. For example, Figure 2, below, depicts the calculation of decline potential charges and actual decline monthly charges from July 2017 through June 2018. This figure shows extensive under-delivered volumes, but only *de minimis* under-delivery charges actually being imposed. This is a stark demonstration of the existing under-delivery charge's ineffectiveness at deterring intertie schedule deviations.

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Figure 2

IMPORTS Date	Decline Charge (\$)	Decline Charge as % of Potential	Potential Decline Charge (\$)	Declined Quantity (MWh)
2017	\$ 5,886	0.26%	\$ 2,265,863	92,706
Jul-17	\$ -	0.00%	\$ 263,560	15,827
Aug-17	\$ 5,886	2.55%	\$ 231,042	8,812
Sep-17	\$ -	0.00%	\$ 309,106	12,772
Oct-17	\$ -	0.00%	\$ 487,151	23,800
Nov-17	\$ -	0.00%	\$ 853,499	25,258
Dec-17	\$ -	0.00%	\$ 121,505	6,237
2018	\$ 7,815	0.52%	\$ 1,495,763	73,867
Jan-18	\$ -	0.00%	\$ 91,105	5,346
Feb-18	\$ -	0.00%	\$ 562,312	11,302
Mar-18	\$ -	0.00%	\$ 208,247	12,507
Apr-18	\$ -	0.00%	\$ 225,683	14,055
May-18	\$ 7,815	3.87%	\$ 201,958	15,954
Jun-18	\$ -	0.00%	\$ 206,458	14,704
Grand Total	\$ 13,701	0.36%	\$ 3,761,626	166,573



As shown in Figure 2, scheduling coordinators exceeded the 10 percent threshold for imports in only two months (August 2017 and May 2018) of that year-long period. Even in those two months, the decline monthly charge

amounts (depicted using the blue bars) were negligible – \$5,886 in August 2017 and \$7,815 in May 2018. The decline monthly charge amounts were also much smaller than the decline potential charge amounts (depicted using the orange bars) for those months – \$231,042 and \$201,958, respectively. The decline monthly charge amounts assessed for all of 2017 and 2018 were only a tiny percentage of the decline potential charge amounts that could have been (but were not) applied for those two years – 0.26 percent and 0.52 percent, respectively. Using the 10 percent threshold means the existing non-delivery charge fails to deter scheduling coordinators from falling short of delivering on their intertie schedules.

The second reason the existing non-delivery charge is ineffective is that applying the charge over each month masks stressed periods when intertie transaction non-delivery is most impactful to the CAISO. For example, a scheduling coordinator may fail to deliver import energy during a heat wave when pricing is high and supply is scarce. This will negatively affect the CAISO, but if the scheduling coordinator has not exceeded the 10 percent monthly threshold, it will not be assessed a monthly decline charge.

C. Stakeholder Process Preceding This Tariff Amendment

The CAISO initiated the stakeholder process that led to this tariff amendment in August 2018.³² The stakeholder process included the following opportunities for stakeholder input and participation:

- The CAISO issued four papers;³³
- The CAISO held several stakeholder meetings and conference calls to discuss the issues raised in the CAISO papers and provided opportunities for stakeholders to submit comments on the papers;
- The CAISO developed draft tariff revisions; and
- The CAISO provided stakeholders the opportunity to submit written comments on the draft tariff provisions, which the CAISO considered in preparing the final version of the tariff revisions.³⁴

³² Materials related to the stakeholder process are available at <http://www.caiso.com/StakeholderProcesses/Intertie-deviation-settlement>.

³³ These papers included the Draft Final Proposal provided in attachment C to this filing.

³⁴ A list of key dates in the stakeholder process is provided in attachment E to this filing.

The CAISO Governing Board (Board) voted unanimously to authorize this filing at its public meeting held on February 7, 2019.³⁵ At that point, the CAISO's intent was to implement this initiative through its Fall 2019 software release. Implementation subsequently was rescheduled for the Fall 2020 software release.

Stakeholders generally supported the policies reflected in this tariff amendment. However, some stakeholders objected to certain features. In addition, the Market Surveillance Committee (MSC) and the Department of Market Monitoring (DMM) each stated that the policies improve upon the existing CAISO tariff rules.³⁶ The CAISO addresses any objections to its proposals below in section IV of this transmittal letter.

III. Proposed Tariff Revisions

The CAISO proposes targeted tariff enhancements to address significant amounts of undelivered intertie transactions the CAISO market experiences and the fact the existing non-delivery charge does not deter such non-deliveries sufficiently.³⁷ Specifically, this tariff amendment contains enhancements to: (1) the treatment of intertie schedules and the market inputs and processing related to E-Tag rules; and (2) the non-delivery charge for deviations from scheduled intertie transactions. The first category of changes will provide the FMM with more reliable information about whether intertie transactions awarded from day-ahead and HASP are likely to materialize in real-time. The second category of changes increases incentives for market participants to deliver awarded intertie

³⁵ Materials related to the Board's authorization are available at <http://www.caiso.com/informed/Pages/BoardCommittees/BoardGovernorsMeetings.aspx>. These materials included a memorandum to the Board from Keith Casey, Vice President, Market & Infrastructure Development (Board Memorandum), which is provided in attachment D to this filing. The EIM Governing Body also issued a memorandum supporting the proposed tariff changes. See <http://www.caiso.com/Documents/Decision-IntertieDeviationSettlementProposal-EIMGBInput-Feb2019.pdf>.

³⁶ See MSC Opinion on Intertie Deviation Settlements, at 4 (Jan. 16, 2019) (MSC Opinion) (stating that "the implementation of stronger incentives for the delivery of scheduled intertie transactions is desirable, and, on balance, we recommend the adoption of the proposed changes"). The MSC Opinion is available at <http://www.caiso.com/Documents/Decision-IntertieDeviationSettlementProposal-MSCOpinion-Feb2019.pdf>. See also DMM Comments on Intertie Deviation Proposal at 1 (Feb. 4, 2019) (DMM Comments) (stating that DMM "supports the proposal as an improvement over the current market design. These changes should increase the reliability of import schedules and reduce uncertainty about imports that may not be delivered in the real-time market."). The DMM Comments are available at http://www.caiso.com/Documents/Decision_IntertieDeviationSettlementProposal-DMM_Comments-Feb2019.pdf.

³⁷ See *supra* section II.B of this transmittal letter.

transactions. Besides these two categories of tariff revisions, the CAISO proposes to clarify certain tariff provisions regarding intertie scheduling practices.

A. Enhance the Treatment of Intertie Schedules and the Market Inputs and Processing Regarding E-Tag Rules

The FMM assumes that a scheduling coordinator will deliver its scheduled intertie transaction if it indicates as such through the CAISO's automated dispatch system after the HASP is completed,³⁸ regardless of whether the scheduling coordinator has submitted an E-Tag. This creates issues for the CAISO market because indications of intent to deliver provided through the automated dispatch system are less firm than when such intentions are reflected through an E-Tag. To address this, the CAISO proposes to amend its tariff provisions regarding the treatment of intertie schedules and the E-Tag rules applicable to the economic bidding and self-scheduling option to more accurately reflect intertie transactions that will be delivered.³⁹

Specifically, the CAISO proposes modifications to its market processes based on submitted E-Tags. Intertie transactions that do not follow these rules will have their prior market awards set to zero in the FMM.⁴⁰ First, the CAISO proposes to require scheduling coordinators to submit E-Tags that pass the CAISO E-Tag validation procedures and support their market awarded economic bids and self-schedules, by 40 minutes before the trading hour (T-40). The transmission profile of the E-Tag at T-40 must equal the applicable economic bid or self-schedule (or, for an FMM economic bid, to be equal to or greater than that bid). If the scheduling coordinator has a transmission profile less than its advisory energy schedule, then the CAISO will limit the schedule for energy in the FMM so it does not exceed the quantity of the transmission profile.⁴¹ As discussed above,⁴² the FMM begins 37.5 minutes before each fifteen-minute interval and produces final schedules and prices 22.5 minutes before that interval. Thus, the tariff revisions will allow the CAISO to base the FMM schedules on the preliminary E-Tags with transmission profiles submitted by T-

³⁸ After the CAISO publishes the results of HASP, any scheduling coordinator with an awarded schedule has approximately five minutes to either accept, partially accept, or decline the award.

³⁹ Revised tariff sections 30.5.7.1 – 30.5.7.5. The CAISO also proposes to make non-substantive corrections to the use of defined terms in tariff section 30.5.7.

⁴⁰ Such transactions also would be subject to the under/over delivery charge described in section III.B, below.

⁴¹ Further, for an economic hourly block bid with an intra-hour option, the MW level to which the FMM can redispatch the bid above its HASP advisory schedule, pursuant to the CAISO's existing authority to redispatch such a bid, will be limited to the quantity of the transmission profile submitted by T-40.

⁴² See *supra* section II.A.1 of this transmittal letter.

40.⁴³ This will help the CAISO by basing the FMM market optimization on a more realistic view of what intertie schedules actually will materialize.

Second, the tariff revisions will allow a scheduling coordinator to revise an energy profile up to T-20, but the quantity of the energy profile must equal the quantity of the economic bid or self-schedule (or, for an FMM economic bid, must equal the quantity of the FMM energy schedule) by T-20. This is consistent with the NAESB E-Tagging deadline of T-20. If the scheduling coordinator fails to submit a valid E-Tag consistent with these deadlines, then the CAISO will set the MW quantity of the FMM schedule associated with the economic bid or self-schedule to zero for each FMM interval of the hour.⁴⁴

These tariff enhancements will address issues that result from the timing of the CAISO market runs. Currently, the FMM binding award for hourly block intertie resources is equal to the HASP award accepted in the automated dispatch system after, under normal circumstances. This is problematic because the FMM assumes an E-Tag will be submitted to match the market award even though there is no guarantee of an E-Tag submission. If a scheduling coordinator fails to submit an E-Tag by T-20, it is too late for the HASP to schedule additional energy. In this situation, the CAISO is not only short energy (or in an energy surplus if an export is not tagged), but the reserved transmission capacity for the resource may go unused, unless a fifteen-minute dispatchable import or export can use that transmission capacity. Untagged energy can cause FMM prices to be lower than they should have been and RTD prices to be higher than they should have been. As discussed *supra*, at least for the first two fifteen-minutes of the hour, the FMM would have cleared at a higher price had the market optimization known the awarded energy would not be delivered. Replacing the energy results in a price increase in the real-time market and, if the real-time market cannot replace the energy, the CAISO may experience reliability problems.

⁴³ Early in the stakeholder process for this tariff amendment, the CAISO had proposed a firm real-time E-Tag deadline of T-40. This would require submission of all E-Tags including energy and transmission profiles by T-40, which is 20 minutes prior to the NAESB E-Tagging deadline of T-20. The CAISO proposed that no changes to the E-Tag could occur after T-40. The intent behind that proposal was to ensure that E-Tags would be submitted and approved in advance of the FMM runs, each of which begins 37.5 minutes before the applicable 15-minute interval. However, stakeholders noted seams issues with the rules in other balancing authority areas that the CAISO determined would make the proposal impracticable. Therefore, the CAISO withdrew that proposal. See Draft Final Proposal at 4-5, 41.

⁴⁴ In addition, a scheduling coordinator with a cleared FMM economic bid may update either the transmission profile or the energy profile after the relevant deadlines. A scheduling coordinator choosing to update its transmission profile or its energy profile must submit that update by T-40 or T-20, respectively.

Submitting an E-Tag with a transmission profile under the proposed tariff revisions will provide the CAISO with a sufficient indicator that the scheduling coordinator intends to deliver the awarded energy. If a valid E-Tag is submitted, it is appropriate for the FMM to assume the energy will most likely be delivered. This aligns with how the CAISO market determines awards for fifteen-minute dispatchable intertie resources, which must submit E-Tags with transmission profiles before the FMM run.⁴⁵ If no E-Tag is submitted, the resource does not receive an award.

Going forward, the CAISO proposes to make award determinations for all imports and exports based on the submission of an E-Tag, as opposed to assuming an E-Tag will be submitted to match the market award. This change will allow the FMM to schedule imports and exports based on what is actually tagged rather than what the CAISO merely assumes will be tagged. The change will also encourage scheduling coordinators to have physical generation and transmission procured when they submit bids. Assuming the bid clears, the CAISO expects the associated energy to be delivered. If a scheduling coordinator cannot tag the energy before the market run, the CAISO market will no longer assume this energy will be delivered.

B. Enhance the Non-Delivery Charge for Deviations from Scheduled Intertie Transactions

The CAISO also proposes to enhance the incentives for scheduling coordinators to deliver their scheduled intertie transactions by replacing the existing monthly non-delivery charge with a new, more robust type of charge called the “under/over delivery charge.”⁴⁶ As its name indicates, the under/over delivery charge will apply not only to under-deliveries of scheduled intertie energy but also to over-deliveries of such energy. This change is appropriate and necessary because both under- and over-deliveries represent deviations from scheduled intertie transactions, and must be made up for with the re-dispatch of supply in the five-minute RTD market. Additionally, the new charge is necessary because the existing imbalance energy settlement is ineffective on its own when intertie energy is scheduled in the HASP but not delivered.

Under the tariff revisions, for each FMM interval, the CAISO will assess an under/over delivery charge to a scheduling coordinator with an intertie

⁴⁵ See existing tariff section 30.5.7.5.

⁴⁶ Revised tariff sections 11.31 – 11.31.3, and 30.5.1; tariff appendix A, new definitions of “Under/Over Delivery Charge,” “Under/Over Delivery Price,” and “Under/Over Delivery Quantity;” tariff appendix A, deleted definitions of “Decline Monthly Charge – Exports,” “Decline Monthly Charge – Imports,” “Decline Potential Charge – Exports,” “Decline Potential Charge – Imports,” “Decline Threshold Percentage – Imports/Exports,” and “Deleted Threshold Quantity – Imports/Exports.”

transaction if the intertie resource supporting that transaction has a positive under/over delivery quantity. The under/over delivery charge will equal the intertie resource’s under/over delivery quantity (subject to certain exclusions) multiplied by the under/over delivery price for the resource’s corresponding intertie in that FMM interval.⁴⁷ Importantly, the existing 10 percent monthly threshold will no longer apply. The CAISO will then allocate the under/over delivery charge amounts among scheduling coordinators.⁴⁸ Figure 3, below, summarizes the key points of the new under/over delivery charge and how they compare to the existing decline potential charge. The CAISO discusses these points in further detail in subsections III.B.1 through III.B.5, below.⁴⁹

Figure 3

	<i>Decline Potential Charge</i>	<i>Under/Over Delivery Charge</i>
<i>Time Granularity of Charge</i>	Monthly	Fifteen minutes
<i>Covered Resources/Schedules</i>	HASP block intertie schedules; economic hourly block bid with intra-hour option; external variable energy resource using own forecast	All intertie transactions not specifically exempted
<i>Exempt Resources/Schedules</i>	Fifteen-minute dispatchable economic bids; external variable energy resource using CAISO forecast; dynamic transfers	Schedule curtailed for reliability reason; existing transmission contract or transmission ownership right self-schedule; dynamic transfers
<i>Covered Non-Deliveries</i>	Under-deliveries only	Under- and over-deliveries
<i>Applicable Charge</i>	Greater of (i) 50 percent of FMM LMP; or (ii) \$10/MWh	Greater of: (i) 50 percent of the FMM LMP; (ii) 50 percent of the highest RTD LMP among three RTD intervals in FMM; or (iii) \$10.00 MWh. Parts (i) & (ii) are 75 percent if undelivered schedule accepted in ADS.
<i>Quantity Subject to Charge</i>	Undelivered import/export schedules if declined before start of FMM interval but only if quantity exceeds: (i) 10 percent of total scheduling coordinator’s monthly imports/exports; and (ii) 300 MWh	All undelivered import/export schedules.
<i>Allocation of Funds Collected</i>	Pro-rata by measured demand in month	Pro-rata by measured demand on day charges assessed

1. Calculation for Each FMM Interval

The CAISO will calculate the under/over delivery charge for each FMM interval. This will ensure that the charges a scheduling coordinator incurs are in proportion to the impact its under- or over-deliveries have on the CAISO market across the actual intervals in which they occur, thus incentivizing scheduling coordinators to deliver on their awarded intertie transactions.

On the other hand, the monthly non-delivery charge under the existing tariff allows a scheduling coordinator not to deliver an intertie transaction during stressed system conditions with accompanying high prices but without incurring a non-delivery charge, so long as it does not exceed the existing ten percent threshold over the entire month. The CAISO’s proposed methodology for calculating the under/over delivery charge for each FMM interval eliminates that issue.

⁴⁷ Revised tariff sections 11.31 – 11.31.2.

⁴⁸ Revised tariff section 11.31.3.

⁴⁹ The CAISO’s Draft Final Proposal, included as Attachment C, provides detailed examples of how the proposed deviation charge interacts with the proposed changes to how the E-Tagging rules interface with market timelines. Attachment C, at 44-48.

2. Under/Over Delivery Quantity

For an hourly block schedule, the under/over delivery quantity will equal the absolute value of the difference between: (1) the HASP block intertie schedule; and (2) the final quantity of the energy profile on the intertie transaction's E-Tag.⁵⁰ This calculation captures the energy under hourly block schedules that is under-delivered or over-delivered.

The CAISO also proposes to determine an under/over delivery quantity (and thus an under/over delivery charge) for fifteen-minute dispatchable resources. This proposal is reasonable because undelivered fifteen-minute dispatchable intertie bids tie up transmission capacity reserved in the HASP, just as undelivered hourly block intertie bids do. For a fifteen-minute dispatchable resource, the under/over delivery quantity will equal the amount by which the HASP advisory schedule exceeds the quantity of the transmission profile of the E-Tag as of T-40.⁵¹ This calculation captures the energy that cannot be delivered for fifteen-minute dispatchable resources and accords with the T-40 timeline for submitting E-Tag transmission profiles discussed above.⁵² Specifically, this logic works in conjunction with the CAISO's existing functionality of automatically updated fifteen-minute dispatchable E-Tags. When the HASP schedule is submitted, the scheduling coordinator must submit an E-Tag by T-40 with a transmission profile. The FMM energy award is published roughly 22.5 minutes prior to the applicable interval. The NAESB tagging deadline is 20 minutes prior to the interval, so there is a very short window in which the E-Tag energy profile can be updated to match the award. To remedy this, the ISO automated the adjustment process and will update E-Tag energy profiles to match the award as soon as the award is published. This process can only occur if the E-Tag has a transmission profile to support the schedule. As a result, as long as the transmission profile is submitted, the energy profile will be adjusted to match the award. If the transmission profile is not submitted, the resource is deemed unavailable.

⁵⁰ New tariff section 11.31.1.1. Similarly, in the case of an exceptional dispatch or other manual dispatch instruction, the under/over delivery quantity will be the absolute value of the difference between (1) the exceptional dispatch or manual dispatch instruction quantity and (2) the final quantity of the energy profile on the intertie transaction's E-Tag. *Id.*

⁵¹ New tariff section 11.31.1.2. If, instead, that transmission profile equals or exceeds the HASP advisory schedule, then there will be no under/over delivery quantity (and therefore no under/over delivery charge) for that intertie transaction for that FMM interval. *Id.* Further, in the case of an exceptional dispatch or other manual dispatch instruction, the under/over delivery quantity will be calculated in the same way described in the footnote immediately above. *Id.*

⁵² See *supra* section III.A.1 of this transmittal letter.

For both hourly block schedules and fifteen-minute dispatchable resources, the under/over delivery quantity will be slightly different where the intertie schedule has been exceptionally dispatched or otherwise is subject to a manual dispatch. In these cases, the under/over delivery quantity will be determined based on the absolute value of the difference between the: (1) Exceptional Dispatch or manual Dispatch Instruction quantity; and (2) final quantity of the Energy profile on the Intertie transaction's E-Tag.⁵³ The rationale for this different treatment is that the exceptional dispatch overrides the prior market award and that treatment should be reflected in calculating the over/under delivery quantity.

The calculation of the under/over delivery quantity will exclude certain energy deliveries or non-deliveries in three circumstances. First, the calculation will exclude energy not delivered because a balancing authority or transmission service provider curtailed delivery for reliability reasons.⁵⁴ This exclusion will prevent a scheduling coordinator from being subject to an under/over delivery charge due to compliance with a reliability directive outside of its control.⁵⁵ Second, the calculation will exclude energy either delivered or not delivered as part of a valid existing transmission contract (ETC) self-schedule or transmission ownership right (TOR) self-schedule.⁵⁶ This exclusion recognizes that ETC and TOR self-schedules represent preexisting scheduling rights reserved for the scheduling coordinator.⁵⁷ Third, the calculation will exclude energy either delivered or not delivered from a dynamic system resource.⁵⁸ Dynamic resources are scheduled on a five-minute basis, rather than a fifteen-minute basis, so dynamic resources do not create the same sort of issues that other intertie deviations can create. This exclusion also maintains the exclusion from intertie schedule decline charges that the existing tariff provides for dynamically scheduled transfers.⁵⁹

⁵³ See new tariff section 11.31.1.1 and 11.31.1.2.

⁵⁴ New tariff section 11.31.1.3(a).

⁵⁵ In such cases, the scheduling coordinator must reflect the reliability-based curtailment on the transaction's final E-Tag. *Id.*

⁵⁶ New tariff section 11.31.1.3(b).

⁵⁷ See existing tariff sections 16-17.

⁵⁸ New tariff section 11.31.1.3(c). Pseudo-tie generating units also will be excluded from the charge because they are treated as internal generating units. Per the definition of "Pseudo-Tie" in Appendix A of the CAISO tariff, a pseudo-tie is "deemed to be produced in an Attaining Balancing Authority Area that provides Balancing Authority services" In the case of a pseudo-tie import, the CAISO is the attaining balancing authority area. For this reason, the tariff does not specifically exempt them even though the charge will not apply.

⁵⁹ See existing tariff section 11.31.

3. Under/Over Delivery Price

Except as described below, the under/over delivery price will equal the greater of: (a) 50 percent of the LMP in the corresponding FMM interval at the intertie where the resource was scheduled; (b) 50 percent of the highest LMP among the three five-minute RTD intervals corresponding to the FMM interval at the intertie where the resource was scheduled; or (c) \$10.00.⁶⁰ Values (a) and (c) are reflect the existing tariff provision, which states that, for each settlement interval during the month, the CAISO calculates the decline potential charge by multiplying the MWh of undelivered import or export energy by the greater of 50 percent of the LMP for the FMM or \$10/MWh.⁶¹ The CAISO proposes to add new value (b) to the equation to strengthen the incentive for scheduling coordinators to deliver their scheduled amounts. Intertie deviations generally affect the real-time market, which includes both the FMM and the RTD. The CAISO cannot predict exactly how an intertie deviation specifically might impact FMM or RTD prices. Basing the under/over delivery charge on the higher of the FMM or RTD price better ensures that the charge considers the effects on all markets disrupted by the conduct the charge is meant to dissuade.

The CAISO proposes to calculate an under/over delivery price higher than the one described above if the automated dispatch system recognizes a scheduling coordinator as having accepted an award at an intertie (because the scheduling coordinator actively accepts the award or because the scheduling coordinator fails to decline it) and the awarded energy is not delivered. In that circumstance, the under/over delivery price will equal the greater of the three values listed above except that the 50 percent values under (a) and (b) will instead be 75 percent values.⁶² A higher charge is warranted in these circumstances because, if a scheduling coordinator does not decline an awarded intertie schedule, and simply fails to deliver, the CAISO has no advance notification that the energy will not be delivered. On the other hand, if the CAISO receives advance notification of a non-delivery, the CAISO balancing authority area operator has adequate time to dispatch additional energy, outside of the market run, if necessary. This higher charge for accepted, but not delivered, awards will incent scheduling coordinators to timely give CAISO system operators the information they need to take actions to better ensure reliability, such as manually dispatching a resource to provide the energy not delivered by a scheduling coordinator under its scheduled intertie transaction.

⁶⁰ Revised tariff section 11.31.2.

⁶¹ See existing tariff section 11.31(d). Maintaining the existing \$10.00 minimum charge will also ensure that scheduling coordinators are subject to an under/over delivery charge even when pricing in the market is low or negative.

⁶² Revised tariff section 11.31.1.

4. Eliminate the 10 Percent and 300 MWh Thresholds in Applying the Under/Over Delivery Charge

The CAISO proposes to eliminate the tariff provisions stating that the decline monthly charges only apply if the scheduling coordinator's undelivered amount of imports or exports for the month equals or exceeds both (i) 10 percent of the total scheduling coordinator's monthly imports or exports and (ii) 300 MWh.⁶³ Neither threshold will apply to the under/over delivery charge.

As the Commission recognized in the 2008 Order, the CAISO established the thresholds solely because it was unable to determine whether an intertie transaction was not delivered because: (1) an operator for another balancing authority area had curtailed transmission or taken some other similar action outside of the scheduling coordinator's control; or (2) the scheduling coordinator had chosen not to deliver the full energy.⁶⁴ Today, however, the CAISO receives curtailment information from other balancing authority areas and thus can distinguish between these two possibilities. Thus, the thresholds no longer need to be included in the tariff.⁶⁵

Eliminating the thresholds also follows the direction in the 2008 Order that the Commission "expect[s] CAISO will continue to monitor the level of pre-dispatched bid declines. If the situation does not improve, we will remain open to further remedies."⁶⁶ As discussed above, the problem still abounds. The CAISO has determined that eliminating these thresholds and making the other revisions in this tariff amendment is an appropriate and necessary remedy to address the continuing problem of pre-dispatched bid declines. The data provided above supports this conclusion and shows that the current charge structure, with the thresholds, does not sufficiently deter intertie non-deliveries.

⁶³ Existing tariff sections 11.31.1 – 11.31.2; tariff appendix A, existing definitions of "Decline Monthly Charge – Imports," "Decline Monthly Charge – Exports," "Decline Threshold Percentage – Imports/Exports," and "Decline Threshold Quantity – Imports/Exports."

⁶⁴ See 2008 Order at P 27 ("CAISO's proposed 10 percent threshold will appropriately accommodate bid declines that are beyond the scheduling coordinator's control, such as curtailments by reliability authorities, derates of transmission lines or generation outages"); *id.* at P 29 ("We will also not require CAISO to evaluate declines to determine whether they are justified as beyond the scheduling coordinator's control. CAISO indicates that it does not have sufficient visibility to tally the entire universe of circumstances which are beyond a market participant's control . . . We agree and find that such a requirement would be unreasonable").

⁶⁵ As discussed above, the CAISO will exclude from the under/over delivery quantity any energy that is not delivered because a balancing authority or EIM transmission service provider curtailed the delivery for reliability reasons, so long as the reliability-based curtailment is reflected on the transaction's final E-Tag. New tariff section 11.31.1.3(a).

⁶⁶ 2008 Order at P 30.

5. Allocate the Under/Over Delivery Charge

The CAISO proposes to allocate the under/over delivery charge similar to how it allocates the decline monthly charge under the existing tariff, except that the CAISO will now allocate the charge daily rather than monthly. The CAISO will distribute the total charges collected for a day pro rata based on a scheduling coordinator's measured CAISO demand during that interval as a percent of total measured CAISO demand in that interval, excluding demand served by ETCs and TORs.⁶⁷ Again, this exclusion recognizes that ETC and TOR self-schedules represent preexisting scheduling rights reserved for the scheduling coordinator.

C. Clarify the Tariff Provisions that Address Intertie Scheduling Practices

The existing HASP settlement reversal rule in the tariff states that the CAISO will charge a scheduling coordinator the positive difference between the day-ahead market price and the FMM LMP applicable to any imports that clear the day-ahead market and are reduced through a bid to the real-time market, if the scheduling coordinator withdraws an E-Tag prior to 45 minutes before the trading hour.⁶⁸ However, the CAISO has identified a discrepancy between this tariff provision and the language in the BPM configuration guide, which states that the CAISO will charge the amount for such imports if the day-ahead schedule is reduced before publication of the HASP results (as opposed to 45 minutes before the trading hour).⁶⁹

To address the discrepancy, the CAISO proposes to revise the tariff provision to conform it to the language in the BPM configuration guide.⁷⁰ The purpose of the HASP settlement reversal rule is to address implicit virtual bidding.⁷¹ As long as day-ahead schedules are supported by an E-Tag until the CAISO publishes the results of the HASP, the resource can be used in the HASP market optimization without being deemed to be an implicit virtual bidder. The CAISO's proposed tariff revision has this result.

⁶⁷ Revised tariff section 11.31.3.

⁶⁸ Existing tariff section 11.32(i).

⁶⁹ BPM configuration guide 6460, version 5.8, at 5-6. This document is available at <https://bpmcm.caiso.com/Pages/SnBBPMDetails.aspx?BPM=Settlements%20and%20Billing>.

