Addendum to May 31 Paper

- Key issues related to Credit Policy for Virtual Bids

June 22, 2007
Introduction
This addendum expands upon and revises information posted on May 31 related to credit policies for virtual bidding. This material is meant to further stakeholder discussion on credit policy for virtual bids, which is a key feature of the convergence bidding design targeted for implementation within 12 months after the startup of the MRTU markets.

In addition, a matrix summarizing the credit policy provisions relating to virtual bidding at NYISO, PJM, ISO-NE and MISO was previously posted at:
http://www.caiso.com/1bef/1be56c72c30.pdf

The CAISO will host a conference call from 10:30 to 11:30 am on June 29th to review the key policy issues that should be addressed in the development of a credit policy for virtual bids. This discussion and stakeholder input will be a preliminary step in the CAISO’s development of a credit policy for virtual bids.

Additional written comments on these credit issues or other features related to the design of convergence bidding are welcome and should be sent to: convergencebidding@caiso.com.

Additional papers and stakeholder discussions related to convergence bidding will be conducted in July and August as outlined below. Please refer to the CAISO calendar located at:
http://www.caiso.com/meetings/index.cqi for details on these stakeholder engagements as these meetings are confirmed.

Updated Plan for Stakeholder Input to Develop Convergence Bidding Design
During the discussion of convergence bidding at the June 6 MSC / Stakeholder meeting, several stakeholders urged additional high-level review and discussion of the granularity at which virtual bids would be permitted in the convergence bidding design.

The CAISO intends to facilitate such discussion in a conference call on July 17, with further discussion at an all-day stakeholder meeting on July 26.

By July 10 the CAISO will post a Paper focusing on granularity of virtual bids as a foundation for the discussion on July 19. Similarly, by July 19 (a week prior to the all-day stakeholder meeting on July 26) the CAISO will post a White Paper offering a Straw Proposal on additional key features of the convergence bidding design.

At least two follow-up conference calls are tentatively scheduled in August to focus on any unresolved issues or additional features of the design that require further stakeholder review.
The following table outlines the revised plan for stakeholder input in the development of the convergence bidding design:

<table>
<thead>
<tr>
<th>Date</th>
<th>Activity or Milestone</th>
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<tbody>
<tr>
<td>June 22</td>
<td><strong>Post Addendum to Issues Paper</strong></td>
</tr>
<tr>
<td></td>
<td>o Key Issues related to CAISO credit policy for convergence bidding</td>
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<tr>
<td>June 29</td>
<td><strong>Stakeholder conference call</strong></td>
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<td></td>
<td>o key issues related to credit policy for convergence bidding</td>
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<tr>
<td>July 10</td>
<td><strong>Post White Paper on granularity of virtual bidding</strong></td>
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<tr>
<td>July 17</td>
<td><strong>Stakeholder conference call</strong></td>
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<tr>
<td></td>
<td>o discussion and key issues related to granularity of virtual bidding</td>
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<tr>
<td>July 19</td>
<td><strong>Posting of White Paper with Straw Proposal on Convergence Bidding</strong></td>
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<td></td>
<td>o written proposal to facilitate further discussion on granularity of virtual bidding</td>
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<td></td>
<td>o other elements of the design for virtual bidding</td>
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<tr>
<td>July 26</td>
<td><strong>Stakeholder meeting to review Straw Proposal</strong></td>
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<tr>
<td>August 3</td>
<td><strong>Stakeholder written comments due:</strong></td>
</tr>
<tr>
<td></td>
<td><a href="mailto:convergencebidding@caiso.com">convergencebidding@caiso.com</a></td>
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<tr>
<td>August 7</td>
<td><strong>Stakeholder conference call</strong></td>
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<td></td>
<td>(tentative)</td>
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<tr>
<td>August 13</td>
<td><strong>Stakeholder conference call</strong></td>
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<tr>
<td>(tentative)</td>
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<tr>
<td>August 24</td>
<td><strong>Posting of ISO's Final White Paper</strong></td>
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<tr>
<td>August 28</td>
<td><strong>Stakeholder Conference Call to review Final White Paper</strong></td>
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<tr>
<td>September 6-7</td>
<td><strong>ISO Board Meeting</strong></td>
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</table>
Credit Policies related to Convergence Bidding

This section identifies certain elements that should be considered in the CAISO’s development of credit policy for convergence bidding. The CAISO welcomes initial stakeholder comments on these elements or other suggestions for issues that should be addressed.

