

Memorandum

To: ISO Board of Governors

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

Date: October 21, 2009

Re: **Decision on Convergence Bidding Design**

This memorandum requires board action.

EXECUTIVE SUMMARY

Convergence bidding is an important market enhancement that 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. Convergence bidding involves placing purely financial bids, sometimes called virtual bids, at particular pricing nodes in the day-ahead market. If these bids are cleared in the day-ahead market, they are then liquidated in the opposite position¹ in the real-time market. The market participant thus earns or is charged the difference between the day-ahead price and the real-time price at the location of the bid. Convergence bidding operates successfully in other independent system operators' markets, and provides those markets with the benefits described above. In recognition of the importance of convergence bidding in the healthy functioning of a location marginal price (LMP) market, the Federal Energy Regulatory Commission (FERC) mandated that the California Independent System Operator Corporation (ISO) implement convergence bidding. Some market participants, however, are concerned about the possibility of market manipulation or negative reliability impacts if convergence bidding is implemented in our still-maturing LMP market. Through a multi-year stakeholder process, the ISO and market participants have carefully developed a conservative design proposal for the convergence bidding functionality that addresses these concerns.

¹ For example, a market participant with an accepted virtual supply position in the day-ahead market will earn the day-ahead price for that position but then buy-back this position at the real-time price. To the extent the real-time price is lower than the day-ahead price, the bidder will have profited from the transaction.

The implementation of convergence bidding will:

- Enable more efficient market outcomes when market participants identify convergence bidding opportunities through more accurate market information;
- Minimize systematic differences between day-ahead and real-time prices reducing incentives for under or over-scheduling physical demand in the day-ahead market;
- Enable suppliers to hedge against the possibility of a generator outage between day-ahead and real-time, which may be particularly useful in peak conditions; and
- Increase market liquidity at all pricing locations, which helps to discipline physical supplier market power.

Management's proposal for convergence bidding consists of the following key design elements:

1. Convergence bidding at all internal pricing nodes, trading hubs, and at the interties;
2. A registration process and a dynamic credit check for convergence bidders;
3. Initial position limits, to be gradually phased out over time, reducing the megawatt amount of a convergence bids that a market participant can place at any one pricing node;
4. Stricter position limits and other safeguards at the interties to ensure reliability;
5. Local market power mitigation, market monitoring tools, and the ability to suspend any convergence bidding that negatively impacts reliability;
6. A settlement rule to deter adverse incentives tied to congestion revenue rights (CRR); and
7. A scheme for the allocation of market costs and grid management charges to convergence bidders.

The following points help to underscore the fact that convergence bidding will not adversely affect the ISO's ability to ensure reliability.

- Convergence bids are allowed at the inter-ties but can not provide counter-flow (*i.e.*, congestion relief) to physical inter-tie schedules that would otherwise be infeasible;
- Convergence bids are not part of the residual unit commitment process that commits additional capacity, if necessary, to meet the next day's demand forecast;
- Convergence bids are not part of any dispatch or real time market processes (except for financial settlement at the real time LMPs); and

- Convergence bidding strategies that contribute to load or generation levels or patterns that cause a divergence between day-ahead and real-time prices are money-losing strategies. In this way, prices discipline market behavior and drive market outcomes to more efficient dispatch of physical resources.

Moved, that the ISO Board of Governors approves the proposed market enhancement, convergence bidding, as described in the memorandum dated October 21, 2009, 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 this proposal.

DISCUSSION AND ANALYSIS

Background

Convergence bids are purely financial bids submitted in the day-ahead market. If cleared in the integrated forward market, these purely financial supply and demand bids settle at day-ahead prices and are automatically liquidated with the opposite position at real time prices. Convergence bidders typically seek profit from price differences between the day-ahead and the real-time market; thus, if price differentials grow larger, financial bidding activity should counteract these differences by pressuring day-ahead and real-time market prices to move closer together. Because these bids are strictly financial, they are not backed by physical assets, nor is there any linkage between the financial bids and any physical supply or demand bids submitted by the same entity.

Design elements and management recommendations

Management has strived to develop a balanced proposal that accommodates stakeholders' divergent views and concerns as much as possible. The design proposed is fundamentally driven by the principles of reliability, market efficiency, and cost causation.

Convergence bidding at all internal pricing nodes, trading hubs, and at the interties

Management's position, which is supported by a number of market participants and market experts, is that the full benefits provided by convergence bidding can only be realized by nodal level implementation. Nodal convergence bidding will add liquidity to the ISO market, enable participants to hedge their physical transactions and provide the market with more accurate and granular (locational) information.

At the onset of the stakeholder process through which this proposal evolved, Management considered limiting convergence bidding to the three large load aggregation points (LAPs) rather than at the individual PNodes. LAP level convergence bidding would provide the benefit of deterring the under or over scheduling of physical load in the day-ahead market. But it would not provide physical supply with the ability to hedge against generation outages, nor

would it provide the market with the same liquidity or price discipline as nodal convergence bidding. Although nodal convergence bidding could potentially open up more avenues for market manipulation, the safeguards proposed by Management along with the price discipline provided by nodal convergence bidding will guard against this. Additionally, we have learned from the experience of all the other independent system operators in the United States that have implemented convergence bidding and attested to its benefits in their markets. All of these independent systems operators implemented convergence bidding at the nodal level with the exception of the New York ISO, which is in the process of doing so.

