January 25, 2017

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. ER17-_____-000

Tariff Amendment to Modify Congestion Revenue Rights Settlement Rule

Dear Secretary Bose:

The California Independent System Operation Corporation (CAISO) proposes a narrowly tailored revision to its tariff rules regarding what transactions constitute implicit virtual awards at the interties for purposes of settling congestion revenue rights (CRRs).[1]

In settling CRRs, the CAISO automatically adjusts a market participant's CRR revenue for any virtual awards that materially impacts the value of its CRR holdings. This automatic adjustment, known as the CRR settlement rule, applies both to actual and implicit virtual bids.[2] The current rule for determining what constitutes implicit virtual bidding is overly broad and creates disincentives for economic intertie bidding. The CAISO proposes to modify the criteria it uses to determine whether a bid is an implicit virtual bid at an intertie to limit the scope of

[1] The CAISO submits this filing pursuant to Section 205 of the Federal Power Act, 16 USC § 824d, Part 35 of the Commission's Regulations, 18 C.F.R. § 35, *et seq.,* and rules 207, and 602 of the Commission's Rules of Practice and Procedure, 18 CFR §§ 385.207 and 385.602. The capitalized terms not otherwise defined herein have the meanings set forth in the CAISO tariff, and references to specific sections, articles, and appendices are references to sections, articles, and appendices in the current CAISO tariff and revised or proposed in this filing, unless otherwise indicated.

[2] Throughout this filing, the CAISO refers to an "actual" or "explicit" virtual bid in the sense that the term "virtual bid" is defined in Appendix A of the CAISO tariff. As explained in more detail below, an "implicit virtual bid" is a set of paired transactions designed to mimic an actual virtual bid.

bids deemed to be implicit virtual bids, thus eliminating unintended disincentives to economic intertie bidding.

The CAISO also proposes to eliminate the exemption from the CRR settlement rule for virtual bids submitted at trading hubs and load aggregation points because the exemption is no longer justified. Section 11.2.4 has been clarified to address minor grammar, cross-reference, punctuation, and terminology issues.

The CAISO respectfully requests that the Commission issue an order by March 27, 2017, approving the proposed revisions to the CAISO's CRR settlement rule. The CAISO requests an effective date of April 1, 2017, for these proposed revisions. The CAISO must make software changes to implement these new rules, and the new rules will cause market participants to bid differently in the fifteen-minute market. An order by March 27, 2017, will ensure that the CAISO is ready to conduct, and market participants are ready to participate in, the day-ahead market for the April 1, 2017, trading day in a timely and reliable manner.

I. BACKGROUND

A. CRR Settlement Rule and "Implicit" Virtual Bids

1. Overview of Convergence Bidding/Virtual Bidding

The CAISO has permitted convergence bidding (also referred to as virtual bidding) in its markets since February 2011. Convergence bidding is a mechanism that permits a market participant can make a financial sale or purchase of energy in the day-ahead market in merit order and then automatically liquidate that position at the real-time market price.[3] This allows the CAISO to settle the energy transaction based upon the difference between the day-ahead market price and the real-time market price. The CAISO pays virtual supply the day-ahead market price and charges it the real-time market price, whereas the CAISO charges virtual demand the day-ahead market price and pays it the real-time market price.

2. Overview of Congestion Revenue Rights

CRRs are financial instruments settled on the difference in the marginal cost of congestion between two points (the source and the sink) on the CAISO's system (as determined in the CAISO day-ahead market), multiplied by the MW

[3] When convergence bidding began, the CAISO liquidated virtual bids at internal nodes at the five-minute price, with intertie virtual bids (when permitted) settled at the hour ahead scheduling process price. After adding the fifteen-minute market to the real-time market on May 1, 2014, the CAISO now liquidates all virtual bids at the fifteen-minute market price.

quantity of the CRRs the party holds between the two points. The CAISO releases CRRs through both an allocation process at no cost to load serving entities, and an auction mechanism to market participants based on cleared bids at market-clearing prices.

3. Development of the CRR Settlement Rule

In developing the convergence bidding market rules, the CAISO was aware that a market participant could use convergence bidding as a mechanism to increase payments to its CRR portfolio by submitting virtual bids in the day-ahead market to congest certain locations. This would increase the congestion component of the locational marginal price and subsequently increase the value of CRRs sourced at those locations. Although liquidating virtual bids in the real-time market can result in a loss due to differences between day-ahead and real-time system marginal energy prices and losses. That liquidation of virtual bids does not eliminate potential incentives for parties to submit such virtual bids in the day-ahead market because the CAISO settles CRRs based on the congestion costs collected in the day-ahead market. This can result in CRR revenues exceeding the losses associated with the virtual bids, thus resulting in an overall profitable trading scheme.

To discourage such behavior the CAISO included the CRR settlement rule in tariff section 11.2.4.6 as part of the convergence bidding design. The rule automatically adjusts the CRR revenue for a convergence bidding entity whose virtual bidding behavior materially affects the value of its CRR holdings. The rule does not apply to convergence bids cleared on trading hubs and load aggregation points.

The CRR settlement rule is an upfront, transparent, and automatic mechanism that creates disincentives for undesirable conduct. The CAISO did not intend the CRR settlement rule to require the CAISO, or its Department of Market Monitoring, to conduct an after-the-fact evaluation of the facts and circumstances of individual transactions.

4. CRR Settlement Rule as Applied to "Implicit" Virtual Awards

In addition to explicit virtual bids, the CRR settlement rule also addresses the potential for "implicit" virtual awards to influence CRR settlements.[4] This filing deals primarily, though not exclusively, with this aspect of the CRR settlement rule.

[4] Similar concerns led the CAISO to develop the hour ahead scheduling process (HASP) reversal rule to incentivize e-tagging prior to the start of the real-time market. *See* CAISO tariff section 11.32.

A market participant constructs an implicit virtual bid by using import or export bids to replicate virtual supply and virtual demand settlement. For example, to mimic a virtual supply transaction at an intertie, a market participant could bid an import into the day-ahead market. Then it could re-bid that day-ahead award into the real-time market at the $1,000/MWH bid cap, all-but ensuring that the day-ahead import will not clear the fifteen-minute market. The settlement consequence of this bidding behavior essentially is the same as a virtual supply transaction at the same location, assuming that an explicit virtual transaction at an intertie were permissible.[5]

In designing the CRR settlement rule, the CAISO was mindful of potential implicit virtual bidding and crafted the CRR settlement rule to recapture CRR revenue generated from congestion resulting from implicit virtual bidding. The feasibility of internal implicit virtual bidding is viewed as limited so the CRR settlement rule focuses only on such activity at intertie locations. The CRR settlement rule treats an import or export awarded in a day-ahead schedule that is reduced in the real-time market similarly to how it treats an explicit virtual award. If the flow impact of the real-time reduction to a day-ahead intertie award exceeds 10% of the transmission capacity (*i.e.*, it materially affected the congestion upon which CRRs are settled), then 100% of the market participant's CRR revenues from that path are subject to the CRR settlement rule. Similar to explicit virtual bids, the mere fact that a transaction is a virtual award does not, in itself, trigger additional financial consequences. The CRR settlement rule will only clawback CRR revenues if all of the following additional conditions are all met:

1. The recipient of the virtual award must also hold CRRs.
2. The CRRs must source or sink at the same location as the virtual award.
3. The virtual award materially affects the value of those CRRs.

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[5] The CAISO has only permitted explicit convergence bidding at the interties for a brief window of time. The CAISO initially allowed convergence bidding at the interties in February 2011, with the overall implementation of convergence bidding, but subsequently suspended it in November 2011. Outside of that nine-month timeframe, the CAISO has not permitted intertie convergence bidding in its markets. This fact is reflected in Diagram A. through the strikeout type for the word "Intertie" under the explicit virtual award heading.

The CAISO intended to reinstitute explicit intertie convergence bidding on a one-year lag with implementation of the fifteen-minute market in May 2014 but delayed reinstitution several times and ultimately removed it from the tariff in compliance with a Commission order. *Cal. Indep. Sys. Operator Corp.*, 152 FERC ¶ 61,234 (2015). That compliance obligation was without prejudice to the CAISO proposing to reintroduce explicit virtual bidding at the interties at a future point. *Id.* at P 46. To clarify, this filing does not reflect CAISO interest in reinstituting explicit virtual bidding at the interties at this time.

B. Intertie Liquidity Workshop

The CAISO and stakeholders observed persistent and unexpected low liquidity in economic bidding at the interties in the fifteen-minute market after its implementation on May 1, 2014.