⁷⁰ Revised tariff section 11.32(i).

⁷¹ See *Cal. Indep. Sys. Operator Corp.*, 146 FERC ¶ 61,204, at P 56.

IV. Responses to Stakeholder Comments

Most stakeholders supported the proposals reflected in this tariff amendment. They believe the proposed non-delivery charge is justified and will incent delivery of scheduled intertie energy, which will increase grid reliability. Additional benefits identified by stakeholders include more accurate market inputs to the CAISO real-time market and reduced speculative bidding, *i.e.*, bidding without a firm source (or export sink) lined up, or selling bid-in energy elsewhere after an intertie transaction bid is submitted to the CAISO. However, some stakeholders objected to aspects of the proposed changes. The CAISO addresses those objections below.

A. Comments on the Enhancements to the Treatment of Intertie Schedules and the E-Tag Rules

One stakeholder argued that the tariff revisions to allow the CAISO to base FMM schedules on preliminary E-Tags with transmission profiles submitted before the FMM runs will cause more work for scheduling coordinators by requiring submission of the E-Tag transmission profiles by T-40. In response, the CAISO explained that the objective of the tariff revisions is to ensure more accurate market inputs. At an early point in the stakeholder process, the CAISO had proposed a more stringent timeline for scheduling coordinators that would have required submission of both the E-Tag transmission profile and the E-Tag energy profile by T-40. However, based on stakeholder feedback, the CAISO amended that more stringent proposal to what it now proposes in this tariff amendment. The CAISO's proposal provides scheduling coordinators with the flexibility to adjust the energy profile portion of their E-Tags until T-20. The CAISO agreed that it is important to improve market inputs, while also providing flexibility to scheduling coordinators. The proposal reflected in this tariff amendment meets both of those objectives.

The same stakeholder also asserted that the CAISO should continue to seek continuity between the CAISO market timelines and the timelines established by NAESB. The CAISO responded by explaining that the FMM primarily exists to provide flexibility closer to real-time and to integrate renewable resources into the CAISO balancing authority area.⁷² The CAISO acknowledges that the Western Interconnection continues to schedule bilateral transactions primarily on an hourly basis. The CAISO has sought to minimize adverse impacts on the bilateral market in developing this tariff amendment. However, the CAISO must balance that consideration with the need for reliability and a highly efficient real-time market that can meet the purposes of the FMM described above. Aligning the policy reflected in the tariff amendment with the hourly bilateral market would be a step away from achieving those objectives.

⁷² See *Cal. Indep. Sys. Operator Corp.*, 146 FERC ¶ 61,204, at PP 8, 53.

B. Comments on Calculating the Under/Over Delivery Charge for Each FMM Interval

One stakeholder argued that it is unduly discriminatory to impose a fifteen-minute evaluation interval in calculating the under/over delivery charge for hourly block resources. In response, the CAISO explained that hourly block resources have been subject to fifteen-minute settlement since implementation of the Order No. 764 tariff enhancements the Commission accepted in 2014.⁷³ Order No. 764 requires balancing authority areas to offer fifteen-minute scheduling to facilitate the integration of renewable resources.⁷⁴ This tariff amendment maintains compliance with Order No. 764 and ensures that settlement of the under/over delivery charge aligns with the interval in which the deviation from the scheduled intertie transaction occurred.

Another stakeholder argued that the CAISO has not correlated intertie declines with emergency grid situations. The CAISO disagrees. During the stakeholder process, and as discussed above, the CAISO explained that intertie declines can cause emergency grid situations. For example, as discussed above, an emergency event occurred in the CAISO on May 3, 2017 and during a heat wave on September 1-2, 2017. Undelivered imports affected grid stability on these days. This stakeholder also ignores the problems under-deliveries can cause during non-emergency periods, such as raising real-time prices and increasing the need for manual market interventions.

This stakeholder also argued that implementing the under/over delivery charge will reduce market participants' incentives to submit real-time intertie bids. The CAISO has designed the under/over delivery charge so it is stringent enough to encourage delivery of scheduled energy, without being too onerous. The existing mechanism has been ineffective, and a more robust mechanism is needed. Scheduling coordinators still can sell energy economically to the CAISO and will not be negatively affected when the energy is delivered as scheduled. Nevertheless, the CAISO will monitor the impact and effectiveness of the new under/over delivery charge and will consider appropriate incremental enhancements if necessary.

C. Other Comments on the Under/Over Delivery Charge

One stakeholder argued that imports are "surplus energy" and are not needed for reliability because the CAISO has resource adequacy (RA) requirements. The stakeholder claimed that intertie resources should not be

⁷³ See generally *id.*

⁷⁴ See *id.* at P 6.

charged for deviations from their schedules. The CAISO responded that intertie transactions economically clearing the CAISO market are needed for reliability. RA requirements merely require RA resources to submit bids,⁷⁵ but such bids do not necessarily clear the market. In the market optimization, an intertie bid from non-RA capacity may be more economic than bids from RA capacity. If that non-RA resource fails to deliver then it is too late to utilize an RA import.

Another stakeholder contended that the under/over delivery charge should not apply if the scheduling coordinator notifies the CAISO of undeliverable intertie energy before the FMM. The CAISO explained that the under/over delivery charge must apply in that circumstance because, although advance notification of the non-delivery is useful to the CAISO grid operator, it is still impossible for the HASP to schedule another hourly block resource to compensate for the non-delivery. Therefore, it is important for scheduling coordinators to deliver hourly block resources as scheduled through the HASP. This tariff amendment provides an enhanced economic incentive to meet that objective.

A third stakeholder argued that intertie transactions should be treated the same as internal generation, which is only subject to imbalance energy settlement at the five-minute RTD for deviations from fifteen-minute schedules. The two are not similarly situated. In the stakeholder process, the CAISO responded that maintaining comparable pricing signals for internal and external supply is important but noted there are fundamental differences in how these supply resources are scheduled and dispatched in the CAISO market. Internal supply resources are generator-specific, are subject to bid verification, are dispatched every five-minute interval, and are always subject to imbalance energy charges.⁷⁶ On the other hand, the majority of intertie resources are non-resource-specific, are not subject to bid verification, and are scheduled for hourly blocks approximately 60 minutes ahead of time. When an hourly block schedule is scheduled, transmission capacity is reserved for that specific transfer. If the transfer is subsequently not completed, it is impossible to schedule another in-kind replacement resource, and the transmission capacity goes unused. That differentiates imports from internal generation and yields inefficient market results. For these reasons, it is appropriate to use the under/over delivery charge as an economic incentive for the delivery of intertie energy, and to base that charge on the greater of the LMP in the corresponding FMM interval and the highest LMP among the three five-minute RTD intervals corresponding to the FMM interval.

⁷⁵ See *generally* existing tariff section 40 *et seq.*

⁷⁶ See existing tariff section 11.5 *et seq.*

D. Comments on the Need for Data Analysis and Process Improvements

The MSC supports the framework of the intertie deviation settlement proposal but wishes the CAISO would also address market inputs that affect real-time market intertie prices at the same time it implements the proposed tariff revisions. The MSC notes that in stressed system conditions and high amounts of undelivered imports, the real-time market had high HASP prices with much lower FMM and five-minute RTD prices. The MSC states this may incentivize scheduling coordinators not to deliver imports because the prices used for financial settlement could be lower than the submitted import bid. According to the MSC, these pricing anomalies may be caused by CAISO grid operator load forecast adjustments and intertie exceptional dispatches in anticipation of undelivered imports. The MSC supports further analysis of this relationship and implementing additional measures to permit the FMM and RTD prices better reflect stressed system conditions.

Although the MSC's request pertained to additional enhancements that are beyond the scope of the proposed tariff revisions, the CAISO undertook data analysis to better understand the impacts of load conformance adjustments and exceptional dispatches on both real-time pricing and intertie declines. The CAISO published this data analysis for stakeholder review in 2019.⁷⁷ Part of the report explored how intertie deviations negatively impact price formation across CAISO markets. The results of the data analysis will lead to process improvements that can be implemented in Fall 2021 with the planned implementation of the Day-Ahead Market Enhancements initiative.⁷⁸ In any event, the proposed tariff revisions are just and reasonable, and necessary to address ongoing problems and challenges, without the additional enhancements that cannot be implemented for more than a year. Implementing tariff revisions will better assure delivery of intertie resources, which will reduce or eliminate the need for out-of-market processes that may be negatively affecting real-time pricing.

V. Effective Date, Request for Waiver, and Request for Timely Commission Order

The CAISO expects to implement the changes proposed in this tariff amendment effective October 1, 2020 as part of its planned software release for the Fall of 2020. Therefore, the CAISO respectfully requests that the

⁷⁷ The analysis is available on the CAISO website at:
<http://www.caiso.com/Pages/documentsbygroup.aspx?GroupID=C83A8C49-5DFF-48B2-97A8-5C851AC3FDD0>.

⁷⁸ Information about the Day-Ahead Market Enhancements initiative is available at
<http://www.caiso.com/StakeholderProcesses/Day-ahead-market-enhancements>.

Commission grant a waiver of its notice requirement to permit this effective date, which is over 120 days after the CAISO is submitting this tariff amendment.⁷⁹ Consistent with this timing, the CAISO also respectfully requests that the Commission issue an order by September 17, 2020, accepting the tariff revisions in this filing effective October 1, 2020.

Good cause exists for the Commission to grant these requests. Commission issuance of an order by September 17 will give the CAISO and market participants regulatory certainty and the necessary time to implement the tariff revisions on October 1. Therefore, granting the CAISO's requests is appropriate.

VI. Communications

Under Rule 203(b)(3) of the Commission's Rules of Practice and Procedure,⁸⁰ the CAISO requests that all correspondence, pleadings, and other communications about this filing be served upon:

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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 the filing on the CAISO website.

⁷⁹ Specifically, pursuant to section 35.11 of the Commission's regulations, 18 C.F.R. § 35.11, the CAISO requests waiver of the 120-day notice requirement contained in section 35.3(a)(1) of the regulations, 18 C.F.R. § 35.3(a)(1).

⁸⁰ 18 C.F.R. § 385.203(b)(3).

VIII. Contents of Filing

Besides this transmittal letter, this filing includes these attachments:

- Attachment A Clean CAISO tariff sheets incorporating this tariff amendment
- Attachment B Red-lined document showing the revisions in this tariff amendment
- Attachment C Draft Final Proposal
- Attachment D Board Memorandum

IX. Conclusion

The CAISO respectfully requests that the Commission issue an order by September 17, 2020 that accepts the tariff changes proposed in this filing for implementation by October 1, 2020.

Respectfully submitted,

/s/ David Zlotlow

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Attachment A – Clean Tariff

Intertie Deviation Settlement

California Independent System Operator Corporation

May 22, 2020

11.31 Under/Over Delivery Charge for Deviations from Intertie Awards

For each FMM interval, the CAISO assesses an Under/Over Delivery Charge to a Scheduling Coordinator with an Intertie transaction if the Intertie resource supporting that transaction has a positive Under/Over Delivery Quantity. The Under/Over Delivery Charge is the product of the Intertie resource's Under/Over Delivery Quantity in that FMM interval and the Under/Over Delivery Price for the resource's corresponding intertie in that FMM interval.

11.31.1 Determining the Under/Over Delivery Quantity

11.31.1.1 Under/Over Delivery Quantity for Hourly Block Schedules

For Self-Schedule Hourly Blocks for Energy and Ancillary Services and Economic Hourly Block Bids for Energy and Ancillary Services, and Economic Hourly Block Bids with Intra-Hour Option for Energy, the Under/Over Delivery Quantity is the absolute value of the difference between the: (1) HASP Block Intertie Schedule or HASP Advisory Schedule, as appropriate; and (2) final quantity of the Energy profile on the Intertie transaction's E-Tag. In the case of an Exceptional Dispatch or other manual Dispatch Instruction, the Under/Over Delivery Quantity is the absolute value of the difference between the: (1) Exceptional Dispatch or manual Dispatch Instruction quantity; and (2) final quantity of the Energy profile on the Intertie transaction's E-Tag.

11.31.1.2 Under/Over Delivery Quantity for Fifteen-Minute Dispatchable Resources

For Intertie transactions not addressed in Section 11.31.1.1, the Under/Over Delivery Quantity is the amount by which the HASP Advisory Schedule exceeds the quantity of the transmission profile of the E-Tag as of forty minutes prior to the Operating Hour. If the transmission profile of the E-Tag as of forty minutes prior to the Operating Hour is greater than or equal to the HASP Advisory Schedule, then there is no Under/Over Delivery Quantity for that Intertie transaction for that FMM interval.

In the case of an Exceptional Dispatch or other manual Dispatch Instruction, the Under/Over Delivery Quantity is the absolute value of the difference between the: (1) Exceptional Dispatch or manual Dispatch Instruction quantity; and (2) final quantity of the Energy profile on the Intertie transaction's E-Tag.

11.31.1.3 Exclusions from the Under/Over Delivery Quantity

The CAISO excludes from the Under/Over Delivery Quantity as calculated under either 11.31.1.1 or 11.31.1.2 any Energy that meets at least one of the following conditions:

- (a) Energy that is not delivered because a Balancing Authority or EIM Transmission Service Provider curtailed the delivery for reliability reasons. The reliability-based curtailment must be reflected on the transaction's final E-Tag.
- (b) Energy that is either delivered or not delivered as part of a valid ETC Self-Schedule or TOR Self-Schedule.
- (c) Energy that is either delivered or not delivered from a Dynamic System Resource.

11.31.2 Determining the Under/Over Delivery Price

If ADS recognizes a Scheduling Coordinator as accepting an award at an Intertie (either because the Scheduling Coordinator actively accepts the award or because the Scheduling Coordinator fails to decline it) and the awarded Energy is not delivered, then the Under/Over Delivery Price is the greater of: (a) 75% of the LMP in the corresponding FMM interval at the intertie where the resource was scheduled; (b) 75% of the highest LMP among the three RTD intervals corresponding to the FMM interval at the intertie where the resource was scheduled; or (c) \$10.00.

In all other cases, the Under/Over Delivery Price is the greater of: (a) 50% of the LMP in the corresponding FMM interval at the Intertie where the resource was scheduled; (b) 50% of the highest LMP among the three RTD intervals corresponding to the FMM interval at the Intertie where the resource was scheduled; or (c) \$10.00.

11.31.3 Allocation of Under/Over Delivery Charges

For any Trading Day on which the CAISO assesses an Under/Over Delivery Charge, each Scheduling Coordinator receives a credit on its Settlement Statement for its share of the total Under/Over Delivery Charges collected for that day. The CAISO distributes the total charges collected pro rata based on a Scheduling Coordinator's Measured CAISO Demand on that day as a percent of total Measured CAISO Demand for the CAISO Balancing Authority Area on that day. Both the numerator and denominator of the pro rata calculation exclude demand served by ETCs and TORs.

11.32 Measures to Address Intertie Scheduling Practices

The CAISO will take the following actions regarding Schedules that clear the Day-Ahead Market at the Interties and that are wholly or partially reversed through a FMM Schedule:

- (i) The CAISO will charge the Scheduling Coordinator the positive difference between the

Day-Ahead Market price and the FMM LMP applicable to any imports that clear the Day-Ahead Market and are reduced through a Bid to the RTM if the Scheduling Coordinator either: (a) fails to submit an E-Tag or E-Tags consistent with the Scheduling Coordinator's Day-Ahead Schedule and WECC scheduling criteria; or (b) withdraws the E-Tag or E-Tags prior to the CAISO's publication of HASP results on the CAISO's secure communication system.

- (ii) The CAISO will charge the Scheduling Coordinator the positive difference between the FMM LMP and the Day-Ahead Market LMP applicable to any exports that clear the Day-Ahead Market and are reduced through a Bid to the RTM if the Scheduling Coordinator either: (a) fails to submit an E-Tag or E-Tags consistent with the Scheduling Coordinator's Day-Ahead Schedule and WECC scheduling criteria; or (b) withdraws the E-Tag or E-Tags prior to forty-five (45) minutes before the Trading Hour.
- (iii) If a Scheduling Coordinator reduces a Day-Ahead import or export Schedule through a Bid to the RTM and submits Schedules on behalf of, or is, a CRR Holder, then the reduction to the import or export may be treated as a Virtual Award for purposes of adjusting CRR Revenue as further set forth in Section 11.2.4.6.
- (iv) For any import Schedule that clears the Day-Ahead Market which a Scheduling Coordinator reduces through a Bid to the RTM, such reduced quantities will be subject to the allocation of Net RTM Bid Cost Uplift as set forth in Section 11.8.6.6.
- (v) The provisions of this Section 11.32 will not apply to Schedules that clear the Day-Ahead Market at the Scheduling Points and that a Scheduling Coordinator wholly or partially reverses through a Bid to the RTM to the extent such Schedules are valid and balanced ETC, TOR, or Converted Rights Self-Schedules in the Day-Ahead Market.

* * *

30.5.1 General Bidding Rules

* * *

- (r) A Scheduling Coordinator may submit a Variable Energy Resource Self-Schedule for the RTM can be submitted from a Variable Energy Resource. A Scheduling Coordinator can use either the CAISO forecast for Expected Energy in the RTM or can provide its own forecast for Expected Energy pursuant to the requirements specified in Section 4.8.2. The Scheduling Coordinator must indicate in the Master File whether it is using its own forecast or the CAISO forecast for its resource in support of the Variable Energy Self-Schedule. The Scheduling Coordinator is not required to include the same MWh quantity for each of the four fifteen (15)-minute intervals that make up the applicable Trading Hour for the Variable Energy Resource Self-Schedule include. If an external Variable Energy Resource that is not using a forecast of its output provided by the CAISO submits a Variable Energy Resource Self-Schedule and the Expected Energy is not delivered in the FMM, the Scheduling Coordinator for the Variable Energy Resource will be subject to the Under/Over Delivery Charge as described in Section 11.31. Scheduling Coordinators for Dynamically Scheduled Variable Energy Resources that provide the CAISO with a two-hour rolling forecast with five-minute granularity can submit Variable Energy Resource Self-Schedules.

* * *

30.5.7 E-Tag Rules and Treatment of Intertie Schedules

In addition to complying with all generally applicable E-Tagging requirements, Scheduling Coordinators must submit their E-Tags consistent with the requirements specified in this Section 30.5.7. If a Scheduling Coordinator receives an intra-hour Schedule change, then the Scheduling Coordinator must, by twenty minutes before the start of the FMM interval to which the Schedule change applies, ensure that an updated energy profile reflects the change. Absent extenuating circumstances, the CAISO

automatically updates Energy profiles on E-Tags for Energy Schedules that change from HASP to the FMM within a Trading Hour. In performing this service for a Scheduling Coordinator, the CAISO does not assume any responsibility for compliance with any E-Tag requirements or obligations to which the Scheduling Coordinator is subject. The changed energy profile will apply for the balance of the operating hour unless it is subsequently changed by a further updated energy profile.

30.5.7.1 Self-Schedule Hourly Blocks

By forty minutes prior to the applicable Trading Hour, the Scheduling Coordinator must submit an E-Tag (or set of E-Tags) that passes CAISO E-Tag validation procedures and that supports the Self-Schedule Hourly Block.

The transmission profile of the E-Tag at forty minutes prior to the applicable Trading Hour must be equal to the Self-Schedule Hourly Block. If the Scheduling Coordinator has a transmission profile less than its advisory Energy schedule, then the CAISO will limit the schedule for Energy in the FMM so that it does not exceed the quantity of the transmission profile.

The Scheduling Coordinator may revise the Energy profile up to twenty minutes prior to the applicable Trading Hour but the quantity of the Energy profile must be equal to the quantity of the Self-Schedule Hourly Block by twenty minutes prior to the applicable Trading Hour. The CAISO may modify the Energy profile due to Reliability related curtailments.

If the Scheduling Coordinator fails to submit a valid E-Tag consistent with these deadlines, then the CAISO will set the MW quantity of the FMM Schedule associated with the Self-Schedule Hourly Block to zero for each FMM interval of the hour.

30.5.7.2 Variable Energy Resource Self-Schedule

By forty minutes prior to the applicable Trading Hour, the Scheduling Coordinator must submit an E-Tag (or set of E-Tags) that passes CAISO E-Tag validation procedures and that supports the Variable Energy Resource Self-Schedule.

The transmission profile of the E-Tag at forty minutes prior to the applicable Trading Hour must be equal to the Variable Energy Resource Self-Schedule. If the Scheduling Coordinator has a transmission profile less than its advisory Energy schedule, then the CAISO will limit the schedule for Energy in the FMM so that it does not exceed the quantity of the transmission profile.

The Scheduling Coordinator may revise the Energy profile up to twenty minutes prior to the applicable Trading Hour but the quantity of the Energy profile must be equal to the quantity of the Variable Energy Resource Self-Schedule by twenty minutes prior to the applicable Trading Hour. The CAISO may modify the Energy profile due to Reliability related curtailments.

If the Scheduling Coordinator fails to submit a valid E-Tag consistent with these deadlines, then the CAISO will set the MW quantity of the FMM Schedule associated with the Variable Energy Resource Self-Schedule to zero for each FMM interval of the hour.

30.5.7.3 Economic Hourly Bid

By forty minutes prior to the applicable Trading Hour, the Scheduling Coordinator must submit an E-Tag (or set of E-Tags) that passes CAISO E-Tag validation procedures and that supports the Economic Hourly Block Bid.

The transmission profile of the E-Tag at forty minutes prior to the applicable Trading Hour must be equal to the Economic Hourly Block Bid. If the Scheduling Coordinator has a transmission profile less than its advisory Energy schedule, then the CAISO will limit the schedule for Energy in the FMM so that it does not exceed the quantity of the transmission profile.

The Scheduling Coordinator may revise the Energy profile up to twenty minutes prior to the applicable Trading Hour but the quantity of the Energy profile must be equal to the quantity of the Economic Hourly Block Bid by twenty minutes prior to the applicable Trading Hour. The CAISO may modify the Energy profile due to Reliability related curtailments.

If the Scheduling Coordinator fails to submit a valid E-Tag consistent with these deadlines, then the CAISO will set the MW quantity of the FMM Schedule associated with the Economic Hourly Block Bid to zero for each FMM interval of the hour.

30.5.7.4 Economic Hourly Block Bid with Intra-Hour Option

By forty minutes prior to the applicable Trading Hour, the Scheduling Coordinator must submit an E-Tag (or set of E-Tags) that passes CAISO E-Tag validation procedures and that supports the Economic Hourly Block Bid with Intra-Hour Option. The transmission profile of the E-Tag at forty minutes prior to the applicable Trading Hour must be equal to the Economic Hourly Block Bid with Intra-Hour Option. If the Scheduling Coordinator has a transmission profile less than its advisory Energy schedule, then the

CAISO will limit the schedule for Energy in the FMM so that it does not exceed the quantity of the transmission profile.

The Scheduling Coordinator may revise the Energy profile up to twenty minutes prior to the applicable Trading Hour but the quantity of the Energy profile must be equal to the quantity of the Economic Hourly Block Bid with Intra-Hour Option by twenty minutes prior to the applicable Trading Hour. The CAISO may modify the Energy profile due to Reliability related curtailments.

If the Scheduling Coordinator fails to submit a valid E-Tag consistent with these deadlines, then the CAISO will set the MW quantity of the FMM Schedule associated with the Economic Hourly Block Bid with Intra-Hour Option to zero for each FMM interval of the hour.

In the case of an intra-hour redispatch from the FMM, the CAISO may increment or decrement the Energy profile to correspond to the intra-hour redispatch. The MW level to which the FMM can redispatch an Economic Hourly Block Bid with Intra-Hour Option above its HASP Advisory Schedule is limited by the quantity of the transmission profile submitted by forty minutes prior to the applicable Trading Hour.

30.5.7.5 FMM Economic Bid

By forty minutes prior to the applicable Trading Hour, the Scheduling Coordinator must submit an E-Tag (or set of E-Tags) that passes CAISO E-Tag validation procedures and that supports the FMM Economic Bid.

The transmission profile of the E-Tag at forty minutes prior to the applicable Trading Hour must be greater than or equal to the FMM Economic Bid. If the Scheduling Coordinator has a transmission profile less than its advisory Energy schedule, then the CAISO will limit the schedule for Energy in the FMM so that it does not exceed the quantity of the transmission profile.

The Scheduling Coordinator may revise the Energy profile up to twenty minutes prior to the applicable Trading Hour but the quantity of the Energy profile must be equal to the quantity of the FMM energy schedule by twenty minutes prior to the applicable Trading Hour. The CAISO may modify the Energy profile due to Reliability related curtailments.

If the Scheduling Coordinator fails to submit a valid E-Tag consistent with these deadlines, then the CAISO will set the MW quantity of the FMM Schedule associated with the FMM Economic Bid to zero for each FMM interval of the hour.

Scheduling Coordinators with cleared FMM Economic Bids may update either the transmission profile or the Energy profile after the relevant deadlines. A Scheduling Coordinator choosing to update the transmission profile must submit an updated transmission profile at least 40 minutes prior to the applicable FMM interval. A Scheduling Coordinator choosing to update the Energy profile must submit an updated Energy profile at least 20 minutes prior to the applicable FMM interval.

Cleared FMM Economic Bids are eligible for Bid Cost Recovery as specified in Section 11.8.

* * *

Appendix A

Master Definition Supplement

* * *

- Under/Over Delivery Charge

For a given Intertie transaction that has an Under/Over Delivery Quantity for a FMM interval, a charge equal to the product of the Under/Over Delivery Price and Under/Over Delivery Quantity.

- Under/Over Delivery Price

The price, as further specified in Section 11.31.2, a Scheduling Coordinator is charged for deviations between Energy awarded at an Intertie and Energy delivered at that Intertie.

- Under/Over Delivery Quantity

The quantity of Energy at an Intertie, as further specified in Section 11.31.1, the CAISO deems either under- or over-delivered relative to awarded Energy for purposes of charging a fee for such under- or over-deliveries.

Attachment B – Redline Tariff

Intertie Deviation Settlement

California Independent System Operator Corporation

May 22, 2020

11.31 Under/Over Delivery Charge for Deviations from Intertie Awards~~Intertie Schedules Decline Charges~~

~~For each FMM interval, the CAISO assesses an Under/Over Delivery Charge to a Scheduling Coordinator with an Intertie transaction if the Intertie resource supporting that transaction has a positive Under/Over Delivery Quantity. The Under/Over Delivery Charge is the product of the Intertie resource's Under/Over Delivery Quantity in that FMM interval and the Under/Over Delivery Price for the resource's corresponding intertie in that FMM interval.~~

~~The Decline Potential Charge shall apply to Intertie transactions as discussed below. The Decline Potential Charge does not apply to FMM Schedules of Economic Bids, dynamic transfers, and Variable Energy Resources located outside the CAISO Balancing Authority Area that have been qualified to use the forecast of their output produced by the CAISO as specified in Section 4.8.2.1.2.~~

- ~~(a) HASP Block Intertie Schedules: Any HASP Block Intertie Schedule for an Energy import when the HASP Block Intertie Schedule is not delivered for any reason (with no exceptions based on the circumstances of a particular failure to deliver), to the extent the decline is made prior to the start of the applicable FMM interval. The Decline Potential Charge—Exports shall apply to any HASP Block Intertie Schedule for an Energy export when the HASP Block Intertie Schedule is not delivered for any reason (with no exceptions based on the circumstances of a particular failure to deliver), to the extent the decline is made prior to the start of the applicable FMM interval. The Decline Potential Charge will not apply if the decline is made after the applicable E-tag deadline, as defined in Section 30.6.2.~~
- ~~(b) Economic Hourly Block Bid with Intra-Hour Option: Imports and exports accepted in an HASP Block Intertie Schedule that are incremental to Day-Ahead Schedules are subject to the Decline Potential Charge to the extent the decline is made prior to the start of the applicable FMM interval. The Decline Potential Charge will not apply if the decline is made after the applicable E-tag deadline, as defined in Section 30.6.2. To the extent the incremental import or export schedule in HASP is curtailed through the FMM, for the 15-minute FMM interval in which the resource follows the CAISO Dispatch Instructions will~~

~~not be subject to the Decline Potential Charge.~~

- ~~(c) Variable Energy Resources outside CAISO Balancing Authority Area Using Own Forecast: Imports from Variable Energy Resources using their own forecast are subject to the Decline Potential Charge to the extent the resource over forecasts over the month as discussed below. For each Trading Hour, the CAISO compares the maximum 15-minute FMM Schedule (that is based on the forecast submitted 37.5 minutes prior to flow) to the maximum 15-minute advisory schedule from the Hour Ahead Scheduling Process (based upon the hourly forecast received 75 minutes prior to flow) and calculates the differences between the two. These hourly differences are summed over the month. If the maximum advisory schedule exceeds the actual financially binding schedule by the relevant threshold over the course of the month, the Decline Potential Charge applies.~~
- ~~(d) Decline Potential Charge: For any Settlement Interval, the Decline Potential Charge—Imports or Decline Potential Charge—Exports, as the case may be, shall equal the MWh quantity of the import or export not delivered multiplied by the greater of \$10/MWh or fifty percent (50%) of the FMM LMP. The Decline Potential Charge—Imports and Decline Potential Charge—Exports will be calculated for each HASP Block Intertie Schedule or VER Self-Schedule that is not delivered, provided that only the Decline Monthly Charge—Imports and Decline Monthly Charge—Exports shall be payable by the Scheduling Coordinator as described in Section 11.31.1.~~

~~11.31.1_ Determining the Under/Over Delivery Quantity~~

~~Decline Monthly Charge—Imports~~

~~11.31.1.1 Under/Over Delivery Quantity for Hourly Block Schedules~~

~~For Self-Schedule Hourly Blocks for Energy and Ancillary Services and Economic Hourly Block Bids for Energy and Ancillary Services, and Economic Hourly Block Bids with Intra-Hour Option for Energy, the Under/Over Delivery Quantity is the absolute value of the difference between the: (1) HASP Block Intertie Schedule or HASP Advisory Schedule, as appropriate; and (2) final quantity of the Energy profile on the Intertie transaction's E-Tag. In the case of an Exceptional Dispatch or other manual Dispatch Instruction, the Under/Over Delivery Quantity is the absolute value of the difference between the: (1) Exceptional~~

Dispatch or manual Dispatch Instruction quantity; and (2) final quantity of the Energy profile on the Intertie transaction's E-Tag.

