

Memorandum

To: ISO Board of Governors

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

Date: February 9, 2012

Re: Briefing on Market Design Initiatives

This memorandum does not require Board action.

EXECUTIVE SUMMARY

On August 18, 2011, the ISO Board of Governors approved the proposed tariff change regarding the compensation provisions of the flexible ramping constraint. The Board directed Management to report back by February 2012 on the progress towards a longer-term product solution, including a proposed target implementation date.

Also at the August meeting, the Board approved Management's proposal to eliminate convergence bidding on the interties to address the immediate impacts it was having on the real time imbalance energy offset uplift costs. However, fundamental issues remained with the current design of the real time imbalance energy offset. As a result, the Board directed Management to provide an update on the progress of the policy development to address these issues at the February 2012 meeting.

This memo provides a briefing on the progress made to date on both of these initiatives.

Flexible Ramping Product

On December 13, 2011, the ISO implemented the flexible ramping constraint in the real time market optimization. The purpose of the constraint is to address identified reliability and operational issues. It has been operating as designed.

The Board approved compensating the generators for meeting the flexible ramping constraint. The compensation is based on the opportunity cost of the marginal resource meeting the flexible ramping requirement in the real time unit commitment process. These costs have been allocated to real time metered load and exports. The total cost of the flexible ramp product for the first seven weeks was \$5.2 million. As instructed by the Board, Management commenced an accelerated stakeholder initiative to replace the constraint with a market-based flexible ramping capacity product. The ISO expects to

achieve greater market efficiency with a capacity based product that allows the ISO to procure and compensate dispatch flexibility. The ISO posted the first straw proposal on November 1, 2011 and expects to complete the stakeholder process in May, 2012. Management plans to implement this product in 2013.

Intertie Pricing and Settlements

This memo also provides a summary of the work that has been done to date on resolving issues related to pricing and settling intertie transactions that have led to real time imbalance energy offset uplift costs and the need to eliminate convergence bidding on the interties.

The ISO commenced a new stakeholder process in October 2011 and is seeking solutions to address the real time imbalance energy offset uplift costs and to find a near term solution that would facilitate reinstating convergence bidding on the interties. Management intends to provide a proposal for decision to the Board in May that addresses these issues.

FLEXIBLE RAMPING PRODUCT DISCUSSION AND ANALYSIS

As a balancing area authority, the ISO is responsible for maintaining system power balance in real time. The ISO's real time market processes are designed to fulfill this goal. The real time market processes consist of real time unit commitment and real time dispatch. The real time unit commitment process ensures sufficient capacity is committed on a fifteen-minute interval basis. This capacity allows for efficient real time dispatches thereafter. The real time dispatch process economically dispatches resources to meet system demand on a five-minute interval basis. As will be discussed below, the ISO observes that sometimes the real time system fleet is not flexible enough. Sudden and rapid changes of load or supply can result in power balance violations. Insufficient fleet flexibility may force the ISO to excessively draw on regulation and supply from neighboring balancing authority areas. While these actions are necessary to balance demand with supply, they could diminish reliability performance or even cause reliability standard violations. To address this issue, Management proposed and the Board approved a flexible ramping constraint to ensure sufficient upward ramping capability for the five-minute real time dispatch. The Board also directed Management to move expeditiously towards a capacity based, long term solution

Update on Approved Flexible Ramping Constraint

On October 7, 2011 Management made a filing with the Federal Energy Regulatory Commission to implement the proposed tariff change. Several parties filed protests to the filing in regards to the compensation and cost allocation methodologies. On December 12, 2011 the Commission approved the tariff filing. The Commission found that the ISO's proposed flexible ramping constraint helped to enhance dispatch flexibility. However, the Commission found that the ISO has not adequately demonstrated:

1. Differences between flexible ramp constraint and existing non-contingent spinning reserve product;
2. The compensation method is just and reasonable; and
3. How the cost allocation method reflects the Commission's cost causation principles.