The CAISO hosted a stakeholder workshop on October 6, 2015, to explore the causes of this low liquidity.[6] The CAISO and stakeholders identified multiple potential causes of this illiquidity. Stakeholders generally agreed that many of those issues, such as difficulty in procuring external transmission at fifteen-minute granularity and other commercial limitations, were outside the scope of the CAISO's control. Several recommendations, however, are within the CAISO's purview. These include: (1) exempting fifteen-minute market export bids from transmission access charges and measured demand uplift charges;[7] (2) removing hourly block trading and the hour-ahead scheduling process so that only fifteen-minute market blocks could be offered;[8] and (3) modifying the applicability of the CRR settlement rule to transactions at the interties to make its application less stringent and more predictable.

After considering the feedback received after the workshop and engaging in further analysis, the CAISO decided to open a stakeholder initiative focused solely on the third option – modifying the CRR settlement rule. This filing is the result of that stakeholder process. The CAISO deferred consideration of the first option. The CAISO has included that market rule change in the CAISO's market initiatives catalogue, although stakeholders did not prioritize this item highly enough to justify the CAISO moving forward with it in a stakeholder process at this time. The CAISO rejected the second option because it is too significant a change to the real-time market design the CAISO implemented on May 1, 2014, as part of its Order 764 compliance.

The rationale for the third option is that market participants are reticent to bid economically at the interties in the fifteen-minute market out of concern for

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[6] Information about the workshop is available at: http://www.caiso.com/Pages/documentsbygroup.aspx?GroupID=F74BFA47-69BD-4DDB-A2CA-884DB879BE75. Slide 4 of the CAISO's presentation at the workshop provides information reflecting the observed low liquidity. http://www.caiso.com/Documents/ISOPresentation_Import-ExportLiquidity_15-MinuteMarket_Workshop_Oct6_2015.pdf.

[7] The rationale for this option is to make economic intertie bidding by exports less expensive. Import schedules in the fifteen-minute market are exempt from transmission access and uplift charges. Exports, however, face both charges. Some stakeholders reasoned that exempting exports from these charges would incentivize export bidding and enhance liquidity.

[8] The rationale for the second option is to change the bidding options in the fifteen-minute market so that market participants have no choice but to submit economic bids at a fifteen-minute granularity.

triggering the CRR settlement rule. Stakeholders expressed the view that once a day-ahead schedule is awarded, any economic bid into the real-time could lead to a schedule reduction. The CRR settlement rule would then treat the market participant as having submitted an implicit virtual bid even if that was not what the market participant intended Further, stakeholders explained that they could not predict how any unanticipated schedule reduction might influence congestion on paths where they hold CRRs. In their view, the combined impact of these unknown factors makes submitting economic bids on interties in the real-time market an unjustified risk. Rather than risk unexpected clawback of revenues after the fact, stakeholders stated that it is safer to pursue other options, such as submitting self-schedules to the real-time market.

The workshop also highlighted that rebidding day-ahead import and export schedules into the fifteen-minute market likely would be beneficial for real-time intertie liquidity. When bidding incremental imports and exports into the fifteen-minute market, scheduling coordinators must secure external transmission prior to the start of the fifteen-minute market. During the workshop, stakeholders stressed that determining whether and how to include this incremental transmission cost into their real-time energy bid was difficult. However, for day-ahead schedules that are rebid into the fifteen-minute market, the external transmission is already procured and compensated by the payment for the day-ahead schedule. Day-ahead imports reduced through a fifteen-minute market bid provide downward flexibility, and day-ahead exports reduced through a fifteen-minute market bid provide upward flexibility. Market participants can bid this flexibility into the fifteen-minute market without incurring an additional transmission charge external to the CAISO.

This filing addresses the concerns raised by stakeholders at the workshop.

C. Load Aggregation Points, Trading Hubs, and their Exclusion from the CRR Settlement Rule

The CAISO clears and settles all CAISO load at load aggregation points (LAPs), which are aggregations of individual pricing nodes. The CAISO clears and settles the majority of load at one of the default LAPs, which correspond to the service territories of Pacific Gas and Electric Co. (PG&E), Southern California Edison Co. (SCE), San Diego Gas and Electric Co. (SDG&E), and the Valley Electric Authority (VEA).[9] For each default LAP, the CAISO calculates a zonal

[9] The CAISO Tariff defines the term “Default LAP” as the “TAC Area at which all Bids for Demand shall be submitted and settled . . . .” At the start of the CAISO’s new market in 2009, there were three Default LAPs, which corresponded to the service territories of the three major California investor-owned utilities. With the integration of Valley Electric Association into the CAISO controlled

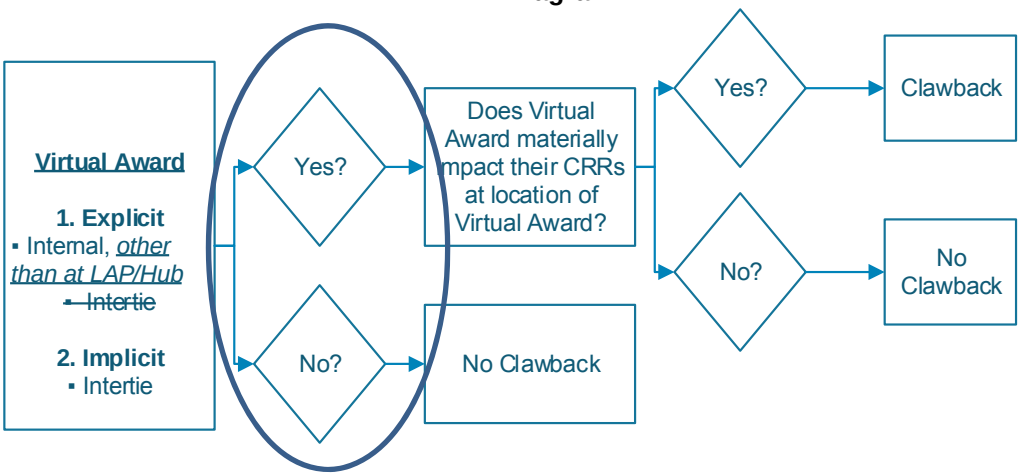
locational marginal price based on the distribution of system load at the constituent pricing nodes within the applicable default LAP. The CAISO settles a scheduling coordinator's load at the applicable locational marginal price for the default LAP in which that load is located.[10]

Trading hubs generally mirror LAPs. Like LAP pricing, the CAISO prices trading hubs to reflect a weighted average of an aggregation of nodes. The nodes, however, represent generation rather than load. The CAISO's most significant trading hubs are the existing zone generation trading hubs, which reflect the average price paid to generation resources within each of the three zones of the CAISO's pre-2009 zonal market.

The CAISO permits convergence bidding at both LAPs and trading hubs. Additionally, CRRs can source and sink at LAPs and trading hubs. The CRR settlement rule, however, does not consider virtual bids submitted at LAPs and trading hubs. In creating the CRR settlement rule, the CAISO believed that these aggregated pricing nodes would be sufficiently liquid to prevent any single market participant from being able to use convergence bids at these locations to influence its CRR portfolio.

Diagram A, below, reflects the process for applying the CRR settlement rule for both explicit and implicit virtual awards.

Diagram A.



grid as a participating transmission owner in 2013, the CAISO created a fourth Default LAP corresponding to Valley Electric's service territory.

[10] *See, e.g.*, CAISO tariff section 11.2.1.2.

II. DISCUSSION OF TARIFF AMENDMENT

A. Summary of Tariff Proposed Amendments

To address the general issues described above, the CAISO proposes to revise tariff section 11.2.4.6 of the CAISO tariff, *i.e.,* the CRR settlement rule, and make a minor conforming revision to section 11.32. These revisions more accurately reflect what transactions should be considered implicit virtual bids for purposes of applying the CRR settlement rule. These revisions should promote greater economic bidding at the interties in the fifteen-minute market. In terms of Diagram A., these revisions relate to the part of the diagram surrounded by an oval. To determine whether the CRR settlement rule is triggered, the CAISO must first determine if there has been a virtual award. Making that determination with explicit virtual awards is straightforward because such awards result from bids that the scheduling coordinator explicitly identifies as a virtual award. The issue is less clear with implicit virtual awards. The tariff currently has one standard for determining whether an intertie transaction is deemed a virtual award. These revision simply narrow the definition, meaning that fewer intertie transaction will be deemed virtual awards and proceed through the CRR settlement rule process.

Under the current CRR settlement rule, the CAISO considers any reduction to the quantity of a day-ahead import or export schedule in the real-time market to be a virtual award for purposes of the CRR settlement rule. The CAISO then evaluates whether the schedule reduction materially affected the market participant's CRR holdings. As discussed further below, this broad rule creates too high a risk of false positives in identifying intertie transactions as implicit virtual awards.