11.31.1.2 Under/Over Delivery Quantity for Fifteen-Minute Dispatchable Resources

For Intertie transactions not addressed in Section 11.31.1.1, the Under/Over Delivery Quantity is the amount by which the HASP Advisory Schedule exceeds the quantity of the transmission profile of the E-Tag as of forty minutes prior to the Operating Hour. If the transmission profile of the E-Tag as of forty minutes prior to the Operating Hour is greater than or equal to the HASP Advisory Schedule, then there is no Under/Over Delivery Quantity for that Intertie transaction for that FMM interval.

In the case of an Exceptional Dispatch or other manual Dispatch Instruction, the Under/Over Delivery Quantity is the absolute value of the difference between the: (1) Exceptional Dispatch or manual Dispatch Instruction quantity; and (2) final quantity of the Energy profile on the Intertie transaction's E-Tag.

11.31.1.3 Exclusions from the Under/Over Delivery Quantity

The CAISO excludes from the Under/Over Delivery Quantity as calculated under either 11.31.1.1 or 11.31.1.2 any Energy that meets at least one of the following conditions:

- (a) Energy that is not delivered because a Balancing Authority or EIM Transmission Service Provider curtailed the delivery for reliability reasons. The reliability-based curtailment must be reflected on the transaction's final E-Tag.
- (b) Energy that is either delivered or not delivered as part of a valid ETC Self-Schedule or TOR Self-Schedule.
- (c) Energy that is either delivered or not delivered from a Dynamic System Resource.

~~The Decline Monthly Charge — Imports shall be applied to each Scheduling Coordinator on the Settlement Statements issued for the last Trading Day of each Trading Month, and shall be the sum of the Scheduling Coordinator's Decline Potential Charges — Imports for each Settlement Period during that Trading Month multiplied by a ratio. The ratio will represent the portion of the Scheduling Coordinator's declined HASP Block Intertie Schedules for Energy imports or the VER Self-Schedules that exceed during the Trading Month the applicable exemption threshold described in Section 11.31.1 and Section 11.31.2.~~

- ~~(a) — The ratio will be calculated as follows:~~

~~(i) the Scheduling Coordinator's total MWh quantity of HASP Block Intertie Schedules for Energy imports that were not delivered during that Trading Month minus the applicable exemption threshold, divided by~~

~~(ii) the Scheduling Coordinator's total MWh quantity of HASP Block Intertie Schedules for Energy imports that were not delivered during the Trading Month.~~

~~(b) The applicable exemption threshold is the greater of the following:~~

~~(i) the Decline Threshold Quantity — Imports/Exports; or~~

~~(ii) the total MWh quantity of HASP Block Intertie Schedules for Energy imports during the Trading Month multiplied by the Scheduling Coordinator's Decline Threshold Percentage — Imports/Exports.~~

~~Notwithstanding the foregoing, the Decline Monthly Charge — Imports shall equal zero if either:~~

~~a) The percentage of the MWh quantity of HASP Block Intertie Schedules for Energy imports that the Scheduling Coordinator did not deliver during the Trading Month is less than the Decline Threshold Percentage — Imports/Exports; or~~

~~b) The total MWh quantity of HASP Block Intertie Schedules for Energy imports that the Scheduling Coordinator did not deliver in the applicable Trading Month is less than the Decline Threshold Quantity — Imports/Exports.~~

11.31.2 ~~Decline Monthly Charge — Exports~~Determining the Under/Over Delivery Price

If ADS recognizes a Scheduling Coordinator as accepting an award at an Intertie (either because the Scheduling Coordinator actively accepts the award or because the Scheduling Coordinator fails to decline it) and the awarded Energy is not delivered, then the Under/Over Delivery Price is the greater of: (a) 75% of the LMP in the corresponding FMM interval at the intertie where the resource was scheduled; (b) 75% of the highest LMP among the three RTD intervals corresponding to the FMM interval at the intertie where the resource was scheduled; or (c) \$10.00.

In all other cases, the Under/Over Delivery Price is the greater of: (a) 50% of the LMP in the corresponding FMM interval at the Intertie where the resource was scheduled; (b) 50% of the highest LMP among the three RTD intervals corresponding to the FMM interval at the Intertie where the resource

was scheduled; or (c) \$10.00.

~~The Decline Monthly Charge—Exports shall be applied to each Scheduling Coordinator on the Settlement Statements issued for the last Trading Day of each Trading Month, and shall be the sum of the Scheduling Coordinator's Decline Potential Charges—Exports for each Settlement Interval during that Trading Month multiplied by a ratio. The ratio will represent the portion of the Scheduling Coordinator's declined HASP Block Intertie Schedules for Energy exports that exceed the applicable exemption threshold during the Trading Month.~~

~~(a) The ratio will be calculated as follows:~~

~~(i) the Scheduling Coordinator's total MWh quantity of HASP Block Intertie Schedules for Energy exports that were not delivered during that Trading Month minus the applicable exemption threshold, divided by~~

~~(ii) the Scheduling Coordinator's total MWh quantity of HASP Block Intertie Schedules for Energy exports that were not delivered during the Trading Month.~~

~~(b) The applicable exemption threshold is greater of the following:~~

~~(i) the Decline Threshold Quantity—Imports/Exports; or~~

~~(ii) the total MWh quantity of HASP Block Intertie Schedules for Energy exports during the Trading Month multiplied by the Scheduling Coordinator's Decline Threshold Percentage—Imports/Exports.~~

~~Notwithstanding the foregoing, the Decline Monthly Charge—Exports shall equal zero if either:~~

~~a) The percentage of the MWh quantity of HASP Block Intertie Schedules for Energy exports that the Scheduling Coordinator did not deliver during the Trading Month is less than the Decline Threshold Percentage—Imports/Exports; or~~

~~b) The total MWh quantity of HASP Block Intertie Schedules for Energy exports that the Scheduling Coordinator did not deliver in the applicable Trading Month is less than the Decline Threshold Quantity—Imports/Exports.~~

11.31.3 Allocation of Import/Export Decline Monthly Under/Over Delivery Charges

For any Trading Day on which the CAISO assesses an Under/Over Delivery Charge, each Scheduling

Coordinator receives a credit on its Settlement Statement for its share of the total Under/Over Delivery Charges collected for that day. The CAISO distributes the total charges collected pro rata based on a Scheduling Coordinator's Measured CAISO Demand on that day as a percent of total Measured CAISO Demand for the CAISO Balancing Authority Area on that day. Both the numerator and denominator of the pro rata calculation exclude demand served by ETCs and TORs.

~~On the Settlement Statements issued for the last Trading Day of the applicable Trading Month, each Scheduling Coordinator shall receive a credit for its share of the total of all Decline Monthly Charges—Imports and Decline Monthly Charges—Exports assessed to Scheduling Coordinators for the applicable Trading Month. The credits shall be allocated according to the proportion of each Scheduling Coordinator's Measured CAISO Demand to total Measured CAISO Demand for the CAISO Balancing Authority Area during the Trading Month.~~

11.32 Measures to Address Intertie Scheduling Practices

The CAISO will take the following actions regarding Schedules that clear the Day-Ahead Market at the Interties and that are wholly or partially reversed through a FMM Schedule:

- (i) The CAISO will charge the Scheduling Coordinator the positive difference between the Day-Ahead Market price and the FMM LMP applicable to any imports that clear the Day-Ahead Market and are reduced through a Bid to the RTM if the Scheduling Coordinator either: (a) fails to submit an E-Tag or E-Tags consistent with the Scheduling Coordinator's Day-Ahead Schedule and WECC scheduling criteria; or (b) withdraws the E-Tag or E-Tags prior to ~~forty-five (45) minutes before the Trading Hour~~the CAISO's publication of HASP results on the CAISO's secure communication system.
- (ii) The CAISO will charge the Scheduling Coordinator the positive difference between the FMM LMP and the Day-Ahead Market LMP applicable to any exports that clear the Day-Ahead Market and are reduced through a Bid to the RTM if the Scheduling Coordinator either: (a) fails to submit an E-Tag or E-Tags consistent with the Scheduling Coordinator's Day-Ahead Schedule and WECC scheduling criteria; or (b) withdraws the E-Tag or E-Tags prior to forty-five (45) minutes before the Trading Hour.
- (iii) If a Scheduling Coordinator reduces a Day-Ahead import or export Schedule through a

Bid to the RTM and submits Schedules on behalf of, or is, a CRR Holder, then the reduction to the import or export may be treated as a Virtual Award for purposes of adjusting CRR Revenue as further set forth in Section 11.2.4.6.

- (iv) For any import Schedule that clears the Day-Ahead Market which a Scheduling Coordinator reduces through a Bid to the RTM, such reduced quantities will be subject to the allocation of Net RTM Bid Cost Uplift as set forth in Section 11.8.6.6.
- (v) The provisions of this Section 11.32 will not apply to Schedules that clear the Day-Ahead Market at the Scheduling Points and that a Scheduling Coordinator wholly or partially reverses through a Bid to the RTM to the extent such Schedules are valid and balanced ETC, TOR, or Converted Rights Self-Schedules in the Day-Ahead Market.

* * *

30.5.1 General Bidding Rules

* * *

- (r) A Scheduling Coordinator may submit a Variable Energy Resource Self-Schedule for the RTM can be submitted from a Variable Energy Resource. A Scheduling Coordinator can use either the CAISO forecast for Expected Energy in the RTM or can provide its own forecast for Expected Energy pursuant to the requirements specified in Section 4.8.2. The Scheduling Coordinator must indicate in the Master File whether it is using its own forecast or the CAISO forecast for its resource in support of the Variable Energy Self-Schedule. The Scheduling Coordinator is not required to include the same MWh quantity for each of the four fifteen (15)-minute intervals that make up the applicable Trading Hour for the Variable Energy Resource Self-Schedule include. If an external Variable Energy Resource that is not using a forecast of its output provided by the CAISO submits a

Variable Energy Resource Self-Schedule and the Expected Energy is not delivered in the FMM, the Scheduling Coordinator for the Variable Energy Resource will be subject to the Under/Over Delivery Charge Decline Potential Charge as described in Section 11.31.

Scheduling Coordinators for Dynamically Scheduled Variable Energy Resources that provide the CAISO with a two-hour rolling forecast with five-minute granularity can submit Variable Energy Resource Self-Schedules.

* * *

30.5.7 E-Tag Rules and Treatment of Intertie Schedules

In addition to complying with all generally applicable E-Tagging requirements, Scheduling Coordinators must submit their E-~~T~~tags consistent with the requirements specified in this Section ~~30.6.2~~ 30.5.7. If a Scheduling Coordinator receives an intra-hour Schedule change, then the Scheduling Coordinator must, by twenty minutes before the start of the FMM interval to which the Schedule change applies, ensure that an updated energy profile reflects the change. Absent extenuating circumstances, the CAISO automatically updates Energy profiles on E-~~T~~tags for Energy Schedules that change from HASP to the FMM within a Trading Hour. In performing this service for a Scheduling Coordinator, the CAISO does not assume any responsibility for compliance with any E-~~T~~tag requirements or obligations to which the Scheduling Coordinator is subject. The changed energy profile will apply for the balance of the operating hour unless it is subsequently changed by a further updated energy profile.

30.5.7.1 Self-Scheduled Hourly Blocks

By forty minutes prior to the applicable Trading Hour, the Scheduling Coordinator must submit an E-Tag (or set of E-Tags) that passes CAISO E-Tag validation procedures and that supports the Self-Schedule Hourly Block.

The transmission profile of the E-Tag at forty minutes prior to the applicable Trading Hour must be equal to the Self-Schedule Hourly Block. If the Scheduling Coordinator has a transmission profile less than its advisory Energy schedule, then the CAISO will limit the schedule for Energy in the FMM so that it does

not exceed the quantity of the transmission profile.

The Scheduling Coordinator may revise the Energy profile up to twenty minutes prior to the applicable Trading Hour but the quantity of the Energy profile must be equal to the quantity of the Self-Schedule Hourly Block by twenty minutes prior to the applicable Trading Hour. The CAISO may modify the Energy profile due to Reliability related curtailments.

By twenty minutes prior to the applicable Trading Hour, the Scheduling Coordinator must submit an E-Tag in support of Self-Scheduled Hourly Blocks. If the Scheduling Coordinator fails to submit a valid E-Tag consistent with these deadlines, then the CAISO will set the MW quantity of the FMM Schedule associated with the Self-Schedule Hourly Block to zero for each FMM interval of the hour.

The transmission profile must be greater than or equal to the Energy profile, and the Energy profile must equal the Self-Scheduled Hourly Block. The CAISO may modify the Energy profile due to Reliability related curtailments.

30.5.7.2 Variable Energy Resource Self-Schedule

By forty minutes prior to the applicable Trading Hour, the Scheduling Coordinator must submit an E-Tag (or set of E-Tags) that passes CAISO E-Tag validation procedures and that supports the Variable Energy Resource Self-Schedule.

The transmission profile of the E-Tag at forty minutes prior to the applicable Trading Hour must be equal to the Variable Energy Resource Self-Schedule. If the Scheduling Coordinator has a transmission profile less than its advisory Energy schedule, then the CAISO will limit the schedule for Energy in the FMM so that it does not exceed the quantity of the transmission profile.

The Scheduling Coordinator may revise the Energy profile up to twenty minutes prior to the applicable Trading Hour but the quantity of the Energy profile must be equal to the quantity of the Variable Energy Resource Self-Schedule by twenty minutes prior to the applicable Trading Hour. The CAISO may modify the Energy profile due to Reliability related curtailments.

If the Scheduling Coordinator fails to submit a valid E-Tag consistent with these deadlines, then the CAISO will set the MW quantity of the FMM Schedule associated with the Variable Energy Resource Self-Schedule to zero for each FMM interval of the hour.

~~By twenty minutes prior to the applicable Trading Hour, the Scheduling Coordinator must submit an E-Tag in support of a Variable Energy Resource Self-Schedule. The transmission profile must be greater than or equal to the Energy profile, and the Energy profile must equal the Variable Energy Resource Self-Schedule. The CAISO may modify the Energy profile due to Reliability related curtailments.~~

30.5.7.3 Economic Hourly Bid

By forty minutes prior to the applicable Trading Hour, the Scheduling Coordinator must submit an E-Tag (or set of E-Tags) that passes CAISO E-Tag validation procedures and that supports the Economic Hourly Block Bid.

The transmission profile of the E-Tag at forty minutes prior to the applicable Trading Hour must be equal to the Economic Hourly Block Bid. If the Scheduling Coordinator has a transmission profile less than its advisory Energy schedule, then the CAISO will limit the schedule for Energy in the FMM so that it does not exceed the quantity of the transmission profile.

The Scheduling Coordinator may revise the Energy profile up to twenty minutes prior to the applicable Trading Hour but the quantity of the Energy profile must be equal to the quantity of the Economic Hourly Block Bid by twenty minutes prior to the applicable Trading Hour. The CAISO may modify the Energy profile due to Reliability related curtailments.

If the Scheduling Coordinator fails to submit a valid E-Tag consistent with these deadlines, then the CAISO will set the MW quantity of the FMM Schedule associated with the Economic Hourly Block Bid to zero for each FMM interval of the hour.

~~By twenty minutes prior to the applicable Trading Hour, the Scheduling Coordinator must submit an E-Tag in support of an Economic Hourly Block Bid. The transmission profile must be greater than or equal to the Energy profile, and the Energy profile must equal the Economic Hourly Block Bid as awarded through HASP. The CAISO may modify the Energy profile due to Reliability related curtailments.~~

30.5.7.4 Economic Hourly Block Bid with Intra-Hour Option

By forty minutes prior to the applicable Trading Hour, the Scheduling Coordinator must submit an E-Tag (or set of E-Tags) that passes CAISO E-Tag validation procedures and that supports the Economic Hourly Block Bid with Intra-Hour Option. The transmission profile of the E-Tag at forty minutes prior to the applicable Trading Hour must be equal to the Economic Hourly Block Bid with Intra-Hour Option. If the

Scheduling Coordinator has a transmission profile less than its advisory Energy schedule, then the CAISO will limit the schedule for Energy in the FMM so that it does not exceed the quantity of the transmission profile.

The Scheduling Coordinator may revise the Energy profile up to twenty minutes prior to the applicable Trading Hour but the quantity of the Energy profile must be equal to the quantity of the Economic Hourly Block Bid with Intra-Hour Option by twenty minutes prior to the applicable Trading Hour. The CAISO may modify the Energy profile due to Reliability related curtailments.

If the Scheduling Coordinator fails to submit a valid E-Tag consistent with these deadlines, then the CAISO will set the MW quantity of the FMM Schedule associated with the Economic Hourly Block Bid with Intra-Hour Option to zero for each FMM interval of the hour.

~~By twenty minutes prior to the applicable Trading Hour, the Scheduling Coordinator must submit an E-Tag in support of an Economic Hourly Block Bid. The transmission profile must be greater than or equal to the Energy profile, and the Energy profile must equal the Economic Hourly Block Bid as awarded through HASP. The CAISO may modify the Energy profile due to Reliability related curtailments.~~

In the case of an intra-hour redispatch from the FMM, the CAISO may increment or decrement the Energy profile to correspond to the intra-hour redispatch. The MW level to which the FMM can redispatch an Economic Hourly Block Bid with Intra-Hour Option above its HASP Advisory Schedule is limited by the quantity of the transmission profile submitted by forty minutes prior to the applicable Trading Hour.

30.5.7.5 FMM Economic Bid

By forty minutes prior to the applicable Trading Hour, the Scheduling Coordinator must submit an E-Tag (or set of E-Tags) that passes CAISO E-Tag validation procedures and that supports the FMM Economic Bid.

The transmission profile of the E-Tag at forty minutes prior to the applicable Trading Hour must be greater than or equal to the FMM Economic Bid. If the Scheduling Coordinator has a transmission profile less than its advisory Energy schedule, then the CAISO will limit the schedule for Energy in the FMM so that it does not exceed the quantity of the transmission profile.

The Scheduling Coordinator may revise the Energy profile up to twenty minutes prior to the applicable Trading Hour but the quantity of the Energy profile must be equal to the quantity of the FMM energy schedule by twenty minutes prior to the applicable Trading Hour. The CAISO may modify the Energy profile due to Reliability related curtailments.

If the Scheduling Coordinator fails to submit a valid E-Tag consistent with these deadlines, then the CAISO will set the MW quantity of the FMM Schedule associated with the FMM Economic Bid to zero for each FMM interval of the hour.

~~By twenty minutes prior to the applicable Trading Hour, the Scheduling Coordinator must submit an E-Tag in support of a FMM Economic Bid. The transmission profile must be greater than or equal to the maximum bid-in capacity for the Trading Hour, and the Energy profile must equal the MWs awarded for the first FMM interval of the Operating Hour.~~

Scheduling Coordinators with cleared FMM Economic Bids may update either the transmission profile or the Energy profile after the relevant deadlines. A Scheduling Coordinator choosing to update the transmission profile must submit an updated transmission profile at least 40 minutes prior to the applicable FMM interval. A Scheduling Coordinator choosing to update the Energy profile must submit an updated Energy profile at least 20 minutes prior to the applicable FMM interval.

~~If the Scheduling Coordinator intends to limit its participation in the FMM to the quantity in the HASP advisory energy schedule (including zero), the Scheduling Coordinator may update its transmission profile to the maximum amount it wants to make available to the FMM prior to the start of the binding FMM optimization, which is no earlier than thirty-seven and a half minutes before the applicable Trading Hour. If the Scheduling Coordinator does not have a transmission profile greater than or equal to its advisory Energy schedule, then the CAISO will limit the schedule for Energy in the FMM so that it does not exceed amounts greater than what is listed in the transmission profile. Cleared FMM Economic Bids are eligible for Bid Cost Recovery as specified in Section 11.8.~~

* * *

Appendix A

Master Definition Supplement

~~-Decline Monthly Charge—Exports~~

~~A charge that applies to the aggregate of a Scheduling Coordinator's HASP Block Intertie Schedules for Energy exports that are not delivered in a Trading Month, as determined pursuant to Section 11.31.1.~~

~~-Decline Monthly Charge—Imports~~

~~A charge that applies to the aggregate of a Scheduling Coordinator's HASP Block Intertie Schedules for Energy imports that are not delivered in a Trading Month, as determined pursuant to Section 11.31.1.~~

~~-Decline Potential Charge—Exports~~

~~A potential charge that is calculated for any HASP Block Intertie Schedule for an Energy export when the HASP Block Intertie Schedule is not delivered for any reason, which potential charge and its applicability are determined pursuant to Section 11.31.~~

~~-Decline Potential Charge—Imports~~

~~A potential charge that is calculated for any HASP Block Intertie Schedule for an Energy import when the HASP Block Intertie Schedule is not delivered for any reason, which potential charge and its applicability are determined pursuant to Section 11.31.~~

~~-Decline Threshold Percentage—Imports/Exports~~

~~The rate at which Scheduling Coordinators may fail to deliver imports or exports in accordance with HASP Block Intertie Schedules without incurring Decline Monthly Charges—Imports or Decline Monthly Charges—Exports, as measured by the respective percentages of HASP Block Intertie Schedules for import or export MWh quantities that the Scheduling Coordinator does not deliver during a Trading Month. The Decline Threshold Percentage—Imports/Exports is ten percent (10%).~~

~~-Decline Threshold Quantity—Imports/Exports~~

~~The MWh quantity of HASP Block Intertie Schedules for imports or exports of Energy that a Scheduling Coordinator may fail to deliver during a Trading Month without incurring Decline Monthly Charges—Imports or Decline Monthly Charges—Exports. The Decline Threshold Quantity—Imports/Exports is 300 MWh.~~

* * *

- Under/Over Delivery Charge

For a given Intertie transaction that has an Under/Over Delivery Quantity for a FMM interval, a charge equal to the product of the Under/Over Delivery Price and Under/Over Delivery Quantity.

- Under/Over Delivery Price

The price, as further specified in Section 11.31.2, a Scheduling Coordinator is charged for deviations between Energy awarded at an Intertie and Energy delivered at that Intertie.

- Under/Over Delivery Quantity

The quantity of Energy at an Intertie, as further specified in Section 11.31.1, the CAISO deems either under- or over-delivered relative to awarded Energy for purposes of charging a fee for such under- or over-deliveries.

Attachment C – Draft Final Proposal

Intertie Deviation Settlement

California Independent System Operator Corporation

May 22, 2020



Intertie Deviation Settlement

Draft Final Proposal

December 12, 2018

Intertie Deviation Settlement Draft Final Proposal

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1. Purpose

The purpose of this initiative is to incentivize delivery of awarded energy on interties to improve operational awareness and grid reliability. Intertie resources that do not meet their cleared market schedules cause impacts on market pricing and grid stability. The *Intertie Deviation Settlement* initiative will analyze the existing Intertie Decline Charge and ultimately propose a new settlement methodology for undelivered intertie resources. The desired outcome of this initiative is to provide economic incentives for the delivery of intertie resources. The ISO expects this initiative to lead to more accurate estimates of the net scheduled interchange, increased grid reliability, and accurate market pricing.

What is the problem we aim to solve? When market participants fail to deliver intertie resources, grid operators and the ISO markets face operational challenges that can result in high prices, manual processes, and sub-optimal market solutions. The ISO's *Intertie Deviation Settlement* initiative aims to reduce the amount of declined and undelivered intertie resources.

What expectations guide our decision making? The primary objective of the ISO as a balancing authority operator is to maintain operational reliability of the bulk electric grid. The ISO's security constrained economic dispatch allows for optimal dispatch of resources to serve load across the balancing authority area. Accurate pricing signals are critical to provide economic incentive to participants in the ISO markets.

1.1 Response to Stakeholder Comments

The ISO appreciated stakeholder comments in response to the *Intertie Deviation Settlement* straw proposal. In the previous proposal, the ISO presented data identifying large quantities of undelivered import resources. Stakeholders recognize that undelivered import and export intertie resources are having a detrimental impact on market pricing and grid stability and therefore are generally supportive of the proposed under/over delivery charge.

This proposal includes the following changes from the previous straw proposal:

- The under/over delivery charge will be determined based on the greater of the FMM or RTD price.
- In the straw proposal, the ISO proposed a firm T-40 real-time E-Tagging deadline. Due to seams issues that were identified, the ISO is no longer proposing to implement a real-time E-Tagging deadline of T-40. Instead, the ISO's business practice manual will identify that an E-Tag with a transmission profile should be submitted prior to T-40 and the ISO expects proposed fifteen-minute market logic will incentivize submission of the E-Tag transmission profile by T-40. This

update will allow scheduling coordinators flexibility to update the energy profile on E-Tags as needed until T-20.

- In the previous straw proposal, the ISO suggested logic to determine the amount of undelivered energy for bids electing the fifteen-minute dispatchable option. This logic proposed to compare the fifteen-minute award to the final E-Tag. After further consideration, the ISO is proposing to determine the amount of underlived energy for bids electing the fifteen-minute dispatchable option by comparing the E-Tag transmission profile to the HASP schedule.
- In order to apply the under/over delivery charge at the price of the corresponding interval, the ISO will need to receive 15-minute energy and transmission profile information for OATI.
- The ISO is clarifying its authority to curtail hourly block resources for intervals in which the E-Tag energy profile is greater than the corresponding market award. This is necessary to ensure scheduling limits are not exceeded and the ISO adheres to industry standards.
- A floor of \$10/MWh will ensure a charge is still applied even when pricing is low or negative. This aligns with the floor used in the existing decline charge. This change is proposed based on stakeholder feedback; the previous proposal suggested a floor of \$0.
- The straw proposal suggested allowing ISO operators to permit the flow of energy when E-Tag energy profiles exceeded the accepted market schedule. The ISO has recognized negative impacts of this concept and therefore is removing this from the proposal. As is done today, the ISO operators will not permit the flow of energy when E-Tags are greater than the accepted award.
- Currently, the ISO business practice manuals allow scheduling coordinators to accept, partially accept, or decline awards in the automated dispatch system for up to 5-minute after the publication of the hour ahead scheduling process results. In order to provide more flexibility to scheduling coordinators, the ISO is proposing to allow scheduling coordinators to accept, partially accept, or decline awards in the ADS system until T-45.
- In the previous straw proposal, the ISO suggested a business rule to address the operational impacts that occur when a declined export resource results in the over scheduling of an intertie in the import direction. The ISO has removed this business practice from the draft final proposal because it cannot be successfully implemented. The reasons for this change are described in [Section 7.11](#).

In addition to the changes proposed above, the ISO has added clarifications to the following topics: E-Tag curtailments versus adjustments; rationale for use of the transmission profile to determine the fifteen-minute market award for hourly block resources; clarification of rules for the Hour-Ahead Scheduling Process (HASP) reversal rule; and, additional data analysis supporting the need for the over/under delivery charge.

Stakeholder comments that are outside of the scope of this proposal are addressed in [Section 8](#).

2. References

The following documents are referenced throughout the document and can be found at the respective links.

