



**Bidding Rules Enhancements
Issue Paper**

December 3, 2014

Table of Contents

- 1. Issue..... 2
- 1.1. Energy bidding flexibility..... 2
 - 1.1.1. Survey of ISOs/RTOs 2
 - 1.1.2. Considerations for CAISO..... 4
- 1.2. Commitment cost bidding flexibility 5
 - 1.2.1. Survey of ISOs/RTOs 5
 - 1.2.2. Considerations for CAISO..... 7
- 1.3. Resource characteristics review 8
- 2. Schedule for policy stakeholder engagement..... 9
- 3. Next steps..... 9

1. Issue

This initiative was created to explore how the ISO's bidding rules can be improved to support market efficiency and reinforce reliability. For example, the ISO allows market participants to change real-time energy bids up to 75 minutes (T-75) before the trading hour to reflect the most current market conditions for efficient dispatch. Under the *Renewables Integration Market and Product Review Process*, the ISO decreased the bid floor to negative \$150/MWh to provide greater opportunities for renewable resources to reflect their curtailment preferences to ease over-generation conditions. The ISO also proposed greater flexibility and clarity for bidding start-up and minimum load costs in the *Commitment Cost Enhancements Phase 1 and 2* initiatives.

This stakeholder process combines consideration of energy and commitment cost bidding rules to refine and improve alignment between the three part bid. This initiative will review the ISO's current rules for energy and commitment cost bidding flexibility and resource characteristics definitions. This initiative will balance the benefits of allowing market participants to reflect actual costs through increased bid flexibility against the increased potential for inefficient market outcomes by inappropriately changed bid prices – for example, when the market cannot incorporate a changed bid because a resource cannot respond due to an inter-temporal constraint.

1.1. Energy bidding flexibility

1.1.1. Survey of ISOs/RTOs

Table 1 below compares real-time market (RTM) energy bidding rules in selected ISOs and RTOs. CAISO's rules are very flexible and allow for changes to energy bids regardless if there are existing day-ahead schedules. Energy bids submitted to the real-time market can be different than day-ahead market bids and can vary between hours in both the day-ahead and real-time markets. This is in line with ISO New England and MISO. NYISO and PJM have rules that largely limit changes to account for higher bid costs and/or when there is no corresponding day-ahead schedule. PJM is also proposing to allow for changes to each generator's fuel cost calculation methodology.¹

¹ PJM, Gas Unit Commitment Coordination, 2014/2015 Winter Scope Proposal Review, October 30, 2014, p. 5. Available at: <http://www.pjm.com/~media/committees-groups/committees/mrc/20141030/20141030-item-11-gas-unit-commitment-presentation.ashx>.

Table 1
ISO-RTO real-time market energy bidding rules

| ISO/RTO | RTM close for energy bids | Rules for changing energy bids in real-time | Calculates reference levels? | Mitigation |
|---------|---|--|------------------------------|--|
| CAISO | T-75 ² | No limit ³ | Yes | Dynamic structural test (three pivotal suppliers) |
| ISO-NE | T-30 ⁴ | No limit ⁵ | Yes ⁶ | Conduct and impact test ⁷ ; restricted from fuel price adjustment for 2 (first offense) to 6 months (second offense) ⁸ |
| MISO | T-30 ⁹ | No limit ¹⁰ | Yes ¹¹ | Conduct and impact test ¹² |
| NYISO | T-75 ¹³ | If day-ahead schedule exists, increase in bid only ¹⁴ ; may revise fuel cost used to calculate reference levels ¹⁵ | Yes ¹⁶ | Conduct and impact test ¹⁷ |
| PJM | Day-ahead: 16:00 EST TD-1 ¹⁸ | Can only change bids if no day-ahead schedule ²⁰ ; | Yes ²² | Structural test (three pivotal suppliers) ²³ |

² CAISO, Tariff section 30.5.1 General Bidding Rules.

³ CAISO, Tariff section 30.5.1 General Bidding Rules.

