Settlement of Interties in Real-Time

Revised Straw Proposal

March 13, 2012
Settlement of Interties in Real-Time

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1 Introduction

This revised straw proposal presents the ISO’s proposed solution to three separate but interrelated issues:

- **Real-time imbalance energy offset:** High amounts of this settlement charge were being further increased by a convergence bidding strategy consisting of virtual bids at the interties offset by virtual bids at internal nodes.

- **Convergence bidding on interties:** The high amounts of the real-time imbalance energy offset and other related market inefficiencies prompted the ISO to propose to FERC that convergence bidding on the interties be temporarily suspended. FERC approved this request effective November 28, 2011.

- **Price inconsistencies caused by intertie constraints:** The design of pricing on the interties to facilitate convergence bidding caused a relatively limited amount of pricing anomalies in which physical imports and exports cleared at levels inconsistent with their bid price.

The ISO initially established two separate stakeholder initiatives in April 2011 to address the real-time imbalance energy offset costs and intertie price inconsistency issues. The “Redesign of the Real-Time Imbalance Energy Offset” initiative,¹ sought to address issues resulting from virtual demand at internal nodes offset by virtual supply schedules at the interties that were encouraged by the difference between the Hour-Ahead Scheduling Process (HASP) price for interties and the Real-Time Dispatch (RTD) price for internal generation and load. The “Price Inconsistency Caused by Intertie Constraints,”² initiative sought to address instances where physical imports and exports may clear inconsistent with their bid price. These initiatives have since been combined in the initiative that is the subject of this revised straw proposal.

Through this current initiative, the ISO is seeking solutions to intertie pricing and settlement that will reduce the pattern of offsetting virtual bids at the interties that gave rise to the suspension of convergence bidding at intertie locations, reduce the inflation of real-time imbalance energy offset charges, and resolve the price inconsistency caused by intertie constraints.

The ISO’s objective is to identify solutions that will allow the return of convergence bidding on the interties. In the ISO’s issue paper that it recently published as part of this initiative, the ISO proposed a solution to resolve the issues of intertie pricing and convergence bidding at the interties that it could implement relatively soon. Given stakeholder feedback, the ISO is now also proposing a more comprehensive solution that will take longer to implement. These options are as follows:

² [http://www.caiso.com/informed/Pages/StakeholderProcesses/PriceInconsistencyCausedIntertieConstraints.aspx](http://www.caiso.com/informed/Pages/StakeholderProcesses/PriceInconsistencyCausedIntertieConstraints.aspx)
Option One

- Implement an interim solution, including intertie convergence bidding rule modifications, by the end of 2012 and reintroduce convergence bidding on the interties. The interim solution includes:

  - Settle convergence bids at an intertie’s HASP LMP if an intertie is congested such that average hourly HASP congestion shadow price associated with the specific intertie is greater than $2 in either the import or export direction. Otherwise, convergence bids will settle at the simple average of the RTD LMPs over the applicable hour at the intertie. (This approach is a variation of the ISO’s original proposal to close out intertie convergence bids at the average of the RTD LMPs using the congestion and loss component of the HASP LMP. The ISO could implement the proposed interim sooner than the previously proposed or longer term approaches.)

  - The $2 threshold for deeming the interties congested would increase if the amount of real-time imbalance energy offsets surpasses $3.5 million on a 30-day rolling average and remain for at least 30 days.

  - When the dual intertie constraints bind in the day-ahead market, the ISO will use different settlement LMPs for physical awards and virtual awards (Option A) based on the shadow price of the respective constraint at which the physical and virtual bids participate.

  - Intertie convergence bids would be subject to a 2.5 percent position limit of each intertie’s capacity (ATC) per scheduling coordinator (SC).

- The ISO would design a longer term solution using the NYISO intertie pricing model as a basis to resolve the real-time settlement of both intertie convergence bids and intertie physical resources.

- The longer term solution would be implemented in Spring 2014 (note that this is later than the implementation of the long term solution under option two, below).

Option Two

- The ISO would not pursue an interim solution and convergence bidding on the interties would remain suspended until the longer solution is implemented.

- The ISO would work with stakeholders to immediately start designing a longer term solution using the NYISO intertie pricing model as a basis for the real-time settlement of both intertie convergence bids and intertie physical resources.

- The longer term solution would be implemented starting Fall 2013.

- Convergence bidding on the interties would remain suspended until the longer term solution is in place.

Because the ISO has implemented (or will soon implement) mechanisms that have significantly reduced real-time imbalance energy offset charges, with exception of implementing a solution
to the dual constraints problem, the ISO is not proposing changes to the settlement of physical intertie resources as part of the interim solution.

2 Stakeholder Engagement

At the onset of the stakeholder process, the ISO engaged a stakeholder working group to assist in the formation of the initial straw proposal. Participants in the working group discussed unresolved issues outlined in the issue paper for this initiative. At the end of each session, the working group provided the ISO with resolutions reached during the working group as well as proposed next steps and tasks that were taken on by various members of the working group. The contributions of the working group have led to the proposals outlined in this revised straw proposal. In addition, the FERC technical conference regarding convergence bidding on the interties has further influenced this proposal.

The schedule for the stakeholder process is shown below.

<table>
<thead>
<tr>
<th>Date</th>
<th>Action</th>
</tr>
</thead>
<tbody>
<tr>
<td>November 8</td>
<td>Post Issue Paper</td>
</tr>
<tr>
<td>November 15</td>
<td>Working Group Meeting</td>
</tr>
<tr>
<td>November 29</td>
<td>Working Group Meeting</td>
</tr>
<tr>
<td>January 25</td>
<td>Working Group Meeting</td>
</tr>
<tr>
<td>February 10</td>
<td>Post straw proposal</td>
</tr>
<tr>
<td>February 17</td>
<td>Stakeholder meeting on straw proposal</td>
</tr>
<tr>
<td>February 24</td>
<td>Stakeholder comments on straw due</td>
</tr>
<tr>
<td>March 13</td>
<td>Post revised straw proposal</td>
</tr>
<tr>
<td>March 20</td>
<td>Stakeholder meeting on revised straw proposal</td>
</tr>
<tr>
<td>March 27</td>
<td>Stakeholder comments on revised straw due</td>
</tr>
<tr>
<td>April 12</td>
<td>Post draft final proposal</td>
</tr>
<tr>
<td>April 19</td>
<td>Stakeholder meeting on draft final proposal</td>
</tr>
<tr>
<td>April 26</td>
<td>Stakeholder comments due on draft final proposal</td>
</tr>
<tr>
<td>May 16-17</td>
<td>Board of Governors</td>
</tr>
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</table>
3 Redesign of Real-Time Imbalance Energy Offset