Intertie Deviation Settlement stakeholder page:

<http://www.caiso.com/informed/Pages/StakeholderProcesses/IntertieDeviationSettlement.aspx>

Business Practice Manual (BPM) for Market Operations:

<https://bpmcm.caiso.com/Pages/BPMDetails.aspx?BPM=Market%20Operations>

Settlements and Billing BPM Configuration Guide Charge Code 6455 Intertie Schedules Decline Charges:

https://bpmcm.caiso.com/BPM%20Document%20Library/Settlements%20and%20Billing/Configuration%20Guides/HASP-RT/BPM%20-%20CC%206455%20Intertie%20Schedules%20Decline%20Charges_5.9.doc

Settlements and Billing BPM Configuration Guide Charge Code 6457 Intertie Schedules Decline Charges Allocation:

https://bpmcm.caiso.com/BPM%20Document%20Library/Settlements%20and%20Billing/Configuration%20Guides/HASP-RT/BPM%20-%20CC%206457%20Intertie%20Schedules%20Decline%20Charges%20Allocation_5.1a.doc

Declined Predispatched Intertie Bids – White Paper, 2007:

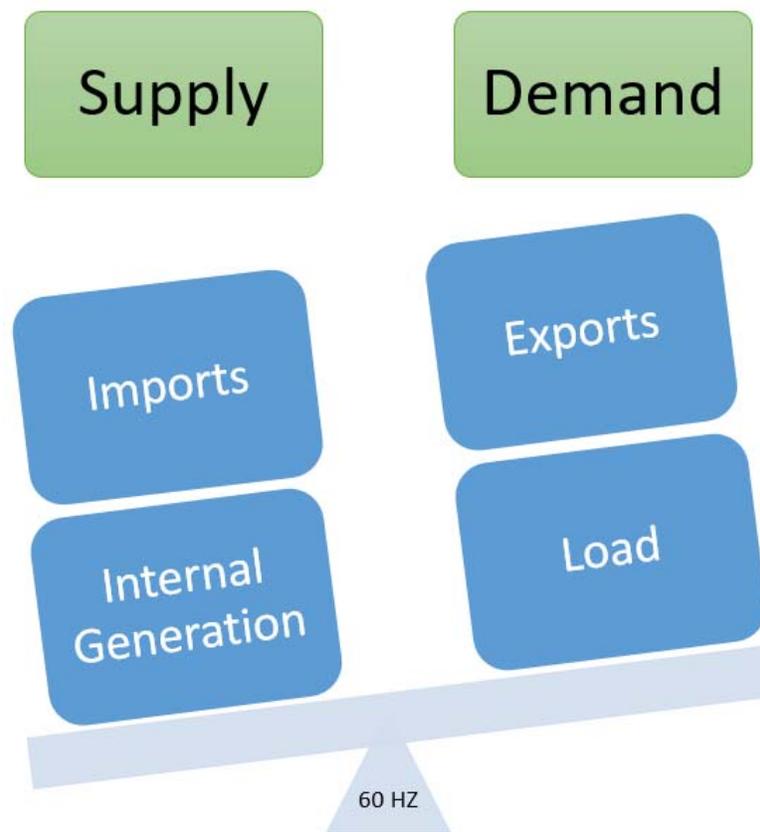
<http://www.caiso.com/Pages/documentsbygroup.aspx?GroupID=561FB99F-13BA-4B61-93EC-FAA77D134A55>

3. Background

It is the responsibility of the ISO to ensure there is enough energy supply to meet load across the balancing authority area footprint. Maintaining the balance between supply and demand will ensure stability of the bulk electric grid.

Internal supply sources and interchange, which is energy imported and exported across interties, are used to balance load across the ISO's balancing authority area. An intertie is an interconnection permitting the flow of electric power (current) between two or more balancing authority areas. **Figure 1** illustrates how a grid operator must ensure there is adequate supply to serve demand and maintain reliability.

Figure 1: Supply and demand must be balanced to maintain a grid stability. Supply is composed of internal generation and interchange (imports/exports).¹



When an intertie resource receives a market award to import energy into the balancing authority area but does not deliver the awarded energy, the grid operator must maintain system balance by increasing internal supply or finding another intertie resource to replace the undelivered energy.

¹ Internal generation includes any supply source internal to the ISO balancing authority area and includes demand response or other energy sources that do not require rotating mass.

3.1 Interties, Market Timing, and E-Tagging

Intertie resources can submit bids and receive energy awards in both the day-ahead and real-time markets. Because intertie resources can submit bids indicating a price at which they are willing to buy or sell energy, the CAISO market design assumes intertie resources that are scheduled in the day-ahead and real-time market will accept the schedule and deliver the energy.

An intertie resource is formally defined as a **system resource**, which is a group of resources, single resource, or portion of a resource located outside of the CAISO balancing authority area. System resources are categorized as dynamic or non-dynamic. A **dynamic system resource** is a type of system resource that is tied to a specific generator and has contractual agreements to respond to CAISO market dispatches every 5 minutes in the real-time dispatch. A **non-dynamic system resource** is a system resource that is not capable of submitting a dynamic schedule. It may be a collection of resources and not necessarily tied to a specific generator. Non-Dynamic System Resources are not capable of responding to 5-minute dispatches and instead participate in the ISO's real-time 15-minute market.

Henceforth, this paper will use the term *intertie resource* instead of *system resource*. Additionally, for clarification purposes, when this paper uses the term *intertie resources*, it refers to non-dynamic system resources because dynamic resources are excluded from the Decline Charge policy on the rationale that those resources behave similar to internal generators.

Scheduling Coordinators can elect one of several bid options for intertie resources. Intertie resources that are statically scheduled into the ISO (non-dynamic system resources) can bid using the following options²:

Self-scheduled hourly block. An intertie resource bid that is a price taker. A self-scheduled hourly block will be awarded in the hour-ahead scheduling process and settle at the fifteen-minute market locational marginal price. The schedule must remain constant throughout the operating hour and is unable to be dispatched on a fifteen minute basis.

Economic hourly block. An intertie resource bid that specifies a price. The economic hourly block intertie resource will only clear if the bid is economic in relation to the locational marginal price in the hour-ahead scheduling process. The schedule must remain constant throughout the operating hour and is unable to be dispatched on a fifteen minute basis. The schedule is a price taker in the fifteen-minute market and thus settles at the fifteen-minute market price.

² Additional information can be found in the BPM for Market Operations section 7.6.3.2: Treatment of System Resources.

Economic hourly block with intra-hour option. An intertie resource bid that specifies a price. The economic hourly block intertie resource will only clear if the bid is economic in relation to the locational marginal price for the balance of the operating hour. The schedule can only change one time during the operating hour. If the schedule is changed intra-hour, the resource becomes a price taker for the balance of the hour and is settled at the fifteen-minute market locational marginal price.

Economic. An intertie resource bid that specifies a price. The economic hourly block intertie resource will only clear if the bid is economic in relation to the locational marginal price. The schedule can change every fifteen-minute interval as scheduled by the fifteen-minute market.

Economic variable energy resource. A variable energy resource that is economically bid as an intertie resource. The variable energy resource submits a forecast into the scheduling infrastructure and business rules (SIBR) application. The forecast is used to determine the maximum amount that the resource can be scheduled to. The economic variable energy resource schedule can change every fifteen-minute interval as scheduled by the fifteen-minute market.

Market schedules are published at the top of the scheduling hour when a scheduling coordinator bids into the real-time market using the hourly block or intra-hour change option.³ The dispatch is published in the CAISO market results interface (CMRI) application and the automated dispatch system (ADS).⁴ Once the award is published, the scheduling coordinator has approximately five minutes to “accept”, “partially accept”, or “decline” the award. Once the award has been accepted, partially accepted, or declined, the new amount is reflected as the *automated dispatch system accepted value*.

Accept means the award is fully accepted at dispatched value.

Partially accept means the award is accepted at a value below the day-ahead and/or hour-ahead scheduling process award.

Declined means the market award is fully declined and 0 MW will be delivered.⁵

³ Here forward, the term “hourly block” will be inclusive of the intra-hour change option.

⁴ The scheduling hour is defined as the hour prior to the operating hour. For example, if the operating hour ends at 10:00AM (also known as HE10, which corresponds to 9:00AM – 10:00AM), the scheduling hour will end at 9:00AM (also known as HE9, which corresponds to 8:00AM – 9:00AM).

⁵ For the purpose of this paper, the term “decline” is inclusive of “partially accept” unless specified differently. Generally, the term “decline” refers to a scheduling coordinator not fully accepting an award in the automated dispatch system.

Figure 2: Examples for hourly block resources that accept, partially accept, and decline awards in the automated dispatch system.

Day-ahead market award	Hour-ahead scheduling process instruction	Hour-ahead scheduling process award	Scheduling coordinator action	Automated dispatch system accepted value
150 MW	No change	150 MW	Accept	150 MW
150 MW	+ 50 MW (INC)	200 MW	Accept	200 MW
150 MW	- 50 MW (DEC)	100 MW	Partially accept	125 MW
150 MW	+ 50 MW (INC)	200 MW	Partially accept	175 MW
150 MW	- 100 MW (DEC)	50 MW	Decline	0 MW

During the five-minute window, the scheduling coordinator accepts, partially accepts, or declines, the award in the automated dispatch system. If the scheduling coordinator does not respond to the dispatch, the award is automatically accepted at the end of the five-minute window. The scheduling coordinator can call the ISO operator and request the award be manually changed up until T-40.⁶ The scheduling coordinator is then responsible to submit an E-Tag to serve as confirmation of the transaction.

Information contained on an E-Tag is like a receipt. It shows the scheduled energy (in MWs) that a scheduling coordinator agrees to deliver for a specified duration of time. Additionally, an E-Tag contains a contract path detailing how energy will be delivered to a specified location based on transmission purchased by the scheduling coordinator. For example, an E-Tag may depict a 100 MW transaction, sourcing in BPA and sinking in CAISO across the MALIN500 intertie for HE10. In this example, the E-Tag has an energy profile of 100 MW to match the ISO market award; it also has a transmission profile of at least 100 MW to indicate the scheduling coordinator has procured transmission to accommodate the energy transfer. Grid operators verify the scheduling coordinator's E-Tag information to ensure the scheduled energy matches the awarded energy.

The ISO's *Business Practice Manual for Market Operations* states an E-Tag must be submitted before T-20 (20 minutes prior to the operating hour).⁷ This requirement is set forth by the North American Energy Standards Board (NAESB). However, the ISO's fifteen-minute market runs 37.5 minutes prior to the operating hour to determine the final market award. Consequently, it is ideal for hourly block E-Tags to be submitted at T-40 because E-Tag data is used as a market input. This allows time for the hourly block E-Tag to be received and processed in advance of the market run. For intertie resources that submit economic bids that can be scheduled in the fifteen-minute market, the E-Tags must be submitted prior

⁶ Reference the CAISO *Business Practice Manual for Market Operations*, Section 7.8.3.1.3: *ADS Decline Functionality for Non-Dynamic System Resource Instruction*.

⁷ The CAISO *Business Practice Manual for Market Operations* requires E-Tags be submitted no later than 20 minutes prior to the operating interval (T-20). This is in accordance with the E-Tagging specifications maintained by the NAESB. Reference the *Business Practice Manual for Market Operations*, Section 8 - *Tagging* for additional information.

to T-40 with a transmission profile that supports the intertie resources bid range. The market uses the transmission profile from the E-Tag to ensure the resource is not scheduled above the lowest external transmission path outside the CAISO.

The ISO receives E-Tags through its interchange transaction scheduler (ITS) system. The ITS system produces a receipt of E-Tags and allows ISO operators to calculate the net scheduled interchange and verify scheduling limits are not exceeded for the upcoming operating hour. The net scheduled interchange feeds directly into the area control error (ACE), which measures how well the balancing authority area is balancing load and supply. NERC standards are in place to ensure the area control error is appropriately controlled. Therefore, the net scheduled interchange (the total of all E-Tags) is a critical component in maintaining balance between supply and demand and adhering to NERC standards.

3.2 Declined Award

The ISO expects scheduling coordinators to accept hour-ahead scheduling process awards. Scheduling coordinators submit bids, and if the market clears at a price in which the bid is awarded, it is assumed the schedule should be accepted. A submitted bid should be a firm offer to deliver the offered energy at the bid price.

Occasionally, conditions prohibit a scheduling coordinator from delivering awarded energy such as transmission outages, generation outages, or occasionally economic considerations. When those instances occur, the business practice manual requires the scheduling coordinator to notify the ISO of the un-deliverable energy. Intertie declines are critical information for the ISO operator as they provide additional time for operations to resolve system balance. Scheduling coordinators may notify the ISO through the automated dispatch system or by a phone call to the ISO operator before T-40. When the scheduling coordinator notifies the ISO of the intertie decline in advance, it is more likely that the 15-minute market will have adequate time to economically schedule and/or commit replacement energy. However, insufficient notice of the intertie decline will leave the replacement energy to be resolved by the 5-minute real-time dispatch which does not have the ability to commit additional resources if needed.

Let's assume the following example:

Net scheduled interchange as awarded by the hour-ahead scheduling process = 5,000 MW

Awards accepted by scheduling coordinators = 4,500 MW

Awards declined by scheduling coordinators = 500 MW

Net scheduled interchange used as an input to the fifteen-minute market = 4,500 MW

In this scenario, the scheduling coordinator declined 500 MW at the beginning of the scheduling hour. This enabled the fifteen-minute market to recognize the 500 MW shortage and economically schedule and/or commit additional resources to make up for the discrepancy. Additionally, the balancing authority area operator had adequate time to manually dispatch resources, if necessary.

Intertie declines, particularly when they involve especially large MW values or multiple concurrent declines from multiple scheduling coordinators, can cause significant operational and reliability problems. Additionally, when a scheduling coordinator accepts an energy award but does not submit an E-Tag there are additional market inefficiencies and operational concerns.

3.3 Undelivered Energy (no E-Tag)

When energy on the interties cannot be delivered, scheduling coordinators should notify the ISO with as much notice as possible. However, not all scheduling coordinators follow the ISO's best practice of declining hourly block intertie awards by T-40. Occasionally, scheduling coordinators do not take action when awards are published in the automated dispatch system – this results in the award being auto-accepted on behalf of the scheduling coordinator. In turn, the market assumes the energy will be delivered.

Let's assume a second example:

Net scheduled interchange as awarded by the hour-ahead scheduling process = 5,000 MW

Awards accepted by scheduling coordinators = 4,500 MW

Awards *automatically* accepted by the automated dispatch system = 500 MW

Net scheduled interchange used as an input to the fifteen-minute market = 5,000 MW

In this scenario, the automated dispatch system automatically accepted 500 MW on behalf of the scheduling coordinator. However, the scheduling coordinator is unable to deliver the energy and did not submit an E-Tag. When this occurs, the fifteen-minute market assumes 5,000 MW will be delivered on the interties because a total of 5,000 MW shows as accepted in automated dispatch system. In reality, only 4,500 MW will be delivered. The undelivered intertie energy (no E-Tag) won't be recognized in the market until the real-time dispatch 5-minute market run.⁸

⁸ The fifteen-minute market will recognize the shortage during the third and fourth intervals of the operating hour. The market timing is discussed more in Section 5.2: Intertie Declines Examples.

Undelivered energy (no E-Tag) on the interties can have serious negative impacts on grid reliability. Once the grid operator recognizes the shortage, the operator is unable to schedule additional energy on the interties due to the NAESB E-Tagging timeline of T-20. It is also too late to manually schedule energy on the interties.⁹ The real-time dispatch will recognize the shortage and dispatch energy, but cannot commit additional resources. As a result, the energy may be expensive or unavailable without emergency actions and could even lead to capacity procurement mechanism (CPM) designations.

For example, if an intertie resource under-delivers by 250 MW, the fifteen-minute market has already run and thus cannot account for this energy. Therefore, the real-time dispatch must dispatch an additional 250 MW. Assuming there are limited internal supply resources available, pricing may increase in order to accommodate the need for an additional 250 MW. Therefore, the 250 MW intertie shortage directly affected pricing throughout the real-time market.

Figure 3: Difference between Intertie Decline and No E-Tag.

Name	Description	Impact
Intertie decline (or partially accept)	Energy award is declined in the automated dispatch system or via phone call before T-40	The grid operator is aware the energy will not be delivered and likely has adequate time to economically schedule and/or commit additional energy through the market systems or an exceptional dispatch.
No E-Tag	Energy award is accepted but not delivered in real time	The grid operator is <u>un</u> aware the energy will not be delivered until T-20. This energy shortage at the beginning of the ramp for the corresponding interval leaves the operator an extremely limited time to respond and there is potentially very limited resources available for dispatch. This may lead to CPM.

In summary, the ISO expects all awards be delivered and finds it optimal if there are no intertie declines at all. However, if the full dispatch cannot be delivered, it is better for scheduling coordinators to notify the ISO by T-40. When an award is accepted but an E-Tag is not submitted, there are challenges for the ISO operator and the market.

⁹ Exceptional dispatches on the interties must occur with enough time for the ISO operator to make verbal agreement and the scheduling coordinator to submit an E-Tag.

4. Issue Paper: Decline Charge Policy is Outdated

4.1 Current Decline Charge

In spring of 2007, the ISO experienced an unusually high amount of declines, which led the ISO's Department of Market Monitoring (DMM) to analyze the issue. DMM concluded that bidding behavior may have contributed to the spring event. ISO Management then determined the ISO's current tariff provisions did not provide clear guidance on expected bidding behavior or consequences for undelivered import or export bids. Consequently, the ISO conducted the *Charge for Undelivered Import or Export Bids* stakeholder initiative to make tariff provisions clearer.

The ISO determined with stakeholders that a financial charge for declines would discourage excessive declines of pre-dispatched real-time bids from imports and exports. However, because unpredictable events may occur, the decline charge only applies if the scheduling coordinator fails to deliver 10% or more of total intertie transactions (in the import and export directions separately) or 300 MWh, whichever is greater. The total undelivered value is calculated in MWh over the course of a month to determine if the 10% threshold (or 300 MWh, whichever is greater) has been exceeded. If intertie declines are less than 10% of total transactions, no charge applies. If intertie declines are greater than or equal to 10% of total transactions, the market participant is subject to the decline charge. The decline charge is equal to is the maximum of \$10.00 or 50% of the fifteen-minute market locational marginal price per MW that exceeds the 10% threshold.

At the time the policy was implemented, ISO settlement system had no way to distinguish between an intertie decline and a reliability curtailment. It only had visibility to the hour-ahead schedule process schedules and final E-Tag values. Therefore, the total amount of "declines" could have also included E-Tags that were curtailed for reliability reasons – curtailments that were not the fault of the market participant but still counted towards the decline charge. This contributed to the need to have a threshold to determine if the decline charge should apply or not.

At the time the original policy was developed, there was "widespread agreement that there should be a mechanism that discourages market participants from submitting bids that they do not have a reasonable expectation of delivering".¹⁰ Stakeholders disagreed on how the ISO would define "reasonable" through the threshold amount. Some stakeholders criticized the 10% threshold as being too high. They argued a 10% threshold would open the door for speculative behavior and reliability concerns from scheduling coordinators who were currently at a 5% decline threshold. Any threshold above 5%, they argued, would incentivize scheduling coordinators to decline more and negate the intent of the ISO's policy.

¹⁰ Declined Predispatched Intertie Bids – White Paper, 2007:
<http://www.caiso.com/Pages/documentsbygroup.aspx?GroupID=561FB99F-13BA-4B61-93EC-FAA77D134A55>

The ISO ultimately decided to use a 10% threshold because it would provide scheduling coordinators sufficient “headroom” to remain below the threshold if conditions outside their control arose.¹¹ It would be the responsibility for the market participant to track monthly their declines and remain below the threshold. Ultimately, the policy balanced limiting the number of declines and ensuring sufficient energy bids were available for reliability.

4.2 FERC Order 764 Impacts

Historically, interchange (imports and exports) bids were scheduled by ISO/RTO’s on an hourly basis. The Federal Energy Regulatory Commission (FERC) issued Order No. 764, which required all public utilities to revise their open access transmission tariffs to include the option of using intra-hour transmission scheduling at 15-minute intervals. The requirement to implement 15-minute transmission scheduling only applied to intertie transactions in organized wholesale energy markets. The California ISO implemented this requirement through the initiative, *FERC Order No. 764 Market Changes*. This initiative also introduced binding 15-minute scheduling and settlement for both internal and intertie resources.

As a result of the *FERC Order No. 764 Market Changes* initiative, the hour-ahead scheduling process no longer determines financially binding locational marginal prices. Prior to Order 764 implementation the hour-ahead scheduling process was binding because it produced a single schedule and a single price for the entire hour. With FERC 764, hourly pricing was eliminated. Now, the ISO produces prices for each 15-minute interval.

To accommodate intertie resources that cannot change schedules every 15-minutes, the ISO created an “hourly block” option. This allows intertie resources to keep the same schedule for all four 15-minute intervals. However, the schedule will be individually settled at the fifteen-minute market price for each interval.

At the time of the FERC 764 implementation, the ISO determined no changes to the decline charge were necessary. Since then, the ISO has recognized impacts of undelivered interties. Specifically, the ISO has identified that scheduling coordinators are not delivering awarded energy (no submission of an E-Tag) instead of declining awards at the beginning of the scheduling hour. The ISO analyzed the available data to understand the magnitude and impact of undelivered intertie resources. The analysis can be found in [Section 5: Impact of Intertie Declines](#).

4.3 Energy Imbalance Market

The energy imbalance market (EIM) design does not include intertie bidding. Therefore, EIM is not subject to the decline charge. Reviewing and assessing EIM’s current policy for intertie bidding is outside the scope of this initiative.

¹¹ See *Cal. Indep. Sys. Operator Corp.*, Transmittal Letter to Tariff Amendment to (Both Current and MRTU) to Implement a Charge for Undelivered Import or Export Bids, Docket No. ER8-628-000 (February 29, 2008) at p. 6.

5. Impact of Undelivered Intertie Resources

This section quantifies the magnitude of undelivered intertie schedules. Additionally, this section provides examples that explain the operational and settlement impacts of no E-Tag submitted as opposed to declined awards by T-40.

Please note, these examples have been simplified for illustrative purposes. The full settlement of an hourly-block intertie resource and the applicable decline charge (charge code 6455) is included in Appendix A.

5.1 Operational Impacts of Intertie Declines

As explained in [Section 3: Background](#), undelivered energy caused by the failure to submit an E-Tag has more significant operational impacts than declining an award in the automated dispatch system prior to the fifteen-minute market run.

Envision the following scenario:

A scheduling coordinator bids into the ISO's real-time market and receives a 500 MW award through the hour-ahead scheduling process. The scheduling coordinator does not take action when the schedule is first published and a 500 MW award is automatically accepted by the automated dispatch system. Later in the scheduling hour, the scheduling coordinator decides not to deliver the awarded energy due to economic considerations. Although the award was accepted, the scheduling coordinator does not submit an E-Tag. At this point, the ISO is still anticipating delivery of 500 MW across the interties and will not recognize the shortage until after T-20. At that point, it is too late for the fifteen-minute market to schedule additional energy on the interties. Instead, regardless of cost, the five-minute market must dispatch 500 MW of supply.

It is a significant operational burden when E-Tags are not submitted for awarded energy on the interties. Operators would prefer to receive advanced notification of the decline **before** T-40 because it would allow operators to schedule additional energy.

This paper focuses on the decline and/or failure to deliver awarded import awards on the interties. The ISO is a net importer, and therefore the decline of imports is more common than the decline of exports. However, it is important to note that the decline and/or failure to deliver awarded export awards can impact the ISO as well. When an export award is declined, the ISO ends up with more energy than the market awarded. Export declines can result in decreased prices, which makes it more expensive to dispatch internal generation down in the real-time dispatch.

5.2 Intertie Declines Examples

The ISO always expects hour-ahead scheduling process awards will be accepted. This is the best outcome for operators and the market. However, if an award cannot be delivered, there is operational benefit in having advance notification of the intertie decline. That being said, based on the current decline charge, there is an economic incentive not to provide advance notification of undeliverable energy on the interties.

Since the FERC 764 implementation, the decline charge is more severe when a scheduling coordinator declines an award in advance as opposed to not submitting an E-Tag. This settlement consequence contradicts the ISO's best practice of declining awards in advance to improve situational awareness for the operators as well as improve market outcomes. Additionally, an E-Tag that is curtailed for reliability reasons has the same impact as not delivering an E-Tag even though the scheduling coordinator is not at fault for the discrepancy. These concepts are explained further in the examples below.

5.3 Definitions

The following terms have been defined as they relate to intertie transaction, the settlement of intertie transactions, and the decline charge.

Figure 4: Settlement terms in relation to declined or undelivered intertie resources and the decline charge.

Term	Acronym	Definition
Total Expected Energy	TEE	Final dispatch instruction. For intertie resources, this is typically the fifteen-minute market binding award. ¹²
Instructed Imbalance Energy	IIE	Instructed change between market runs. For interties, this may be the difference between day-ahead and fifteen-minute market awards.
Uninstructed Imbalance Energy	UIE	Uninstructed deviation from the real-time market dispatch. Compares the meter value (what was delivered) to the total expected energy (final dispatch instruction). <u>Interties do not have metered values, therefore there is no uninstructed imbalance energy for generic intertie system resources.</u> ¹³

¹² If an intertie resource is exceptionally dispatched, the TEE will be the exceptional dispatch instruction instead of the FMM binding award.

¹³ Dynamic intertie resources are tied to metered data and therefore are settled for UIE.

Operational Adjustment	OA	Comparison of the E-Tag's final energy profile to the total expected energy. ¹⁴
Fifteen-Minute Market Undelivered Quantity		Difference between hour-ahead scheduling process and fifteen-minute market schedules that are not the result of an economic dispatch. ¹⁵
Decline Charge		A charge applied to scheduling coordinators if the total fifteen-minute market undelivered quantity over the course of the month exceeds 10% of total intertie transactions for the corresponding month.
Hour-Ahead Scheduling Process Reversal Rule		A settlement applied if the E-Tag energy profile at T-45 does not match the corresponding day-ahead market award. This is intended to prevent implicit virtual bidding on the interties and incentivize scheduling coordinators to tag day-ahead market awards prior to the hour ahead scheduling process.

5.4 Market Timing & Logic

Day-ahead market awards are published at approximately 1PM Pacific Prevailing Time (PPT) prior to the trade date. Day-ahead awards are used in the real-time market optimization; therefore, it is critical that scheduling coordinators submit an E-Tag to match their market award. Market awards that are not tagged by T-45 (45 minutes prior to the operating hour) will be subject to the hour-ahead scheduling process (HASP) clawback. The HASP clawback ensures that day-ahead awards that are bought back in the HASP are backed by physical resources; it is intended to prevent virtual bidding on the interties.

Hour-ahead scheduling process awards are published at the top of the scheduling hour. It is expected that energy awarded in the hour-ahead scheduling process will be accepted by the scheduling coordinator. If the scheduling coordinator is unable to deliver the scheduled value, it is his responsibility to partially accept or decline the award in the automated dispatch system. The accepted award is used as an input to the fifteen-minute market. This value is used to clear the fifteen-minute market and determine the appropriate award, which is used for settlement purposes. The fifteen-minute market runs approximately 37.5 minutes prior to the corresponding interval and the results are published approximately 10 minutes after the market run starts.

The fifteen-minute market uses the following logic to determine awards for hourly block intertie resources. It assumes market participants will deliver what has been accepted in the automated

¹⁴ OA is settled under IIE. Even though the E-Tag may differ from the FMM instruction at the fault of the scheduling coordinator (could be considered "uninstructed"), there was originally no way to distinguish between instructed and uninstructed changes. Because an E-Tag may be curtailed for reliability reasons by the grid operator, the ISO elected to categorize OA as Instructed Imbalance Energy.

¹⁵ For economic hourly blocks, clearing HASP is economic over the hour. Therefore, any changes that result in the FMM are due to tagging changes and are considered the Undelivered Quantity.

dispatch system for the first two intervals of the operating hour. (The E-Tag deadline twenty minutes prior to the operating hour is too late for this E-Tag information to be incorporated into the first two intervals). The ADS accepted schedule will become the binding award for interval 1 & 2. For the last two intervals of the operating hour, scheduling coordinators cannot make E-Tag changes. Therefore, the E-Tag value will become the binding award for interval 3 & 4.

Figure 5: Market logic used to determine awards for hourly block intertie resources.¹⁶

FMM Binding Interval of Operating Hour	Time of Operating Hour	RTPD # ¹⁷	Logic Used to Determine Binding Award
1	00 – 15	5	ADS Accepted Award
2	15 – 30	4	ADS Accepted Award
3	30 – 45	7	E-Tag energy profile
4	45 – 00	6	E-Tag energy profile

Based on this logic, if an award is automatically accepted by the automated dispatch system, the fifteen-minute market will assume the award will be delivered for the first two 15-minute intervals of the operating hour. If in reality the E-Tag is not submitted, it is too late to schedule additional energy through the fifteen-minute market for those intervals. Thus, the real-time dispatch is forced to make up for the shortage with internal supply and/or dynamic (or pseudo-tie) generators, dispatching more than it otherwise would have and increasing real-time dispatch prices. The acceptance of an award on the interties combined with the failure to submit an E-Tag directly impacts the real-time market prices.

