

Memorandum

To: ISO Board of Governors

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

Date: August 18, 2011

Re: **Decision on Eliminating Convergence Bidding on the Interties**

This memorandum requires Board action.

EXECUTIVE SUMMARY

The California Independent System Operator Corporation proposes to eliminate convergence bidding on the interties. The ISO implemented convergence bidding on February 1, 2011, which includes the ability to submit financial bids on the intertie scheduling points in the ISO market. Convergence bidding is an important market enhancement. It enables market participants to hedge their physical market positions and arbitrage differences between day-ahead and real-time prices. This ultimately leads to better price convergence between these markets and more efficient dispatch of physical resources. However, the ISO has observed that, due to current real-time market structure issues, convergence bidding on the interties is not driving the intended market efficiencies.

Convergence bidding involves placing purely financial bids, sometimes called virtual bids, at particular pricing nodes in the day-ahead market. If cleared in the day-ahead market, virtual supply and virtual demand bids settle first at day-ahead prices. They then automatically liquidate with the opposite sell or buy position at the applicable *hour ahead scheduling process* price for interties or *real-time dispatch* prices for internal nodes. The hour ahead scheduling process is where all intertie bids submitted in real-time are cleared and priced. This process runs prior to the 5-minute real-time dispatch for internal resources. Interties require a separate scheduling process in real-time because their schedules need to be finalized and cleared with adjacent balancing areas well in advance of the applicable operating hour. The real-time dispatch is the five minute real-time market in which the ISO establishes binding dispatch instructions and prices for internal resources.

Shortly after convergence bidding was implemented, market participants raised two concerns regarding its market impacts on the interties. First, market participants raised a concern over the increased cost of balancing the real-time market and arriving at revenue neutrality, referred to as the *real-time imbalance energy offset*. The concern is that differences in the hour ahead scheduling process and real-time dispatch prices incent virtual bidding strategies that do not serve to converge day-ahead and real-time prices but contribute to the real-time imbalance energy offset costs allocated to measured demand. Second, market participants

raised concerns over occasional inconsistencies between the market clearing price and the bid price of resources scheduled to import or export at the interties resulting from the enforcement of different physical and virtual intertie constraints in the day-ahead market.

Management has determined that these issues are symptomatic of a fundamental current market design shortcoming which requires settlement of intertie transactions in the hour ahead scheduling process while internal supply and demand are settled later in the real-time dispatch. Stakeholders and the ISO have not been able to identify an alternative near term option that effectively addresses the identified issues without creating new market efficiency issues or reliability concerns. Additionally, the ISO has commenced the renewable integration market and product review phase 2 stakeholder initiative to evaluate potential enhancements to the real-time market. Enhancements being considered include a single settlement timeframe for interties and internal supply and demand that would resolve the structural issues currently afflicting convergence bidding on the interties.

If the settlement timeframes of the real-time market are resolved so that there is a common clearing price for intertie schedules and internal resources, convergence bidding at the interties could be reinstated. In the meantime, Management believes it is inappropriate to continue to allow virtual bids that exacerbate current market design issues without improving market efficiency. This is particularly true in light of the fact that the costs created by this these issues are borne entirely by parties that do not cause and cannot control the issues. Therefore, Management proposes to remove from its current market design the ability for parties to submit virtual bids at the interties. The elimination of this market feature will eliminate the root cause of the two identified issues.

Management proposes the following motion:

Moved, that the ISO Board of Governors approves the proposed tariff change regarding removing interties as eligible convergence bidding nodes, as described in the memorandum dated August 18, 2011; 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

Each of the two problems created by convergence bidding on the interties (market uplifts and occasional market prices that are not fully compensatory with awarded bids) is explained more fully below, along with the various options that have been considered to address them.

Convergence bidding on the interties has significantly increased market uplifts

Convergence bidding on the interties increases market uplifts through increasing the real-time imbalance energy offset. The real-time imbalance energy offset is a neutrality account used to reconcile the settlement dollar values for all real-time energy charge codes to ensure that, after all payments and charges have been calculated, there is neither a shortage nor surplus in revenue. Any offset surpluses or shortages are allocated to scheduling coordinators based on a pro rata share of their measured demand (real-time metered load and exports). Therefore, scheduling coordinators may receive a payment or a charge, depending on whether there is a surplus or deficit in the offset account. The ISO has experienced higher than expected real-time imbalance energy offset charges since the start of the new market in April 2009 and commenced a stakeholder process to address the issue in the fall of 2009. Through that process, the ISO identified price differences between the hour ahead scheduling process and real-time dispatch as the main driver of the offset costs. The price difference was often driven by market modeling and forecasting issues and the limited quantities of short-term ramping capability available to accommodate changes in imbalance conditions. Beginning in May 2009, the ISO undertook a number of enhancements to address these issues and improve hour ahead scheduling process and real-time dispatch price convergence. However, when convergence bidding was implemented in February 2011, the real-time imbalance energy offset costs increased significantly.