The proposed revision to section 11.2.4.6 has three key elements. First, in addition to considering whether there has been a schedule reduction at an intertie, the CAISO proposes also to consider certain aspects of the bid the scheduling coordinator submits to the real-time market that led to the schedule reduction at the intertie point. Thus, under revised section 11.2.4.6, for the CAISO to determine that there is an implicit virtual award for purposes of the CRR settlement rule, there must be a schedule reduction, and at least one of the following three conditions must be met:

1. An economic import bid is bid-in to the real-time market at a price above the day-ahead locational market price; or

2. An economic export bid is bid-in to the real-time market at a price below the day-ahead locational market price; or

3. The total quantity of the real-time bid (self-schedule plus economic bid) does not at least include the full quantity of the day-ahead schedule.[11]

In addition to revising how the CAISO determines what constitutes an implicit virtual award under the CRR settlement rule, the CAISO also proposes to eliminate the exemption from the CRR settlement rule for explicit virtual bids cleared on trading hubs and load aggregation points. This proposed change is reflected in revised section 11.2.4.6.

The CAISO discusses the proposed tariff revisions in greater detail below.

B. Assessing Real-Time Economic Intertie Bids to the Day-Ahead Price

The CAISO has determined that it also needs to assess real-time export and import bid prices relative to the day-ahead intertie clearing price for purposes of the CRR settlement rule because evaluating virtual awards based solely on schedule reductions provides an incomplete and potentially inaccurate picture. Altered system conditions can lead the CAISO to change a schedule between day-ahead and real-time for a scheduling coordinator even if the scheduling coordinator itself did not change its bidding behavior between day-ahead and real-time. In determining whether the scheduling coordinator has engaged in implicit virtual bidding for purposes of the CRR settlement rule, it is appropriate to consider whether the scheduling coordinator's bidding activity played a role in forcing the schedule reduction.

The CAISO proposes to make that determination by evaluating the bid price of real-time market economic bids at an intertie relative to the day-ahead market clearing price at that intertie. If a scheduling coordinator rebids its import into the real-time market at a price equal to or less than the day-ahead locational marginal price, the CAISO will not consider this an "implicit" virtual bid because the bid reflects that the importer is supporting its day-ahead schedule. Because

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[11] The specific revision to section 11.2.4.6 provides that reducing an intertie day-ahead schedule in the real-time is considered a virtual award:

> if the segment of Economic Bid (but not Self-Schedule) leading to the Schedule reduction is: at an Energy Bid price greater than the Day-Ahead Market LMP at the relevant intertie, in the case of an import; or at an Energy Bid price less than the Day-Ahead Market LMP at the relevant intertie, in the case of an export. In addition, if the RTM Bid does not include the full MW quantity of the Day-Ahead Schedule through some combination of Economic Bid and Self-Schedule, then the MW range not covered by the RTM bid that was included in the Day-Ahead Schedule will be treated as a Virtual Award.

the bid price is equal to or less than the day-ahead bid price, the market clearing process would only reduce the import schedule if system conditions have changed from the day-ahead, such that the import is no longer economic to balance real-time supply and demand. Therefore, the CAISO would not consider the scheduling coordinator to have engaged in implicit virtual bidding, and its CRR revenue would not be evaluated for potential resettlement under the CRR settlement rule.

In contrast, if the import bid is higher than the day-ahead market-clearing price, the higher bid price makes the energy scheduled in the day-ahead more costly, potentially resulting in a reduction in that schedule even if all other conditions remain the same. This indicates the entity may never have intended to deliver the schedule in the real-time and submitted the bid in the day-ahead only for purposes of congesting that intertie, *i.e.*, submitting an implicit virtual bid.

As applied to exports, the same logic applies in reverse. Where a scheduling coordinator rebids its export into the real-time at a price equal to or greater than the day-ahead market-clearing price, any reduction in the export schedule from day-ahead almost certainly would be unrelated to the participant's real-time bidding activity. In this case, the export bid would clear the real-time bid except if other conditions changed and the schedule had to be reduced. Therefore, the bid likely did not cause any reduction in the schedule. Similarly, if the exporter rebids its export into the real-time at a price below the day-ahead price, the real-time bid is more costly in the real-time market, which may cause the bid to not clear in the real-time. Under these circumstances, CAISO cannot presume that such a schedule reduction resulted only because of changed system conditions between day-ahead and real-time.

This is best illustrated by an example. Assume a scheduling coordinator bids a 100 MW import into the CAISO in the day-ahead at its marginal cost of $45. With a clearing price at the relevant intertie of $50, that market participant will receive a full schedule of 100 MW in the day-ahead. If that scheduling coordinator rebids its day-ahead schedule into the real-time at its marginal cost of $45 (*i.e.*, the same offer it submitted to the day-ahead), there is no guarantee that it will receive a 100 MW schedule in the real-time. Changed system conditions between day-ahead and real-time could result in the price at the intertie dropping from $50 in day-ahead to $40 in real-time. The scheduling coordinator in this example could see its day-ahead schedule reduced from 100 MW to 0 MW because of changes in system conditions. Although the resource never deviated from bidding its pure marginal cost, the current CRR settlement rule would treat it as having engaged in implicit virtual bidding. The proposed tariff revisions will prevent false positives such as this.

Under the CAISO's proposed revised rule, the CAISO would not deem the schedule reduction in this example to be an implicit virtual award because the real-time offer price was at or below the day-ahead clearing price, which reflects that the resource was not attempting to force changes in schedules through its bid price. This tariff revision will reduce the instances in which intertie schedules are flagged as virtual bids, thus subjecting the market participant's CRRs at that intertie point to potential resettlement under the CRR settlement rule. This is a more just and reasonable outcome because it eliminates unnecessary and inappropriate application of the rule. Submitting a real-time offer at or below the day-ahead clearing price provides a sufficient basis for the CAISO to conclude, for the purposes of the CRR settlement rule, that the scheduling coordinator was not seeking a schedule reduction.

On the other hand, an opposite conclusion is supported where a scheduling coordinator rebids its day-ahead intertie schedule into the real-time at a price above the day-ahead market-clearing price. Expanding on the above example, if the scheduling coordinator rebid its 100 MW day-ahead schedule into the real-time at $75, then under the proposed amendment 100 MW would be deemed a virtual award if the schedule is reduced. In this example, the price of the economic bid at $75, $25 above the day-ahead clearing price, would result in the bid not clearing in the real-time market even if system conditions remain the same. This would raise questions about the scheduling coordinator's bidding behavior and its intent to influence congestion to benefit its CRRs. If this hypothetical scheduling coordinator were concerned about the impact of the CRR settlement rule, it simply could lower its economic bid in the real-time to the day-ahead clearing price to avoid the rule. These proposed changes would ensure the bid would continue to clear in the real-time.

These proposed rules are just and reasonable because they reduce the number of false positives that arise where the CRR settlement rule is triggered even though a scheduling coordinator's market conduct does not suggest an intent to impact the day-ahead price with implicit virtual bids. With the proposed changes, the CRR settlement rule will continue to eliminate incentives for bidding behavior to increase CRR payments through day-ahead market bids that cause congestion in the day-ahead market but are not delivered. The proposed changes also provide clearly defined rules as to when the CRR settlement rule will apply, thus providing scheduling coordinators the ability to avoid triggering the CRR settlement rule by adhering to a clear standard that is known ahead of time.

C. Ensuring the Real-Time Bid Includes the Full Quantity of the Day-Ahead Schedule

A scheduling coordinator may also reduce its schedule from the day-ahead to the real-time market, *i.e.*, engage in implicit virtual bidding, by changing the quantity of the real-time bid. The proposed rule will deem any quantity of a day-ahead intertie schedule that is not included in the real-time offer, either through a self-schedule or economic bid, to be an implicit virtual award and apply the CRR settlement rule to such quantities. Reducing the MW quantities cleared in the day-ahead raises the question of whether the scheduling coordinator ever intended to deliver its day-ahead bid-in quantity, or whether it only submitted that day-ahead bid to create congestion in an effort to artificially increase its CRR payments. Because this behavior affects the day-ahead marginal cost of congestion, the CAISO proposes to deem the MW portions of the day-ahead cleared schedules not covered by either a real-time self-schedule or economic bid submitted by the scheduling coordinator as implicit virtual bidding. The CAISO will apply the CRR settlement rule to those portions. Again, being deemed a virtual award does not, on its own, trigger a settlement consequence. Being a virtual award merely means that those portions of the day-ahead schedule are subject to further analysis under the CRR settlement rule.