Additional information related to the existing Decline Charge can be found in the *Settlements and Billing Configuration Guide - Intertie Schedules Decline Charges CC 6455*:

https://bpmcm.caiso.com/BPM%20Document%20Library/Settlements%20and%20Billing/Configuration%20Guides/HASP-RT/BPM%20-%20CCG%20CC%206455%20Intertie%20Schedules%20Decline%20Charges_5.9.doc

¹⁶ Intertie resources with contract rights or transmission operating rights (TOR) can submit an E-Tag any time before T-20 even if there is no bid or market award. Therefore, the fifteen-minute market logic will use the E-Tag value for intertie E-Tags tied to a TOR even if a market award does not exist.

¹⁷ The real-time pre dispatch (RTPD) is the security constrained economic dispatch (SCED) for the fifteen-minute market. It consists of 7 forward looking runs. It starts with RTPD 7, which coincides with the hour-ahead scheduling process run. Each RTPD run gets closer to real-time up until RTPD 1.

5.5 Examples

Examples 1 – 6 are provided for illustrational purposes. The examples explain the settlement implications for declining before T-40 as opposed to not submitting an E-Tag. While the ISO maintains that all awarded energy should be tagged and delivered, the failure to submit an E-Tag to match a corresponding award creates more operational challenges than declining an award in advance.

The decline charge only applies when the difference between the hour-ahead scheduling process award and the E-Tag energy profile exceed 10% of total transactions. When an award is declined, the total MWh that counts towards the threshold for the month equals the declined value for the entire operating hour. In comparison, when an award is not tagged the total MWh that counts towards the threshold for the month is only effective for half of the operating hour. As a result, scheduling coordinators are less likely to exceed the 10% threshold and be subject to the decline charge when they elect to not tag as opposed to decline before T-40. This outcome is contrary to the operational need to notifying the ISO in advance when energy cannot be delivered.

Example 7 explains a related problem of declining market awards. Due to the nature of net scheduling in the ISO markets (the summation of imports plus exports cannot exceed intertie limits), the decline of an export schedule in combination with the acceptance of import schedules can result in the over-scheduling of an intertie. When this happens, the import schedules are cut but the export schedule flows.

The *Intertie Deviation Settlement Worksheet* is provided as an attachment and can be used to understand pricing impacts and settlement across markets for intertie declines.

Example #1 – Day-ahead market import resource declined

Setup: A resource receives a 100 MW award in the day-ahead market. The scheduling coordinator does not bid into the real-time market, therefore, the award remains at 100 MW. The 100 MW award is *declined* in the automated dispatch system.

	Interval 1	Interval 2	Interval 3	Interval 4
DA Award	100 MW	100 MW	100 MW	100 MW
HASP schedule	100 MW	100 MW	100 MW	100 MW
FMM award	0 MW	0 MW	0 MW	0 MW
E-Tag	0 MW	0 MW	0 MW	0 MW

Settlement: The fifteen-minute market undelivered quantity is 100 MW for intervals 1 – 4. Therefore, 100 MWh is applied towards the end-of-month summation to determine if the 10% threshold is exceeded and the decline charge should be applied. The operational adjustment is 0 MW for all intervals because the E-Tag matches the total expected energy.

Settlement	Quantity	Intervals	MWh
Instructed Imbalance Energy = DA – FMM award at FMM LMP	100 MW	1 – 4	100 MWh
FMM Undelivered Quantity (Decline Charge*) = HASP schedule – FMM award at 50% FMM LMP	100 MW	1 – 4	100 MWh
Operational Adjustment = FMM award – E-Tag at RTD LMP	0 MW	N/A	0 MWh

*Decline charge only applies if FMM Undelivered Quantity exceeds 10% of total transactions

Summary: The scheduling coordinator notified the ISO in advance of the undeliverable energy. Although any undeliverable energy has adverse operational and market impacts, both the operator and the market are aware of the change and may have time to re-commit internal supply or intertie resources. The scheduling coordinator has 100 MW applied toward the decline charge threshold.

Example #2 – Day-ahead market import resource not tagged

Setup: A resource receives a 100 MW award in the day-ahead market. The scheduling coordinator does not bid into the real-time market, therefore, the award remains at 100 MW. The 100 MW award is *accepted* in the automated dispatch system, but no E-Tag is submitted.

	Interval 1	Interval 2	Interval 3	Interval 4
DA Award	100 MW	100 MW	100 MW	100 MW
HASP schedule	100 MW	100 MW	100 MW	100 MW
FMM award	100 MW	100 MW	0 MW	0 MW
E-Tag	0 MW	0 MW	0 MW	0 MW

Settlement: The fifteen-minute market undelivered quantity is 100 MW for the intervals 3 and 4. Therefore, 50 MWh will be applied towards the end-of-month summation to determine if the 10% threshold is exceeded and the decline charge should be applied. The operational adjustment is 100 MW for intervals 1 and 2 because the E-Tag does not match the total expected energy. This totals 50 MWh of operational adjustment at the real-time dispatch locational marginal price.¹⁸

Settlement	Quantity	Intervals	MWh
Instructed Imbalance Energy = DA – FMM award at FMM LMP	100 MW	3 – 4	50 MWh
FMM Undelivered Quantity (Decline Charge*) = HASP schedule – FMM award at 50% FMM LMP	100 MW	3 – 4	50 MWh
Operational Adjustment = FMM award – E-Tag at RTD LMP	100 MW	1 – 2	50 MWh

*Decline charge only applies if FMM Undelivered Quantity exceeds 10% of total transactions

Summary: The scheduling coordinator did not notify the ISO in advance of the undeliverable energy. Undelivered intertie resources are never beneficial for the ISO, but the failure to submit an E-Tag is even worse than declining an award by T-40. Neither the operator nor the market are aware of any shortage for the first two intervals of the operating hour. The scheduling coordinator has 50 MW applied toward the decline charge threshold. In comparison to Example #1, the MWh applied toward the decline charge is less even though the behavior of not tagging creates operational challenges for the ISO.

¹⁸ MW is the unit of instantaneous power at any given moment in time. MWh is a unit of energy, which is defined as power over a specified time – in this case an hour. MWh can be calculated by determining the power (MW) for each 15-minute interval. For example #2, 100 MW was generated for two 15-minute intervals and 0 MW was generated for two 15-minute intervals. Therefore, $100 \times (1/4) + 100 \times (1/4) + 0 \times (1/4) + 0 \times (1/4) = 50$ MWh.

Example #3 – Real-time market import resource declined

Setup: A resource receives no award in the day-ahead market. The scheduling coordinator bids into the real-time market and is awarded 100 MW. The 100 MW award is *declined* in the automated dispatch system.

	Interval 1	Interval 2	Interval 3	Interval 4
DA award	0 MW	0 MW	0 MW	0 MW
HASP schedule	100 MW	100 MW	100 MW	100 MW
FMM award	0 MW	0 MW	0 MW	0 MW
E-Tag	0 MW	0 MW	0 MW	0 MW

Settlement: The fifteen-minute market undelivered quantity is 100 MW for intervals 1 – 4. Therefore, 100 MWh will be applied towards the end-of-month summation to determine if the 10% threshold is exceeded and the decline charge should be applied. The operational adjustment is 0 MW for all intervals because the E-Tag matches the total expected energy.

Settlement	Quantity	Intervals	MWh
Instructed Imbalance Energy = DA – FMM award at FMM LMP	0 MW	N/A	0 MWh
FMM Undelivered Quantity (Decline Charge*) = HASP schedule – FMM award at 50% FMM LMP	100 MW	1 – 4	100 MWh
Operational Adjustment = FMM award – E-Tag at RTD LMP	0 MW	N/A	0 MWh

*Decline charge only applies if FMM Undelivered Quantity exceeds 10% of total transactions

Summary: The scheduling coordinator notified the ISO in advance of the undeliverable energy. The decline of an intertie award is never beneficial for the ISO, but in this case both the operator and the market are aware of the shortage in advance of the fifteen-minute market run. The scheduling coordinator has 100 MW applied toward the decline charge threshold. Declining an award has the same impact and settlement (with the exception of the hour-ahead scheduling process reversal rule) regardless if the award was from the day-ahead or real-time market.

Example #4 – Real-time market import resource not tagged

Setup: A resource receives no award in the day-ahead market. The scheduling coordinator bids into the real-time market and is awarded 100 MW. The 100 MW award is *accepted* in the automated dispatch system, but no E-Tag is submitted.

	Interval 1	Interval 2	Interval 3	Interval 4
DA Award	0 MW	0 MW	0 MW	0 MW
HASP schedule	100 MW	100 MW	100 MW	100 MW
FMM award	100 MW	100 MW	0 MW	0 MW
E-Tag	0 MW	0 MW	0 MW	0 MW

Settlement: The fifteen-minute market undelivered quantity is 100 MW for intervals 3 – 4. Therefore, 50 MWh will be applied towards the end-of-month summation to determine if the 10% threshold is exceeded and the decline charge should be applied. The operational adjustment is 100 MW for intervals 1 -2 because the E-Tag does not match the total expected energy. This totals 50 MWh of operational adjustment at the real-time dispatch locational marginal price.

Settlement	Quantity	Intervals	MWh
Instructed Imbalance Energy = DA – FMM award at FMM LMP	100 MW	1 – 2	50 MWh
FMM Undelivered Quantity (Decline Charge*) = HASP schedule – FMM award at 50% FMM LMP	100 MW	3 – 4	50 MWh
Operational Adjustment = FMM award – E-Tag at RTD LMP	100 MW	1 – 2	50 MWh

*Decline charge only applies if FMM Undelivered Quantity exceeds 10% of total transactions

Summary: The scheduling coordinator did not notify the ISO in advance of the undeliverable energy. By failing to submit an E-Tag neither the operator nor the market are aware of the change. However, in comparison to Example #3, the scheduling coordinator only has 50 MW applied toward the decline charge threshold. The scheduling coordinator has a smaller MW amount applied towards the decline charge even though the behavior of not tagging is less desirable than declining an award in advance of the fifteen-minute market run. Not submitting an E-Tag has the same impact and settlement (with the exception of the hour-ahead scheduling process reversal rule) regardless of the award was from the day-ahead or the real-time market.

Example #5 – Tag submitted for partial amount of award

Setup: A resource receives a 100 MW award in the day-ahead market. The scheduling coordinator bids into the real-time market and is awarded an additional 20 MW. The 120 MW award is *accepted* in automated dispatch system, but an E-Tag is submitted for only 80 MW.

	Interval 1	Interval 2	Interval 3	Interval 4
DA Award	100 MW	100 MW	100 MW	100 MW
HASP schedule	120 MW	120 MW	120 MW	120 MW
FMM award	120 MW	120 MW	80 MW	80 MW
E-Tag	80 MW	80 MW	80 MW	80 MW

Settlement: The fifteen-minute market undelivered quantity is 40 MW for intervals 3 – 4. Therefore, 20 MWh will be applied towards the end-of-month summation to determine if the 10% threshold is exceeded and the decline charge should be applied. The operational adjustment is 40 MW for intervals 1 - 2 because the E-Tag does not match the total expected energy. This totals 20 MWh of operational adjustment at the real-time dispatch locational marginal price.

Settlement	Quantity	Intervals	MWh
Instructed Imbalance Energy = DA – FMM award at FMM LMP	+20 MW	1 – 2	0 MWh
	-20 MW	3 – 4	
FMM Undelivered Quantity (Decline Charge*) = HASP schedule – FMM award at 50% FMM LMP	40 MW	3 – 4	20 MWh
Operational Adjustment = FMM award – E-Tag at RTD LMP	40 MW	1 – 2	20 MWh

*Decline charge only applies if FMM Undelivered Quantity exceeds 10% of total transactions

Summary: The scheduling coordinator did not notify the ISO in advance that a portion of the energy was undeliverable. This is not beneficial for the ISO; neither the operator nor the market are aware of the change. The scheduling coordinator has a smaller MW amount applied towards the decline charge even though the behavior of not tagging is less desirable than declining an award. Submission of an E-Tag that is only a portion of the accepted award still has operational and settlement impacts.

Example #6 – Tag curtailed for reliability reasons

Setup: A resource receives a 100 MW award in the day-ahead market. The scheduling coordinator bids into the real-time market and is awarded an additional 20 MW. The 120 MW award is *accepted* in the automated dispatch system, an E-Tag is submitted, but the E-Tag is curtailed to 80 MW for reliability reasons.

	Interval 1	Interval 2	Interval 3	Interval 4
DA Award	100 MW	100 MW	100 MW	100 MW
HASP schedule	120 MW	120 MW	120 MW	120 MW
FMM award	120 MW	120 MW	80 MW	80 MW
E-Tag	80 MW	80 MW	80 MW	80 MW

Settlement: The fifteen-minute market undelivered quantity is 40 MW for intervals 3 – 4. Therefore, 20 MWh will be applied towards the end-of-month summation to determine if the 10% threshold is exceeded and the decline charge should be applied. The operational adjustment is 40 MW for intervals 1 - 2 because the E-Tag does not match the total expected energy. This totals 20 MWh of operational adjustment at the real-time dispatch locational marginal price.

Settlement	Quantity	Intervals	MWh
Instructed Imbalance Energy = DA – FMM award at FMM LMP	+20 MW - 20 MW	1 – 2 3 – 4	0 MWh
FMM Undelivered Quantity (Decline Charge*) = HASP schedule – FMM award at 50% FMM LMP	40 MW	3 – 4	20 MWh
Operational Adjustment = FMM award – E-Tag at RTD LMP	40 MW	1 – 2	20 MWh

*Decline charge only applies if FMM Undelivered Quantity exceeds 10% of total transactions

Summary: The scheduling coordinator correctly accepted the market award and submitted an E-Tag. However, the E-Tag was curtailed for reliability reasons. In comparison to Example #5, this example has the same settlement implications. The scheduling coordinator is impacted and has 20 MWh applied towards the decline charge threshold even though the scheduling coordinator was not at fault.

Example #7 – Real-time market export resource partial accepted

Setup: An intertie resource bids into the real-time market as an export (exporting energy out of the CAISO balancing authority area) and is awarded 50 MW. The export resource partially accepts the award to 25 MW. The ISO net schedules intertie resources meaning the summation of import and export resources cannot exceed the scheduling limit. Therefore, an increase of an export enables additional import resources to be dispatched. Because the export resource only partially accepts the award but the import resources fully accept their awards, the ISO exceeds the scheduling limit and must pro-rata curtail all import resources.

	eTag	DA	HASP	Accepted DOT	Curtailed MW	Final eTag
Accepted incremental dispatch	Import_1	50	50	50	5	45
	Import_2	100	100	100	10	90
	Import_3	0	25	25	2	23
	Import_4	50	75	75	8	67
Partial accepted decremental dispatch	Export_1	0	(50)	(25)	0	(25)
	LIMIT	200	200	200	200	200
	TOTAL	200	200	225	25	200

Summary: In this scenario, the partially accepted export in combination with the fully accepted imports resulted in the intertie being net scheduled over its limit. The ISO always expects hour-ahead scheduling process awards to be accepted. Based on that assumption, the partially accepted export resource has caused the intertie to be over scheduled. This results in curtailments to all import resources – even import resources that were scheduled in the day-ahead market and have not made any bidding and/or tagging changes. The curtailment negatively impacts all import resources but does not negatively impact the export resource. The ISO requests stakeholder feed to discuss possible solutions to address this problem.

6. Data Analysis

This section includes data analysis to quantify the root cause of intertie declines and the magnitude of the decline charge in comparison to total deviations.

6.1 Root Cause for Intertie Declines

Many stakeholders requested root-cause analysis to determine why scheduling coordinators are either declining or not tagging intertie resources. When an hour-ahead scheduling process schedule is partially accepted or declined, the automated dispatch system requires the scheduling coordinator input a reason.

The scheduling coordinator can select one of the following options to decline an intertie award:

- Bad Bid Submitted
- Economic Consideration
- Line Down
- No Available Transmission
- Unit Derate

Data analysis has been completed and summarizes the reasons for intertie declines. This data summarizes declined and partially accepted awards, categorized by reason, from July 2017 – June 2018.

Figure 6: Declined imports and exports categorized by reason for July 2017 – June 2018.

Reason for Decline	% of Total Declines, Imports	% of Total Declines, Exports
Bad Bid Submitted	50.38%	53.76%
No Available Transmission	19.68%	-0.61% ¹⁹
Economic Consideration	16.89%	44.96%
Unit Derate	8.60%	1.89%
Line Down	4.45%	0.00%

For intertie imports and exports, the majority of declines occur due to “Bad Bid Submitted”. The intent of this option is to indicate that a bid was incorrectly submitted into the ISO market. However, based on the frequency with which this option is selected, it may also mean that although the bid has cleared, the scheduling coordinator is no longer satisfied with the clearing price of the bid. The reason the scheduling coordinator selects “Bad Bid Submitted” is subjective.

It is significant to note that “Bad Bid Submitted”, “Economic Considerations” and “No Available Transmission” are all within control of the scheduling coordinator. Only “Line Down” and “Unit Derate” indicate a forced outage is the reason for the decline – these are outside control of the scheduling

¹⁹ The negative percent occurs when intertie schedules accept a value greater than the HASP schedule. This occurs when an import resource declines a decremental award, or when an export resource declines an incremental award.

coordinator. For import resources, only 13.05% of declines (4.45% due to “Line Down” + 8.60% due to “Unit Derate” = 13.05%) occur due to reasons beyond control of the scheduling coordinator. For export resources, only 1.89% of declines occur due to reasons beyond control of the scheduling coordinator.

The ISO has provided data regarding declined and partially accepted awards, but is unable to produce concrete data for the reason scheduling coordinators choose not to tag accepted awards. Scheduling coordinators may choose not to submit an E-Tag for a corresponding market award for many reasons that are unknown to the ISO.

Powerex has summarized why this may occur in their written comments in response to the *Intertie Deviation Settlement* issue paper.²⁰ Powerex explains that scheduling coordinators may fail to tag and deliver award energy for three reasons: (1) energy cannot be delivered due to a forced outage, (2) energy is not delivered because seller elects to deliver the energy elsewhere, and (3) speculative energy supply was bid into the market but is not tied to a physical generator or transmission. These items are summarized in Figure 7: Powerex summary for intertie delivery failures.

The first item is completely beyond control of the scheduling coordinator. Forced outages are unpredictable and unavoidable – they also are not correlated to low supply conditions that may result in high prices in the ISO’s markets.

The second two items, however, are in control of the market participant. If prices are higher outside of the ISO, a seller can choose to deliver the energy elsewhere in hopes of economic gains or, a seller may not have physical generation available when bidding into the real-time market. If the bid clears at a favorable price, the seller will attempt to locate physical generation and transmission. If this cannot be complete, the seller likely faces no consequences as long as the 10% decline charge threshold has not been exceeded.

²⁰ See Powerex written comments in response to the *Intertie Deviation Settlement* issue paper, page 5: <http://www.caiso.com/Documents/PowerexComments-IntertieDeviationsSettlement-IssuePaper.pdf>

Figure 7: Powerex summary for intertie delivery failures.

Category	Factors Driving Delivery Failure	Risk to CAISO (and EIM)
Physical supply, delivery according to final award	Forced outages or de-rates at source BAA; transmission curtailment	Risk generally not correlated to alternative supply conditions; comparable to risks for internal resources
Physical supply, but seller elects non-delivery to CAISO in order to sell in other markets	Risk that more attractive market opportunities exist outside CAISO	Risk is elevated during tight regional supply conditions; Consequences are also likely more severe , as CAISO faces fewer or more costly alternative supply options
Speculative energy supply (non-RA)	Risk that external supply is not available, or price makes physical delivery uneconomic for seller	

Source: Powerex comments on Intertie Deviation Settlement issue paper, page 5.

In summary, the ISO has determined intertie declines occur most commonly due to the submission of bad bids. The ISO is unable to explicitly state why under-tagging occurs but believes it is likely due to economic reasons or because the seller is unable to purchase generation at a favorable price. The ISO plans to address intertie declines and under-tagging with the new under/over delivery charge that is explained in [Section 7](#).

6.2 Decline Charge Settlement Data

The decline charge is calculated by summing the total fifteen-minute market undelivered quantity (in MWh) over the course of a month. If the total exceeds 10% of total transactions (in the import and export direction individually) the decline charge applies. The price applied is the maximum of \$10.00 or 50% of the fifteen-minute market locational marginal price for each MWh that exceeds the threshold.

The data below summarizes the total decline charge applied to all scheduling coordinators from July 2017 - June 2018 by month in the import and export direction.

- **Decline Charge (\$)** is the total charge applied to all scheduling coordinators in the import and export direction respectively for a given month
- **Potential Decline Charge (\$)** is the total cost of the decline charge if it were applied by interval and without a threshold
- **Declined Quantity (MWh)** is the total amount of undelivered intertie resources including declined, under-tagged, and curtailed resources for all scheduling coordinators in the import and export direction respectively for a given month

Figure 8 and Figure 9: Total applied decline charge (\$) due to undelivered imports for all scheduling coordinators for January 2017 – June 2018 by month.

IMPORTS Date	Decline Charge (\$)	Decline Charge as % of Potential	Potential Decline Charge (\$)	Declined Quantity (MWh)
2017	\$ 5,886	0.26%	\$ 2,265,863	92,706
Jul-17	\$ -	0.00%	\$ 263,560	15,827
Aug-17	\$ 5,886	2.55%	\$ 231,042	8,812
Sep-17	\$ -	0.00%	\$ 309,106	12,772
Oct-17	\$ -	0.00%	\$ 487,151	23,800
Nov-17	\$ -	0.00%	\$ 853,499	25,258
Dec-17	\$ -	0.00%	\$ 121,505	6,237
2018	\$ 7,815	0.52%	\$ 1,495,763	73,867
Jan-18	\$ -	0.00%	\$ 91,105	5,346
Feb-18	\$ -	0.00%	\$ 562,312	11,302
Mar-18	\$ -	0.00%	\$ 208,247	12,507
Apr-18	\$ -	0.00%	\$ 225,683	14,055
May-18	\$ 7,815	3.87%	\$ 201,958	15,954
Jun-18	\$ -	0.00%	\$ 206,458	14,704
Grand Total	\$ 13,701	0.36%	\$ 3,761,626	166,573

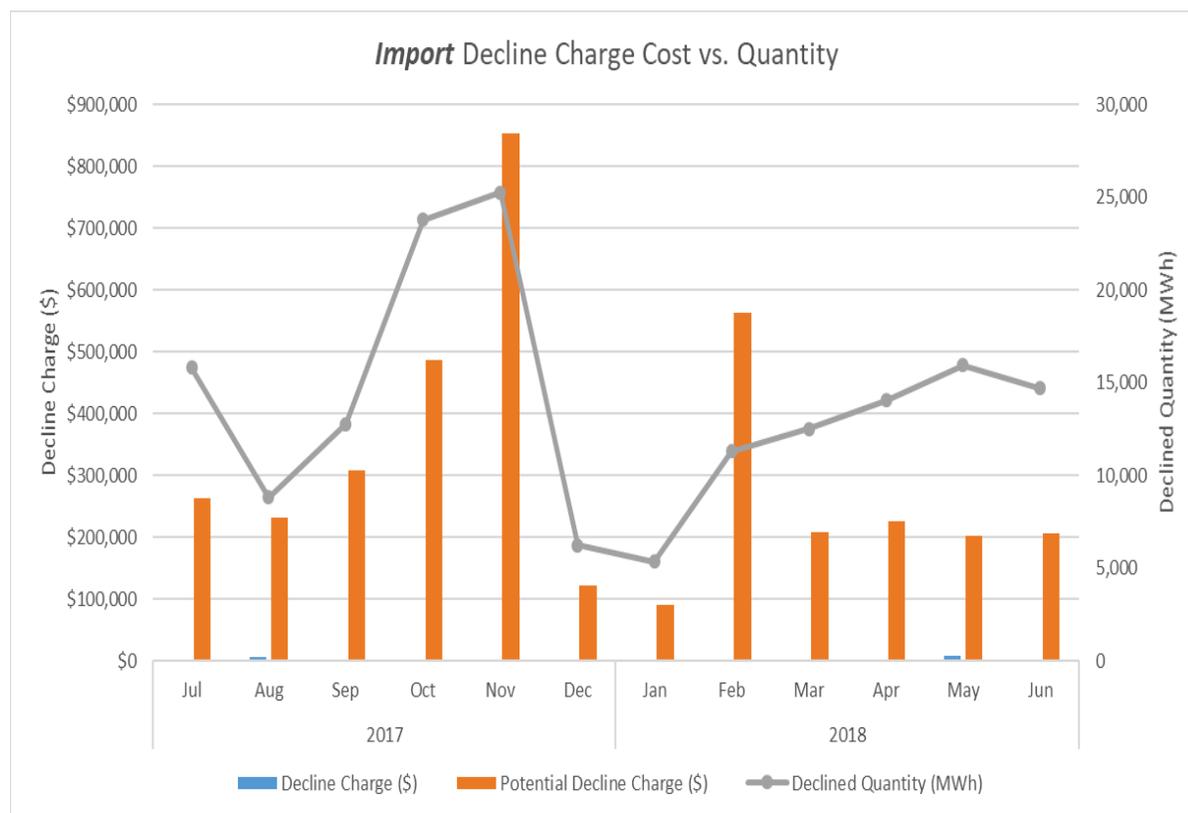
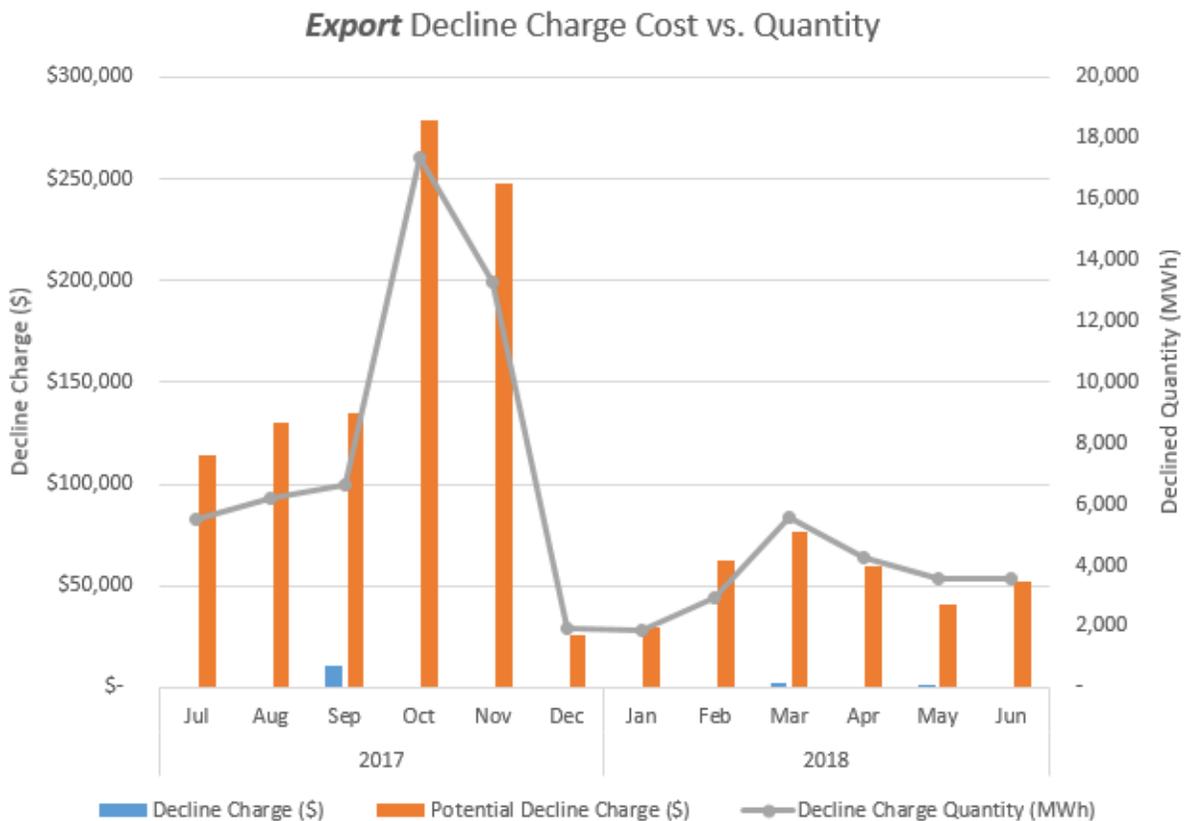


Figure 10 and Figure 11: Total applied decline charge (\$) due to undelivered exports for all scheduling coordinators for January 2017 – June 2018 by month.