⁴ ISO-NE, FERC docket no. ER13-1877, July 1, 2013, Ethier/Parent testimony, p. 7. Tariff amendment to become effective December 3, 2014.

⁵ ISO-NE, FERC docket no. ER13-1877, July 1, 2013, Ethier/Parent testimony, p. 7. Tariff amendment to become effective December 3, 2014.

⁶ ISO-NE, Market Rule 1, Section III.A.7: Calculation of Resource Reference Levels for Physical Parameters and Financial Parameters of Resources.

⁷ ISO-NE, Market Rule 1, Section III.A.5: Mitigation.

⁸ ISO-NE, FERC docket no. ER13-1877, July 1, 2013, proposed tariff section III.A.3.4: Fuel Price Adjustments. Tariff amendment to become effective December 3, 2014.

⁹ MISO, Energy and Operating Reserve Markets, Business Practices Manual, BPM-002-r13, Section 8. Real-Time Energy and Operating Reserve Market Activities.

¹⁰ MISO, Energy and Operating Reserve Markets, Business Practices Manual, BPM-002-r13, Section 8. Real-Time Energy and Operating Reserve Market Activities.

¹¹ ISO-NE, Market Rule 1, Section III.A.7: Calculation of Resource Reference Levels for Physical Parameters and Financial Parameters of Resources.

¹² MISO, Market Monitoring and Mitigation Business Practices Manual BPM-009-r7, Section 5 Conduct Warranting Mitigation.

¹³ NYISO, Open Access Transmission Tariff (OATT) - 1 OATT Definitions - 1.18 OATT Definitions – R, “Real-Time Scheduling Window.”

¹⁴ NYISO, NYISO Tariffs - Market Administration and Control Area Services Tariff (MST) – 4 MST Market Services: Rights and Obligations, 4.4.1.2.1 Real-Time Bids to Supply Energy and Ancillary Services, other than External Transactions.

¹⁵ NYISO, NYISO Tariffs - Market Administration and Control Area Services Tariff (MST) - 23 MST Att H - ISO Market Power Mitigation Measures (2) - 23.3 MST Att H Criteria for Imposing Mitigation Measures (2) 23.3.1.4 Reference Levels, specifically 23.3.1.4.6.3.

¹⁶ NYISO, NYISO Tariffs, Market Administration and Control Area Services Tariff, Attachment H: ISO Market Power Mitigation Measures, Section 23.3.1.4 Reference Levels.

¹⁷ NYISO, NYISO Tariffs, Market Administration and Control Area Services Tariff, Attachment H: ISO Market Power Mitigation Measures, Section 23.1: Purpose and Objectives.

| ISO/RTO | RTM close for energy bids | Rules for changing energy bids in real-time | Calculates reference levels? | Mitigation |
|---------|---|--|------------------------------|------------|
| | If no day-ahead schedule: 18:00 EST TD-1 ¹⁹ | proposing to allow fuel policy changes intra-day ²¹ | | |

1.1.2. Considerations for CAISO

The ISO believes that the bid flexibility currently offered is sufficient to accommodate resources' responses to system and market conditions, where such responses may be needed to support reliability and market efficiency. However, there are instances where this flexibility is provided even when the resource cannot effectively respond. For example, resources may experience inter-temporal limitations such as during a multi-hour minimum up or down time, when it is in the process of starting-up or shutting down (*i.e.*, is below Pmin), or is already off. Resource changing real-time bids during these inter-temporal constraints may be able to increase bid cost recovery payments even though the resource cannot respond to dispatch instructions during this time.

Inter-temporal constraints coupled with flexible bidding parameters may produce unintended consequences in the ISO's optimization. For example, if a resource with a minimum down time self-provides non-spinning reserves, it can develop a bidding strategy to get the optimization to keep the resource on in order to collect bid cost recovery on uneconomic bid costs. The optimization would not be able to shut the resource down because the minimum down time would make the non-spinning reserve unavailable. The ISO cannot identify a reason why a resource would need to change its bids during an inter-temporal constraint even though the flexibility is available.