The ISO has made several improvements to the accuracy of the ISO forecasts and in the consistency of procuring and dispatching resources to these forecasts in the HASP and RTD. These improvements have reduced the differences in energy prices between the HASP and RTD. This price difference between HASP and RTD, as well as the volumes of energy bought/sold in the HASP and RTD, are two components that drive the amount of the real-time imbalance energy offset charge. The price difference between HASP and RTD can arise from forecast error, operator biasing, insufficient ramping capability and the asymmetrical bid floor/cap. The ISO has addressed these items through improved operational practices and the implementation of the flexible ramping constraint. These efforts, along with reducing the volumes of energy transacted between HASP and RTD by eliminating convergence bidding at the interties, have resulted in a significant reduction in real-time imbalance energy offset costs. Lowering the bid floor pending implementation of separating bid cost recovery between the real-time market and day-ahead market should further reduce real-time imbalance energy offset charges in the future.

3.1 Background

The real-time imbalance energy offset (CC 6477) is a neutrality account through which the ISO tracks the settlement dollar values for the following charge codes: real-time instructed imbalance energy (CC 6470), real-time uninstructed imbalance energy (CC 6475), real-time unaccounted for energy (CC 6474), and HASP energy, congestion and loss pre-dispatch (CC 6051), less the real-time congestion offset (CC 6774). The real-time imbalance energy offset is allocated to all scheduling coordinators (SCs) based upon a pro rata share of their measured demand (i.e., metered load and exports) excluding the demand quantity for the valid and balanced portion of self-schedules related to transmission ownership rights in real-time and net measured demand of load following metered subsystems (MSSs). This may result in a payment or charge to SCs depending on the whether there is a surplus or deficit.

In 2009, the ISO conducted a stakeholder process to determine whether modifications to the current design of the allocation of the real-time imbalance energy offset were appropriate and necessary. At that time, no clear alternative could be identified because causal attribution to specific market activity was not clear. At the conclusion of the stakeholder process, the ISO did not change fundamentally the allocation to measured demand, but clarified that for SCs for MSS operators that have elected load following, the ISO will not assess any charges or make payments for the resulting non-zero differences recovered through the offset. The ISO, however, committed to, and has since continued to work on, operational enhancements that would assist in the convergence of the HASP and RTD prices. The ISO also committed to revisit

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Additional documentation can be found in the Settlements & Billing BPM Configuration Guide available at https://bpm.caiso.com/bpm/bpm/version/000000000000085
its prior conclusion if the dollar volume in the real-time imbalance energy offset account increased substantially.\(^4\)

As Figure 1 illustrates, from April 2009 through December 2011 the average monthly real-time imbalance energy offset has been just over $10.5M. The offset peaked in June/July 2010 at over $20M and returned to levels consistent with the first half of 2010 in September 2010. Since February of 2011, when convergence bidding was introduced, through December of 2011, the monthly real-time imbalance energy offset averaged just over $11.1M per month. The real-time imbalance energy offset peaked for this time period in April 2011, at which point the ISO commenced its stakeholder process to examine market design changes to address the issue. The stakeholder process resulted in the elimination of convergence bidding on the interties which was found to be exacerbating the real time imbalance energy offset charges. In the remaining months of 2011 after April, real-time imbalance energy offset amounts generally declined. After intertie convergence bidding was suspended in late-November 2011, the real-time imbalance energy offset amount reached a nearly two year low in December 2011.

Additionally, after the commencement of the ISO’s stakeholder process to address the real time imbalance energy offset charges, the volume of offsetting virtual bids dropped dramatically and HASP and RTD prices showed significantly improved convergence. However, the increased volume brought about by convergence bidding, even with improved HASP and RTD prices, still resulted in increased levels of real-time imbalance energy offset until intertie convergence bidding was suspended in late-November of 2011.

Figure 1 – Monthly Real Time Imbalance Energy offset January 2010 through September 2011

Since July 2010, the ISO has implemented several other market rules changes that impact the offset. First, as required by the ISO tariff, in April 2010, the energy bid cap was raised from $500/MWh to $750/MWh and in April of 2011, it was raised to $1,000/MWh. Because certain

\(^4\) Additional information on the first Real-Time Imbalance Energy Offset (2009) stakeholder process is available at http://www.caiso.com/2406/2406e2a640420.html
pricing parameters are tied to the energy bid cap, this has increased the level prices can reach in the real-time market when there are short-term imbalances in which the pricing parameters set the market clearing prices. The higher RTD prices impact the real-time imbalance energy offset charge when the ISO is constrained to procure additional energy in RTD at the higher prices. The offset is the mechanism for settling the additional imbalances for energy that are not already allocated to instructed and uninstructed deviations from resources’ day-ahead schedules. Depending on the condition, the real-time imbalance energy offset can increase or decrease. However, because the bid floor remained unchanged at negative $30.00 combined with the lower frequency of negative prices, the relative impact of potential reductions in the offset when negative prices caused by over-generation situations occur (e.g., when the HASP price is greater than RTD) is not symmetric and does not balance the effect of the real-time offset when RTD prices are higher than the HASP price.

The recently introduced flexi-ramp constraint is currently helping reduce the amount of real-time imbalance energy offset charges by decreasing the frequency of price spikes in RTD. Additionally, ISO proposals in the Renewable Integration and Market Product Review: Phase 1 initiative and work on the flexi-ramp product should further reduce real-time imbalance energy offset charges.

Lastly, it is important to note that although these changes will reduce the amount of real-time imbalance energy offset charges, they will not eliminate them completely. Even with perfect procurement consistency between the HASP and RTD, real-time imbalance energy offset charges will exist because load is metered hourly and internal generation is metered on a 10 minute interval. This difference will create at least a small amount of real-time imbalance energy offset charges.

### 3.1.1 Consideration of Changes to the Allocation of Offset

The offset is currently allocated to all SCs based upon a pro rata share of their measured demand (i.e., metered load and exports) excluding the demand quantity for the valid and balanced portion of self-schedules related to transmission ownership rights in real-time and net measured demand of load following metered subsystems. In 2009, the ISO conducted a stakeholder process to determine whether modifications to the current design of the allocation of the real-time imbalance energy offset were appropriate and necessary. At that time, no clear alternative could be identified because causal attribution to specific market activity was not clear. At the conclusion of the stakeholder process, the ISO did not fundamentally change the allocation to measured demand, but clarified that for SCs for MSS Operators that have elected load following, the ISO will not assess any charges or make payments for the resulting non-zero differences recovered through the offset.