Virtual Bids as a Component of an Entity’s Total Credit Limit

Currently, entities participating in the CAISO markets must maintain an Aggregate Credit Limit (Unsecured Credit Limit plus posted collateral) in excess of the Estimated Aggregate Liability (EAL) at all times.

Financial amounts (due to the CAISO or due from the CAISO) related to convergence bidding could become a component of the EAL. The EAL then would contain all amounts related to convergence bidding, both for transactions that have already occurred, and an amount to cover pending/prospective trades.

A revised table of the components of the EAL is included on page 10. With the implementation of convergence bidding, the EAL might need to be revised to include amounts related to virtual bids as follows:

1. The value of a given Virtual Energy Charge/Credit that has been invoiced, but not yet paid.
2. The value of a given Virtual Energy Charge/Credit that has been settled and/or calculated, but not yet invoiced.
3. Virtual Bid Reservation: The value of Virtual Energy Charge/Credit in an exposure window of a limited number of days.

Following practices established at other ISOs, this could be calculated as the product of:

A  Participant’s daily Virtual MWh Limit
   times
B  A reference price = the highest differential between the Day-ahead and Real-Time Locational Marginal Prices at the XXth percentile over the previous XX months.
   times
C  The number of days in the Virtual Transactions Estimated Exposure Window (for example, 2 Days).

Important policy considerations in the design of the credit policy for convergence bidding relate primarily to the third item above.
Potential Credit Issues to be Addressed

Based on the review of credit practices of other ISOs (which is an attached document), the CAISO suggests the following additional policy issues related to credit for convergence bidding that may need further examination. Again, stakeholders are welcome to offer initial written comments (convergencebidding@caiso.com) on these suggested policy issues.

A. Proxy / reference price for difference between Day Ahead (DA) and Real Time (RT) energy prices used to measure the exposure for credit purposes.

1. How granular is this figure?
   - Single figure per MWh MISO
   - Different figure for different paths / etc. ISO-NE, PJM, NYISO

Discussion
This reference price issue may be linked to the overall granularity of virtual bids. The CAISO will be reviewing implementation requirements for establishing multiple proxy reference prices in the credit and bidding systems.

2. How often is the figure reset?
   - Every two months NYISO, PJM
   - Monthly ISO-NE
   - Annually MISO

Discussion
Annually: DA and RT differentials may differ by season. To the extent that CAISO sets a reference price based on annual differentials, the amount may be excessive during some portions of the year resulting in excessive collateral requirements and inadequate collateral requirements at other times of the year.

Monthly: This approach could require more CAISO resources, but would likely provide more accurate DA-RT differentials, and accordingly, more precise collateral requirements.

3. What data will be used to calculate the proxy reference price?
   - initially upon the implementation of convergence bidding
   - On-going basis after convergence bidding has been in place
4. What risk level shall CAISO use to determine the potential variance between DA and RT prices?
   - 97% ISO-NE, NYISO, PJM
   - 50% MISO
   - other

Discussion
The CAISO notes that for purposes of valuing CRRs, a 95% confidence level has been proposed by the CAISO.

B. Exposure Window for Virtual Transactions
1. How many days shall be assumed for the Virtual Transactions Estimated Exposure Window?
   - Other ISOs use 1-3 days.
   - FERC rejected four days for PJM and six days for MISO

Discussion
This number of days should be based on the risk and the actual exposure given CAISO timelines for bidding, and for collateral posting (may need to adjust CAISO’s five day period).