In our proposed design, we also include the ability to place virtual bids at trading hubs. This allows market participants that have bilateral transactions that settle at trading hubs to effectively hedge those transactions. This is an appropriate and beneficial use of convergence bidding.

We further propose that convergence bidding be allowed at the intertie points between the ISO balancing authority area and outside balancing authority areas. This will enable explicit convergence bidding at the interties, thereby mitigating the potential for implicit convergence bidding.² Implicit convergence bidding could create reliability problems if intertie schedules that are counted on for reliability in the day-ahead market are ultimately unavailable in real-time. By allowing explicit convergence bidding at the interties, the ISO market and reliability processes will be able to distinguish between physical and purely financial intertie transactions and therefore make better reliability decisions (*e.g.*, committing additional physical generation in residual unit commitment). Convergence bidding at the interties will also enable participants to arbitrage differences between the day ahead and hour ahead scheduling process prices, which have been relatively large since the launch of the new ISO market.

Dynamic credit check for virtual traders

When a market participant submits convergence bids in the day-ahead market, the value of these bids will immediately be compared to the market participant's available credit limit. The convergence bids that pass the credit checking will be fed into the market clearing process. At the same time, the value of the convergence bids, based on historical reference prices, will be added to the estimated aggregate liability of the participant.

Initial, gradually phased-out position limits

As an initial safety net upon the implementation of convergence bidding, we propose position limits be in place at each PNode. At the launch of convergence bidding, it is proposed that each market participant be able to bid up to ten percent (10%) of the average annual load at demand PNodes, or the maximum generation at supply PNodes. The position limits will offer some security as the market matures and develops. These limits will be lifted incrementally over a two-year period.

² Submitting physical intertie bids in the day-ahead market with no ability or intention of physically delivering on the schedules with the sole intent of liquidating the schedules in the Hour Ahead Scheduling Process (HASP).

Additional safeguards at the interties to ensure reliability

The issue of whether or not to permit convergence bidding at the interties was highly debated. Some stakeholders were concerned about allowing purely financial bids at the interties because California is highly dependent on imported energy. These stakeholders worry about the possibility that purely financial schedules at the interties could crowd out physical imports, or that such schedules would provide fictional counter-flows, that would result in infeasible real time intertie schedules. Our proposal addresses both of these concerns.

Specifically, to alleviate these concerns, we propose to limit each participant's ability to submit convergence bidding bids to five percent (5%) of an intertie's scheduling limit. Furthermore, we propose a second set of constraints that, (1) holds physical schedules to be within the applicable scheduling limit, and (2) limits both physical plus virtual schedules to be within the applicable scheduling limit. This net constraint prevents counter-flows created by accepted convergence bidding from enabling physical schedules at an intertie greater than is allowed under the Western Electricity Coordinating Council (WECC) scheduling limit.

Local market power mitigation, market monitoring tools, and the ability to suspend convergence bidding trading that negatively impacts reliability

As part of our overall conservative approach to the design of convergence bidding, we propose that local market power mitigation (LMPM) be performed based on physical bid-in generation and forecast load. The mitigation mechanism for local market power is designed so that physical generation needed to meet physical load will be appropriately mitigated. Also, the ISO's Department of Market Monitoring (DMM) will have advanced monitoring tools that will enable them to analyze market outcomes both with and without convergence bids. Furthermore, in the unlikely event that convergence bidding is causing or contributing to an operational or reliability concerns, we propose that the ISO have authority to suspend convergence bidding functionality at all or individual PNodes.

A settlement rule to deter the manipulation of congestion revenue rights (CRR)

Management is proposing a congestion revenue rights (CRR) settlement rule that provides a targeted way of limiting CRR payments in cases when the CRR holders' convergence bids may otherwise increase their CRR payments. This rule addresses concerns that market participants might attempt to use convergence bids to manipulate the market prices at locations where they hold CRRs and thereby increase the profitability of their CRR holdings. To address this concern, the proposed rule will net the market results across all hours of each day corresponding to the participant's CRR. For each congested constraint that is found to be affected by the participant's convergence bids, the rule will consider the aggregate (net) impact of this congestion on participant's CRRs during each hour. If it is determined that a market participant's convergence bids were used to artificially increase day-ahead congestion, CRR payments to that market participant will be reduced. While the settlement rule will be applied to each business entity separately, business entities with multiple Scheduling Coordinator (SC) IDs will have the settlement rule applied on an aggregate basis to their entire portfolio of CRRs and convergence bids.

A scheme for the allocation of market costs and grid management charges to convergence bidders

In developing a full conceptual proposal for assessing costs on convergence bids, we followed the principle of cost causation which dictates that convergence bids should be charged costs for which they have caused. Therefore, virtual demand bids are subject to a portion of bid cost recovery uplift costs for unit commitment in the integrated forward market above what is needed to serve actual load. Virtual supply bids are subject to a portion of bid cost recovery uplift charges related to increased unit commitment within the residual unit commitment process. This increased unit commitment is due to the need to replace physical generation the residual unit commitment process that did not clear the integrated forward market as a result of virtual supply bids.