As noted in Figure 1 above, real-time imbalance energy offset charges have been decreasing since June 2011. The ISO expects that improvements and modifications put in place, and those planned, will continue to significantly reduce these uplift costs. At this time, the ISO does not propose any modifications to the cost allocation for the real time imbalance energy offset charge. However, as part of the long term solution proposed in in Section 4.2, the ISO will reassess the allocation of these uplift costs to determine how virtual bids contribute to the uplift costs and if it reasonable and feasible to allocate uplift costs to virtual bids.
3.2 FERC Technical Conference on Convergence Bidding at the Interties

On February 2, 2012, FERC convened a technical conference to address convergence bidding on the interties. The ISO and the ISO’s Department of Market Monitoring (DMM) presented information to support the need to at least temporarily suspend convergence bidding on the interties. While the real-time imbalance energy offset was used to demonstrate the magnitude of the problems the ISO identified, high real-time imbalance energy offset charges were not the primary reason the ISO suspended convergence bidding on the interties. The ISO was also concerned that intertie convergence bidding was, in certain hours, undermining and offsetting the ability of internal virtual demand bids to converge day ahead and real-time prices. At the technical conference, additional data was presented on expected vs. actual virtual bid behavior, volume of offsetting intertie virtual bids, and price convergence.5

3.3 The Working Group Process

The ISO engaged a stakeholder working group to assist in the formation of an initial straw proposal to address real-time imbalance energy offset issues that are the subject of this paper. The participants in the working group discussed the unresolved issues regarding the redesign of the real-time imbalance energy offset charge, including: 1) issues with the settlement of hour ahead import(exports versus settling such transactions on the same 5-minute real-time prices that internal resources are settled at; 2) issues associated with the non-performance in the real-time of intertie resources that are dispatched in the hour ahead scheduling process, and 3) potential changes to the allocation of the offset. One of the primary points made by working group participants was that any solutions the ISO proposed must be compatible with reintroducing convergence bidding back on the interties. Since the release of the ISO’s issue paper for this initiative, the working group has convened three times.

The first working group meeting was held on November 15, 2011. Participants at this meeting formed two groups. One group chose to focus on the creation of a full hour-ahead market. The other group examined smaller, more incremental solutions. Both groups favored solutions to reduce real-time imbalance energy offset that would allow the reintroduction of convergence at the interties.

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 advantages and disadvantages of various methodologies to reduce real-time imbalance energy offset amounts. 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 the impact on market liquidity.6

The working group illuminated the complexities of reducing real-time imbalance energy offset charges. For example, some working group members favored the development of a full hour-

5 The ISO’s presentation materials for the FERC technical conference are available at http://www.caiso.com/informed/Pages/StakeholderProcesses/IntertiePricing_Settlement.aspx
6 See the final slide of the ISO presentation at the FERC technical conference on convergence bidding on the interties. Available at http://www.caiso.com/informed/Pages/StakeholderProcesses/IntertiePricing_Settlement.aspx
ahead market because they felt it would address real-time imbalance energy offsets, allow convergence bidding back on the interties, and potentially solve other market inefficiencies. Meanwhile other working group members pointed out that this option was not practical, as it would be the most costly, challenging, and time consuming solution to implement.

At the end of the meeting there was no consensus amongst the working group 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 focused on addressing proposals brought by Powerex and Southern California Edison (SCE).

### 3.3.1 The Powerex Proposal

Powerex provided a proposal that offered a three phased solution that Powerex asserts 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. While many of these parties did not fully agree with all aspects of the Powerex proposal, many agreed that the proposal offered a reasonable starting point for further discussion.

The initial phase of the Powerex proposal includes five measures that Powerex asserts addresses the root causes of price divergence between the hour ahead scheduling process and real-time market. Powerex proposes increased assurance that energy will be available in real-time through items such as modifications to e-tagging timelines to avoid undelivered energy and mitigate price spikes in real-time. The measures Powerex proposes are:

1. Charging HASP awards that do not deliver the worse of HASP or RTD and charging IFM awards that do not deliver the worse of IFM or RTD
2. Enforce product definitions for firm and non-firm energy and requiring an e-tag by 3:00pm the day before real-time
3. Reduce price floor
4. Discontinue premature liquidation of internal convergence bids
5. Create a post HASP procurement mechanism (i.e. a post HASP procurement process)

Phase two would allow for the reinstatement of convergence bidding at the interties and consists of:

6. Reinflate intertie convergence bidding, ensuring all awards are consistent with bid prices

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7) Modify implementation of position limits to eliminate intertie-specific constraints on liquidity

The focus of the third phase of the Powerex proposal is promoting long term market efficiency and includes:

8) The creation of a post HASP RUC process

9) Additional measures to ensure proper use of firm energy

Powerex’s proposal for HASP dispatches that fail to deliver in real-time is specifically addressed below in Section 4.2.1. Pursuing refinements to the e-tagging, as Powerex suggests, will not provide significant benefit at this time. In fact, modifying the ISO’s current e-tagging practices would reduce flexibility, hurting liquidity. Lowering the bid floor should reduce the real-time imbalance energy offset, and, as noted above in Section 3.1, the ISO is lowering the bid floor as part of Renewable Integration and Market Product Review: Phase 1 initiative. The ISO has reviewed the Powerex proposal at great length. The ISO believes that several items improve the overall efficiency of the markets. Additionally, while a post-RUC process or expanding the use of Exceptional Dispatch may, in theory, ensure the ISO has sufficient resources for real-time dispatch, holding virtual bids through to the real-time market poses significant reliability and operational concerns for the ISO. The Powerex proposal would require significant changes to the current market design and business processes that should be considered in context of a longer-term solution. The ISO addresses other aspects of the Powerex proposal in Section 4 below.

3.3.2 The SCE Proposal

SCE provided a proposal as part of the working group process 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, SCE proposes imports receive the hour-ahead advisory price and exports would be settled at the real-time price at the relevant proxy bus, computed as the time weighted average real-time price. This is similar to the NYISO approach described further down in this paper. 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. The ISO addresses the SCE proposal in Section 4 below.