With the introduction of virtual bids, virtual positions at the interties are settled at the relevant hour ahead scheduling process LMP in the same way as any changes in physical intertie schedules in the hour ahead scheduling process are settled. However, virtual positions on eligible internal pricing locations are settled based on the relevant real-time dispatch LMP. As a result, when virtual bids on the interties clear against internal bids, and there is a significant difference between the respective settlement prices (hour ahead scheduling process and real-time dispatch), there is a corresponding increase in the real-time energy offset.

Additionally, the persistent average price differential between the hour ahead scheduling process and real-time dispatch has encouraged a strategy using internal virtual demand bids and external virtual or physical supply bids. This bidding strategy seeks to arbitrage the price differential, but when the bidding strategy is successful, there is an increase in the real-time imbalance energy offset costs. Market participants can combine an internal virtual demand bid and an intertie physical or virtual supply bid at the same price and quantity, which in essence allows the market participant to arbitrage the lower hour ahead scheduling process price relative to the real-time dispatch price. Since the bidding strategy requires a balanced intertie and internal position to be successful, the strategy does not lead to a change in day-ahead unit commitment or improved system wide market efficiency.

Convergence bidding on the interties can produce prices that are not fully compensatory to awarded bids

Under the current convergence bidding design, the ISO enforces two constraints at intertie scheduling points: (1) net physical schedules across each scheduling point, ignoring the accepted virtual schedules to ensure that the physical schedules are within the established scheduling limit for that scheduling point; and (2) physical and virtual imports net of physical and virtual exports must also be within established scheduling limits for that scheduling point. Since convergence bidding was implemented, the ISO has observed cases where physical export bids are clearing the market at LMPs that are inconsistent (higher) than the submitted bid for the scheduled resource. Market participants adversely impacted by such settlement outcomes have raised concerns over this issue.

This issue was identified during the convergence bidding design process. However, since there were no easily implementable options to address it at the time, the ISO committed to monitoring the issue to determine if it was significant enough in operation to warrant a design modification. In addition, physical import bids are clearing at LMPs that are also inconsistent with their bids resulting in higher payments than would have otherwise been received. The impact to the market on the export side has been approximately \$250,000 per month. However, stakeholders who have raised concerns about this issue do not believe the impact reaches a threshold that supports eliminating convergence bidding on the interties. They would prefer that uplift payments be provided to make them whole with respect to their bid costs. However, since removing convergence bidding at the interties is necessary to address the real-time imbalance energy offset concerns, the price inconsistency issue is also resolved.

POTENTIAL SOLUTIONS REVIEWED WITH STAKEHOLDERS

The ISO reviewed several proposed alternatives to eliminating convergence bidding on the interties with stakeholders to address the issues related to the increased real-time imbalance energy offset uplift costs and the price inconsistency on the interties. The proposed alternatives analyzed in the stakeholder process, and the reasons for not implementing them, are described below.

Proposed alternatives for addressing real-time imbalance energy offset uplift costs

Cost allocation of real-time imbalance energy offset

During the 2009 stakeholder process to address issues related to the real-time imbalance energy offset, the ISO worked with stakeholders to determine whether the current design of the allocation of the real-time imbalance energy offset was appropriate. At that time, no clear alternative could be identified because causal attribution to specific market activity was not clear. During the current stakeholder initiative, the allocation of the offset was reviewed again, but there still was no consensus on an alternative approach. Moreover, Management believes that this cost allocation issue is better addressed through a longer-term comprehensive review of a larger set of cost allocation issues being addressed in the renewable integration market and product review phase 2 stakeholder initiative.

Prohibit balanced internal and external virtual bids

Management considered implementing a rule that would prohibit scheduling coordinators from placing balanced internal and external virtual positions. This rule would be designed to address the impact of individual scheduling coordinators' balanced positions on the real-time imbalance energy offset costs. However, it was determined through the stakeholder process that the rule would be easily undermined by potential collusive transactions involving two or more scheduling coordinators that could effectively implement the same bidding strategy. As a result, the ISO concluded that this is not a viable option.

Implement a settlement rule that would neutralize the price arbitrage of the hour ahead scheduling process and real-time dispatch

Under this option, a new settlement rule would be invoked for each scheduling coordinator that would result in a charge or credit based upon the price difference between hour ahead scheduling process and real-time dispatch for the scheduling coordinator's balanced supply and demand position at the interties and internal to the ISO. Although this initially appeared to be a targeted and effective solution to the real-time uplift issues caused by convergence bidding, stakeholders raised significant concerns that the rule could be easily subverted through bilateral arrangements outside of the ISO markets.

Convergence bidding liquidation and settlement timing

Management also considered modifications to the timing of convergence bidding liquidation and settlement. Specifically, Management considered keeping day-ahead awarded internal virtual supply and demand positions in the hour ahead scheduling process, on the theory that doing so would lead to better convergence between the IFM, hour ahead scheduling process and real-time dispatch. However, this option poses potential reliability risks given the importance of imports to meeting ISO load. For example, in the case where there is net internal virtual supply, the ISO would not be able to secure additional physical imports in the hour ahead scheduling process to replace the net internal virtual supply.