Because convergence bids will increase bid volume substantially in the day-ahead market, convergence bids will also be subject to a transaction fee per submitted bid segment to allow the ISO to mitigate bid volumes economically to a reasonable level.

The costs recovered through the ISO's grid management charge (GMC) are currently allocated to eight service charges.³ Because convergence bidding is solely a financial transaction, not all service charges apply to convergence bidding under the principle of cost causation. The following service charges will be applied to convergence bidding: forward scheduling charge, market usage (day ahead) charge, and settlements, metering and client relations charge. During the stakeholder process, however, it became apparent that service charges for convergence bidding should be based on a flat fee that will be known up front. The current billing determinants for the forward scheduling charge and market usage (day ahead) charge are currently charged by schedule and by cleared net mega watt hour. As a result, we are proposing to create a new flat fee service charge exclusively for convergence bidding that will be charged based on cleared gross megawatt hours. The revenue generated from the convergence bidding charge will be applied to the existing forward scheduling charge and market usage (day ahead) charge.

POSITIONS OF THE PARTIES

The ISO has undertaken an on-going stakeholder process to develop the key features for convergence bidding. Stakeholder engagement began in the summer of 2006 and continued through early October 2009 with a break from December 2008 through June 2009 while the ISO launched the new markets. Management's proposal incorporates feedback received from 13 stakeholder meetings, 14 rounds of formal comments on 14 white papers, and has input from the ISO's Department of Market Monitoring (DMM) and Market Surveillance Committee (MSC). Stakeholder comments are summarized in *Attachment A – Stakeholder Matrix*. The MSC has provided an opinion which is *Attachment B* to this memo.

Throughout this extensive stakeholder process, there have been consistent differences of opinion with regard to convergence bidding design. In particular, load serving entities have

³ The service charges are described in detail in Appendix F, Schedule 1, Parts A and F of the ISO tariff.

been cautious about nodal bidding because they do not believe that the new markets will mature quickly enough to ensure liquidity and thus balance positions in the market. On the other hand, generation owners and energy traders have sought nodal convergence bidding because they feel that the LMP markets will quickly develop and that nodal convergence bidding will provide more benefits to the ISO markets. Load serving entities have not been supportive of convergence bidding at the interties, whereas generation owners and energy traders have been in favor of this design element. Load serving entities have advocated for more market costs to be placed on convergence bids while suppliers and traders have advocated that additional costs be limited as high costs will limit the liquidity of convergence bids.

Management recognizes that fundamental differences in the business models of these two groups are at the root of their opposite positions on these and other facets of the convergence bidding design. For this reason and out of respect for the paramount objectives of grid reliability and efficient markets, we are taking a conservative approach which is outlined in this memorandum and detailed in the proposal. This approach includes position limits, local market power mitigation, monitoring tools, ability to suspend convergence bidding when it compromises reliability, a dynamic credit check for convergence bidders, and the implementation of the CRR settlement rule. Ultimately the proposed design is a collection of elements that reflects our consideration of input from all parties, our attempts to mitigate concerns without compromising functionality, and our careful weighing of costs and benefits in terms of reliability and market efficiency.

Some stakeholders have also raised concerns about nodal convergence bidding placing more reliance on the residual unit commitment process due to large volumes of virtual supply displacing physical generation in the integrated forward market. Specifically these stakeholders are concerned that units needed for reliability may be able to bypass the integrated forward market and potentially the local market power mitigation process. This can occur by a market participant submitting a virtual supply bid that is lower than its physical generator bid and which then clears the integrated forward market, thereby ensuring that the physical generator is taken in the residual unit commitment process. To remedy this problem, these stakeholders advocate that the ISO add local market power mitigation to the residual unit commitment process. Management believes that existing mitigation measures are adequate to address these concerns. However, Management agrees that additional mitigation measures may be warranted if more frequent bidding of start-up and minimum load costs are adopted. We will address this issue in the stakeholder process that is currently addressing start-up and minimum load bidding. The ISO Department of Market Monitoring (DMM) has also addressed this issue in their October Board memo *Market Monitoring Report*.

RECOMMENDATION

Management recommends that the Board approve the proposal for convergence bidding as described in this memo. Implementation is targeted for February 2011, but, upon receiving the design at year-end 2009, Management may consider an earlier implementation date. Convergence bidding is a key feature in the healthy functioning of a LMP market, and is an important market enhancement that enables market participants to hedge their physical market

positions and arbitrage differences in day-ahead and real-time prices, which ultimately leads to better price convergence between these markets and more efficient dispatch of physical resources. We are confident of the benefits of convergence bidding based on the successful implementation of convergence bidding in the markets of the other independent system operators in the United States, and based on FERC's own confidence as evidenced by its mandate to implement this functionality. The proposed convergence bidding design embodies Management's and market participants' efforts to achieve the benefits of convergence bidding, while upholding the paramount objectives of grid reliability and fair and efficient markets.