3.4 Settlement of Import/Exports based upon RTD

In addition to the suggestion made by Powerex and SCE, the ISO has examined numerous other options to reduce real-time imbalance energy offset charges. Many of the options to resolve the real-time imbalance energy offset issues were also considered in the prior stakeholder initiatives. However, each of the options outlined had potential market inefficiencies or
reliability concerns. The ISO does not wish to reexamine the options, but believes it is appropriate for the stakeholder process to attempt to either a) find alternative options or b) solutions that address market inefficiency or reliability concerns of the proposed options. The proposals in 3.4.1 through 3.4.4 provide various options for reducing the real-time imbalance energy offset charges, they do not, without putting additional safeguards in place, provide sufficient protections for reintroducing convergence bidding on the interties. Additionally, some of these options may have other undesirable side-effects. As described in Section 4, the ISO believes the NYISO model for settling imports and exports provides the most useful starting point for developing a long-term solution for the ISO.

3.4.1 Pay as Bid

This option is essentially the method for settling intertie transactions that existed in the ISO market prior to the new locational marginal price (LMP) market introduced in April 2009. Under this option, HASP timelines and bidding processes would remain unchanged; however, the HASP settlement for physical intertie transactions and liquidation of intertie virtual demand/supply would be eliminated. All intertie virtual demand/supply will be liquidated at the RTD price. The HASP process would determine indicative prices used to select which HASP intertie transactions that are accepted. Bids to export or reduce day-ahead imports would be accepted if the bid is below the indicative HASP price. Bids to export or reduce day-ahead imports would not be accepted if the bid is above the indicative HASP price. For incremental imports and reductions in day-ahead exports, the bids would be accepted if lower than the indicative price. The accepted physical transactions would be paid their bid price and difference between the bid price and the actual RTD price would be included as a credit/debit to the real-time imbalance energy offset. See Table 1 and 2 for example of the rule and impact to the offset.

As noted by several stakeholders, this would be a step backwards from the LMP market design. The previous concerns with bidding behavior that takes into consideration a market participant’s expectation of real-time pricing versus bidding the resource’s marginal cost could impact market efficiency. However, prior to the LMP market introduced in April 2009, the Pay as Bid process did operate without excessive undesirable side effects.

3.4.2 Pay as Bid or Better

Under the pay as bid or better option, HASP timelines and bidding processes would remain unchanged; however, the HASP settlement for physical intertie transactions and liquidation of intertie virtual demand/supply would be eliminated. All intertie virtual demand/supply would be liquidated at the RTD price. The HASP process would determine indicative prices used to select which HASP intertie transactions that are accepted. Bids to export or reduce day-ahead imports would be accepted if the bid is below the indicative HASP price. Bids to export or reduce day-ahead imports would not be accepted if the bid is above the indicative HASP price. For incremental imports and reductions in day-ahead exports, the bids would be accepted if lower than the indicative price. The accepted physical exports would pay the lower of their bid price or actual RTD price. The accepted physical imports would receive the higher of their bid price or actual RTD price. The difference between the bid price and the actual RTD price would...
be included as a charge to the real-time imbalance energy offset. See Table 1 and 2 for example of the rule and impact to the offset.

Tables 1 and 2 below show examples of pay as bid and bid or better would work under different relationships between HASP and real-time price. Table 1 shows pay as bid and bid or better when HASP price is less than the real-time price. Table 2 shows a similar example, except that HASP price is greater than real-time price.

**Table 1 - Pay as Bid and Bid or Better Settlement HASP Price < RTD Price**

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<thead>
<tr>
<th>HASP Price ($ 60.00)</th>
<th>RTD Price ($ 80.00)</th>
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<tr>
<td><strong>Bid</strong></td>
<td><strong>Award</strong></td>
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</tr>
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<td>Import B $ 60.00</td>
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<tr>
<td>Import C $ 80.00</td>
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<td>Import D $ 100.00</td>
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<td>Y</td>
</tr>
<tr>
<td>Export D $ 40.00</td>
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</table>

* A negative real-time imbalance energy offset (RTIEO) amount is a credit to the offset, positive is a charge to the offset

**Table 2 – Pay as Bid and Bid or Better Settlement HASP Price > RTD Price**

<table>
<thead>
<tr>
<th>HASP Price ($ 80.00)</th>
<th>RTD Price ($ 60.00)</th>
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<tbody>
<tr>
<td><strong>Bid</strong></td>
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<tr>
<td>Export D $ 40.00</td>
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</tr>
</tbody>
</table>

* A negative RTIEO amount is a credit to the offset, positive is a charge to the offset

### 3.4.3 Comparison with NYISO Intertie Scheduling and Virtual Bidding

The New York ISO (NYISO) is the most relevant ISO/RTO for comparison with the ISO. Like the ISO, the NYISO is a large net importer of power and has an hour-ahead scheduling process...
similar to the ISO. However, the NYISO does not allow virtual bids at the interties or at individual internal nodes.

The NYISO schedules imports and exports in an hour-ahead process that is very similar to the ISO’s HASP process. The NYISO process/software tool is called RTC. RTC initializes and runs every 15 minutes, looking forward nine 15 minute intervals in time. In addition to scheduling imports, RTC is used to commit quick start units, primarily 10 minute and 30 minute gas turbines. While RTC runs four times an hour, only one of the four runs is currently used to schedule imports and exports. This run is referred to as RTC15 and initializes at the top of the hour and posts 15 minutes after the hour, with schedules for the hour beginning roughly 45 minutes after posting.

If there is no congestion on the external interfaces in the RTC evaluation, RTC will schedule imports and exports, but the price used for settlements will be the real-time price at the relevant proxy bus, computed as the time weighted average real-time price. However, imports scheduled in RTC receive a bid production cost guarantee that if the real-time price is lower than their offer price, they will be paid their offer price. This introduces a potential pay-as-bid element into the market design that is not ideal, but concluded to be necessary to ensure the availability of import supply. The NYISO, like the ISO, is typically a net importer, and is particularly likely to be a net importer during high load conditions when imports may be important for reliably meeting load.

There is no price assurance for exports scheduled in RTC. If the real-time price turns out to be higher than projected in RTC and higher than the price bid by the purchaser for the export, the export buyer has to pay the real-time price for power. The rationale for the absence of any price guarantee is that the scheduling of exports does not benefit New York power consumers and hence there is no basis for them to bear any uplift costs associated with exports. Neither generators nor exporters have volunteered to bear uplift costs to make exporters whole, so there is no price assurance for export transactions.