Alternatives considered addressing intertie price inconsistency

Management evaluated three alternatives to address the issue where LMPs are not consistent with intertie bids. The alternatives were designed to address the hour ahead scheduling process settlement for intertie transactions and included: (1) pay as-bid; (2) pay as-bid or better; and (3) the New York ISO approach to settlement of interties. As explained below, significant problems were identified with each of the three proposed options.

Pay as-bid

Under this option, intertie schedules produced in the hour ahead scheduling process would be paid their submitted bid price as opposed to a market clearing price. This approach is problematic in that it could result in significant market inefficiencies as market participants would have incentives to submit intertie bids as close as possible to what they expected the expected clearing price to be instead of their marginal costs of providing the energy. This would preclude the ISO from selecting the most efficient mix of imported and exported energy supplies to meet its operational needs.

Pay as-bid or better

Under this option, an import resource would receive either the market clearing price or its own bid, whichever was higher, and an export resource would pay either the market clearing price or its own bid, whichever was lower. In situations where the resource's bid, rather than the market clearing price, was the better price, the ISO would add an uplift payment to the market clearing price to enable that resource to receive its bid cost. This option is problematic because it creates an incentive for intertie resources to bid in a manner that increases uplift costs. This occurs because resources have an incentive to bid large quantities of offsetting import and export energy (which to a significant extent offset one another, in which case no energy is actually received by or provided to the system), so that load is being charged significant amounts for the ensuing uplift costs without receiving any concomitant benefits.

New York ISO approach

Like the California ISO, the New York ISO is a large net importer of power and has a similar hour ahead scheduling process. If there is no congestion on the interties during hour ahead scheduling process, the New York ISO will schedule imports and exports, and the price used for settlements will be computed as the time weighted average real-time price. Imports receive a bid production cost guarantee such that if the real-time price is lower than their offer price, the imports will be paid their offer price. There is no price assurance for exports. If there is congestion on the interties during hour ahead scheduling process, different settlement rules apply to the inter-tie transactions. Though the New York ISO does not allow virtual bids on their interties, Management considered whether the settlement rules that govern their hour ahead scheduling process would help address the price inconsistency issue the ISO periodically experiences. Management concluded that these rules would not help, as they still could lead to pricing inadequacies for exports.

POSITIONS OF THE PARTIES

The parties involved in the stakeholder process have been unable to reach resolution on a near term solution to the settlement timing issues in the hour ahead scheduling process and real-time dispatch. A summary of stakeholder comments and positions is provided as Attachment A. The varied positions of stakeholders have been a key driver in narrowing the proposal to remove convergence bidding on the interties under the current market design. In the ongoing renewable integration market and review phase 2 initiative, the ISO is working with stakeholders to review the changes necessary to the real-time market in order to meet renewable integration requirements. The changes necessary to address the market inefficiency issues currently with convergence bidding, such as eliminating hour ahead scheduling process, are more appropriately addressed within the context of this larger, more comprehensive initiative.

During the stakeholder process, several stakeholders highlighted an additional concern that deviations from physical hour ahead scheduling process import and export schedules were another large driver of the real-time imbalance energy offset, and that removing convergence bidding at the interties could result in an increase in implicit virtual bidding. Implicit virtual bidding is the use of physical import and export bids with no intention to physically deliver the power if the bid is awarded. Other stakeholders highlighted that additional measures to

address implicit virtual bidding may have negative unintended consequences that could result in reduced liquidity at the interties. As such, Management has concluded that no additional measures are needed at this time to mitigate against potential implicit virtual bidding. Furthermore, the treatment of schedule deviations is more appropriately addressed through the renewable integration market and product review phase 2 stakeholder initiative currently underway.

The Market Surveillance Committee and Department of Market Monitoring support the removal of convergence bidding at the interties; however, they state that further measures may still be necessary if the real-time imbalance energy offset charges continue at high levels. The Market Surveillance Committee notes that currently, the ISO's hour ahead scheduling process and real-time dispatch markets are not well integrated, and convergence bidding cannot resolve these integration problems. As a result, convergence bidding on interties has contributed to an unacceptably high real-time imbalance energy offset charge that is borne ultimately by California energy consumers. The final opinion of the Market Surveillance Committee is provided as Attachment B. The Department of Market Monitoring believes the short-term option of eliminating convergence bidding on the interties will help reduce high real-time imbalance energy offset charges without any decrease in overall market efficiency. A comprehensive re-design of the hour ahead scheduling process and real-time dispatch real-time markets that would more fully address this issue is expected to take several years. Therefore, the Department of Market Monitoring states that the ISO should consider additional modifications for settlement of physical inter-tie schedules that may be implemented on a relatively short time frame. The Department of Market Monitoring Report is included with the informational reports in the August board materials.

MANAGEMENT RECOMMENDATION

Management requests Board approval of its proposal to remove interties as eligible nodes for convergence bidding as described in this memorandum. The benefits of continuing convergence bidding on interties under the current real-time market design do not outweigh the market inefficiencies outlined in this memo.