EXPORTS Date	Decline Charge (\$)	Decline Charge as % of Potential	Potential Decline Charge (\$)	Decline Charge Quantity (MWh)
2017	\$ 10,809	1.16%	\$ 930,630	50,901
Jul	\$ -	0.00%	\$ 113,811	5,507
Aug	\$ -	0.00%	\$ 130,402	6,182
Sep	\$ 10,809	8.03%	\$ 134,579	6,662
Oct	\$ -	0.00%	\$ 279,018	17,340
Nov	\$ -	0.00%	\$ 247,447	13,286
Dec	\$ -	0.00%	\$ 25,372	1,925
2018	\$ 2,995	0.93%	\$ 321,397	21,785
Jan	\$ -	0.00%	\$ 29,706	1,900
Feb	\$ -	0.00%	\$ 62,521	2,945
Mar	\$ 2,225	2.90%	\$ 76,742	5,566
Apr	\$ -	0.00%	\$ 59,528	4,268
May	\$ 770	1.89%	\$ 40,796	3,547
Jun	\$ -	0.00%	\$ 52,105	3,558
Grand Total	\$ 13,804	1.10%	\$ 1,252,026	72,687



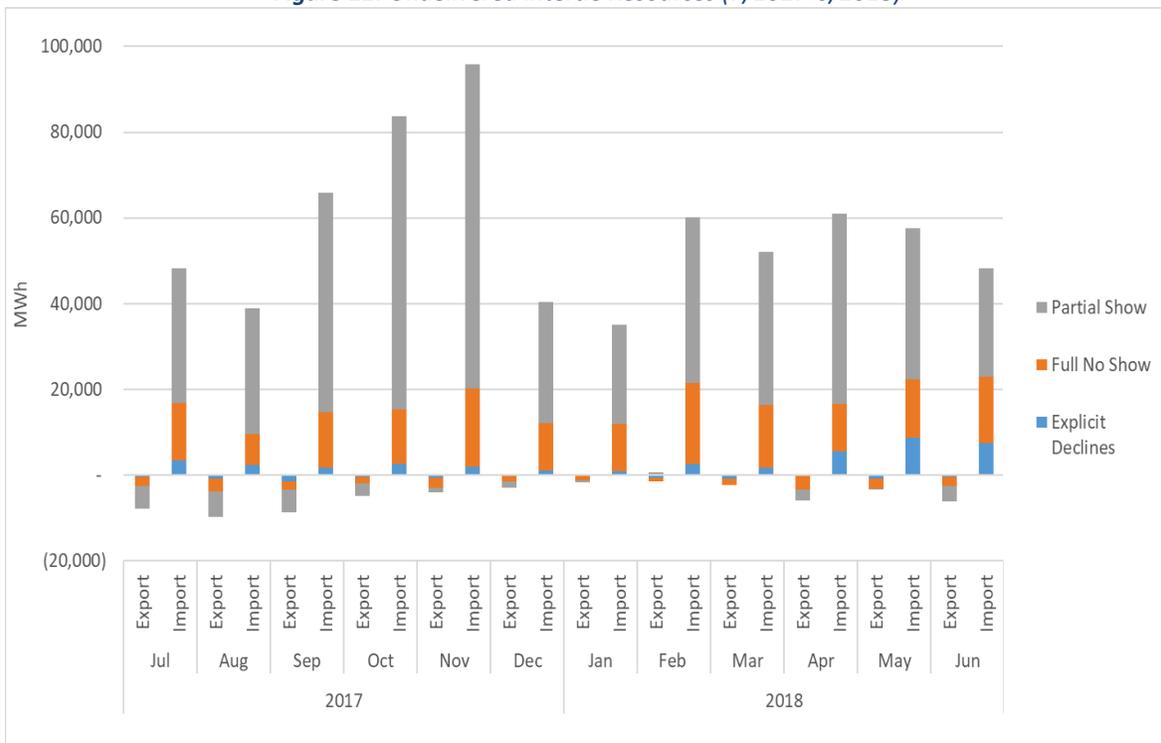
6.3 Frequency of Declines and Under-Tagging of Intertie Resources

This section includes data analysis to summarize the historical volume in MWh of undelivered intertie resources for July 2017 through June 2018. The causes for undelivered intertie resources fall into three categories:

1. **Explicit declines** = HASP schedule is declined in the ADS system
2. **Full no-show** (no E-Tag submitted) = HASP schedule is accepted in the ADS system but no E-Tag is submitted
3. **Partial show/accept**²¹ = HASP schedule is accepted in the ADS system but the E-Tag that is submitted does not match the ADS accepted schedule.

The volume of MWh depicted in **Figure 12** through **Figure 15**: Range of Hourly Undelivered Intertie Resources – Import Direction (8/28/2017 – 9/3/2017) is representative of HASP awards minus actual RTD awards. For this analysis, curtailments have been removed from the data set. The majority of undelivered intertie resources are due to partially accepted awards as opposed to explicitly declined awards. The data shows the majority of awarded but undelivered energy occurs because the scheduling coordinator fails to submit an E-Tag on time rather than decline the award prior to T-40 in the automated dispatch system. Failure to submit an E-Tag results in decreased situational awareness and leaves market resolution to the 5-minute real-time dispatch.

Figure 12: Undelivered Intertie Resources (7/2017-6/2018)



²¹ See Section 3.1 for definition of Partial Accept.

Figure 13 examines the range of total undelivered intertie resources in the import direction on an hourly granularity. The total amount of undelivered interties is represented by combining the MWh quantities of explicit declines, full no show and partial show/accepted awards. Each hour of the year (July 2017- June 2018) analyzed has three corresponding points: the minimum, maximum, and average undelivered intertie quantity that occurred during that specific hour. The range of undelivered intertie quantities is noticeably greater during the evening peak hours. The maximum points during these hours highlight there is a greater amount of uncertainty during this time as the potential amount of undelivered intertie resources reaches up to 2,368 MWh in hour ending 17. In order to maintain stable grid conditions, the ISO operators may be prepared to cover the maximum amount of potential undelivered energy on the interties across all hours.

Figure 13: Range of Hourly Undelivered Intertie Resources – Import Direction (7/2017 - 6/2018)

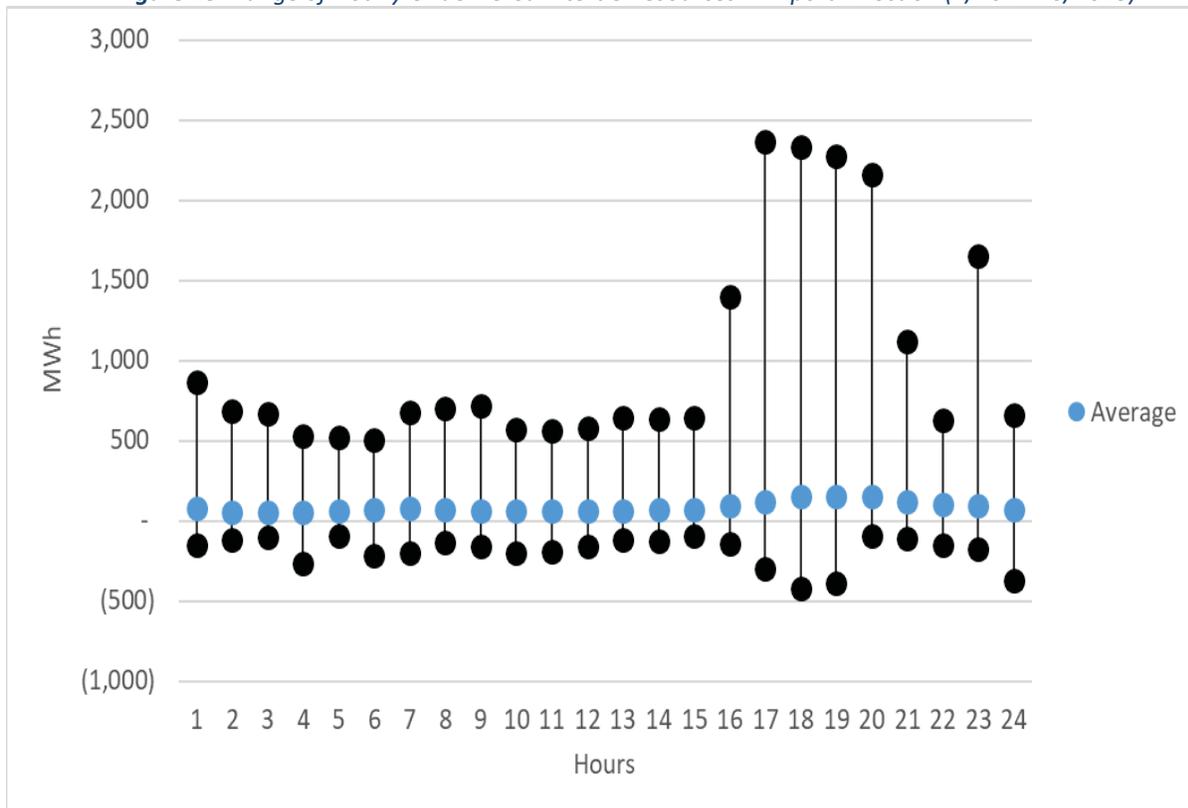


Figure 14 quantifies the undelivered intertie awards during the critical period of the September 1-2, 2017 heat wave. It is evident that the amount of undelivered interties was more prevalent during the warmest days of the week of August 28 – September 3, 2017.

Figure 14: Undelivered Intertie Resources (8/28/2017 - 9/3/2017)

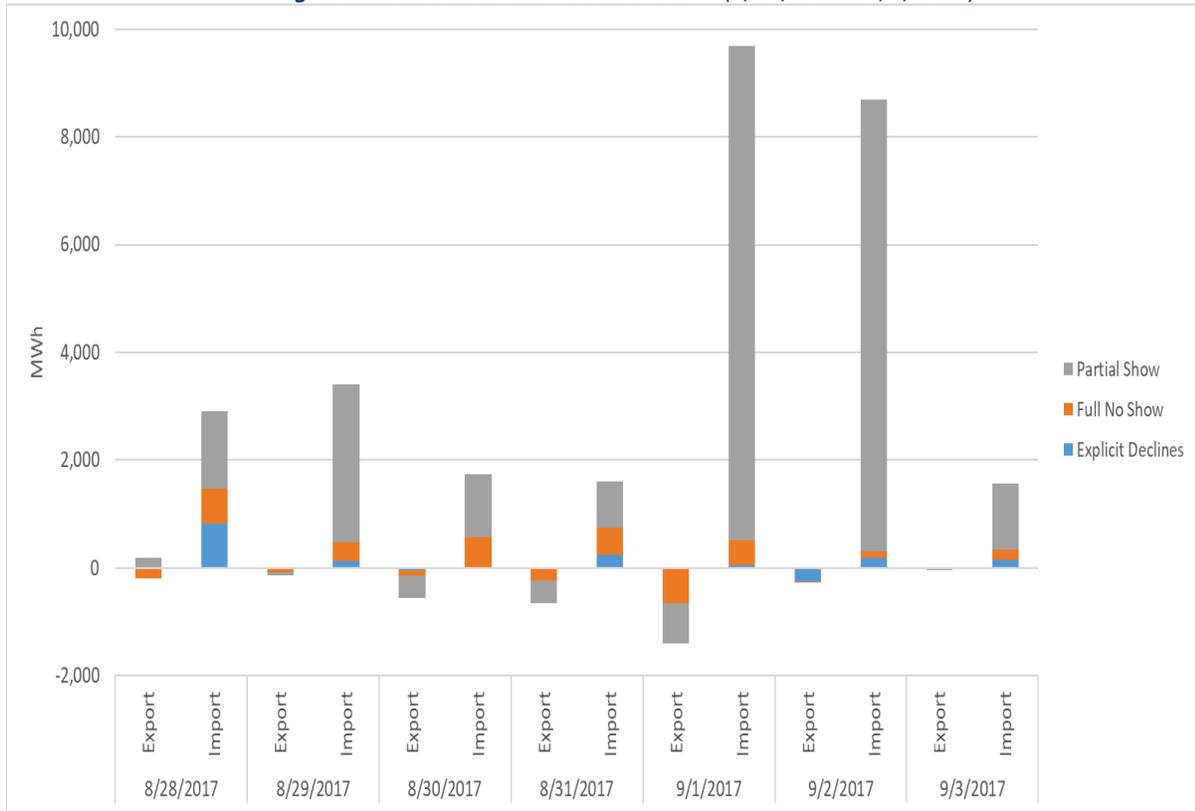
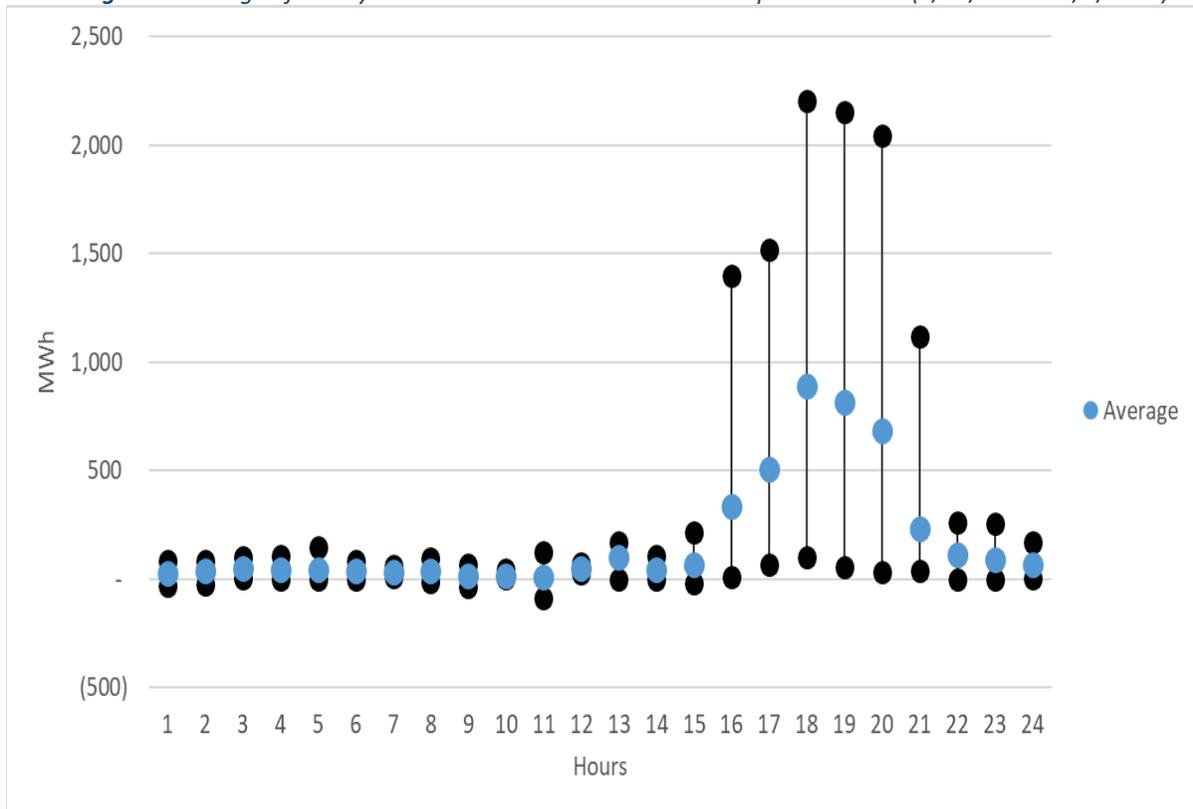


Figure 15 examines the range of total undelivered intertie resources in the import direction on an hourly granularity during the critical period of the September 1-2, 2017 heat wave. Similar to **Figure 13**, the range of total undelivered interties is the greatest during the evening peak hours. Even while the system is stressed due to high temperatures throughout the West, it is vital that the potential amount of undelivered interties is accounted for.

Figure 15: Range of Hourly Undelivered Intertie Resources – Import Direction (8/28/2017 – 9/3/2017)



7. Under/Over Delivery Charge Proposal

The purpose of the decline charge is to incentivize delivery of awarded energy. The existing framework of the decline charge is not effective because (1) the monthly threshold is too high, (2) the charge does not apply to 15-minute resources, (3) the charge does not account towards import resources that decline a decremental dispatch between the day-ahead and real-time market (or export resources that decline an incremental dispatch) between the day-ahead and real-time market.

If a scheduling coordinator is subject to the existing decline charge (total deviations exceed 10% of total transactions for the month), the scheduling coordinator is charged at 50% of the fifteen-minute market locational marginal price per MWh. The fifteen-minute market price, however, does not accurately reflect that the energy was undelivered. By the time the deviation occurs, the fifteen-minute market is not necessarily able to dispatch additional energy on the interties. Therefore, the real-time dispatch is used to address the shortage. This may result in an unnecessary increase in the real-time market price because the market had to clear at a higher bid than it would have if the intertie had been delivered.

The ISO proposes to eliminate the decline charge and replace it with a new settlement mechanism henceforth known as the under/over delivery charge. This proposal applies to all import and export intertie resources, excluding dynamic intertie resources. Explicitly, the proposed under/over delivery charge will apply to intertie resources awarded in the:

- Day-ahead market
- Hour-ahead scheduling process
- Incremental and decremental changes between the day-ahead market and hour-ahead scheduling process
- Fifteen-minute market

The objective of this initiative is to decrease the number of undelivered intertie resources that occur due to declines and under-tagging. Therefore, the purpose of the new charge is to incentivize acceptance and delivery of market awards – if an award is either declined or not tagged, the market participant will be charged based on the price implications to the real-time market. The ISO proposes the framework summarized in the subsections below for the under/over delivery charge.

7.1 Determination of Fifteen-Minute Binding for Hourly Block Resources

As explained in [Section 4.2: FERC Order 764 Impacts](#), the ISO no longer settles intertie schedules on an hourly basis. Instead, the ISO settles for every fifteen minute interval based on the fifteen-minute locational marginal price. In order to accommodate hourly-block scheduling, which is a common practice in the western interconnection, the ISO agreed to continue to allow hourly intertie transactions but would settle them for each fifteen-minute interval.

The following terms are related to hourly-block scheduling and used in the sections below. They are defined here so stakeholders have a compressive overview of the proposal and understand the correlation between the terms.

Hourly-block bid option. A bid indicating the scheduling coordinator is choosing to keep the intertie schedule (i.e. energy profile) at the same value for the entire operating hour.

Hour-ahead scheduling process (HASP) schedule. The schedule that has cleared the ISO market based on the hourly-block bid. This is the value is published roughly sixty minutes prior to the operating hour (T-0) and is the amount of energy the scheduling coordinator should tag. The HASP schedule is not used directly for settlement purposes.

Fifteen-minute market binding award. Award used for settlement purposes. The award value may differ for each interval and is based on logic that considers the energy and/or transmission profile on the E-Tag. Although the fifteen-minute market award may change, the energy schedule for the hourly-block resource will stay the same during the hour. Differences between the fifteen-minute market award and the hourly-block energy profile are subject to imbalance energy settlement and under/over delivery charge.

The fifteen-minute market binding award for hourly block intertie resources is currently equal to the hour-ahead scheduling process award accepted in the automated dispatch system (under typical circumstances) for the first two intervals of the operating hour. This is problematic because the fifteen-minute market assumes a tag will be submitted to match the market award even though there is no guarantee of the tag submission. For additional information about the current fifteen-minute market logic reference [Section 5.2: Intertie Declines Examples, Market Timing & Logic](#).

If a scheduling coordinator fails to submit an E-Tag, it is too late for the hour-ahead scheduling process to schedule additional energy. In this situation, the ISO is not only short energy (or in an energy surplus if an export is not tagged), but the ISO has also reserved transmission capacity for that resource which will go unused. Untagged energy can result in the fifteen-minute market prices being lower than they should have been, and real-time dispatch prices higher than they should have been. The FMM should have cleared at a lower price if the awarded energy was not going to be delivered (market would have cleared lower on the bid stack). Replacing the energy results in a price increase in the real-time market. If the real-time market is unable to replace the energy, the ISO may experience reliability problems.

Therefore, instead of assuming the accepted award will be delivered, the ISO proposes to determine the fifteen-minute binding award for hourly blocked resources based on the E-Tag at T-40. The fifteen minute market binding award will equal the lower of the HASP schedule, HASP accepted award (ADS accepted value), or E-Tag transmission profile.

Figure 16: Proposed market logic used to determine awards for hourly block intertie resources.

FMM Binding Interval of Operating Hour	Time of Operating Hour	RTPD #	Logic Used to Determine Binding Award
1	00 – 15	5	MIN(HASP schedule, ADS accepted value, E-Tag transmission profile)
2	15 – 30	4	MIN(HASP schedule, ADS accepted value, E-Tag transmission profile)
3	30 – 45	7	E-Tag energy profile
4	45 – 00	6	E-Tag energy profile

For example: if an hourly blocked schedule is accepted in the automated dispatch system but no E-Tag is submitted in advance of the fifteen-minute market run, the binding award will equal 0 MW. Contrarily, if an E-Tag is submitted but is greater than the market award, the fifteen-minute market binding award will still equal the HASP schedule.

The CAISO proposes to use the E-Tag transmission profile as opposed to the E-Tag energy profile for determination of the fifteen-minute market binding award. If an E-Tag with a transmission profile is submitted, the ISO believes this is an adequate indicator that the scheduling coordinator intends to deliver the awarded energy. As such, it is appropriate that the fifteen-minute market makes the assumption and recognizes that the energy will most likely be delivered. This aligns with the logic that is used for the determination of awards for fifteen-minute dispatchable resources.

This logic aligns with the fifteen-minute dispatchable intertie resources which are required to submit an E-Tag with a transmission profile prior to the fifteen-minute market run.²² If no E-Tag is submitted, the resource does not receive a binding award. Going forward, the ISO proposes to make binding award determinations for all imports and exports based on the submission of an E-Tag as opposed to the assumption that a tag will be submitted to match the market award. This allows the fifteen-minute market to schedule resources according to what is tagged, as opposed to what we assume will be tagged.

The enhanced fifteen-minute market logic also encourages scheduling coordinators to have physical generation and transmission procured when a bid is submitted. Assuming a bid clears, the ISO expects the energy to be delivered. If a scheduling coordinator is unable to tag the energy prior to the market

²² The Business Practice Manual for Market Operations (section 8.5.2) and the ISO Tariff (section 30.6.2.5) currently say fifteen-minute dispatchable resources must have an E-Tag submitted by T-37.5. The ISO proposes to change this to T-40. The market needs time to receive and process the E-Tag information so it can be used in the market run, which begins at exactly T-37.5.

run, the ISO market will no longer assume this energy will be delivered. This logic also ensures intertie schedules that are counted toward the resource sufficiency test have tagged and available transmission and a supply source.

Note: Intertie resources that receive a manual dispatch or have contract rights will be excluded from this logic. In these scenarios, the market may assume the energy will be delivered even if an E-Tag has not yet been submitted.

7.2 Removal of Tagging Deadline

In the *Intertie Deviation Settlement* Straw Proposal, the ISO proposed a real-time E-Tagging deadline of T-40. The intent behind the tagging deadline was to ensure E-Tags were submitted and approved in advance of the fifteen-minute market run that occurs at T-37.5. After further investigation, the ISO has decided to remove the E-Tagging deadline for the following reasons:

- Forecasts for variable energy resources in the Pacific Northwest are not published until T-30. Therefore, the proposed ISO tagging deadline of T-40 creates a 10 minute gap. It would be impossible for final tags to be submitted and approved 10 minutes prior to the publication of the forecast. The ISO is committed to the integration of renewable resources; the flexibility to adjust tags following the T-30 renewable forecast publication is necessary.
- The ISO strives to ensure the most accurate market inputs. While a T-40 tagging deadline would meet this objective, it fails to recognize and appreciate the flexibility that is needed to manage the grid in real-time. If a scheduling coordinator was unable to submit a 100 MW tag before T-40 due to a circumstance outside of his control, the ISO would still want the 100 MW tag to be submitted between T-40 and T-20 to ensure the energy could be delivered. The ISO would rather receive the 100 MW than not receive it at all. In this scenario, the scheduling coordinator would be subject to imbalance energy settlement for the first interval of the hour because the fifteen-minute market did not reflect the submission of the E-Tag.

The ISO will business practice manuals will identify the best practice of submitting an E-Tag with a transmission profile by T-40. This allows for the most efficiency market optimization and is an indication to the ISO that the scheduling coordinator intends to deliver the energy. Additionally, there are economic incentives in place to encourage the best-practice behavior of submitting an E-Tag by T-40.

The ISO intends to provide flexibility to scheduling coordinators by allowing the update/adjustment of energy profiles until T-20. This ensures forecasts are reflected and encourages delivery of energy even if the T-40 best-practice timeline is not met.

7.3 Exclusion of Curtailments

When the decline charge was originally developed, the ISO had no way to distinguish between operator reliability curtailments and scheduling coordinator under (or over) tagging. The existing decline charge compares the hour-ahead scheduling process award to the final E-Tag energy profile – there is no specific distinction between when an operator curtailed E-Tag and a scheduling coordinator adjusted E-Tag.

For purposes of discussion, the ISO will use the following language to distinguish between an operator and a scheduling coordinator adjustment:

Adjustment. A change to an E-Tag's energy profile that is submitted by the scheduling coordinator. When an E-Tag differs from a market award due to an adjustment, the scheduling coordinator is responsible for the difference between the tag and the award.

Curtailment. A change to an E-Tag's energy profile that is submitted by a balancing authority area operator for a reliability reason. When an E-Tag differs from a market award due to a curtailment, the balancing authority area operator is responsible for the difference between the tag and the award. A curtailment can be completed by the ISO balancing authority operator, or balancing authority operator from another region but must be done for reliability reasons.

The ISO now has the ability to distinguish between curtailments and adjustments. Therefore, the ISO proposes to exclude balancing authority operator curtailments from the under/over delivery charge. Consistent with the settlement structure used today, curtailments will continue to be settled for imbalance energy. If an E-Tag is both curtailed and adjusted, the ISO will only apply the under/over delivery charge to the amount of the adjustment. The curtailed amount will be excluded from the charge.

It is critical to note that E-Tag adjustments can be denied by scheduling coordinators whereas curtailments cannot. Therefore, if the ISO is required to change an E-Tag energy profile because the energy profile exceeds the market award, the ISO can elect to curtail the E-Tag. In this scenario, the E-Tag was curtailed at the resources level for a non-reliability reason. These E-Tags will be flagged to be included in the penalty, whereas reliability curtailments by the ISO (or other BAAs/TSPs) will be excluded from the penalty.

- Curtailments by the ISO that occur at the resource level are due to the resource not tagging correctly. These resources will be flagged and are subject to the under/over delivery charge.
- Curtailments by the ISO that occur for reliability reasons (i.e. a pro-rata curtailment to multiple resources on a tie point) are due to forces beyond the SCs control. These resources will be excluded from the under/over delivery charge.

The ISO acknowledges that this business practice may result in the curtailment of hourly block resources for various 15-minute intervals. This is necessary to ensure the ISO adheres to industry standards and does not over-schedule any intertie transmission limits. Additional information is described in **Section 7.4.1 Scenario 3**.

The figures below are screen shots of E-Tags showing a curtailment (**Figure 17**) and an adjustment (**Figure 18**). Anytime an E-Tag is changed, a record is created to show the version history. Tags that are curtailed by a balancing authority (BA) or a transmission service provide (TSP) will be excluded from the under/over delivery charge. Tags that are adjusted by a market operator (MO) and result in a deviation from the HASP schedule will be subject to the under/over delivery charge.

Figure 17: E-Tag is curtailed by the balancing authority (BA).

Tag Information									ID	Type	Author	Creation Time	Status
GCA	CPSE	Tag Code	LCA	Transaction Type	Time Zone	Test Tag	Tag MWH at Gen (Original/Final)	Tag MWH at Load (Original/Final)	3	Adjustment	(PSE)	11/04 00:05	DENIED
			CISO	Normal	PST	No	300 / 298	300 / 298	2	Curtailment	CISO (BA)	11/03 23:54	APPROVED
PSE Comment: FES for San Luis Rey (PST)									1	Adjustment	(PSE)	11/01 07:55	APPROVED
Multiple Base Profile: No									0	Creation	(PSE)	11/01 07:53	APPROVED

Market Path			
PSE	Product	Contract	Misc Info
	G-F	FESP	Yes
	L		No

Physical Path										
BA	TSP	MO	PSE	POR	POD	Sched Entities	Contract	Misc Info	Loss	
WALC				Source: DSHM01				No		
	WALC			PARKER161	BLYTHE161	WALC		No		
	CISO	CISO		BLYTHE161	SP15	CISO		Yes		
CISO				Sink: CISO_SP15				Yes		

Current Energy and Transmission Profiles - MW (out of)											
Show:	1 day	Starting:	11/29/2018	<input checked="" type="checkbox"/> MW	<input checked="" type="checkbox"/> Reservation	<input checked="" type="checkbox"/> Trans Total					
Date	Start	Stop	Gen	WALC			CISO				
			MW	Trans	MW	Trans	MW	Trans	MW		
11/29	00:00	01:00	1	1	1	1	1	1	1	1	
11/29	12:00	23:00	1	1	1	1	1	1	1	1	
		MWH:	12	12	12	12	12	12	12	12	

Requested Profile Change - MW (out of)							
Date	Start	Stop	Gen	WALC	CISO	Ramp Duration	
			MW	MW	MW	Start	Stop
11/04	00:00	01:00	0	0	0		
		MWH:	0	0	0		

7.5 Determination of Under/Over Delivery Quantity

This section explains how the amount of undelivered energy is determined by the ISO. The under/over delivery charge will apply to both hourly block and fifteen-minute dispatchable intertie resources. The subsections below identify the logic used to determine the under/over delivery quantity for each bid type respectively.