The exception to interchange prices being determined in real-time is if the interface is constrained in RTC such that the offer price of the marginal import is lower than the internal New York price (import constrained) or the bid price of the marginal export is higher than the internal New York price (export constrained). If a proxy bus is import constrained and the clearing price in RTC is lower than the real-time price, the import supplier is paid the RTC price, i.e. a price lower than the internal NYISO price. Conversely, if a proxy bus is export constrained the clearing price in RTC is higher than the real-time price, the export buyers pays the higher RTC price. Thus, congestion does not give rise to shortfalls and uplift but contributes to surpluses in the form of real-time congestion rents.

The NYISO does not allow virtual bids on the interties, but it should also be pointed out that the NYISO does not allow nodal virtual bidding at this time. All virtual supply and demand bids are cleared at zonal prices. As a result, the market optimization for liquidating virtual supply and demand and determining internal zonal prices occur under the same timeframe. Since NYISO

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does not allow virtual bids on the interties, they do not have a timing disconnect similar to the ISO under the current convergence bidding design.

The NYISO intertie settlement option was reviewed in the Real-Time Imbalance Energy Offset stakeholder process. Given the timeframe allowed and the added complexity that would have been needed to make the process complete for the interim solution the ISO concluded that the NYISO settlement option was not appropriate at that time. Since the ISO, through this initiative, is proposing a longer term solution which would provide additional time to consider the modifications that would be necessary to make the NYISO process applicable to the ISO, there is now more time and merit in examining this option as part of the stakeholder process.

Some stakeholders suggested that providing bid cost recovery for HASP exports would have less liquidity impact on intertie transactions than the bid or better option. The ISO will consider the merits of providing bid cost recovery for HASP import and exports as part of the longer term solution.

### 3.4.4 Comparisons to the Ontario Model

Similar to the NYISO model described above, the IESO Ontario prices the interties differently if there is congestion on the interties. If there is no congestion on the interties, intertie resources are dispatched based on hour-ahead prices, but settle at real-time prices. In order to manage this price risk, IESO Ontario offers an “intertie offer guarantee.” The intertie offer guarantee is similar to the ISO’s bid-cost recovery. If, over the course of an hour, the price differential between the hour-ahead pre-dispatch is such that an intertie resource is unable to fully recover bid, then intertie offer guarantee returns the resource to zero operating profits. It does not provide a guarantee of the expected profits from the hour-ahead pre-dispatch, but ensures that resource price risk is sufficiently mitigated.

However, if there is congestion on the interties, the IESO Ontario calculates the internal energy price and the external energy price. The difference between the internal price and the external price in called the “intertie congestion price” (ICP). The ICP is similar to the ISO’s marginal loss and marginal congestion components. IESO Ontario then settles the resources on congested interties at the real time price plus the ICP.

### 4 The ISO Proposal: Two Options

Given the challenges associated with comprehensive market modifications needed to resolve all intertie pricing issues, the ISO is proposing two options to resolve the issues of intertie pricing and convergence bidding at the interties. The ISO has examined the requirements of each option and has determined that while both are feasible to implement, there are essential timing trade-offs. The options are as follows:

**Option One**

1. The ISO would implement, by the end of 2012, an interim solution in which virtual bids are:

   a. Priced at real-time LMP when an intertie’s scheduling constraints are not binding or the absolute value of the intertie constraints’ shadow price is less than $2.
These intertie constraints consist of each intertie’s ITC scheduling limit, as well as the branch group or MSL flow-based limits.

b. Priced at the HASP LMP when an intertie’s scheduling constraints are binding with the absolute value of the intertie constraints’ shadow price greater than $2.

c. Subject to a 2.5 percent position limit of each intertie’s capacity (ATC) per scheduling coordinator (SC).

d. Subject to an increasing threshold for the value of the intertie constraints’ shadow price to determine when intertie virtual bids are priced at the real-time LMP or the HASP LMP. Each time the amount of overall real-time imbalance energy offset charges due to offsetting virtual bids exceeds a total of $3.5M for a rolling 30-day average, the threshold for the intertie scheduling constraint shadow price that determines if virtual bids settle at real-time LMP or HASP LMP would increase for all interties. The real-time LMP will be based on a simple average of the five minute LMPs for the applicable hour for at least 30 days.

e. There would be no changes to HASP pricing for physical resources until a long term solution is put in place.

f. When the dual intertie constraints bind in the day-ahead market, the ISO will use different settlement LMPs for physical awards and virtual awards (Option A) based on the shadow price of the respective constraint at which the physical and virtual bids participate.

2. The ISO would continue this stakeholder process to design the details of a long term solution that uses the NYISO intertie pricing model as a basis for settling both intertie convergence bids and intertie physical resources. Once this longer term solution is implemented, the ISO proposes that intertie bids would be settled as follows:

a. Both intertie physical resources and convergence bids would be settled using an approach modeled after the NYISO approach – at the average RTD LMP (simple average of the five minute LMPs for the applicable hour) unless there was congestion in HASP due to the scheduling constraints on a tie, in which case they would settle at the HASP LMP.

b. The ISO would evaluate as part of developing the longer term solution whether and under what conditions physical intertie resources would be eligible for bid cost recovery to the extent the RTD price is inconsistent with their bid.

c. Physical resource deviations from HASP schedules would be settled at the RTD price.

d. The current HASP schedules decline charge threshold and penalty would be eliminated.

e. At a minimum, the longer term solution will also have to address:

i. Hourly bid-cost recovery for intertie resources
ii. Bid Cost Recovery for exports and the effect on the supply of decremental energy at the interties

iii. Potential rules to limit strategic bidding of offsetting physical imports and exports designed to artificially inflate bid cost recovery for physical imports or exports.

iv. Two tier bid-cost recovery for the real-time market


Option Two

Option Two has many of the same components as option one. However, Option Two does not offer an interim solution to reintroduce intertie virtual bidding by the end of 2012. Thus, item one of Option One is not a part of Option Two. However, the trade-off would be the longer-term solution, which would include the reintroduction of intertie convergence bidding, would be implemented in the Fall of 2013, six months earlier than Option One. Not implementing a short-term solution would allow the ISO to focus resources on the permanent long-term solution and implement it sooner.

4.1 Option One Specific Items

This section details the ISO’s proposal for items that are specific to the interim solution component of Option One, above.