As an example to reflect how the proposed rule would apply in this case, consider that a scheduling coordinator receives a 100 MW import day-ahead schedule at $50. That participant then submits a real-time bid that includes a self-schedule for 50 MW and an economic bid at $45 for 25 MW. Under the CAISO's proposed rule, the participant would have a virtual award of 25 MW because of the 100 MW awarded in the day-ahead, only 75 MW (50 MW self-schedule plus 25 MW economic bid) was covered by the real-time bid.[12] By submitting a bid curve at a maximum of 75 MW, the market optimization essentially has no choice but to accept the schedule reduction.

D. Removing Exemption from CRR Settlement Rule for Trading Hubs and Load Aggregation Points

In the course of examining the CRR settlement rule, the CAISO also concluded that the current exemption for explicit virtual bids submitted at trading hubs and LAPs is not justified. This change is reflected in the box titled "Virtual Award," in Diagram A. Under the new process, the underlined and italicized phrase "other than at LAP/Hub" would be deleted to reflect that all internal virtual awards would be evaluated under the CRR settlement rule. Although not tied directly to intertie liquidity in the fifteen-minute market, removing this exemption

[12] In this instance, if the bid price for the 25 MW economic bid were $52, then the scheduling coordinator would have a virtual award of 50 MW because, by operation of the rules discussed in part II.A., the economic bid segment separately would have been deemed a virtual award.

will benefit overall operation of the CRR settlement rule and is an appropriate enhancement.

The CAISO's original rationale for the exemption was based on the expectation of high liquidity of the trading hubs and LAPs. The high liquidity would make it difficult for implicit virtual bids to influence congestion price to impact CRRs. However, the CRR settlement rule is designed to measure actual impact to congestion from submitted virtual or implicit virtual bids. Because it is not possible to constantly evaluate whether there is sufficient liquidity at a location to ensure the virtual bid cannot set the day-ahead price, it is more prudent and effective to apply the CRR settlement rule *ex ante* to the trading hubs and LAPs.

If the trading hubs and LAPs are so liquid that it is impossible to use virtual bids at those points to influence congestion to benefit an entity's CRR portfolio, then applying the CRR settlement rule to those locations will have no impact. The CRR settlement rule will not be triggered because the liquidity prevents the scheduling coordinator from impacting the marginal cost of congestion. On the other hand, if a trading hub or LAP lacks sufficient liquidity to prevent the scheduling coordinator from affecting the day-ahead marginal cost of congestion, applying the revised CRR settlement rule will ensure that a scheduling coordinator cannot use virtual or implicit virtual bids simply to increase CRR payments.

Further, exempting trading hubs and LAPs fails to recognize that the market optimization clears bids at the aggregation point and manages congestion using the shift factor of the aggregation point to constraints. Therefore, bids at trading hubs or LAPs can cause constraints to bind, resulting in physical congestion. That congestion can impact CRR settlements in the same way as convergence bids would at single nodes.

E. Tariff Clarifications

The CAISO is also proposing minor revisions to clarify all of Section 11.2.4. The clarifications include grammar, punctuation, typographical errors, correction to cross-references, and removal of terms no longer used the CAISO. The CAISO is also cancelling out Section 11.2.4.6 that is currently reflected as a separate record in the CAISO tariff. This Section 11.2.4.6 has been modified and included in Section 11.2.4 of the CAISO's tariff in a tariff amendment filed with the Commission in Docket No. ER13-449-000.

III. STAKEHOLDER PROCESS

The CAISO started the stakeholder process on April 13, 2016 by publishing a straw proposal and holding a stakeholder teleconference on April 20, 2016 to discuss the paper.[13] Following the initial call, the CAISO posted its draft final proposal on May 16, 2016 and held another stakeholder call. The CAISO Board of Governors approved the proposal on June 28, 2016.

Stakeholders generally supported the proposed changes regarding what intertie transactions the CAISO will deem to be virtual awards for purposes of the CRR settlement rule. Most stakeholders believe the bidding provisions will allow market participants who bid consistent with the rules to increase the quantity of day-ahead schedules rebid into the real-time market. A few stakeholders opposed the proposed changes to the rules regarding intertie transactions, arguing the proposed rule restricts bidding and impedes general market activity.[14]

Stakeholders generally were divided on whether to remove the exemption from the CRR settlement rule for virtual bids cleared at load aggregation points and trading hubs. Many stakeholders opined that virtual bids at these load aggregation points and trading hubs should be evaluated in the same manner as bids at individual nodes.[15] Other stakeholders argued that, given market liquidity at these pricing points and hubs and because flows resulting from bids at these points and hubs are distributed across the system, a market participant has limited ability to impact its own CRR payments.[16] They argued that these aggregated pricing nodes should continue to be exempt because subjecting them to potential CRR settlement impedes their ability to submit virtual bids without risking application of the CRR settlement rule. They argue this could impede the legitimate use of virtual bids for hedging or to increase market efficiency, such as reflecting renewable resource supply that is not scheduled in the day-ahead market. The CAISO considered these arguments but was not convinced that its targeted revision to the definition of an implicit virtual bid, designed to narrow the range of instances in which the CRR settlement rule would result in clawed back CRR revenue, was likely to have those consequences.

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[13] Complete details of the stakeholder process leading to this filing are available on the stakeholder initiative site at http://www.caiso.com/informed/Pages/StakeholderProcesses/CongestionRevenueRightsClawbackRuleModification.aspx.

[14] Vitol Inc. and the California Department of Water Resources State Water Project (CDWR) were the two parties that expressed clear opposition.

[15] Examples of stakeholders expressing this general view include CDWR and the Cities of Anaheim, Azusa, Banning, Colton, Pasadena, and Riverside, California (the Six Cities).

[16] Examples of stakeholders expressing this general view include Pacific Gas & Electric Company and the Western Power Trading Forum.

The CAISO considered both positions and concluded that the current exemption for load aggregation points and trading hubs is not warranted. Trading hubs and load aggregation points are simply weighted average prices of their underlying pricing nodes. In terms of the impact on congestion and the transmission system, there is no difference between a single bid of a given quantity at a trading hub and the same total quantity reflected in multiple, smaller bids at each of the nodes making up that trading hub. Further, removing the exemption only allows the CAISO to test virtual bids at trading hubs and load aggregation points for their impact. If they do not exceed the 10% threshold under the existing rule, then CAISO would not resettle CRR revenues.

IV. EFFECTIVE DATE

The CAISO respectfully requests that the Commission issue an order by March 27, 2017, approving the tariff revisions contained in this filing effective April 1, 2017.

V. COMMUNICATIONS

Pursuant to Rule 203(b)(3) of the Commission's Rules of Practice and Procedure, 18 C.F.R. § 385.203(b)(3), please provide all correspondence and other communications to the following individuals, whose names appear on the official service list established by the Commission with respect to this filing:

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VI. 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.

VII. CONTENTS OF FILING

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

- Attachment A – Clean CAISO tariff sheets incorporating this tariff amendment.
- Attachment B – Red-lined document showing the revisions contained in this tariff amendment.
- Attachment C – Board of Governors Memo

VII. CONCLUSION

For the reasons set forth in this filing, the CAISO respectfully requests that the Commission issue an order by March 27, 2017, accepting the tariff changes contained in this filing effective April 1, 2017.

Respectfully submitted,

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Attachment A – Clean Tariff Records

Tariff Amendment to Modify Congestion Revenue Rights Settlement Rule

California Independent System Operator Corporation

11.2.4 CRR Settlements

CRR Holders will be paid or charged for Congestion costs depending on the type of CRRs held by the CRR Holder, the direction of Congestion as measured through the IFM, and the LMP as calculated in the IFM. CRRs will be funded through the revenues associated with the IFM Congestion Charge, CRR Charges, and the CRR Balancing Account. The CRR Payments and CRR Charges will be settled first on a daily basis for each Settlement Period of the DAM. A daily true up will then be conducted in the clearing of the CRR Balancing Account pursuant to Section 11.2.4.4.1.

11.2.4.1 Calculation of the IFM Congestion Charge

For each Settlement Period of the IFM, the CAISO will calculate the IFM Congestion Charge as the IFM MCC amount for all scheduled Demand and Virtual Supply Awards, minus the IFM MCC amount for all scheduled Supply and Virtual Supply Awards. The IFM MCC amount for all scheduled Demand and Virtual Demand Awards is the sum of the products of the IFM MCC and the total of the MWh of Demand scheduled in the Day-Ahead Schedule and Virtual Supply Awards at all the applicable PNodes and Aggregated Pricing Nodes for the Settlement Period. The IFM MCC amount for all scheduled Supply and Virtual Supply Awards is the sum of the products of the IFM MCC and the total of the MWh of Supply scheduled in the Day-Ahead Schedule and the Virtual Supply Awards at all the applicable PNodes for the Settlement Period.