7.6 Hourly Block Resources

The ISO's existing decline charge compares the hour-ahead scheduling process award to the fifteen-minute binding award and applies only to hourly block resources.

In order to address both declines and tagging deviations for all intertie resources, the ISO proposes to calculate the under/over delivery quantity by comparing the HASP schedule to the E-Tag. The under/over delivery quantity will equal the absolute value of the difference between the reference schedule and the after the fact E-Tag energy profile. This is summarized in

Figure 19. This logic, in conjunction with the new fifteen-minute binding award determination logic, will incentivize awards to be accepted and awards to be tagged.

Figure 19: Proposed reference level and determination of under/over delivery quantity for intertie bid options.

Bid Option	Determination of Under/Over Delivery Quantity
Self-Schedule Hourly Block	Absolute Value (HASP Schedule – after the fact E-Tag Energy Profile)
Economic Hourly Block	

The determination of the under/over delivery quantity in conjunction with the proposed fifteen-minute binding award logic ([Section 7.1](#)) is summarized in

Figure 20 below. The blue bars indicate the fifteen-minute award value, the green bars indicate the applicable real-time dispatch instructed imbalance energy settlement, and the orange bars indicate applicable under/over delivery charges. A description is provided below the figure in Scenario 1 – 4.

Figure 20: Impacts and timeline of hourly block scheduling.



Scenario 1

A scheduling coordinator's bid clears the hour-ahead scheduling process, the award is accepted in the automated dispatch system, and an E-Tag with a transmission profile is submitted by T-40. This provides a level of assurance that the energy will be delivered. As such, the fifteen-minute market appropriately schedules the resources for the first two intervals of the operating hour. By T-20, an energy profile is submitted to support the schedule. The fifteen-minute market can now schedule the resource for the last two intervals of the operating hour.

- The E-Tag energy profile matches the FMM schedule, therefore there is no real-time imbalance energy settlement.
- The E-Tag energy profile matches the HASP schedule, therefore there is no under/over delivery charge.

Scenario 2a

A scheduling coordinator's bid clears the hour-ahead scheduling process. The award is declined in the automated dispatch system, and therefore no E-Tag is submitted. The fifteen-minute market reflects this by not scheduling the resource for any interval of the operating hour.

- The E-Tag energy profile matches the FMM schedule (both are 0 MW), therefore there is no real-time imbalance energy settlement.
- The E-Tag energy profile does not match the HSP schedule, therefore the under/over delivery charge is applied.

Scenario 2b

A scheduling coordinator's bid clears the hour-ahead scheduling process. The award is accepted in the automated dispatch system, but an E-Tag with a transmission profile is not submitted by T-40. Therefore, there is no assurance that the energy will be delivered and the fifteen-minute market reflects this by not scheduling the resource for the first two intervals of the operating hour. The scheduling coordinator fails to submit an energy profile by T-20 and as a result the fifteen-minute market reflects this by not scheduling the resource for the last two intervals of the operating hour.

- The E-Tag energy profile matches the FMM schedule (both are 0 MW), therefore there is no real-time imbalance energy settlement.
- The E-Tag energy profile (0 MW) does not match the HASP schedule, therefore the under/over delivery charge is applied.
- Because the award was accepted in the automated dispatch system but the E-Tag was never submitted, an additional 25% is added to the under/over delivery charge.

Note: The only difference between Scenario 2a and 2b is the acceptance/decline of the award in the automated dispatch system. When the scheduling coordinator declines the award ahead of time, the

grid operator has advance notification that the energy cannot be delivered. This improves operational awareness and allows the operator to manually dispatch additional energy on the interties, if needed. When an award is accepted in ADS but the energy is not delivered, the operator does not have the opportunity to manually dispatch. For this reason, an additional 25% is added to the under/over delivery charge. The intent of the 25% is to incentive declining ahead of time when energy cannot be delivered.

Scenario 3

A scheduling coordinator's bid clears the hour-ahead scheduling process. The award is accepted in the automated dispatch system but an E-Tag with a transmission profile is not submitted by T-40. Therefore, there is no assurance that the energy will be delivered and the fifteen-minute market reflects this by not scheduling the resource for the first two intervals of the operating hour. The scheduling coordinator is able to get the E-Tag with an energy profile submitted by T-20 and therefore the fifteen-minute market schedules the resource for the last two intervals of the operating hour.

- The E-Tag energy profile does not match the FMM schedule for the first two intervals of the operating hour, therefore the ISO must curtail the E-Tag so the energy profile does not exceed the market award.
- The E-Tag energy profile does not match the HASP schedule for the first two intervals of the operating hour, therefore the under/over delivery charge is applied.
- The E-Tag energy profile does match the HASP schedule for the last two intervals of the operating hour, therefore the under/over delivery charge is not applied.

In this scenario, the fifteen-minute market will have the ability to dispatch another resource for the first two intervals of the operating hour because it did not anticipate the intertie resource would be delivered (indicated by no transmission profile at T-40). If the fifteen-minute market dispatches another resource *and* the scheduling coordinator submits the energy profile for the intertie resources in question by T-20, there is a possibility that the intertie transmission limit will be exceeded for the first two intervals of the operating hour. In this scenario, which the ISO does not anticipate to occur frequently, the ISO operator will have the authority to adjust/curtail the intertie resource for the first two intervals of the operating hour to ensure scheduling limits are not exceeded. It is important to note that in this scenario the E-Tag may be curtailed for a fifteen-minute interval even though it is an hourly block resources. This logic is an extension of the exiting curtailment practice which allows operators to adjust/curtail intertie resources that exceed their market awards.

The ISO will automate this curtailment to occur sometime after the NAESB E-Tagging deadline of T-20 and prior to the real-time dispatch market run at T-75. The exact time will be determined by implementation needs. Because the automatic curtailment will occur at the resource level and is not for reliability resources, the resource will be flagged and subject to the under/over delivery charge. This automatic curtailment will only occur when the E-Tag energy profile exceeds the market award and ensures the ISO is adhering to all industry standards.

Scenario 4

A scheduling coordinator's bid clears the hour-ahead scheduling process. The award is accepted in the automated dispatch system and an E-Tag with a transmission profile is submitted by T-40. The transmission profile provides a level of assurance that the energy will be delivered and therefore the fifteen-minute market schedules the resource for the first two intervals of the hour. However, the scheduling coordinator fails to submit an energy profile by T-20 and therefore the energy cannot be delivered. This is reflected by the fifteen-minute market with a schedule of 0 MW for the last two intervals of the hour.

- The E-Tag energy profile does not match the FMM schedule for the first two intervals of the operating hour, therefore there is real-time imbalance energy for the first two intervals.
- The E-Tag energy profile does not match the HAPS schedule, therefore the under/over delivery charge is applied.

This combination of events is the worst possibility of the scenarios presented above. The operator believes the energy will be delivered because the award was accepted and a transmission profile was submitted. Ultimately however, the energy is not delivered. It is therefore appropriate that this resource is subject to both the imbalance energy settlement and the under/over delivery charge.

7.7 Fifteen-Minute Dispatchable Resources

Fifteen-minute dispatchable resources are currently excluded from the existing decline charge. However, if a fifteen-minute dispatchable resource does not submit a transmission profile to support the HASP schedule, the fifteen-minute market is unable to award the resources and the energy cannot be delivered. The ISO proposes to calculate the undelivered quantity for fifteen-minute dispatchable resources by comparing the E-Tag transmission profile to the HASP schedule for each fifteen-minute interval. If this value is less than 0 (i.e. the transmission profile does not fully support the HASP schedule), the charge will apply to the difference between the two. If this value is greater than or equal to 0 (i.e. the transmission profile adequately supports the HASP schedule), the charge will not apply.

This logic works in conjunction with the ISO's existing functionality of automatically updated fifteen-minute dispatchable E-Tags. When the HASP schedule is submitted, the scheduling coordinator must submit an E-Tag by T-40 with a transmission profile. The fifteen-minute market energy award is published roughly 22.5 minutes prior to the applicable interval. The NAESB tagging deadline is 20 minutes prior to the interval, so there is a very short window in which the E-Tag energy profile can be updated to match the award. To remedy this, the ISO automated the adjustment process and will update E-Tag energy profiles to match the award as soon as the award is published. This process can only occur if the E-Tag has a transmission profile to support the schedule.

As a result, as long as the transmission profile is submitted, the energy profile will be adjusted to match the award. If the transmission profile is not submitted, the resources is deemed unavailable.

Figure 21: Proposed reference level and determination of under/over delivery quantity for intertie bid options.

Bid Option	Determination of Under/Over Delivery Quantity
Economic (fifteen-minute dispatchable) Economic Variable Energy Resource	E-Tag transmission profile – HASP schedule, If < 0, charge applies to amount of deviation If >= 0, charge does not apply

Examples of the existing functionality in comparison to the proposed functionality can be found in the attached *Intertie Deviation Settlement Worksheet* (detailed settlement solution) and the *UODC Proposal* (simplified settlement solution). These worksheets explain the difference between the decline charge and the proposed under/over delivery charge for both hourly block and fifteen-minute resources.

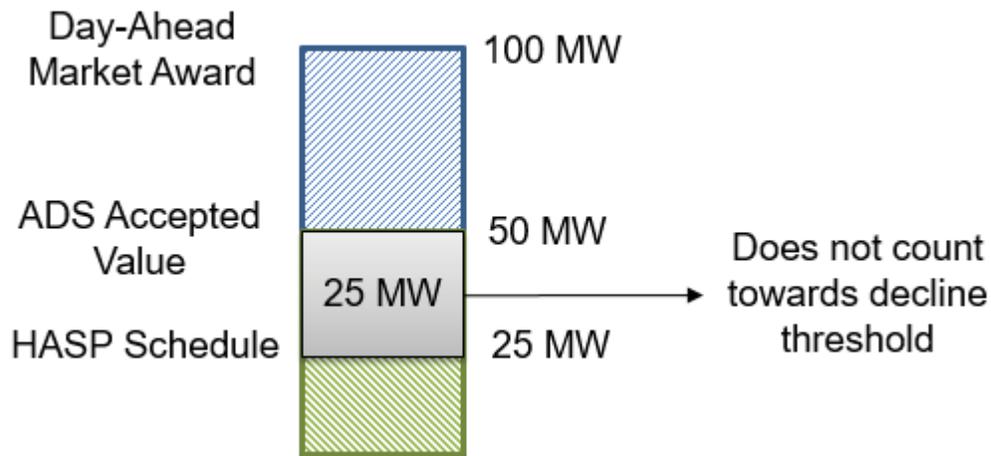
7.8 Under and Over Tagging

The ISO proposes to apply the under/over delivery charge to both under and over tagging. Currently, the decline charge only applies to under-tagged imports, or under-tagged exports. When a scheduling coordinator accepts an award and/or tags a value greater than the HASP schedule, the decline charge does not apply.

Based on today’s logic, an import resource with a day-ahead market award and a decremental bid in the hour-ahead scheduling process can decline the decremental award without having the MWh count towards the decline charge threshold.²³ For example, an import resource with a 100 MW award in the day-ahead market can bid into the hour-ahead scheduling process to decrement the award down to 25 MW. The bid clears, but the scheduling coordinators accepts a schedule of 50 MW. The difference between the HASP schedule of 25 MW and the accepted schedule of 50 MW (declining the decremental dispatch) will not count towards the decline charge threshold.

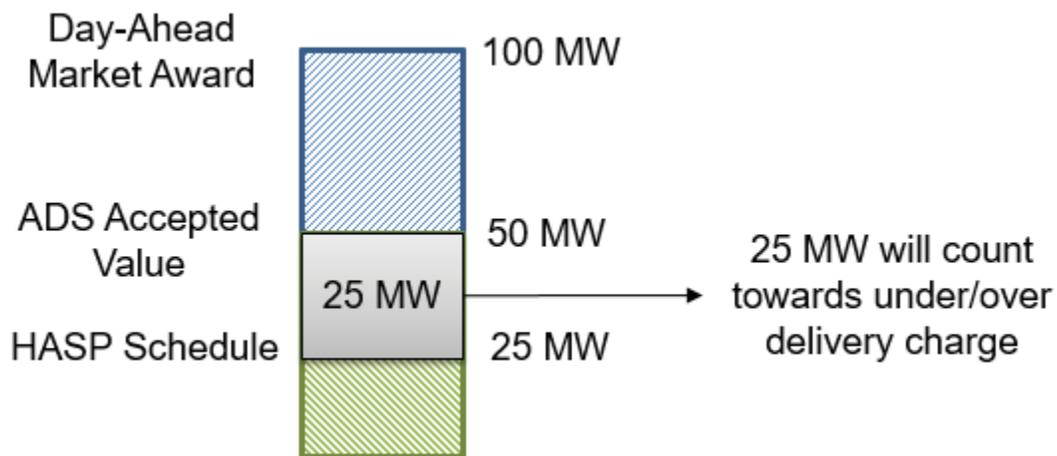
²³ Conversely, the same applies for export resources.

Figure 22: The decline of a decremental dispatch results in the ADS accepted value being greater than the HASP schedule. When this occurs, the existing decline charge does not apply.



By applying the under/over delivery charge to resources with E-Tags that are under or over-scheduled, this gap will be addressed. This is demonstrated in **Figure 23**.

Figure 23: Applying the new charge to both under and over scheduling (in comparison to the HASP schedule) will address a gap in the previous policy.



The *Intertie Deviation Settlement* straw proposal suggested a new business practice of permitting the E-Tag energy profiles that were greater than their respective market awards as long as there was no reliability concern. This ISO is removing this business practice from the draft final proposal. Allowing market participants to tag above their market awards may result in congestion and would allow

scheduling coordinators to flow energy that was not cleared by the market. The ISO agrees that this is not in the best interest of the market, the operators, or other scheduling coordinators. The ISO operators will continue to adjust E-Tags that exceed market awards prior to the operating hour. This is done at the discretion of the ISO operator.

7.9 Price and Allocation of the Under/Over Delivery Charge

The ISO generally expects prices to reflect system conditions. This would imply that when a shortage on the interties occurs, the real-time dispatch price should be higher than the fifteen-minute price. However, there are many outside factors – including operator actions that occur outside of the market – that may influence market pricing. Therefore, even if there is a shortage on the interties, the real-time price may be higher than the fifteen-minute price.

Because the ISO cannot predict whether the fifteen-minute or real-time dispatch price will be higher, the ISO believes it is appropriate that the under/over delivery charge is equal to 50% of the greater of the real-time dispatch or fifteen-minute market locational marginal price.

The ISO proposes for the charge to be applied for each interval in which an under/over delivery quantity is calculated. The ISO believes this proposal will charge the scheduling coordinator at a price dependent on the harm inflicted on the ISO market. Said differently, the charge is comparable to the impact the deviation had on the market. By eliminating the 10% threshold and applying the charge for each interval, the scheduling coordinator has incentive to deliver energy, especially when the ISO needs the energy the most.

In order to successfully implement the under/over delivery charge on an interval by interval basis, the ISO settlement systems will require E-Tag information in 15-minute granularity. Currently, the ISO settlement system receives hourly integrated data for E-Tags. As shown in **Figure 24**, even when a deviation occurs for only a portion of the operating hour, the total undelivered quantity is calculated by integrating across the entire hour.

Figure 24: Integration of hourly block E-Tags results in the undelivered quantity being calculated as an average across the hour.

TODAY	1	2	3	4	Integrated
E-Tag Energy Profile	0	0	100	100	50
Award	100	100	100	100	100
Undelivered Quantity	100 MW	100 MW	0	0	50 MWh

Using 15-minute data will ensure the under/over delivery charge is applied at the price for the corresponding interval, as opposed to calculated based on an hourly average. As shown in **Figure 25**, the MWh of deviation can now be calculated for each interval and will be subject to the price for that interval.

Figure 25: Use of fifteen-minute data will allow the undelivered quantity to be settled based on the price of the interval in which the deviation occurred.

PROPOSED	1	2	3	4
E-Tag Energy Profile	0	0	100	100
Award	100	100	100	100
Undelivered Quantity	100 MW (25 MWh)	100 MW (25 MWh)	0	0

15-minute energy profile information is needed to determine the underlived quantity for hourly block resources. 15-minute transmission profile information is needed to determine the undelivered quantity for fifteen-minute dispatchable resources. Therefore, the ISO settlement system will need to receive 15-minute energy and transmission profile data for all E-Tags.

The intent of the under/over delivery charge is to incentivize market participants to accept their hour-ahead scheduling process award and deliver the award energy. If deviations occur, the charge is applied. However, based on the logic described above, scheduling coordinators would be paid for deviations if pricing is negative. This would potentially incentivize deviations when pricing is negative – payment for deviations would contradict the purpose of the under/over delivery charge. Therefore, the ISO proposes to keep the floor of \$10 for the under/over delivery charge. This ensures a charge exists even when pricing is low or negative. The charge funds collected will be allocated to measured demand less existing transmission contracts (ETCs) and transmission operating rights (TORs). This allocation is consistent with the existing decline charge but will be changed from monthly to each interval. For additional information on the allocation, reference the Intertie Schedules Decline Charges Allocation: CC 6457 (see [References](#)).

7.10 Accept/Decline Functionality in the Automated Dispatch System

The ISO always expects energy awarded in HASP to be delivered. If, however, the energy cannot be delivered, it is beneficial for the scheduling coordinator not notify the ISO prior to the fifteen-minute market run. This enables the ISO grid operator to manually dispatch if necessary. The ISO market is most negatively impacted when a scheduling coordinator accepts an award in the automated dispatch system but fails to deliver the energy. To address this concern, the ISO proposes an additional 25% charge at the greater of the FMM or RTD LMP when the scheduling coordinator accepts an award in ADS but fails to deliver the energy. Said differently, if a scheduling coordinator fails to decline the award in ADS and subsequently does not deliver the energy, the additional 25% will apply. The additional 25% will apply to the entire portion of the under/over delivered quantity as defined in [section 7.4](#).

In order to determine the amount of energy that was accepted or declined in the ADS system, ADS will need to display the HASP schedule, the scheduling coordinator accepted value, and the difference between the two. This information will be sent to the ISO settlement system.

In order to provide additional flexibility, the ISO proposes to allow additional time for the scheduling coordinator to accept, partially accept, or decline awards in the ADS system. Currently, scheduling coordinators only have 5 minutes to accept schedules in ADS. The ISO proposes to extend this window to T-45. This provides additional time for the scheduling coordinators to review and accept schedules and allows the ISO operator a 5-minute window to review accepted schedules prior to the fifteen-minute market run that occurs at ~T-40.

7.11 Decline Resulting in Over-Scheduled Intertie

As shown in [Example 7](#), there are scenarios when over scheduling in the import direction occurs due to an export resource declining or partially accepting an award in the hour-ahead scheduling process.²⁴ When this occurs, the ISO is responsible to curtail all import resources based on their contribution to the over-schedule (also known as a *pro rata* curtailment).

The *Intertie Deviation Settlement* straw proposal originally proposed a business practice to mitigate this issue. The business practice proposed to adjust the tag of a particular scheduling coordinator if that scheduling coordinator was at fault for the net over-schedule. The ISO has recognized that this is not possible to implement. If the ISO operator made a curtailment, the tag would may be expect from the under/over delivery charge. If the ISO operator made an adjustment, the scheduling coordinator would

²⁴ The ISO balancing authority area is typically a net importer. For that reason, this paper and resulting discussion is based on an export resource partially accepting or declining award (as shown in Example 7). Please note the inverse can occur as well: the over-scheduling of an intertie in the export direction can occur due to a partially accepted or declined import resource.

have the ability to deny the adjustment and therefore the problem would not be resolved. Because of these concerns, the ISO is removing the proposed business practice from this proposal.

The ISO believes the under/over delivery charge – specifically the application of the UODC to both over and under scheduling – provides adequate incentive to eliminate the behavior of decremental imports or incremental exports. If the existing incentives no longer exist, the ISO anticipates the existing practice of declining decremental imports or incremental exports will be minimized.

8. Additional Items

8.1 HASP Reversal Rule

This ISO has identified a discrepancy between the business practice manual and the tariff related to rules for the hour ahead scheduling process reversal rule. Section 11.32 of the tariff explains the HASP reversal rule will apply when a scheduling coordinator (a) fails to submit an E-Tag to match the day-ahead schedule, or (b) withdraws the E-Tag prior to 45-minutes before the operating hour. The BPM Configuration Guide 6460 (FMM Instructed Imbalance Energy Settlement) explains the HASP reverse rule will apply if the day-ahead schedules is reduced prior to the publication of the HASP results (as opposed to T-45).

The ISO would like to clarify the tariff language to be consistent with the BPM language. The purpose of the HASP reversal rule is to address implicit virtual bidding. As long as day-ahead schedules are supported by an E-Tag up until the publication of HASP, the resource can be used in the HASP optimization and is not seen as an implicit virtual bidder. Therefore the ISO proposes an update to the tariff to state day-ahead market resources will be subject to the HASP reversal rule if the E-Tag is withdrawn prior to publication of the HASP results.

8.2 Response to Stakeholder Comments Outside Scope of Initiative

The ISO addressed stakeholder comments on the issue paper and straw proposal (published August 15 and October 8, 2018, respectively) throughout this straw proposal.²⁵ Comments that were not addressed above are included in this section.

Resource Adequacy on the Interties

Resource adequacy bidding and scheduling on the interties is outside the scope of this initiative and will be addressed in the *RA Enhancements* initiative. Additional information can be found on the RA Enhancements webpage at:

<http://www.caiso.com/informed/Pages/StakeholderProcesses/ResourceAdequacyEnhancements.aspx>

Market Timelines

Moving the ISO fifteen-minute market timeline closer to the NAESB E-Tagging timeline of T-20 is out of the scope of this initiative. This initiative intends to address undelivered intertie resources and does not propose changes to the market timing. Real-time market enhancements may be addressed at a later date in a separate initiative.

ISO Operating Procedures

ISO operating procedures and business practice manuals specifically explain that scheduling coordinators must submit E-Tags for accepted market awards. This responsibility to tag market awards falls solely on the scheduling coordinator. The job of the ISO operator is to reliably manage operation of the bulk electric grid – the ISO operator will not, and should not, individually call scheduling coordinators to explain financial impacts of not submitting E-Tags. The ISO balancing authority area operator is *not* a marketer and therefore will never discuss market pricing unless necessitated for reliability reasons (i.e. exceptional dispatches). Market pricing is published on OASIS, market awards are published in CMRI and ADS, bids are accessible in SIBR. This information is all accessible to the scheduling coordinator.

²⁵ Stakeholder comments can be found at www.caiso.com under the Stakeholder Processes → Intertie Deviation Settlement initiative webpage. Please reference comments in response to the Issue Paper. <http://www.caiso.com/informed/Pages/StakeholderProcesses/IntertieDeviationSettlement.aspx>

Reference ISO Operating Procedure 2510: NERC Tagging Requirements.²⁶

ISO System Operator responsibility: The ISO validate Interchange transactions and confirms them with adjacent Balancing Authorities (BA) prior to implementing them in the ACE equation. Additionally, the ISO assesses Interchange transaction for reliability purposes, adequacy of transmission rights, and ensures market awards are not exceeded prior to E-Tag implementation. The ISO uses the Interchange transaction scheduler (ITS) software to process NERC E-Tags, and when necessary, curtail E-Tags that do not pass validation or meet requirements. The ISO complies with NERC/NAESB and WECC business practices related to interchange and implements Confirmed Interchange as received from the Interchange Authority.

Scheduling Coordinator (SC) responsibility: SCs are entities certified by the ISO for the purposes of undertaking functions specified in the CAISO Tariff. This includes ensuring Interchange Schedules are prepared in accordance with NERC, WECC, and ISO requirements and providing E-Tags for all applicable transactions. However, SC's are not specifically identified in NERC/NAESB and WECC standards and might not meet the strict definition of a Purchasing Selling Entity (PSE) as defined in the NERC Glossary of Terms. As such, the SC is responsible for ensuring their transactions are properly tagged by a PSE, as SCs must be awarded ISO market bids and self-schedules on all tags for validation purposes. Failure to satisfy these ISO/ENRV/NAESB tagging requirements may result in refusal by the ISO to implement the Interchange Schedule, irrespective of ISO Market Awards.

Uninstructed Deviation Penalty

The ISO plans to apply the proposed under/over delivery charge to non-dynamic intertie resources. Internal generators and dynamic intertie resources will be excluded from the policy. Application of a deviation charge to internal generation is commonly known as an *uninstructed deviation penalty* (UDP) and is used in some energy markets. At this time, consideration of an UDP for CAISO internal generators is out of the scope of this initiative.

The CAISO believes it is appropriate that internal and external generation is settled differently because they are treated differently by the market. Internal generators are unit specific and are metered. Deviation between the generator dispatch and actual output is settled as uninstructed imbalance energy (UIE) but is not additionally penalized. Intertie resource (external supply) do not need to be unit specific and therefore are not necessarily metered at the generator level. This is an important distinction because the ISO markets have confirmation that internal generators are tied to physical resource whereas intertie resources may not be tied to physical supply. For that reason, the ISO needs an

²⁶ Reference the ISO's operating procedures related to interchange management – OP series 2500. <http://www.caiso.com/rules/Pages/OperatingProcedures/Default.aspx>

incentive to encourage delivery of external resources because there is no guarantee that a physical generator is backing the bid.

Another important distinction is the frequency with which internal and external generation can be dispatched. Internal generators can be dispatched every five minutes and inject directly into the ISO grid. If an internal generator is not following its dispatch, another internal generator can be dispatched in the next five-minute interval with direct injection to the grid. This process accounts for transmission congestion. In comparison, intertie resources are dispatched either hourly or every fifteen-minutes and require the procurement of transmission to allow the import or export transaction to take place. When an hourly blocked intertie resource fails to deliver, the transmission goes unused and because transmission is an hourly commodity there is no opportunity to schedule additional energy on the interties. For this reason, it is important to incentive delivery of intertie resources as awarded by the ISO market.

9. 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. At this time, management will only seek policy approval from the ISO Board of Governors. The EIM Governing Body may choose to provide advice on the policy to the Board of Governors.

9.1 Schedule.

Figure 26 lists the planned schedule for the *Intertie Deviation Settlement* stakeholder process. The ISO proposes to present its proposal to EIM Governing Body and the ISO Board of Governors at the respective January and February 2019 meetings.

Figure 26: Proposed schedule for the Intertie Deviation Settlement stakeholder process

Item	Date
Post Issue Paper	August 15, 2018
Stakeholder Conference Call	August 22, 2018
Stakeholder Comments Due	September 5, 2018
Post Straw Proposal	October 8, 2018
Stakeholder Meeting	October 15, 2018
Stakeholder Comments Due	October 29, 2018
Post Draft Final Proposal	December 12, 2019
Stakeholder Conference Call	December 19, 2019
Stakeholder Comments Due	January 8, 2019
EIM Governing Body Meeting	January 24, 2019
Board of Governors Meeting	February 6-7, 2019

The ISO will discuss this paper during a stakeholder call on December 19, 2018. The ISO requests that stakeholders submit written comments by January 8, 2019 to InitiativeComments@caiso.com.

9.2 EIM Governing Body Role

The EIM Governing Body has an advisory role over policies that impact the real-time market. This policy impacts the real-time market and therefore the EIM Governing Body “has the right to submit to the Board its advice on” the issue. Please note that the policy changes will be directed only toward settlement rules for intertie bidding for the ISO balancing authority area. The energy imbalance market design does not include intertie bidding and is not subject to the decline charge.

This EIM classification is temporary and may change at any time during the stakeholder process. If any stakeholder disagrees with the ISO’s initial classification, please include in your written comments a justification of which classification is more appropriate.