4.1.1 Settlement Methodology for Virtual Bids

One goal of this initiative is to provide an appropriate market structure under which convergence bidding on the interties can resume. To accomplish this goal, it is appropriate to modify how intertie convergence bids are settled in a way that provides some of the benefits of convergence bidding while also mitigating the adverse impacts of the bidding patterns and observed market inefficiencies that led to the suspension of convergence bidding on the interties. The ISO proposes to accomplish this by clearing virtual bids on the interties using a methodology that settles intertie convergence bids based on the level of congestion on the interties.

As noted above, since the suspension of convergence bidding in late 2012 and the implementation of other market enhancements, the Real-Time Imbalance Energy Offset has dropped significantly. Therefore, in order to allow SCs to use virtual bids to provide a hedge for price risk, when there is congestion on a given intertie such that the average HASP intertie transfer capacity constraint shadow price exceeds $2, virtual bids will be automatically liquidated with the opposite sell/buy position at in the HASP and will settle at the HASP LMP. The ISO has studied the intertie transfer capacity constraint shadow values for interties in 2011 and determined that for most interties, in most hours, the intertie transfer capacity constraint shadow price is zero. However, for those hours in which the shadow price was not zero, as shown in Table 3, the average HASP intertie constraint shadow price is $2 or less (using
absolute values) only 2.28 percent of the time.\(^9\) Therefore, because these are low frequency events for which the price differential between HASP and real-time is small, virtual bids will be automatically liquidated with the opposite sell/buy position in the HASP, but will settle at real-time LMP. This proposed settlement allows SCs to fully hedge congestion risk in periods of congestion while reducing the volume of virtual bids that settle in HASP and contribute to the Real-Time Imbalance Energy Offset. There will not be bid-cost recovery for convergence bids. Thus, there is no need to consider the bid cost recovery proposal offered in the SCE proposal.

Table 3: Percent of Intertie Transfer Capacity Shadow Prices Above a Given Price When Intertie Transfer Capacity Shadow Values are Greater than Zero

<table>
<thead>
<tr>
<th>Hourly Average ITC Shadow Price(^{10})</th>
<th>Percent of Congested Hours Below</th>
<th>Hourly Average ITC Shadow Price(^{11})</th>
<th>Percent of Congested Hours Below</th>
</tr>
</thead>
<tbody>
<tr>
<td>$ 2.00</td>
<td>2.28%</td>
<td>$ 55.00</td>
<td>76.29%</td>
</tr>
<tr>
<td>$ 5.00</td>
<td>4.19%</td>
<td>$ 60.00</td>
<td>81.74%</td>
</tr>
<tr>
<td>$ 10.00</td>
<td>8.48%</td>
<td>$ 65.00</td>
<td>86.03%</td>
</tr>
<tr>
<td>$ 15.00</td>
<td>12.72%</td>
<td>$ 70.00</td>
<td>88.26%</td>
</tr>
<tr>
<td>$ 20.00</td>
<td>16.44%</td>
<td>$ 75.00</td>
<td>90.96%</td>
</tr>
<tr>
<td>$ 25.00</td>
<td>21.33%</td>
<td>$ 80.00</td>
<td>92.45%</td>
</tr>
<tr>
<td>$ 30.00</td>
<td>29.62%</td>
<td>$ 85.00</td>
<td>93.25%</td>
</tr>
<tr>
<td>$ 35.00</td>
<td>42.66%</td>
<td>$ 90.00</td>
<td>93.53%</td>
</tr>
<tr>
<td>$ 40.00</td>
<td>53.00%</td>
<td>$ 95.00</td>
<td>94.04%</td>
</tr>
<tr>
<td>$ 45.00</td>
<td>62.69%</td>
<td>$100.00</td>
<td>94.32%</td>
</tr>
<tr>
<td>$ 50.00</td>
<td>70.42%</td>
<td></td>
<td></td>
</tr>
</tbody>
</table>

While this proposal reintroduces intertie convergence bidding, it does not fully eliminate the opportunity to engage in the convergence bidding strategies that led to the ISO suspending convergence bidding at the interties, particularly when there is congestion on an intertie in HASP. Therefore, it is reasonable and prudent to implement two additional protective measures: position limits and a Real-Time Imbalance Energy Offset trigger price that would change the intertie transfer capacity shadow price used to determine if virtual bids settle at HASP LMP or the RTD LMP.

4.1.1.1 Position Limits

Given the challenges and risks that have been demonstrated with convergence bidding on the interties, the ISO believes it is prudent to impose initial position limits on intertie convergence bids. As an initial starting point, the ISO proposes a limit of 2.5 percent of a line’s intertie transfer capacity for each SC. The use of 2.5 percent of a line’s intertie transfer capacity will allow sufficient hedging across most ties, while allowing the ISO to assess the effectiveness of the new convergence bidding design. This position limit would remain in place for at least one year after convergence bidding on the interties is reopened. Before lifting this limit, the ISO will

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\(^9\) There are almost 2,000 observations where the hourly average interties transfer capacity shadow price is greater than zero. Less than 50 observations had hourly average transfer capacity shadow prices plus or minus $2.

\(^{10}\) Prices expressed as an absolute value

\(^{11}\) Prices expressed as an absolute value
examine the performance of convergence bids on the interties to determine if additional measures need be implemented to prevent gaming or if the position limits can be raised. The ISO proposes that this be an interim solution and the need for position limits would be reexamined as part of the long term solution.

4.1.1.2 Real-Time Imbalance Energy Offsets Trigger Value

While real-time imbalance energy offset charges are a function of numerous factors, it is possible to isolate the portion of the real-time imbalance energy offset that is caused by virtual bids. Offsetting virtual bids created significant uplift between March 2011 and May 2011. Therefore, the ISO proposes putting a cap at the maximum uplift created by residual offsetting virtual bids, or $3.5 million dollars as shown in Figure 3. If the real-time imbalance energy offset charges attributable to virtual bids reaches $3.5 million on a rolling 30 day average, the ISO would increase the value of the intertie constraints’ (ITC, branch group or MSL limit) shadow price used to determine if a virtual bid is settled using the HASP LMP or the real-time LMP from $2 to $5. Each time this $3.5M rolling average is reached, the ISO will increase the intertie constraints’ shadow price used to determine if a virtual bid is settled using the HASP LMP or the real-time LMP. See Table 4 for the scale.