11.2.4.1.1 [Not Used]

11.2.4.1.2 Calculation of IFM Congestion Fund

For each Settlement Period of the IFM, the CAISO will determine the IFM Congestion Fund, which will consist of the funds available to pay CRR Holders in any Settlement Period as follows:

- ☐ The CAISO will add to the IFM Congestion Fund the IFM Congestion Charge computed as described in Section 11.2.4.1, minus any IFM Congestion Credits as specified in Section 11.2.1.5;
- ☐ The CAISO will add to the IFM Congestion Fund any CRR Charges calculated pursuant to Section 11.2.4.2.2; and
- ☐ The CAISO will add to the IFM Congestion Fund any IFM Congestion Charges associated with Day-Ahead Ancillary Services Awards as provided in Section

11.10.1.1.1.

11.2.4.2 Settlement Calculation for the Different CRR Types

For the purposes of determining the CRR Payments and CRR Charges based on the various CRR Types, the CAISO will calculate the Settlement of CRRs as described in this Section 11.2.4.2. When CRR Source or CRR Sink is a LAP, the Load Distribution Factors used in the IFM will be used to produce the LAP Price at which CRR Payments or CRR Charges will be settled. When CRR Source or CRR Sink is a Trading Hub the weighting factors used in the IFM and the CRR Allocation and CRR Auction processes will also be used to produce the Trading Hub prices that will be used to settle CRR Payments and CRR Charges.

11.2.4.2.1 Point-to-Point CRR Options

For each CRR Holder, the CAISO will calculate a CRR Payment for each Point-to-Point CRR Option held by the CRR Holder equal to the product of: 1) the MCC at the CRR Sink minus the MCC at the CRR Source; and 2) the MW quantity of the CRR, if that amount is positive. If the resulting amount is negative, the CAISO will not assess a charge for the relevant CRR Holder for the negative amount.

11.2.4.2.2 Point-to-Point CRR Obligations

For each CRR Holder, the CAISO will calculate a CRR Payment for each CRR Obligation for a Point-to-Point CRR held by the CRR Holder, equal to the product of: 1) the MCC at the CRR Sink minus the MCC at the CRR Source; and 2) the MW quantity of the CRR, if that amount is positive. If the resulting amount is negative, the CAISO will calculate a CRR Charge for the relevant CRR Holder equal to that negative amount.

11.2.4.3 Payments and Charges for Monthly and Annual Auctions

The CAISO will charge CRR Holders for the Market Clearing Price for CRRs obtained through the clearing of the CRR Auction as described in Section 36.13.6. To the extent the CRR Holder purchases a CRR through a CRR Auction that has a negative value, the CAISO will retain the CRR Auction proceeds and apply them to credit requirements of the applicable CRR Holder, in accordance with Section 12.6.3 of the CAISO Tariff. The CAISO will net all revenue received and payments made through this process. CRR Auction net revenue amounts for on-peak and off-peak usage from each CRR Auction will be separated. CRR Auction revenues for each season coming from the annual auction are first allocated

uniformly across the three months comprising each season based on time of use. These on-peak and off-peak monthly amounts from the seasonal auctions are then added to the corresponding monthly on-peak and off-peak amounts from the monthly CRR Auction for the same month to form the monthly net CRR Auction on-peak and off-peak revenues, respectively. Furthermore, these monthly net CRR Auction revenues will then be converted into daily values and added to the Daily CRR Balancing Accounts. In particular, the daily CRR Balancing Account contribution will be the sum of: (1) the monthly net CRR Auction on-peak amount multiplied by the ratio of daily on-peak hours to monthly on-peak hours; and (2) the monthly net CRR Auction off-peak amount multiplied by the ratio of daily off-peak hours to monthly off-peak hours.

11.2.4.4 Hourly CRR Settlement

For each Settlement Period, the IFM Congestion Funds calculated in Section 11.2.4.1.2 will be used to pay CRR Holders that are owed CRR Payments. In the hourly settlement of CRR Payments for the Settlement Period, all CRR Holders will be paid and charged fully according to their entitlements. Any surplus revenue for the Settlement Period after making all hourly CRR Payments will go to the CRR Balancing Account for use in the end-of-day clearing of the CRR Balancing Account processes pursuant to Section 11.2.4.4.1. Any revenue deficiency for the Settlement Period, will be tracked for further Settlement during the monthly clearing process as described in Section 11.2.4.4.1. The hourly Settlement of CRRs for each CRR Holder will be based on the type of CRR holdings as described in Section 11.2.4.2. The CRR Holder's hourly CRR Settlement amount will be the net of the holder's CRR Payments for CRR Options or CRR Obligations, and the holder's CRR Charges for CRR Obligations out of these holdings.

11.2.4.4.1 Daily Clearing of the CRR Balancing Account - Full Funding of CRRs

At the end of each day, all CRR Payment shortfalls for all CRR Holders will be paid in full and all CRR Charge shortfalls will be fully charged through the CRR Balancing Account clearing process. The net of these CRR Charges and CRR Payment shortfalls will be added to the CRR Balancing Account for the applicable day. Any surplus or shortfall revenue amounts in the CRR Balancing Account will be distributed to Scheduling Coordinators in an amount equal to (a) the CRR Balancing Account surplus or shortfall amounts, times (b) the ratio of each Scheduling Coordinator's Measured Demand (net of the

Scheduling Coordinator's Measured Demand associated with valid and balanced ETC or TOR Self-Schedule quantities, which IFM Congestion Credits and/or RTM Congestion Credits were provided in the same relevant day), divided by (c) the total Measured Demand for all Scheduling Coordinators for the relevant day (net of the total Measured Demand associated with valid and balanced ETC or TOR Self-Schedule quantities, which IFM Congestion Credits and/or RTM Congestion Credits were provided in the same relevant day).

11.2.4.5 CRR Balancing Account

The CRR Balancing Account will accumulate: (1) the seasonal and monthly CRR Auction revenue amounts that were converted into daily CRR Balancing Account values as described in Section 11.2.4.3; (2) any surplus revenue or shortfall generated from hourly CRR Settlements as described in Section 11.2.4.4; and (3) any adjustments of CRR revenue due to virtual bidding or Intertie scheduling practices as described in Section 11.2.4.6. Interest accruing due to the CRR Balancing Account will be at the CAISO's received interest rate and will be credited to each monthly CRR Balancing Account accrued interest fund, which is then allocated to monthly Measured Demand excluding Measured Demand associated with valid and balanced ETC, TOR, or Converted Rights Self-Schedule quantities, which IFM Congestion Credits and/or RTM Congestion Credits were provided in the same month.

11.2.4.6 Adjustment of CRR Revenue Related to Virtual Awards

In accordance with this Section 11.2.4.6, the CAISO will adjust the revenue from the CRRs of a CRR Holder that is also a Convergence Bidding Entity whenever either of the following creates a significant impact on the value of the CRRs held by that entity: the CRR Holder/Convergence Bidding Entity submits Virtual Bids; or the CRR Holder/Convergence Bidding Entity reduces in the RTM an import or export awarded in a Day-Ahead Schedule. As set forth in Section 11.32, the CAISO will also adjust the revenue from the CRRs of a CRR Holder (regardless of whether the CRR Holder is also a Convergence Bidding Entity) where the Scheduling Coordinator representing that CRR Holder reduces in the RTM an import or export awarded in a Day-Ahead Schedule.

(a) For purposes of this Section 11.2.4.6 and the definition of Flow Impact, a reduction by a Scheduling Coordinator submitting Schedules on behalf of an entity that is a CRR Holder to an import or export Schedule in the RTM will be

treated as a Virtual Award if the segment of Economic Bids (but not Self-Schedule) leading to the Schedule reduction is: at an Energy Bid price greater than the Day-Ahead Market LMP at the relevant intertie, in the case of an import; or at any Energy Bid price less than the Day-Ahead Market LMP at the relevant intertie, in the case of an export.

In addition, if the RTM Bid does not include the full MW quantity of the Day-Ahead Schedule through some combination of Economic Bid and Self-Schedule, then the MW range not covered by the RTM Bid that was included in the Day-Ahead Schedule will be treated as a Virtual Award.