Outside of an inter-temporal constraint, the short-term unit commitment (STUC) time horizon commits resources based on bids that can be later revised up to T-75. The ISO performs STUC starting for the third fifteen-minute interval of the current trading hour extending up to the next four trading hours. Therefore, the ISO market's bid cost recovery calculations will use bid costs that did not originally trigger commitment. None of these examples would necessarily trigger

¹⁸ PJM, Manual 11: Energy & Ancillary Services Market Operations, 2.3.1 Bidding & Operations Time Line.

²⁰ PJM, Manual 11: Energy & Ancillary Services Market Operations, Section 2.3.3 Market Sellers.

²² PJM, Manual 15: Cost Development Guidelines, Section 1.6.1 Reason for Cost Based Offers: Market Power Mitigation.

²³ PJM, Manual 15: Cost Development Guidelines, Section 1.6.1 Reason for Cost Based Offers: Market Power Mitigation.

¹⁹ PJM, Manual 11: Energy & Ancillary Services Market Operations, 2.3.1 Bidding & Operations Time Line. Reflects the balancing market offer period close.

²¹ PJM, Gas Unit Commitment Coordination 2014/2015 Winter Scope Proposal Review, October 30, 2014, p. 5. Available at: <http://www.pjm.com/~media/committees-groups/committees/mrc/20141030/20141030-item-11-gas-unit-commitment-presentation.ashx>.

the dynamic market power mitigation. A similar problem exists for the real-time unit commitment (RTUC).

Pursuant to these illustrative examples, the ISO asks stakeholders the following questions:

1. Should the ISO market disallow or reduce changes to real-time energy bids during an inter-temporal constraint?
2. On the other hand, should the ISO market continue to allow real-time energy bidding flexibility but instead calculate bid cost recovery on the bid cost that the optimization used to make the commitment decision?
3. What other options can the ISO consider including other limitations that are not compatible with energy bidding flexibility?

1.2. Commitment cost bidding flexibility

1.2.1. Survey of ISOs/RTOs

Table 2 below compares commitment cost bidding rules in selected ISOs and RTOs. In CAISO, a resource that provides a commitment cost (minimum load or start-up) bid in the day-ahead market must use the same bids in the real-time market, regardless if it receives a day-ahead commitment. If the resource is not bid into the day-ahead market, the scheduling coordinator can bid in the real-time market. Under either scenario the commitment costs are capped at 125 percent of the calculated proxy cost under the proxy cost methodology for all resources.²⁴ For use-limited resources only, until the ISO can calculate opportunity costs, the cap is set to 150 percent of the calculated proxy cost under the registered cost methodology.²⁵

NYISO and PJM are similar to the CAISO in that commitment costs are largely provided in the day-ahead timeframe. They differ from CAISO in allowing resources without a day-ahead schedule to rebid commitment costs in the real-time market. NYISO explains its rationale for not allowing full bidding flexibility for commitment costs as generally a reliability concern. NYISO notes that “for system reliability, the NYISO needs to be able to rely on the Day-Ahead commitment of Generators sufficient to serve expected real-time Load. Maintaining the Minimum Generation and Start-up Bids for Day-Ahead scheduled Generators allows the NYISO to rely on them for incremental Energy, should the need arise.”²⁶ However, NYISO allows real-time updates to fuel prices used in the reference levels—the levels to which a resource is mitigated when it tests positive for market power. PJM is considering a similar allowance to account for intra-day gas volatility.

²⁴ Assumes proposals under *Commitment Cost Enhancements Phase 1* are approved by FERC.

²⁵ *Ibid.*

²⁶ NYISO, FERC docket no. ER10-1977, July 26, 2010, p. 4.