**Figure 3: Real-Time Imbalance Energy Offsets Since Convergence Bidding Implemented (30-Day Rolling Average)**
Table 4. ITC Shadow Price Increases when $3.5M Threshold is Reached

<table>
<thead>
<tr>
<th>Trigger Hit</th>
<th>ITC Shadow Price(^{12})</th>
</tr>
</thead>
<tbody>
<tr>
<td>Initial</td>
<td>$2</td>
</tr>
<tr>
<td>First time</td>
<td>$5</td>
</tr>
<tr>
<td>Second Time</td>
<td>$15</td>
</tr>
<tr>
<td>Third Time</td>
<td>$30</td>
</tr>
<tr>
<td>Fourth Time</td>
<td>$55</td>
</tr>
<tr>
<td>Fifth Time</td>
<td>Convergence Bidding on the Interties Suspended</td>
</tr>
</tbody>
</table>

This means that fewer convergence bids will contribute to the Real-Time Imbalance Energy Offset. It also means that the convergence bids will be able to perfectly hedge congestion risk in fewer hours. However, such a mechanism creates the incentive to use convergence bids only as a hedge and should reduce the incentives to submitting offsetting virtual bids.

4.1.2 No Changes to HASP Pricing for Physicals Resources

Real-time imbalance energy offset charges due to dispatch of physical resources has steadily decreased over the last six months. This reduction is the result of improved consistency with procurement targets as well as the implementation of the Flexi-Ramp constraint. Once the ISO lowers the bid floor and implements the Flexi-ramp product, the ISO will have sufficient tools to mitigate the real-time imbalance energy offset charges attributable to the dispatch of physical resources. Therefore, as part of the interim solution, there appears to be no need to change the settlement and pricing for physical intertie resources (except as noted in section 4.2.3 below). However, as noted below, the ISO will consider settlement rule changes for physical resources as part of the longer term solution.

4.2 Items Relevant to Both Options

As outlined above in the introduction to this section, the ISO is proposing to continue this stakeholder process to develop a longer term solution to the intertie pricing and settlements for both physical and virtual intertie resources. This longer-term approach would be pursued under either Option One or Option Two. The ISO proposes to use the NYISO model described above as the starting point for this longer term solution. At a minimum, the longer term solution will also have to address:

1. Hourly bid-cost recovery for intertie resources
2. Bid Cost Recovery for exports and the affect on the supply of decremental energy at the interties
3. Potential rules to limit strategic bidding of offsetting physical imports and exports designed to artificially inflate bid cost recovery for physical imports or exports.
4. Two tier bid-cost recovery for the real-time market

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\(^{12}\) Prices expressed in absolute values.
Other issues have been vetted so far as part of this stakeholder initiative and should not require additional discussion but are integral parts of the long term solution. While the ISO hopes to resolve these issues as part of the current stakeholder initiative, implementation of these items will occur in conjunction with implementation of the longer term solution. These issues are discussed in greater detail in this section.

4.2.1 Negative Deviations to HASP Imports/Exports

In stakeholder comments in the real-time imbalance energy offset initiative, Powerex identified a concern with the treatment of HASP deviations. An intertie resource that sells energy in HASP, but fails to deliver is not subject to imbalance charges at the RTD price. Instead, failure to deliver on HASP commitments results only in (a) non-payment of the HASP price (up to 10% of the participant’s total HASP respective supply and demand volume per month); or (b) a penalty equal to 50 percent of the HASP LMP for volumes beyond the first 10%.\(^\text{13}\) As a non-performing HASP sale results in the ISO purchasing that energy from internal resources in the RTD, this revised straw proposal proposes as part of the long-term solution, that failure to deliver on HASP awards should be charged the RTD price, independent of the magnitude, frequency or reason for such failure. Intertie resources scheduled in the day-ahead market already pay the real-time price for energy that is not delivered in real-time. This rule change improves the consistency of treatment between the day-ahead market and HASP for intertie resources.

The ISO has reviewed the penalties imposed for failure to deliver on HASP schedules. Table 3 shows that these penalties have been insignificant for 2011. This data shows that very few undelivered imports or exports exceed the 10% margin.

Table 3: Monthly Penalties for Failure to Deliver on HASP Commitments

<table>
<thead>
<tr>
<th>Month</th>
<th>Penalties</th>
</tr>
</thead>
<tbody>
<tr>
<td>1/1/2011</td>
<td>$25,861.87</td>
</tr>
<tr>
<td>2/1/2011</td>
<td>$60,375.89</td>
</tr>
<tr>
<td>3/1/2011</td>
<td>$16,872.14</td>
</tr>
<tr>
<td>4/1/2011</td>
<td>$24,562.05</td>
</tr>
<tr>
<td>5/1/2011</td>
<td>$13,721.57</td>
</tr>
<tr>
<td>6/1/2011</td>
<td>$12,284.98</td>
</tr>
<tr>
<td>7/1/2011</td>
<td>$94,221.41</td>
</tr>
<tr>
<td>8/1/2011</td>
<td>$75,741.50</td>
</tr>
</tbody>
</table>

\(^{13}\) See ISO Tariff, Section 11.31
Though very few scheduling coordinators are triggering the penalty criteria (85 percent of the penalties have been assessed to six scheduling coordinators), it is still important to note that small declines of HASP dispatches can lead to significant effects on the real-time prices. As such, these deviations may significantly increase the real-time imbalance energy offset charges. Therefore, the ISO proposes to require all resources that fail to deliver on HASP commitments to buy back their deviations at the real-time price once the long term solution is put in place. The ISO believes this will create the proper incentives for resources dispatched in HASP to perform in such a way that will reduce divergence of HASP and real-time prices. The Powerex proposal, described above, suggests that the deviations be settled at the worse of the HASP or real-time price to create a stronger incentive to deliver. However, the ISO believes that settling deviations at the real-time price is more aligned with cost-causation principles. While some have asserted that such a requirement would negatively impact the liquidity of the market for imports, Figure 2 demonstrates that the quantity of imports that fail to deliver on final HASP schedules are typically small. However, until the longer term solution is implemented, the ISO will not eliminate the penalty charge for resources with undelivered volumes beyond the first 10%. Keeping this penalty acts as a deterrent for resources that might become continuous problem for failing to deliver on HASP commitments and provides reliability benefits by limiting undelivered HASP dispatches while the longer term solution is developed.
4.2.2 Issue with Convergence Bidding Liquidation and Settlement Timing

Another issue with the current market design for convergence bidding is the structural disconnect between the liquidation of virtual supply/demand and the establishment of real-time binding settlement LMPs for physical supply/demand. The current market design has three binding settlement LMPs for physical supply/demand (IFM, HASP for interties, RTD for internal generation/load), three binding settlement LMPs for virtual supply and demand (IFM and HASP for interties, and RTD for internal nodes), but only two liquidation market optimizations for virtual supply and demand (IFM and HASP).