The financial risk related to convergence bids is in theory only the unknown price differential from the bids committed to today by a bidder, and the RT clearing price that unwinds those bids tomorrow. When the RT bids clear, the amount owed or owing to the convergence bidder is known, and can be included in that market participant’s Estimated Aggregate Liability (EAL) like any other CAISO market obligation. In fact, once the RT prices are known, there is less uncertainty about the effect of those transactions on that market participant’s EAL than for other market transactions, which are not settled until the availability of meter data (or, with the effectiveness of CAISO’s new Settlement and Market Clearing system, the estimated settlement statements which are available to the EAL calculation 7 days after the trade date).

There is a need to establish a convergence bidding credit process that provides flexibility for bidders to adjust bid limits through the posting of additional collateral, and from a risk control standpoint, does not permit bidders to place bids that result in net obligations (EAL) that exceed their Aggregate Credit Limit.

There may be a relationship between this issue and how often the CAISO performs the overall Estimated Aggregate Liability calculation which determines the need for additional collateral.
C. Virtual Bids Reaching Credit Limits
1. How might virtual bids be rejected when an entity is over its credit limit?
   a) All bids rejected PJM (market participant then re-enters bids)
   b) Some appropriate defined methodology such as LIFO. ISO-NE
   c) Some unspecified method. MISO

Discussion
Market Participants should have transparency as to what their credit limits are and with that information, should avoid exceeding limits, but in the event they inadvertently do, which method of having to re-enter rejected bids would be preferable from the user’s standpoint? The CAISO invites comments on this matter.

D. Possible Position Limits on Virtual Bids
1. How might a limit for virtual bids for a given market participant be set?
   • Fixed amount that is changed based on consultation with CAISO credit and the market participant?
   • Dynamic amount that is based on a continuous comparison of the EAL to the credit limit for each market participant?

Discussion
Fixed MWh bid limits
In this approach, the market participant requests a limit through CAISO’s credit function (Finance). Finance determines if sufficient available credit is in place to support that limit. If so, the bid limit is entered into the CAISO systems and remains in place until the market participant requested a higher limit with the same process. This approach results in a fixed amount being added to the market participant’s Estimated Aggregate Liability (the dollar amount is fixed until a change in the reference/proxy price). The benefit to this approach is that the market participant can work with a known MWh limit.

Dynamic Amount
In this approach, the scheduling system compares the entered virtual bids against the available credit on a dynamic basis—i.e. the amount of available credit could change day-by-day based on how other components of the Estimated Aggregate Liability fluctuate. Assuming a constant Aggregate Credit Limit for a market participant, the market participant would have higher availability for virtual bids the day after a market invoice was paid—in other words the amount of credit available for virtual bids depending the date within the CAISO invoice payment calendar/cycle. The advantage for market participant under this approach is that the market participant who has other non-virtual bid obligations may have more credit capacity available for such virtual bids (on average) than under the Fixed MWh bid limits approach.
This approach would likely require that CAISO perform credit checks (where CAISO compares the Aggregate Credit Limit against the Estimated Aggregate Liability) more frequently than the current process.

**E. Potential Defaults from Virtual Bidding**

1. How are losses shared in the event of a default?
   - NYISO uses a different loss sharing approach for virtual transactions vs. other market transactions.
   - Use the same loss allocation approach as for other charges--i.e. net suppliers in the month of the default are short-paid.

The implementation of Convergence Bidding may also require a review of other general credit provisions.