Appendix A: Charge Code 6455 Example

Hourly Block Example - Charge Code 6455

	Int 1	Int 2	Int 3	Int 4	Hrly Total
DA Sched	100	100	100	100	400
FMM OE	25	25	22.5	22.5	95
Deemed Delivered (Meter)	122.5	122.5	122.5	122.5	490
OA = Meter - DA - FMM OE	-2.5	-2.5	0	0	-5
Hrly HASP Advisory	125	125	125	125	500
FMM Transmission etag (T-20 minutes)	122.5	122.5	122.5	122.5	490
FMM Accept Schedule (ADS)	125	125	122.5	122.5	495
FMM LMP	\$ 25.00	\$ 30.00	\$ 20.00	\$ 15.00	
Binding Energy:					
IMPORT = min(ADS, etag)					
EXPORT = max(ADS, etag)	122.5	122.5	122.5	122.5	490
Expected Flow:					
Hrly HASP Advisory	125	125	125	125	500
Neg OA:					
IMPORT = min(0, OA)					
EXPORT = max(0, OA)	-2.5	-2.5	0	0	-5
Deviation Energy:					
Binding Energy - (Expected Flow + Neg OA)	0	0	-2.5	-2.5	-5
Undelivered Energy/Decline Quantity (basis for BQ):					
IMPORT = min(0, Deviation Energy)*(-1)					
EXPORT = max(0, Deviation Energy)	0	0	2.5	2.5	5
Decline Charge Price:					
max (\$10, FMM LMP * 50%)	\$ 12.50	\$ 15.00	\$ 10.00	\$ 10.00	
Potential Decline Charge =					
Undelivered Energy * Decline Charge Price	\$ -	\$ -	\$ 25.00	\$ 25.00	\$ 50.00
Total Hourly HASP Dispatch:					
Abs(Expected Flow + Neg OA)	122.5	122.5	125	125	495
Total HASP Dispatch MTD					600
Total Monthly HASP Dispatch					1095

Threshold Quantity: max(300 MW, Total Monthly HASP Dispatch * 10%)		300
Total Undelivered Energy MTD		400
Total Monthly Undelivered Energy		405
Ratio: max (0, (Total Monthly Undelivered Energy - Threshold Quantity)) / Total Monthly Undelivered Energy		0.25925926
Potential Decline Charge MTD		\$ 500.00
Total Monthly Potential Decline Charge		\$ 550.00
Intertie Schedules Decline Charge - CC 6455: Total Monthly Potential Decline Charge * Ratio		\$ 142.59

Appendix B: Additional Data Analysis

Similar to **Figure 13** and **Figure 15**, **Figure 27** examines the range of total undelivered intertie resources in the export direction on an hourly granularity. The total amount of undelivered interties is represented by combining the MWh quantities of explicit declines, full no show and partial show/accepted awards. Each hour of the year (July 2017-June 2018) analyzed has three corresponding points: the minimum, maximum, and average undelivered intertie quantity that occurred during that specific hour.

Figure 27: Range of Hourly Undelivered Intertie Resources – Export Direction (7/2017 – 6/2018)

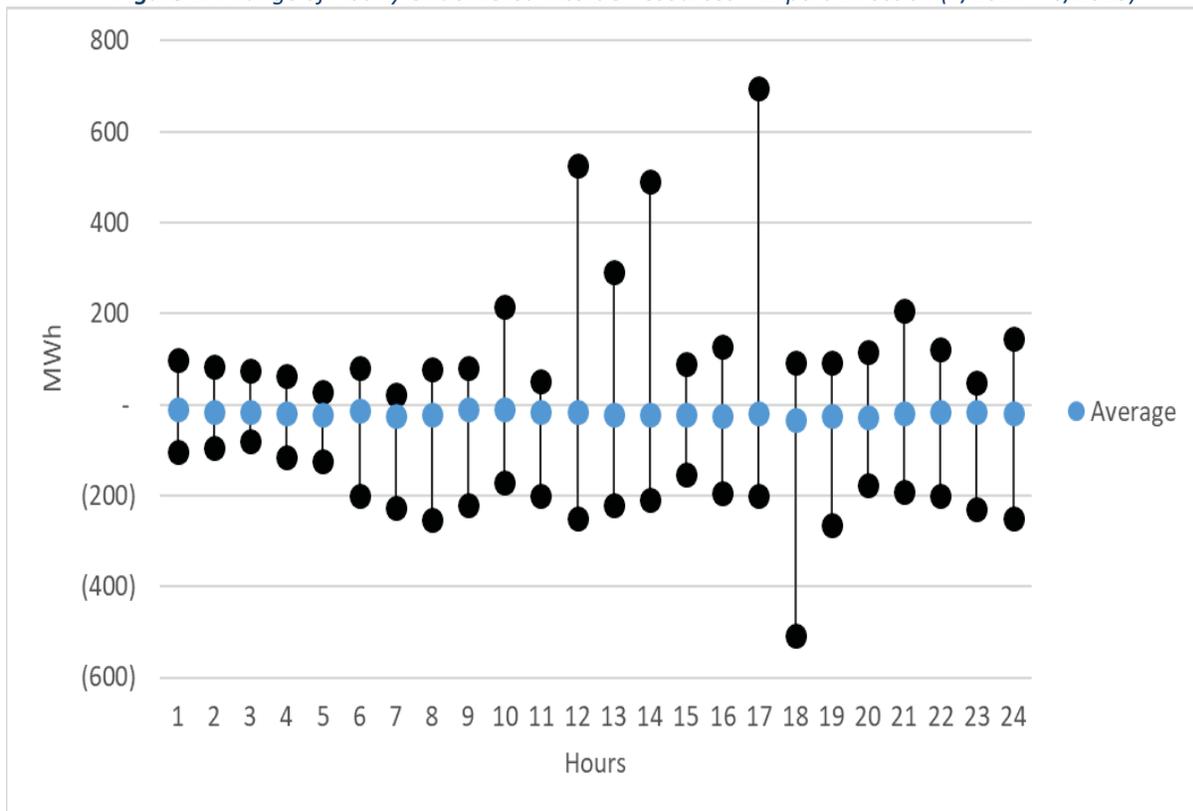
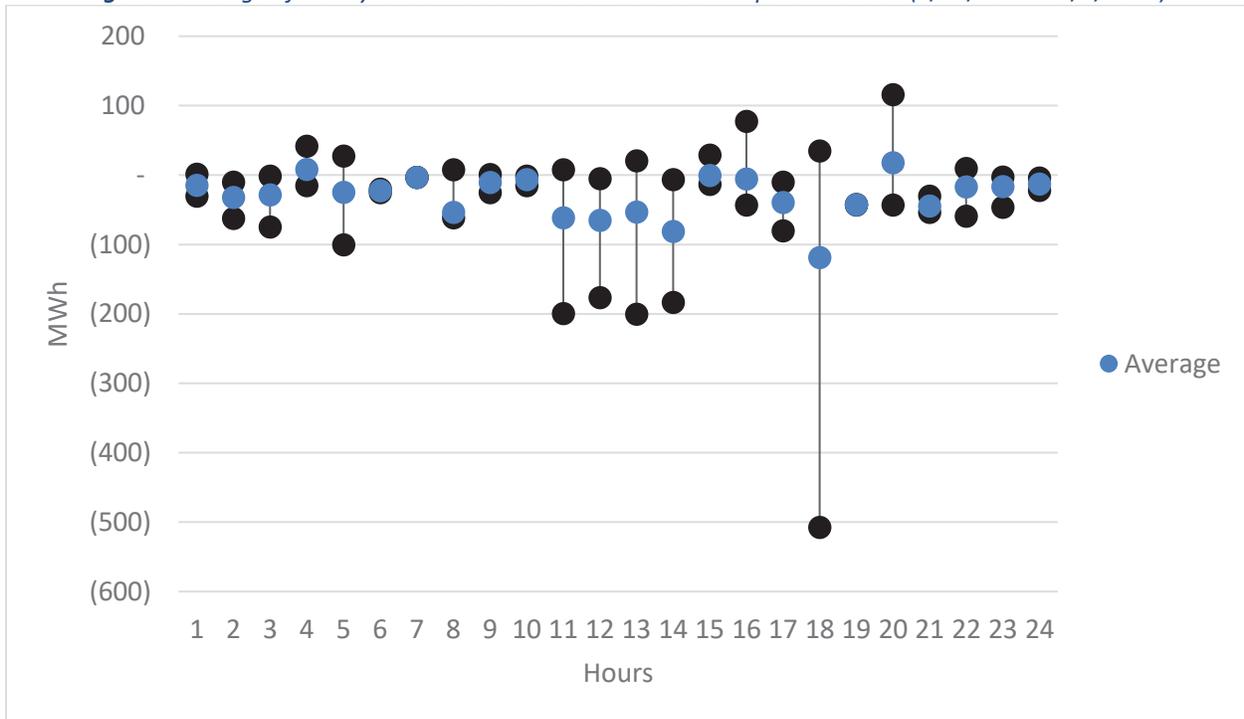


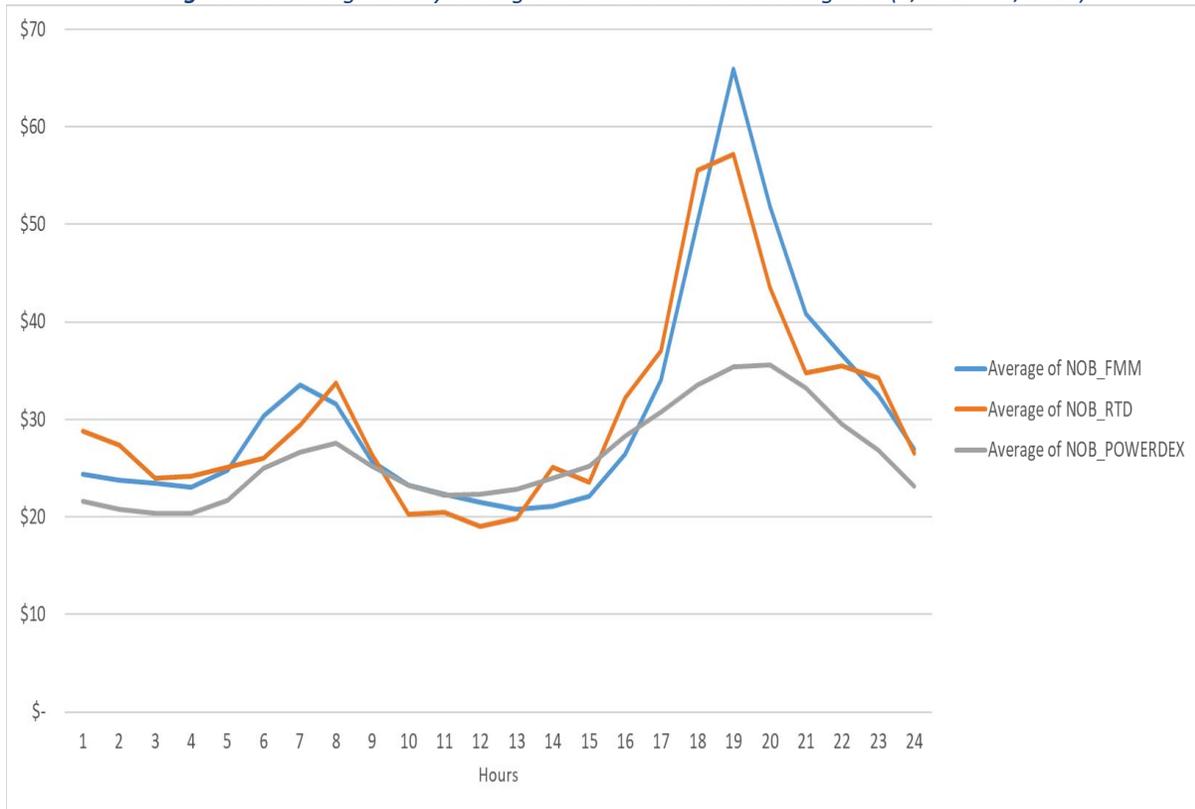
Figure 28 examines the range of total undelivered inertia resources in the export direction on an hourly granularity during the critical period of the September 1-2, 2017 heat wave.

Figure 28: Range of Hourly Undelivered Inertia Resources – Export Direction (8/28/2017 – 9/3/2017)



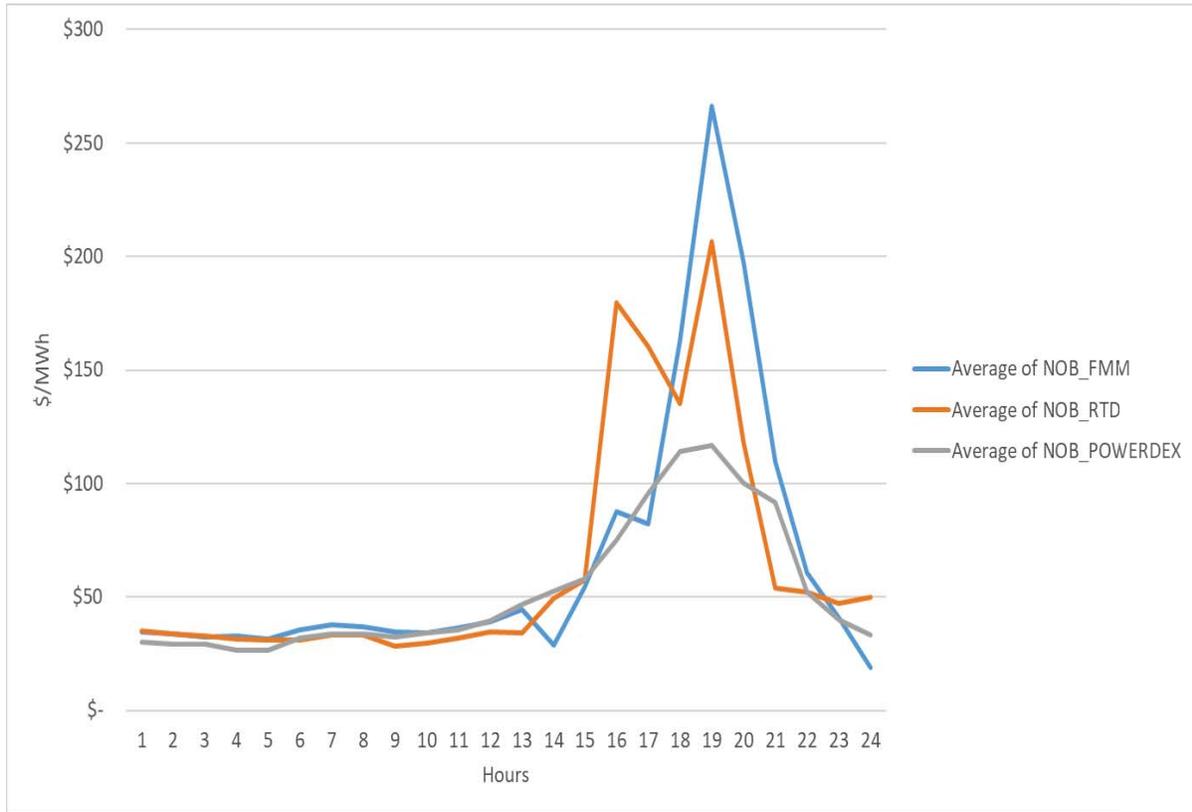
The ISO performed additional analysis by examining real time prices at the NOB bilateral trading hub. Average hourly ISO fifteen-minute and five-minute market prices were compared to real time average hourly Powerdex prices at the NOB trading hub. **Figure 29** highlights that prices are highest during the same evening peak hours when the range of undelivered interties is the greatest.

Figure 29: Average Hourly Pricing at the NOB Bilateral Trading Hub (6/2017 – 7/2018)



When examining average hourly prices during the critical period September 1-2, 2017 heat wave, **Figure 30** depicts similar conclusions that prices are highest during the hours when the range of undelivered intertie resources is the greatest.

Figure 30: Average Hourly Pricing at the NOB Bilateral Trading Hub (8/28/2017 – 9/3/2017)



Attachment D – Board Memorandum

Intertie Deviation Settlement

California Independent System Operator Corporation

May 22, 2020



Memorandum

To: ISO Board of Governors

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

Date: January 30, 2019

Re: **Decision on intertie deviation settlement proposal**

This memorandum requires Board action.

EXECUTIVE SUMMARY

The ISO relies on import and export energy that is economically scheduled through its markets, called intertie transactions, to meet operational needs. Intertie transactions are scheduled at the ISO balancing authority area's interties with adjoining balancing authority areas. These transactions are separate from energy transfers resulting from the energy imbalance market's resource-specific dispatch. The ISO implemented a non-delivery charge to incent the delivery of intertie transactions. However, the ISO has experienced increasing instances of non-delivery. When this occurs, it results in adverse reliability impacts and inefficient market pricing. To address this issue, Management proposes to modify the current intertie transaction non-delivery charge to increase market participants' incentive to deliver intertie transactions scheduled in the ISO market.

Management's proposal addresses identified shortcomings of the current non-delivery charge for intertie transactions. One of the primary shortcomings of the current charge is that it allows for a 10 percent monthly allowance for intertie declines. This was designed to account for intertie transactions that were curtailed for reliability reasons. The ISO is now able to identify specifically those intertie transactions that are declined due to reliability curtailments. Therefore, Management proposes to not apply the charge when intertie transactions are curtailed for reliability reasons and to eliminate the 10 percent monthly allowance for intertie declines. In addition, the current decline charge is based on the fifteen-minute dispatch price which can be significantly lower than the five-minute real-time dispatch price. Therefore, Management proposes that the charge be based on 50 percent of the higher of the 15-minute or five-minute real-time price in addition to any imbalance energy charges. Management believes these changes will provide significantly stronger incentives for market participants to deliver intertie transactions.

Management proposes the following motion:

Moved, that the ISO Board of Governors approves the intertie deviation settlement proposal described in the memorandum dated January 30, 2019; and

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

Management presented this intertie deviation settlement proposal to the EIM Governing Body on January 24, 2019. The EIM Governing Body will be providing advisory input to the Board regarding this proposal.

DISCUSSION AND ANALYSIS

Intertie Scheduling and Settlement

The ISO schedules intertie transactions (i.e. imports and exports) in its hour-ahead scheduling process and its 15-minute market. These schedules result from both economic bids and self-schedules market participants submit to the ISO's real-time market. They also include intertie transactions initially scheduled in the day-ahead market.

The real-time market runs the hour-ahead scheduling process at the top of each hour for the next hour. The hour-ahead scheduling process produces advisory schedules for both hourly block and 15-minute dispatchable intertie bids for the next hour. These schedules indicate how much transmission the ISO market has reserved for energy that will be delivered as a result of a cleared import or export economic bid or self-schedule.

Subsequently, 22.5 minutes before each 15-minute market interval, the 15-minute market produces intertie final schedules and prices. Schedules resulting from hourly block import or export bids are the same value over the hour.

Intertie transaction delivery is accomplished by the market participant submitting an "E-Tag" to the ISO and other balancing authority areas involved in the transaction. Balancing authority areas use E-Tags to track energy transfers between them. Two key parts of E-Tags that are relevant to this proposal are the "transmission profile" and the "energy profile." The transmission profile shows the transmission the market participant has available to facilitate energy. The energy profile shows the energy that will be delivered to complete the intertie transaction.

Final E-tags for intertie transactions, including both the transmission and energy profiles, are due by 20 minutes prior to each operating hour. This is the industry-wide deadline.

Because of differences in market timing, intertie schedules may or may not be subject to imbalance energy charges as a result of not delivering on their schedule. This is different from generation resources internal to the ISO balancing area which are always subject to imbalance energy charges.

Adverse Impacts of Undelivered Intertie Transactions

Undelivered intertie transactions can result in detrimental impacts to the ISO balancing authority area's reliability and to market pricing.

The ISO relies on intertie transactions for up to approximately 25 percent of the ISO balancing authority area's supply in individual hours. An undelivered import causes the ISO to be short supply to meet demand. When an import is not delivered, the ISO market has reserved transmission capacity for the undelivered import and cannot schedule another import to make up for it until the next hour. The 5-minute real-time dispatch must compensate for the undelivered import within the 15-minute interval by dispatching from less overall supply than was available to the 15-minute market.

Undelivered imports are detrimental to the market because they raise 5-minute real-time dispatch price, all other things being equal. Increased prices affects all market participants and likely results in a higher price than would occur if the market could have selected from a broader range of resources in the hour-ahead scheduling process and the 15-minute market. Undelivered exports can cause intertie congestion and exacerbate over-generation conditions.

The ISO has experienced large quantities of undelivered intertie energy during stressed system conditions, ranging up to more than 2,000 MW in an hour. This has contributed to emergency situations and threatened grid stability. For example, the ISO declared an "Energy Emergency Alert Level 1" on May 3, 2017 in part because of undelivered imports during the peak load hours.

ISO operators often take actions in advance, in anticipation of undelivered intertie transactions, to ensure adequate supply is available to meet real-time system needs. These measures include increasing the load forecast the market uses for the hour-ahead scheduling process to schedule additional imports and/or exceptionally dispatching additional imports out of the market. Although these measures may be needed to assure system reliability, they can also introduce differences in prices between the hour-ahead scheduling process, 15-minute market, and the 5-minute real-time dispatch. This can diminish incentives to deliver intertie transactions because the market initially schedules them in the hour-ahead scheduling process based on its prices, but they are financially settled at 15-minute market and/or real-time dispatch prices.

Existing Intertie Transaction Non-Delivery Charge

The existing intertie transaction non-delivery charge consists of a penalty of 50 percent of the 5-minute real-time dispatch price applied to the quantity of an undelivered import or export, with a \$10/MWh minimum. However, it is ineffective because it includes a 10 percent monthly threshold, which is rarely exceeded.

The existing non-delivery charge totals each market participants' undelivered quantities over the month and compares them to the total amount of imports or exports the market participant had over the month. The non-delivery charge only applies if the undelivered quantity of imports or exports exceeds 10% of the total amount of the market participant's imports or exports.

This charge is not effective for two reasons. First, the 10 percent threshold is rarely exceeded. From July 2017 through June 2018, market participants only exceeded this threshold for imports in two months. The quantity of transactions the non-delivery charge applied to and the final charge amounts after applying the monthly threshold were negligible.

Second, the non-delivery charge is ineffective because applying the charge over a month masks stressed periods when intertie transaction non-delivery is most impactful to the ISO. For example, a market participant may fail to deliver import energy during a heat wave when pricing is high and supply is scarce. This will negatively impact the ISO, but if the market participant has not exceeded the 10 percent monthly threshold it will not be assessed the non-delivery charge.

Proposed enhancements to the intertie transaction non-delivery charge

Management proposes to enhance the intertie transaction non-delivery charge as follows:

- **Eliminate the 10 percent threshold**

Management proposes to eliminate the non-delivery charge's threshold of 10 percent of a market participant's total monthly imports or exports for the charge to apply. The ISO originally established this threshold because the ISO was unable to determine if an intertie transaction was not delivered because another balancing authority area had curtailed transmission. The threshold is no longer needed because the ISO now receives curtailment information from other balancing authority areas.

- **Apply the non-delivery charge by market interval**

The ISO calculates the existing non-delivery charge monthly, rather than for every market interval, as part of applying the 10 percent threshold. Not calculating the charge for every interval allows a market participant to deliver an intertie transaction during stressed system conditions with accompanying high

prices without incurring a non-delivery charge as long as it does not exceed the 10 percent monthly threshold.

- **Enhance 15-minute market inputs**

The 15-minute market currently assumes an intertie transaction will be delivered if a market participant provides an indication that it will deliver an intertie transaction through the ISO's dispatch system after the hour ahead scheduling process is completed. This is irrespective of whether the market participant has submitted an E-Tag.

Management proposes to enhance the 15-minute market inputs to more accurately reflect intertie transactions that will be delivered. Management proposes to enhance these inputs so that the 15-minute market will only schedule hourly block intertie resources if the market participant has submitted an E-Tag prior to the market run with the transmission profile part completed. This will provide greater assurance that the transaction will be delivered.

In addition, Management intends to modify the relevant Business Practice Manual and make the corresponding system changes so that only intertie transactions for which an E-Tag with the transmission profile part completed will count for the ISO balancing authority area as part of the energy imbalance market's resource sufficiency tests.

- **Enhance the non-delivery charge price and calculation and apply them to 15-minute dispatchable intertie bids**

Management proposes to modify the non-delivery charge by basing it on 50 percent of the greater of the 15-minute market or 5-minute real-time dispatch price, rather than just basing it on the 5-minute real-time dispatch price as it is today. This ensures the charge provides a strong incentive to deliver even if the 5-minute real-time dispatch price is low. The \$10/MWh minimum will remain to ensure there is still a significant charge when market prices are below this or negative.

Management proposes the charge will include an additional 25 percent of the greater of the 15-minute market or 5-minute real-time dispatch price if the market participant does not provide an indication that it will not deliver an intertie transaction through the ISO's dispatch system after the hour ahead scheduling process is completed. This is to incent market participants to provide this notification so that ISO system operators have additional time to take actions to ensure reliability.

Management proposes that the non-delivery charge will also apply undelivered 15-minute dispatchable intertie bids, rather than just hourly block intertie bids, as it does today. This is because undelivered 15-minute dispatchable intertie bids tie

up transmission capacity reserved in the hour-ahead scheduling process the same as undelivered hourly block intertie bids.

Finally, Management proposes a change in which the non-delivery charge will apply to intertie transactions that are effectively real-time market exports, but the ISO dispatches by reducing imports originally scheduled in the day-ahead market.

- **Data analysis and process improvements**

The ISO has committed to complete data analysis to better understand the impacts of load conformance adjustments and exceptional dispatches on both real-time pricing and intertie declines. The results of the data analysis will lead to process improvements that can be implemented in conjunction with the intertie deviation settlement proposal. By ensuring real-time intertie prices reflect system conditions, the ISO will ensure effectiveness of the intertie deviation settlement proposal. Likewise, implementation of the intertie deviation settlement proposal provides greater assurance that intertie resources will be delivered, which eliminates the need for out-of-market processes that may be negatively impacting real-time pricing.

POSITIONS OF THE PARTIES

Most stakeholders support this intertie deviation settlement proposal. They believe the proposed non-delivery charge is justified and will incent delivery of intertie energy, which will increase grid reliability. Additional benefits, as identified by stakeholders, include more accurate market inputs to the ISO real-time market, more accurate inputs to the EIM resource sufficiency evaluation, and a reduction of speculative bidding. Speculative bidding is bidding without a firm source (or export sink) lined-up, or choosing to sell bid-in energy elsewhere after an intertie transaction bid is submitted to the ISO.

Some stakeholders question the need for a non-delivery charge that is in addition to imbalance energy settlement.

One stakeholder maintains that imports are “surplus energy” and is not needed for reliability because the ISO has resource adequacy requirements. Management believes this view does not recognize that intertie transactions that economically clear the ISO market are needed for reliability. Resource adequacy requirements require bids from resource adequacy resources but they do not necessarily clear the market. Consequently, undelivered intertie transactions can displace resource adequacy capacity from being available in real-time (e.g., resource adequacy imports and uncommitted internal resource adequacy resources).

Another stakeholder maintains intertie transactions should be treated like internal generation that are just subject to imbalance energy settlement at the 5-minute real-time dispatch price for deviations from 15-minute schedules. Management believes the additional non-delivery charge is appropriate for intertie transactions because intertie schedules tie up intertie capacity that is reserved in the hour-ahead scheduling process. Additionally, as described above, intertie transactions are not always subject to real-time imbalance energy settlement, depending on the timing of when the real-time market learns the transaction will not be delivered.

The ISO's Market Surveillance Committee (MSC) supports the framework of the intertie deviation settlement proposal. However, they believe the ISO must also address market inputs that affect real-time market intertie prices at the same time it implements the proposed changes.

The MSC notes that in instances of stressed system conditions and high amounts of undelivered imports, the real-time market had high hour-ahead scheduling process prices with much lower 15-minute market and 5-minute real-time dispatch prices. They state this may provide incentives to not deliver imports as the prices used for financial settlement could be lower than the submitted import bid.

The MSC notes these price anomalies may be caused by ISO grid operator load forecast adjustments and intertie exceptional dispatches in anticipation of undelivered imports. They urge further analysis of this relationship and measures so that 15-minute market and 5-minute real-time prices better reflect stressed system conditions. As discussed above, Management intends to undertake this analysis and look for process improvements to address the identified issues that can be implemented in conjunction with the intertie deviation settlement.

Attachment A presents a summary of stakeholder comments and Management's responses.

The MSC opinion is attached as Attachment B.

CONCLUSION

Management requests the Board of Governors approve this proposal. The intertie deviation settlement proposal will incentivize delivery of scheduled intertie energy. The non-delivery charge coupled with the enhanced fifteen-minute market logic will increase grid reliability and improve accuracy of market inputs and real-time market pricing.