Within the stakeholder process to find a longer term solution, the ISO will attempt to resolve this difference. Using the NYISO approach, with appropriate modifications to account for the addition of virtual bids, should resolve issue to a large extent.

4.2.3 Price Inconsistency Caused by Intertie Constraints

In a stakeholder initiative run in parallel to the real-time imbalance energy offset initiative, the ISO has worked to resolve price inconsistency issues that are caused by enforcing the two intertie constraints implemented with convergence bidding. Under the current design, the ISO enforces two constraints at 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

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14 Additional documentation for the Price Inconsistency Cause by Interties Constraints stakeholder initiative is available at [http://www.caiso.com/2b6d/2b6dbef62e710.html](http://www.caiso.com/2b6d/2b6dbef62e710.html).
that scheduling point. Since convergence bidding was implemented, the ISO has seen 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 have raised concerns regarding the negative impact this pricing inconsistency may have on their settlement outcome.

In the straw proposal for that previous initiative, the ISO included two options that would result in consistent pricing: (A) different settlement LMPs for physical awards and virtual awards and (B) economic curtailment. In the draft final proposal for that initiative, the ISO removed option B from consideration given potential adverse market outcomes. The potential adverse market outcomes arise because virtual export bids could clear against internal supply (at a higher price), but would be settled at the lower physical import price which could lead to day-ahead revenue adequacy issues. Stakeholders did not support option A because it would result in different price for virtuals and physical imports/exports. Several stakeholders requested that exports be provided bid cost recovery. Several stakeholders recommended no change to the current design as the impact was consistent with the frequency of this known issue during the convergence bidding design process.

4.2.3.1 The ISO’s Proposal (Option A)

Prior to curtailing convergence bidding at the interties, only the net virtual plus physical constraint was used in pricing. In order to resolve the price inconsistency problem the ISO proposes to allow the shadow prices of both constraints that are currently implemented to be factored into the settlement LMPs. This will produce two different settlement LMPs for cleared physical and virtual bids. The virtual award will still be settled at LMP*V, while the physical award will be settled at:

\[
LMP^P = x^{SYS} - x^{PVI} - x^{PI} + x^{PVE} + x^{PE}
\]

\[
x^{PVI} = \text{import physical plus virtual constraint}
\]

\[
x^{PI} = \text{import physical constraint}
\]

\[
x^{PVE} = \text{export physical plus virtual constraint}
\]

\[
x^{PE} = \text{export physical constraint}
\]

* = Optimal solution

One outcome of this option is that the virtual awards do not receive the same settlement LMP as the physical awards if the import or export physical constraint is binding. However, this poses no adverse outcome because even today where only one constraint is being priced, the two shadow prices of both constraints already affect the dispatches in the market optimization. In other words, even today physical and virtual bids are economically cleared according to different LMPs, but priced at the same settlement LMP. Option A, therefore, produces a better outcome where the physical and virtual bids are priced in a way that is consistent with how they are cleared, which makes this option the most transparent and mathematically correct approach to maintain price consistency.

This option does not require changes to the current market optimization. However, it does require some settlement changes, OASIS reporting changes, and business practice changes.
Today, there is only one pricing node at the ITC priced at LMP*V. In order to accommodate the two different settlement prices, the ISO needs to create an additional pricing node for the physical resources at LMP*P at the ITC. For physical bids, the pricing node priced at LMP*P must be specified, and for virtual bids, the pricing node at LMP*V must be specified. Both LMP*V and LMP*P will be published in OASIS.

Parties raised a concern that Option A may drive market participants to change their behavior and implement a bidding strategy of submitting physical bids rather than virtual bids with the intent to liquidate their positions in HASP assuming a more advantageous LMP for physical awards. For example, if the physical constraint is binding in the import direction, physical export will receive a lower price than a virtual export, so the virtual export may opt to be physical and liquidate in the real-time market. While this strategy would not be prohibited, it cannot generate sustainable revenue, because the increased physical exports can relieve the physical constraint congestion, rendering this strategy less profitable. It is also possible that the strategy could create congestion in the export direction resulting in an adverse affect. In addition, the ISO implemented the HASP reversal settlement rule concurrently with convergence bidding. This rule was put in place to eliminate any potential incentive for market participants to submit implicit virtual bids by reversing any monies paid due the difference between the day-ahead price and the HASP price for any MW quantity that is not e-tagged. Therefore, this rule to some extent alleviates the concern of using physical bids to conduct implicit virtual bidding because they are settled at different prices.

Many stakeholders commented that the potential for different prices for physical imports/exports and virtual supply/demand at the interties would limit the ability for market participants to hedge day ahead positions. Table 5 illustrates the hedge of a physical import.

<table>
<thead>
<tr>
<th>MW</th>
<th>DA</th>
<th>HASP</th>
<th>Revenue</th>
</tr>
</thead>
<tbody>
<tr>
<td>100</td>
<td>50.00</td>
<td>50.00</td>
<td>$ 5,000.00</td>
</tr>
<tr>
<td>20</td>
<td>55.00</td>
<td>60.00</td>
<td>$ 100.00</td>
</tr>
<tr>
<td>20</td>
<td>(55.00)</td>
<td>60.00</td>
<td>$(5,000.00)</td>
</tr>
<tr>
<td>80</td>
<td>48.75</td>
<td>60.00</td>
<td>$ 3,900.00</td>
</tr>
<tr>
<td>80</td>
<td>47.50</td>
<td>60.00</td>
<td>$ 3,800.00</td>
</tr>
</tbody>
</table>

Some market participants advocate that the ISO provide bid cost recovery to exports to remedy the inconsistencies that result from the existing approach for settling the two constraints. Bid cost recovery has the indirect effect of settling virtual and physical bids at different net prices; therefore, the ISO finds that it is preferable to settle at the two LMPs that could result from the two different constraints, but renders the pricing consistent with the resources bid.
5 Next Steps

The ISO is will host a stakeholder meeting on March 20, 2012. Comments on this revised straw proposal are due on March 27, 2012. Stakeholders interested in participating in the working group should notify the ISO via email to intertiepricing@caiso.com by written comments by March 16, 2012.