**F. Time permitted for required collateral posting**

- one day NYISO, ISO-NE
- two days MISO
- three days PJM
- five days CAISO

**G. Frequency of credit adequacy check**

- a) Daily NYISO, MISO, PJM
- b) Weekly CAISO currently

**H. Maximum amount of credit that may be used**

- a) 100% MISO
- b) 90% CAISO
- c) 85% PJM

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1 CAISO requests more collateral when the 90% level is reached, but the Tariff allows 100% usage before rejection of bids.
d) 50% NYISO (for virtual bids)

Discussion

Based on the table of practices above, there is apparently wide diversity of treatment as to the maximum amount of the credit limits that may be used before the ISO/RTO requires the posting of additional collateral. Allowing less than the entire credit limit to be used prior to requiring additional collateral reduces the risk of payment shortfalls to other market participants in the event of a payment default, however it also costs market participants more to obtain this additional assurance, as collateral has a cost. However, not all entities would be burdened by this additional cost, including:

- Entities that have an Unsecured Credit Limit with CAISO in excess of their needs
- Entities who are consistently owed funds by the CAISO market and accordingly do not need to maintain a positive Aggregate Credit Limit (Unsecured Credit Limit plus posted collateral)

Such entities are likely to view favorably these types of measures that reduce credit risk.

I. Are convergence bids settled on the same invoice and financially cleared at the same time as other transactions?

Discussion

As convergence bid obligations due from and payments due to a convergence bidder are known immediately in real time, it could be possible to bill and financially clear such obligations more rapidly than for other market obligations where the CAISO is unable to calculate the “due from” and “due to” amounts until meter data is available.

As convergence bid functionality is expected to be in place within 12 months of MRTU startup, and the CAISO’s accelerated payment obligation initiative is also scheduled to be implanted within this timeframe, convergence bids will be cleared more rapidly than under today’s settlements timeline. (The accelerated payment initiative aims to financially clear obligations not later than 20 days following the trade month, and potentially on a weekly basis thereafter.)

For several years, there has been discussion about centralized clearing of energy market obligations which could allow entities to clear transactions in multiple markets. Because of the lag in the availability of metering data, this has not been viable for today’s CAISO market obligations, but it could be possible for virtual bidding obligations in the future.

Thus, the settlement and financial clearing for convergence bids will require further consideration and design.
<table>
<thead>
<tr>
<th>Estimated Aggregate Liability Component #</th>
<th>Short Description</th>
<th>Description</th>
<th>Comments related to convergence bids</th>
</tr>
</thead>
<tbody>
<tr>
<td>1</td>
<td>Invoiced</td>
<td>Includes any published but unpaid Invoices, either preliminary or final, that are not yet due.</td>
<td>Assuming that convergence bids are billed and cleared on the same invoices as other market charges, convergence bid payments and obligations are included here.</td>
</tr>
<tr>
<td>2</td>
<td>Published</td>
<td>Trading Days for which either Preliminary (Initial) or Final (Recalculation) Settlement Statements have been issued but not invoiced. The number of Trading Days reflected in this component ranges from 7 to 57 days.</td>
<td>As above, if convergence bids are billed and cleared on the same daily settlement statements as other market charges, convergence bid payments and obligations are included here.</td>
</tr>
<tr>
<td>3</td>
<td>Estimated (and known convergence bid amounts)</td>
<td>Trading days for which Settlement Statements have not been issued up to T+7. Activity for these days is estimated by the Settlements system using any and all available operational data.</td>
<td>There is no need to use estimated meter data to determine convergence bid obligations due from or payments due to a convergence bidder, as such amounts become known on the trade date in real time.</td>
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(Please visit the following link for more details: [http://www.caiso.com/1bf5/1bf59c5b2d350.doc](http://www.caiso.com/1bf5/1bf59c5b2d350.doc))
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<tbody>
<tr>
<td>4</td>
<td>Extrapolated</td>
<td>Trading Days for which Settlement Statements have not yet been issued. The amounts are estimated on a Charge Code by Charge Code basis by deriving daily averages for each and multiplying by the number of days between the latest published Preliminary Settlement Statement (T+38 Business Days) and the date of the Estimated Aggregate Liability calculation plus 7 days. The Charge Code daily averages are generally based on activity over the last 60 days of published Settlement activity, although the CAISO may use one month or one year of charges if deemed appropriate by the CAISO.</td>
</tr>
<tr>
<td>5</td>
<td>Value of CRR Portfolio</td>
<td>Prospective value of the CRR portfolio, if negative. The CRR Obligation is valued as described in Section 12.6.3.</td>
</tr>
<tr>
<td>6</td>
<td>CRR Bidding Reservation</td>
<td>At the start of a CRR Auction, the CRR software obtains from the credit system a maximum bid amount for a CRR Auction participant. This maximum bid amount will be defined as: Aggregate Credit Limit * 90% less Estimated Aggregate Liability (excluding CRR Bidding Reservation). That amount is then added as a new component of the Estimated Aggregate Liability entitled “CRR Bidding Reservation”. That amount is retained as a component of the Estimated Aggregate Liability until the end of the CRR Auction. At the completion of the CRR Auction, the CRR Bidding Reservation is reversed, and replaced with the &quot;CRR Winning Bid Liability&quot;.</td>
</tr>
<tr>
<td>7</td>
<td>CRR Winning Bid Liability (prior to invoicing)</td>
<td>A Market Participant's winning bids at the completion of the CRR Auction, but prior to invoicing (if there is a time lag). A Market Participant's winning bid amount</td>
</tr>
</tbody>
</table>