For each CRR Holder subject to this Section 11.2.4.6, for each hour, and for each Transmission Constraint binding in the IFM or FMM the CAISO will calculate the Flow Impact of the Virtual Awards awarded to the Scheduling Coordinator that represents the CRR Holder. For the purposes of calculating the CRR adjustments as specified in this Section 11.2.4.6, the CAISO will include nodal MW constraints that the CAISO applies to Eligible PNodes in the IFM pursuant to Section 30.10.

(b) The CAISO will determine the peak and off-peak hours of the day where Congestion on the Transmission Constraint was significantly impacted by the Virtual Awards awarded to the Scheduling Coordinator that represents the CRR Holder. Congestion on the Transmission Constraint will be deemed to have been significantly impacted by the Virtual Awards awarded to the Scheduling Coordinator that represents the CRR Holder if the Flow Impact passes two criteria. First, the Flow Impact must be in the direction to increase the value of the CRR Holder's CRR portfolio. Second, the Flow Impact must exceed the threshold percentage of the flow limit for the Transmission Constraint. The threshold percentage is ten (10) percent of the flow limit for each Transmission Constraint.

(c) For each peak or off-peak hour that passes both criteria in Section 11.2.4.6(b),

the CAISO will compare the Transmission Constraint's impact on the Day-Ahead Market value of the CRR Holder's CRR portfolio with the Transmission Constraint's impact on the FMM value of the CRR Holder's CRR portfolio, as applicable.

(d) The CAISO will adjust the peak or off-peak period revenue from the CRR Holder's CRRs in the event that, over the peak or off-peak period of a day, the Transmission Constraint's contribution to the Day-Ahead Market value of the CRR Holder's CRR portfolio exceeds the Transmission Constraint's contribution to the FMM value of the CRR Holder's CRR portfolio, as applicable. The amount of the peak period adjustment will be the amount that the Transmission Constraint's contribution to the Day-Ahead Market value of the CRR Holder's CRR portfolio exceeds the Transmission Constraint's contribution to the FMM value of the CRR Holder's CRR portfolio for the peak-period hours that passed both criteria in Section 11.2.4.6(b), as applicable. The amount of the off-peak period adjustment will be the amount that the Transmission Constraint's contribution to the Day-Ahead Market value of the CRR Holder's CRR portfolio exceeds the Transmission Constraint's contribution to the FMM value of the CRR Holder's CRR portfolio for the off-peak period hours that passed both criteria in Section 11.2.4.6(b), as applicable.

All adjustments of CRR revenue calculated pursuant to this Section 11.2.4.6 will be added to the CRR Balancing Account.

* * * *

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.

(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.

Attachment B – Marked Tariff Records

Tariff Amendment to Modify Congestion Revenue Rights Settlement Rule

California Independent System Operator Corporation

11.2.4 CRR Settlements

CRR Holders ~~shall~~ will be paid or charged for Congestion costs depending on the type of CRRs held by the CRR Holder, the direction of Congestion as measured through the IFM, and the LMP as calculated in the IFM. CRRs ~~shall~~ will be funded through the revenues associated with the IFM Congestion Charge, CRR Charges, and the CRR Balancing Account. The CRR Payments and CRR Charges ~~shall~~ will be settled first on a daily basis for each Settlement Period of the DAM. A daily true up will then be conducted in the clearing of the CRR Balancing Account pursuant to Section 11.2.4.4.1 ~~and 11.2.4.4.2~~.

11.2.4.1 Calculation of the IFM Congestion Charge

For each Settlement Period of the IFM, the CAISO ~~shall~~ will calculate the IFM Congestion Charge as the IFM MCC amount for all scheduled Demand and Virtual Supply Awards, minus the IFM MCC amount for all scheduled Supply and Virtual Supply Awards. The IFM MCC amount for all scheduled Demand and Virtual Demand Awards is the sum of the products of the IFM MCC and the total of the MWh of Demand scheduled in the Day-Ahead Schedule and Virtual Supply Awards at all the applicable PNodes and Aggregated Pricing Nodes for the Settlement Period. The IFM MCC amount for all scheduled Supply and Virtual Supply Awards is the sum of the products of the IFM MCC and the total of the MWh of Supply scheduled in the Day-Ahead Schedule and the Virtual Supply Awards at all the applicable PNodes for the Settlement Period.

11.2.4.1.1 [Not Used]

11.2.4.1.2 Calculation of IFM Congestion Fund

For each Settlement Period of the IFM, the CAISO ~~shall~~ will determine the IFM Congestion Fund, which ~~shall~~ will consist of the funds available to pay CRR Holders in any Settlement Period as follows:

- ☐ The CAISO ~~shall~~ will add to the IFM Congestion Fund the IFM Congestion Charge computed as described in Section 11.2.4.1, minus any IFM Congestion Credits as specified in Section 11.2.1.5;
- ☐ The CAISO ~~shall~~ will add to the IFM Congestion Fund any CRR Charges calculated pursuant to Section~~s~~ 11.2.4.2.2 ~~and 11.2.4.2.3~~; and
- ☐ The CAISO ~~shall~~ will add to the IFM Congestion Fund any IFM Congestion Charges associated with Day-Ahead Ancillary Services Awards as provided in

Section 11.10.1.1.1.

11.2.4.2 Settlement Calculation for the Different CRR Types

For the purposes of determining the CRR Payments and CRR Charges based on the various CRR Types, the CAISO ~~shall~~ will calculate the Settlement of CRRs as described in this Section 11.2.4.2. When CRR Source or CRR Sink is a LAP, the Load Distribution Factors used in the IFM will be used to produce the LAP Price at which CRR Payments or CRR Charges will be settled. When CRR Source or CRR Sink is a Trading Hub the weighting factors used in the IFM and the CRR Allocation and CRR Auction processes will also be used to produce the Trading Hub prices that will be used to settle CRR Payments and CRR Charges.

11.2.4.2.1 Point-to-Point CRR Options

For each CRR Holder, the CAISO ~~shall~~ will calculate a CRR Payment for each Point-to-Point CRR Option held by the CRR Holder equal to the product of: 1) the MCC at the CRR Sink minus the MCC at the CRR Source; and 2) the MW quantity of the CRR~~,~~; if that amount is positive. If the resulting amount is negative, the CAISO ~~shall~~ will not assess a charge for the relevant CRR Holder for the negative amount.

11.2.4.2.2 Point-to-Point CRR Obligations

For each CRR Holder, the CAISO ~~shall~~ will calculate a CRR Payment for each CRR Obligation for a Point-to-Point CRR held by the CRR Holder, equal to the product of: 1) the MCC at the CRR Sink minus the MCC at the CRR Source; and 2) the MW quantity of the CRR~~,~~; if that amount is positive. If the resulting amount is negative, the CAISO ~~shall~~ will calculate a CRR Charge for the relevant CRR Holder equal to that negative amount.

11.2.4.3 Payments and Charges for Monthly and Annual Auctions

The CAISO ~~shall~~ will charge CRR Holders for the Market Clearing Price for CRRs obtained through the clearing of the CRR Auction as described in Section 36.13.6. To the extent the CRR Holder purchases a CRR through a CRR Auction that has a negative value, the CAISO will retain the CRR Auction proceeds and apply them to credit requirements of the applicable CRR Holder, in accordance with Section 12.6.3 of the CAISO Tariff. The CAISO ~~shall~~ will net all revenue received and payments made through this process. CRR Auction net revenue amounts for on-peak and off-peak usage from each CRR ~~a~~Auction ~~shall~~ will be separated. CRR Auction revenues for each season coming from the annual auction are first

allocated uniformly across the three months comprising each season based on time of use. These on-peak and off-peak monthly amounts from the seasonal auctions are then added to the corresponding monthly on-peak and off-peak amounts from the monthly CRR ~~Monthly a~~Auction for the same month to form the monthly net CRR Auction on-peak and off-peak revenues, respectively. Furthermore, these monthly net CRR ~~a~~Auction revenues ~~shall~~ will then be converted into daily values and added to the Daily CRR Balancing Accounts. In particular, the ~~D~~daily CRR Balancing Account contribution will be the sum of: (1) the monthly net CRR Auction on-peak amount multiplied by the ratio of daily on-peak hours to monthly on-peak hours; ~~,~~ and (2) the monthly net CRR Auction off-peak amount multiplied by the ratio of daily off-peak hours to monthly off-peak hours.