As a result the Commission accepted the flexible ramping constraint tariff filing but set it for hearing and settlement discussions, subject to refund. The first settlement conference occurred on January 31, 2012. Settlement discussions continue.

On December 13, 2011, the ISO implemented the flexible ramping constraint in the real time market optimization. The flexible ramping constraint has been operating as expected. The real time unit commitment intervals when the flexible ramping constraint has been binding are consistent with historical observations of ramping tightness during this time of year. Initially the compensation amount was higher than expected. However it reduced as system ramping needs changed and the ramping constraint was tuned. As of January 30, 2012 seven weeks after its implementation, the flexible ramping constraint costs total \$5.2 million with an average daily cost of approximately \$100,000/day. These costs have been allocated to real time metered load and exports.

Progress towards Flexible Ramping Capacity Product Design

As directed by the Board, Management commenced a stakeholder initiative on November 1, 2011 to develop a market-based flexible ramping capacity product to address reliability and operational needs in the real time market. The ISO published a straw proposal and two revised proposals. In addition the ISO hosted three stakeholder meetings to further develop the market design and address stakeholder concerns. The ISO plans to finalize the proposal and bring the flexible ramping product design to the Board for approval at the May 2012 Board meeting. The ISO expects to achieve greater market efficiency with a capacity based product that allows the ISO to procure and compensate dispatch flexibility.

Based on the latest proposal, the flexible ramp product design will be a bid based product for upward and downward flexible ramp capacity. A portion of the required flexible ramping product will be procured in the day-ahead market with the balance being procured in the real time. The proposed compensation for the product will be marginal value of the service which will consider both the awarded submitted bids and any opportunity cost in the respective market.

The issue of cost allocation remains highly contentious with market participants. Management has established a parallel stakeholder initiative to develop cost allocation guiding principles that will be applied to the current market structure and future market design efforts. The initiative will also recommend how to apply the guiding principles to the flexible ramping capacity product market design in order to design the cost allocation methodology. In May, Management will seek Board approval of the flexible ramping capacity product market design which will include a cost allocation consistent

with the guiding principles. Additional market design changes necessary to be consistently apply the cost allocation guiding principles throughout the market will be completed by the end of 2012.

Flexible Ramping Product Next Steps

Management plans to bring to the Board in May the final market design for the flexible ramping capacity product. The stakeholder initiative begun in November 2011 will complete a long term solution to reliability concerns and operational needs due to variability and uncertainty in the real time market. The flexible ramping product will replace the flexible market constraint with a bid based market design in 2013.

INTERTIE PRICING AND SETTLEMENT DISCUSSION

Working Group and Project Progress

The ISO commenced the policy development by engaging a working group to assist in the formation of the initial straw proposal. This differs from the traditional ISO stakeholder process as the stakeholders are more actively involved in development of the initial straw proposal. The ISO believes the working group process will lead to a straw proposal that has been “pre-vetted” by numerous stakeholders thus minimizing the changes between drafts and reducing the number of drafts needed to reach a final proposal. The participants in the working group discussed the unresolved issues regarding the redesign of the real time imbalance energy offset, including settlement of hour ahead import/exports based upon the same 5-minute real time prices that internal resources are settled at, the implication of intertie resources that are dispatched in the hour ahead scheduling process but do not show up in real time, and changes to the allocation of the offset. Since the release of the issue paper, the working group has convened three times.

The first working group meeting was held on November 15, 2011. At this meeting the working group was split into two groups. While both groups favored solutions to reduce real time imbalance energy offset that also allowed the ISO to reintroduce convergence at the interties, the groups took very different approaches. One group focused on the creation of a full hour-ahead market. The other group examined smaller, more incremental solutions.