Table 2
ISO-RTO commitment cost bidding rules

| ISO/RTO | Last time to modify start-up / min load cost | Calculates reference levels? | Mitigation |
|---------|--|------------------------------|--|
| CAISO | 10:00 PST TD-1 / 10:00 PST TD-1 | Yes | Bid caps ²⁷ |
| ISO-NE | T-30 / T-30 ²⁸ | Yes ²⁹ | Conduct and impact test ³⁰ ; restricted from fuel price adjustment for 2 (first offense) to 6 months (second offense) ³¹ |
| MISO | T-30 / T-30 ³² | Yes ³³ | Conduct and impact test ³⁴ |
| NYISO | Day-ahead: 11:00 EST TD-1 / 11:00 EST TD-1 ³⁵ If no day-ahead schedule: T-75 / T-75 ³⁶ and may update fuel prices in reference levels ³⁷ | Yes ³⁸ | Conduct and impact test ³⁹ |
| PJM | Day-ahead: 16:00 EST TD-1 / 16:00 EST TD-1 ⁴⁰ If no day-ahead schedule: 18:00 EST TD-1 / 18:00 EST TD-1 ⁴¹ | Yes ⁴⁴ | 6 month hold on using cost- or price-based option. ⁴⁵ Structural test (three pivotal suppliers) ⁴⁶ |

²⁷ Assumes proposals in Commitment Cost Enhancements Phases 1 and 2 are approved and all resources are on the proxy cost option.

²⁸ ISO-NE, FERC docket no. ER13-1877, July 1, 2013, proposed tariff section III.1.10.9: Hourly Scheduling. Tariff amendment to become effective December 3, 2014.

²⁹ ISO-NE, Market Rule 1, Section III.A.7: Calculation of Resource Reference Levels for Physical Parameters and Financial Parameters of Resources.

³⁰ ISO-NE, Market Rule 1, Section III.A.5: Mitigation.

³¹ ISO-NE, FERC docket no. ER13-1877, July 1, 2013, proposed tariff section III.A.3.4: Fuel Price Adjustments. Tariff amendment to become effective December 3, 2014.

³² MISO, Tariff Module C: Energy and Operating Reserve Markets, Section 40.2.5(b): Required Generation Offer and Demand Response Resource - Type II Offer Components.

³³ MISO, Market Monitoring and Mitigation Business Practices Manual BPM-009-r7, Section 6.9 Reference Levels.

³⁴ MISO, Market Monitoring and Mitigation Business Practices Manual BPM-009-r7, Section 5 Conduct Warranting Mitigation.

³⁵ NYISO, NYISO Tariffs, Market Administration and Control Area Services Tariff (MST) – 4 MST Market Services: Rights and Obligations, 4.4.1.2.1 Real-Time Bids to Supply Energy and Ancillary Services, other than External Transactions.

³⁶ NYISO, Open Access Transmission Tariff (OATT) - 1 OATT Definitions - 1.18 OATT Definitions – R, “Real-Time Scheduling Window.”

³⁷ NYISO, NYISO Tariffs, Market Administration and Control Area Services Tariff, Attachment H: ISO Market Power Mitigation Measures, Section 23.3: Criteria for Imposing Mitigation Measures. Specifically section 23.3.1.4.6.9 for reference to start-up and minimum load costs, specifically section 23.3.1.4.7 for changes to the reference level for fuel, and section 23.3.1.4.6.7 for timing before real-time market close.

³⁸ NYISO, NYISO Tariffs, Market Administration and Control Area Services Tariff, Attachment H: ISO Market Power Mitigation Measures, Section 23.3.1.4 Reference Levels.

³⁹ NYISO, NYISO Tariffs, Market Administration and Control Area Services Tariff, Attachment H: ISO Market Power Mitigation Measures, Section 23.1: Purpose and Objectives.

⁴⁰ PJM, Manual 11: Energy & Ancillary Services Market Operations, 2.3.1 Bidding & Operations Time Line.

| ISO/RTO | Last time to modify start-up / min load cost | Calculates reference levels? | Mitigation |
|---------|---|------------------------------|------------|
| | Daily bidding under cost-based option; 6 month hold for cost-based option. ⁴² Proposing to allow intra-day changes to fuel cost methodology ⁴³ | | |

MISO and ISO-NE allow bidding flexibility up until 30 minutes before the operating hour (T-30). ISO-NE explains that it requires this level of flexibility because it has experienced significant reliability degradation from gas supply constraints causing generators to not respond to dispatch. For example, ISO-NE found that “an examination, conducted in early 2012, of dispatch response performance following the 36 largest system contingency events over the last three years indicates that, on average, the response rate for New England’s non-hydro generating resources was less than 60% of the amount requested during the events.”⁴⁷

In all of the other ISO/RTOs sampled, the market monitoring unit either calculates or works with the ISO/RTO to calculate reference level commitment costs in conjunction with performing a market power mitigation test.