11.2.4.4 Hourly CRR Settlement

For each Settlement Period, the IFM Congestion Funds calculated in Section 11.2.4.1.2 will be used to pay CRR Holders that are owed CRR Payments. In the hourly settlement of CRR Payments for the Settlement Period, all CRR Holders ~~shall~~ will be paid and charged fully according to their entitlements. Any surplus revenue for the Settlement Period after making all hourly CRR Payments will go to the CRR Balancing Account for use in the end-of-day clearing of the CRR Balancing Account processes pursuant to Section 11.2.4.4.1. Any revenue deficiency for the Settlement Period, will be tracked for further Settlement during the monthly clearing process as described in Section 11.2.4.4.1. The hourly Settlement of CRRs for each CRR Holder will be based on the type of CRR holdings as described in Section 11.2.4.2. The CRR Holder's hourly CRR Settlement amount will be the net of the holder's CRR Payments for CRR Options or CRR Obligations, and the holder's CRR Charges for CRR Obligations out of these holdings.

11.2.4.4.1 Daily Clearing of the CRR Balancing Account - Full Funding of CRRs

At the end of each day, all CRR Payment shortfalls for all CRR Holders ~~shall~~ will be paid in full and all CRR Charge shortfalls ~~shall~~ will be fully charged through the CRR Balancing Account clearing process. The net of these CRR Charges and CRR Payment shortfalls ~~shall~~ will be added to the CRR Balancing Account for the applicable day. Any surplus or shortfall revenue amounts in the CRR Balancing Account will be distributed to Scheduling Coordinators in an amount equal to (a) the CRR Balancing Account surplus or shortfall amounts, times (b) the ratio of each Scheduling Coordinator's Measured Demand (net

of the Scheduling Coordinator's Measured Demand associated with valid and balanced ETC or TOR Self-Schedule quantities, ~~for~~ which IFM Congestion Credits and/or RTM Congestion Credits were provided in the same relevant day), divided by (c) the total Measured Demand for all Scheduling Coordinators for the relevant day (net of the total Measured Demand associated with valid and balanced ETC or TOR Self-Schedule quantities, ~~for~~ which IFM Congestion Credits and/or RTM Congestion Credits were provided in the same relevant day).

11.2.4.5 CRR Balancing Account

The CRR Balancing Account ~~shall~~ will accumulate: (1) the seasonal and monthly CRR Auction revenue amounts that were converted into daily CRR Balancing Account values as described in Section 11.2.4.3; ~~,~~ (2) any surplus revenue or shortfall generated from hourly CRR Settlements as described in Section 11.2.4.4; ~~,~~ and (3) any adjustments of CRR revenue due to virtual bidding or Intertie scheduling practices as described in Section 11.2.4.6. Interest accruing due to the CRR Balancing Account ~~shall~~ will be at the CAISO's received interest rate and ~~shall~~ will be credited to each monthly CRR Balancing Account ~~A~~accrued ~~I~~interest ~~F~~fund, which is then allocated to monthly Measured Demand excluding Measured Demand associated with valid and balanced ETC, TOR, or Converted Rights Self-Schedule quantities, ~~for~~ which IFM Congestion Credits and/or RTM Congestion Credits were provided in the same month.

11.2.4.6 Adjustment of CRR Revenue Related to Virtual Awards

In accordance with this Section 11.2.4.6, the CAISO will adjust the revenue from the CRRs of a CRR Holder that is also a Convergence Bidding Entity whenever either of the following creates a significant impact on the value of the CRRs held by that entity: the CRR Holder/Convergence Bidding Entity submits Virtual Bids; or the CRR Holder/Convergence Bidding Entity reduces in the RTM an import or export awarded in a Day-Ahead Schedule. As set forth in Section 11.32, the CAISO will also adjust the revenue from the CRRs of a CRR Holder (regardless of whether the CRR Holder is also a Convergence Bidding Entity) where the Scheduling Coordinator representing that CRR Holder reduces in the RTM an import or export awarded in a Day-Ahead Schedule.

(a) For purposes of this Section 11.2.4.6 and the definition of Flow Impact, a~~ny~~ reduction by a Scheduling Coordinator submitting Schedules on behalf of an entity that is a CRR Holder to an import or export Schedule in the RTM will be

treated as a Virtual Award if the segment of Economic Bids (but not Self-Schedule) leading to the Schedule reduction is: at an Energy Bid price greater than the Day-Ahead Market LMP at the relevant intertie, in the case of an import; or at any Energy Bid price less than the Day-Ahead Market LMP at the relevant intertie, in the case of an export.

In addition, if the RTM Bid does not include the full MW quantity of the Day-Ahead Schedule through some combination of Economic Bid and Self-Schedule, then the MW range not covered by the RTM Bid that was included in the Day-Ahead Schedule will be treated as a Virtual Award.

For each CRR Holder subject to this Section 11.2.4.6, for each hour, and for each Transmission Constraint binding in the IFM or FMM the CAISO will calculate the Flow Impact of the Virtual Awards awarded to the Scheduling Coordinator that represents the CRR Holder~~, excluding Virtual Awards at LAPs and generation Trading Hubs~~. For the purposes of calculating the CRR adjustments as specified in this Section 11.2.4.6~~.4~~, the CAISO will include nodal MW constraints that the CAISO applies to Eligible PNodes in the IFM pursuant to Section 30.10.

(b) The CAISO will determine the peak and off-peak hours of the day ~~in which~~ where Congestion on the Transmission Constraint was significantly impacted by the Virtual Awards awarded to the Scheduling Coordinator that represents the CRR Holder. Congestion on the Transmission Constraint will be deemed to have been significantly impacted by the Virtual Awards awarded to the Scheduling Coordinator that represents the CRR Holder if the Flow Impact passes two criteria. First, the Flow Impact must be in the direction to increase the value of the CRR Holder's CRR portfolio. Second, the Flow Impact must exceed the threshold percentage of the flow limit for the Transmission Constraint. The threshold percentage is ten (10) percent of the flow limit for each Transmission Constraint.

(c) For each peak or off-peak hour that passes both criteria in Section 11.2.4.6(b), the CAISO will compare the Transmission Constraint's impact on the Day-Ahead Market value of the CRR Holder's CRR portfolio with the Transmission Constraint's impact on the FMM value of the CRR Holder's CRR portfolio, as applicable.

(d) The CAISO will adjust the peak or off-peak period revenue from the CRR Holder's CRRs in the event that, over the peak or off-peak period of a day, the Transmission Constraint's contribution to the Day-Ahead Market value of the CRR Holder's CRR portfolio exceeds the Transmission Constraint's contribution to the FMM ~~–~~value of the CRR Holder's CRR portfolio, as applicable. The amount of the peak period adjustment will be the amount ~~by which~~that the Transmission Constraint's contribution to the Day-Ahead Market value of the CRR Holder's CRR portfolio exceeds the Transmission Constraint's contribution to the FMM value of the CRR Holder's CRR portfolio for the peak-period hours that passed both criteria in Section 11.2.4.6(b), as applicable. The amount of the off-peak period adjustment will be the amount ~~by which~~that the Transmission Constraint's contribution to the Day-Ahead Market value of the CRR Holder's CRR portfolio exceeds the Transmission Constraint's contribution to the FMM value of the CRR Holder's CRR portfolio for the off-peak period hours that passed both criteria in Section 11.2.4.6(b), as applicable.

All adjustments of CRR revenue calculated pursuant to this Section 11.2.4.6 will be added to the CRR Balancing Account.

* * * *

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.

(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 ~~The CAISO will treat any reduction by~~ a Scheduling Coordinator reduces~~to~~ 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 ~~pursuant to~~ Section 11.2.4.6 ~~if the Scheduling Coordinator submits Schedules on behalf of or is a CRR Holder~~.

(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.

Attachment C – Board of Governors Memo

Tariff Amendment to Modify Congestion Revenue Rights Settlement Rule

California Independent System Operator Corporation

Memorandum

To: ISO Board of Governors

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

Date: June 21, 2016

Re: **Decision on congestion revenue right settlement modifications**

This memorandum requires Board action.

EXECUTIVE SUMMARY

Management proposes revisions to rules established in conjunction with the implementation of convergence bidding in 2010 that prevent using convergence bids to artificially inflate congestion revenue right (CRR) payments. Convergence bid awards (i.e., "virtual awards") can alter congestion in the day-ahead market and impact payments for a congestion revenue right. Under the ISO's congestion revenue right "settlement" rule, if the congestion impact of a market participant's virtual award exceeds a threshold, the ISO settlement process rescinds the market participant's CRR payments resulting from the virtual awards. Imports or exports that are reduced in the real-time market are also considered virtual awards under the settlement rule. However, virtual bids cleared at default load aggregation points and trading hubs are exempt from the settlement rule.