The second working group session, held on November 29, 2011, had all working group members in a single group. This working group session examined the pros and cons of various methodologies to reduce the real-time imbalance energy offset. The working group assessed the impacts of each of the identified options in terms of the impact to real time imbalance energy offset costs, costs to implement, whether it would accommodate the reinstatement of convergence bidding at the interties, and market liquidity. At the end of the meeting there was no consensus regarding the best option. As a result, the participants requested the ISO to modify the original schedule to allow for additional opportunities to discuss the components of a straw proposal. All thirteen members of the working group affirmatively agreed to extend the original schedule and move approval of a final resolution from the March Board of Governors meeting to the May meeting.

The third meeting of the working group convened on January 25, 2012. The working group addressed proposals brought by Powerex and Southern California Edison. Powerex provided a proposal that offered a three phase solution that they assert would ultimately lead to a timely reinstatement of convergence bidding at the interties. Prior to the meeting, Powerex previewed their proposal with several other members of the working group. The initial phase of their proposal included various initiatives to address the root causes of price divergence between the hour ahead scheduling process and real time market. Phase two would allow for the reinstatement of convergence bidding at the interties. The focus of the third phase of the Powerex proposal was to promote long term market efficiency. While many of working group members commented that aspects of the Powerex proposal offered a reasonable starting point, they asserted that many items within the proposal were either unnecessary or simply disagreed with certain aspects.

SCE provided a proposal that would settle imports scheduled in the hour ahead scheduling process at the real time price and allow bid cost recovery for imports and exports based on the hour ahead scheduling process price. If the hour ahead scheduling process price is greater than zero, then bid cost recovery would be provided only for imports. If the hour ahead scheduling process price is less than zero, then bid cost recovery would be provided only for exports. When imports are congested, similar to the NYISO approach, SCE proposed that imports receive the hour-ahead advisory price and export would be settled at the real time price at the relevant proxy bus, computed as the time weighted average real time price. While not prepared to dismiss SCE's proposal, working group members had numerous questions and were unable to settle on a consensus view of the merits of the proposal.

FERC Order on ISO Filing

In a related matter, on November 25 the Federal Energy Regulatory Commission issued an order that found that the ISO had not demonstrated that its proposal to eliminate convergence bidding on the interties was just and reasonable and that issues related to convergence bidding at intertie locations would benefit from further examination by Commission staff and the parties to this proceeding. FERC found that it is critical to evaluate when the ISO will address the underlying cause of the problem, as well as the potential issues and benefits attributed to convergence bidding at interties, and the associated costs and potential solutions for any such issues at greater length. Although FERC accepted the ISO's proposed tariff revisions, the revisions were subject to the outcome of a technical conference and further order by the Commission.

The technical conference was held on February 2 and explored among other things, potential issues and benefits attributed to convergence bidding at interties, and the associated costs and potential solutions for any such issues at greater length. At the technical conference, the ISO discussed its observations of market outcomes with convergence bidding on the interties and since stopping convergence bidding on the interties. The ISO pointed out that while convergence of the hour ahead scheduling process

and real time dispatch price has improved due to the implementation of operational measures including implementation of flexible ramping, additional safeguards to ensure market efficiency must be implemented before reinstating convergence bidding on the interties. The ISO informed the Commission that it was currently conducting an expedited stakeholder process to identify a near term design solution for intertie pricing that would facilitate the reinstatement of convergence bidding on the interties. Through this initiative, the ISO is seeking solutions to address the real time imbalance energy offset uplift costs and to find a near term solution that would facilitate reinstating convergence bidding on the interties

Intertie Pricing and Settlement Next Steps

Management is currently evaluating the recommendations of the working group and diligently working with stakeholders to consider other near-term options that would address the market structure issues that led to the elimination of convergence bidding on the interties and enable it to be reinstated.

In response to input from the working group participants, the ISO will issue a straw proposal on this matter in February. Management plans to bring a final recommendation regarding modifications to the intertie pricing and settlements policy to the Board for approval at the May 2012 meeting.