*Convergence bids need not be included in the Extrapolated component of the EAL, as data on convergence bids is available at Real Time.*
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<tbody>
<tr>
<td>8</td>
<td>Past-due</td>
<td>Any unpaid/past due Invoices, if the Market Participant is a debtor for such Invoices. This treatment is necessary if the CAISO is to maintain the integrity of the overall Settlement system, which requires that each month be settled separately. Each Trading Month consists of creditors and debtors whose receivables and obligations vary over time. To the extent that amounts owed to Market Participant related to defaults in previous months are included in the liability estimation calculation and permitted to reduce that Market Participant’s current posting requirements, the CAISO will have no means to enforce the payment obligation of that Market Participant to pay current Invoices rather than refuse payment in an attempt to recoup previous past-due amounts owed to it.</td>
</tr>
<tr>
<td>9</td>
<td>FERC Annual Charges</td>
<td>FERC Annual Charges for Market Participants that have elected to pay such amounts on an annual basis that are owed and outstanding which are not included in Estimated Aggregate Liability component #1-4, above.</td>
</tr>
<tr>
<td>10</td>
<td>WAC-current</td>
<td>WAC prepayment-current year, as specified in Section 36.9.2 (Prepayment of Wheeling Access Charges).</td>
</tr>
<tr>
<td>11</td>
<td>WAC-future</td>
<td>WAC prepayment-subsequent year, as specified in Section 36.9.2 (Prepayment of Wheeling Access Charges).</td>
</tr>
<tr>
<td>12</td>
<td>Estimated Aggregate Liability Adjustments</td>
<td>Estimated Aggregate Liability adjustments that may be necessary for a Market Participant based on an analysis performed by the</td>
</tr>
<tr>
<td></td>
<td>Extraordinary Settlements Adjustments</td>
<td>Adjustments to CAISO Settlements amounts related to FERC proceedings, if known and estimated by CAISO as specified in Section 12.1.5.1.3.2.</td>
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<tr>
<td>13</td>
<td>Extraordinary Settlements Adjustments</td>
<td>CAISO or as a result of a dispute by a Market Participant according to Section 12.4.2.</td>
</tr>
</tbody>
</table>

**14 Virtual Bid Reservation**

The value of Virtual Energy Charge/Credit in an exposure window of a limited number of days. This will likely be calculated as the product of:

a. Participant’s daily Virtual MWh Limit

b. A reference price = the highest differential between the Day-ahead and Real-Time Locational Marginal Prices at the XXth percentile over the previous XX months.

c. The number of days in the Virtual Transactions Estimated Exposure Window (for example, 2 Days).

This component could be determined through this calculation with position and credit limits set by a fixed MWh bid limit.

If a dynamic bid limit (based on a check of available credit prior to acceptance of a virtual bid), this formula would be modified.