Market participants have stated that having import and export reductions subject to the CRR settlement rule limits the quantity of economic bids they are willing to submit to the real-time market to reduce day-ahead scheduled imports and exports. In response, Management reviewed with stakeholders the application of the settlement rule to imports and exports to examine if it could be modified to eliminate potential disincentives to economical bids in the real-time market. In reviewing this issue and the current congestion revenue right settlement rule, the ISO's Department of Market Monitoring identified a second issue; the exemption for virtual awards at default load aggregation points and trading hubs could allow market participants to inflate CRR payments without being subject to the settlement rule.

To address these issues Management proposes two modifications to the CRR settlement rule: (1) import and export reductions that are the result of an economic bid that meet specified criteria will not result in settlement of CRR payments, and (2) virtual

bids at default load aggregation points and trading hubs will no longer be exempt from the settlement rule.

Moved, that the ISO Board of Governors approves the congestion revenue right settlement modifications, as described in the memorandum dated June 21, 2016; and

Moved, that the ISO Board of Governors authorizes Management to make all necessary and appropriate filings with the Federal Energy Regulatory Commission to implement the proposed tariff change.

DISCUSSION AND ANALYSIS

The CRR settlement rule was developed as part of the ISO's original convergence bidding design to mitigate concerns that a market participant could use virtual bids to inflate CRR payments. A congestion revenue right entitles a market participant to receive the difference in the marginal cost of congestion between two pricing nodes. The market participant receives a payment if the transmission system is congested from the source node to the sink node. The settlement rule evaluates the impact that awarded virtual bids and reduced imports and exports have on congestion in the day-ahead market. These "virtual awards" can alter congestion and thus inflate the CRR payment. If the modeled electrical flow caused by a virtual award exceeds 10 percent of the transmission capacity of an internal path or intertie, then the ISO's settlement process rescinds 100 percent of the market participant's CRR payment from that path. Virtual bids at default load aggregation points and trading hubs are currently exempt from the settlement rule.

Management proposes two modifications to the CRR settlement rule: (1) To mitigate disincentives to economically bid imports and exports into the real-time market, import and export reductions between the day-ahead and real-time market that are the result of an economic bid that meet specified criteria will not result in settlement of CRR payments, and (2) to mitigate the potential of a market participant inefficiently inflating CRR payments, virtual bids at default load aggregation points and trading hubs will no longer be exempt from the settlement rule.

Import and Exports Bids

The current CRR settlement rule considers import and export reductions to be virtual awards regardless of the reason for the reduction. Imports and exports that are reduced in the real-time market can impact congestion in the day-ahead market and congestion revenue rights payments. They are termed "implicit virtual bids" because, similar to virtual bids, the reduced import or export is not physically delivered and thus represents a "virtual" transaction.

During a recent workshop the ISO held to examine the causes of the relatively low amount of import and export bids submitted to the real-time market, market participants

stated that having import and export reductions subject to the CRR settlement rule limits the quantity of economic bids they are willing to submit to the real-time market to reduce day-ahead scheduled imports and exports. The rule reduces their willingness to rebid imports and exports because a schedule reduction exceeding 10 percent of an intertie's transmission capacity results in settlement of the market participant's CRR payment received in the day-ahead market.

Rebidding day-ahead import and export schedules in the real-time market provides beneficial flexibility and liquidity on the interties. In the case of real-time market 15-minute imports and exports, market participants have stated that it often does not make business sense to bid incremental imports and exports because the market participant has to secure external transmission for the entire hour but is not assured of having its import or export bid dispatched in each 15-minute market interval. However, for day-ahead scheduled imports and exports, the market participant has already procured external transmission for the day-ahead schedule. Thus, market participants can submit economic bids into the real-time market to reduce imports and exports without the added cost and risk of procuring additional external transmission. These bids to reduce day-ahead scheduled imports or exports benefit the real-time market the same as incremental imports and exports. For example, the ISO balancing area gains the same amount of additional energy if the real-time market schedules an incremental import or decreases a day-ahead scheduled export.

Management proposes to modify the settlement rule to distinguish import and export "implicit virtual bids" from normal economic bids. Management proposes to modify the CRR settlement rule as follows:

- If a real-time market import bid price is lower than the day-ahead market bid price, then the import will not result in the rescission of the congestion revenue right payment.

- If a real-time market export bid price is higher than the day-ahead market bid price, then the export will not result in the rescission of the congestion revenue right payment.

- If a real-time market import or export schedule is reduced relative to the day-ahead schedule because the market participant did not submit an economic bid or self-schedule to the real-time market for the full amount of the day-ahead schedule, then the amount reduced will result in the rescission of the congestion revenue right payment.

Management designed these rules to distinguish implicit virtual bidding from normal economic bidding. A market participant seeking to submit implicit virtual bids solely to inflate CRR payments would bid in such a way as to not have a day-ahead scheduled import or export re-clear the real-time market. For example, a market participant could re-bid a day-ahead import into the real-time market at a high price close to the $1,000 bid cap. Alternatively, the market participant could re-bid an export into the real-time

market at a low price, for example the -$150 bid floor. Either of these bids would likely not clear the market and will result in the import or export schedule being reduced to zero.

Similarly, the modifications also subject an import or export schedule to the settlement rule if the import or export is reduced in the real-time market because the market participant did not submit an economic bid or self-schedule in the real-time market for the full amount of the day-ahead schedule.

However, if a market participant rebids an import or export into the real-time market consistent with the day-ahead market price and the real-time market reduces the import or export schedule, this should not be considered an implicit virtual bid because the market participant did not bid in a way to increase the likelihood that the real-time market would reduce the import or export schedule.

Virtual Bids at Aggregation Points

Currently, virtual bids placed on trading hubs and load aggregation points are exempt from the CRR settlement rule. These bids were exempt because during the original virtual bidding design process Management anticipated that liquidity at these aggregation points would reduce the likelihood that an individual virtual bidder could effectively manipulate prices at these locations. Also, Management anticipated that the flows resulting from bids at these trading hubs and load aggregation points would be distributed across many nodes so it would be difficult for a market participant to target a single node at which it held congestion revenue rights.

However, the Department of Market Monitoring has identified instances in which market participants have submitted virtual bids at trading hubs and load aggregation points that resulted in inflated CRR payments. The market optimization clears bids at the aggregation point and manages congestion using the shift factor of the aggregation point to constraints. Thus, bids at aggregation points can cause constraints to bind resulting in congestion in the day-ahead market in the same manner as bids at individual pricing nodes. Therefore, Management proposes to make virtual bids at load aggregation points and trading hubs subject to the CRR settlement rule.

POSITIONS OF THE PARTIES

Stakeholders generally support the proposed changes to the application of the CRR settlement rule to imports and exports. Most believe the bidding provisions will allow market participants who bid consistent with the rules to increase the quantity of day-ahead schedules rebid into the real-time market. A limited number of stakeholders oppose the CRR settlement rule generally, arguing the rule restricts bidding and impedes their activity in the ISO market.

Stakeholders are divided on removing the exemption of virtual bids cleared at load aggregation points and trading hubs from the CRR settlement rule. Many stakeholders

argue that virtual bids at these load aggregation points and trading hubs should be evaluated in the same manner as bids at individual nodes. Other stakeholders argue that given market liquidity at these pricing points and hubs and that flows resulting from bids at these points and hubs are distributed across the system, a market participant has limited ability to impact its own CRR payments. They argue these points and hubs should continue to be exempt because having them subject to potential CRR settlement impedes the ability to submit virtual bids without risk of CRR settlement. They argue this could impede the legitimate use of virtual bids for hedging or to increase market efficiency, such as reflecting renewable resource supply that is not scheduled in the day-ahead market.

Management has considered the potential adverse impact of applying the settlement rule to virtual awards at load aggregation points and trading hubs and finds the current exemption is not warranted. For example, if a market participant bid 100 MW at a trading hub and another market participant disaggregated the 100 MW to each of the underlying pricing nodes, the first market participant would not have its cleared convergence bids subject to the settlement rule but the second market participant would, even though the use of the transmission system and impact on congestion is the same. Moreover, because the flow resulting from virtual awards at load aggregation points and trading hubs is dispersed over the system, it would take a large amount of bids by a single participate to have the flow exceed the 10 percent of a transmission elements capacity necessary to trigger the settlement rule. Thus, virtual bids submitted in reasonable amounts at load aggregation points and trading hubs are not likely to trigger the settlement rule.

CONCLUSION

Management requests the Board approve the modifications to the congestion revenue right settlement rule as described in this memorandum. The proposed changes in the application of the rule to imports and exports will address an identified barrier to bidding imports and exports in the real-time market. The modifications will also provide additional protection against artificially inflating CRR payments.