1.2.2. Considerations for CAISO

Stakeholders have requested additional bidding flexibility to reflect intra-day gas costs, which will help to manage gas use and avoid balancing penalties from natural gas pipeline companies. The ISO notes that pending improvements resulting from the Federal Energy Regulatory Commission’s (FERC’s) notice of proposed rulemaking regarding gas/electric coordination has the potential to improve gas and electric industry alignment. Any policy created here should leverage these national improvements.

At minimum, the ISO can allow resources that did not receive a day-ahead schedule to rebid into the real-time market. For greater bidding flexibility, the ISO may also need to modify or expand its market power mitigation methodology for commitment costs (which currently relies

⁴¹ PJM, Manual 11: Energy & Ancillary Services Market Operations, 2.3.1 Bidding & Operations Time Line. Reflects the balancing market offer period close.

⁴⁴ PJM, Manual 15: Cost Development Guidelines, Section 1.6.1 Reason for Cost Based Offers: Market Power Mitigation.

⁴⁵ PJM, Manual 11: Energy & Ancillary Services Market Operations, Section 2.3.3 Market Sellers.

⁴⁶ PJM, Manual 15: Cost Development Guidelines, Section 1.6.1 Reason for Cost Based Offers: Market Power Mitigation.

⁴² PJM, Manual 11: Energy & Ancillary Services Market Operations, Section 2.3.3 Market Sellers.

⁴³ PJM, Gas Unit Commitment Coordination 2014/2015 Winter Scope Proposal Review, October 30, 2014, p. 5. Available at: <http://www.pjm.com/~media/committees-groups/committees/mrc/20141030/20141030-item-11-gas-unit-commitment-presentation.ashx>.

⁴⁷ ISO-NE, FERC docket no. ER13-1877, transmittal letter, July 1, 2013, p. 3.

on bid caps). The following questions assume that the policies under *Commitment Cost Enhancements Phases 1* are approved by the FERC.⁴⁸

1. Should the ISO continue to use a gas price index?
2. If the ISO does retain use of the gas price index, should it permanently shift the close of the day-ahead market later in order to use the single ICE index? Does this mean the current manual process for a gas price spike should be retained? (This assumes that the ISO may or may not have additional market power mitigation for commitment costs.)
3. If the ISO does not continue to use a gas price index, should there be a cap on what costs can be bid into the market or allow for after-the-fact cost recovery? Does this mean the current manual process for a gas price spike can be eliminated? (This assumes that the ISO will have market power mitigation beyond the current bid caps for commitment costs and will involve consideration of the complex interaction of minimum online commitment constraints, exceptional dispatch, and other tools used by the ISO that impact commitment.)
4. In the day-ahead timeframe (as well as real-time for short-start units), bids reflecting intra-day gas costs are estimates as the gas has likely not been procured. How can the ISO establish *a priori* a reasonableness threshold and not rely entirely on *ex post* verification?
5. If the ISO retains a bid cap, should it be differentiated among the various proxy cost components? For example, stakeholders have proposed a low bid cap on all non-gas items (O&M, greenhouse gas cost, etc.) and a higher one for gas.
6. ?
7. What process should the ISO institute to periodically review the cost cap (if retained) to ensure that it still enables headroom for market participants to accurately reflect their natural gas costs?
8. Some stakeholders have requested a breakup of the current three-day weekend gas “package.” If this is not currently an available index option, what, if anything, can the ISO do about it?

1.3. Resource characteristics review

Resource characteristics are submitted to the Master File based on the generator resource data template.⁴⁹ Valid inter-temporal constraints, such as minimum up and down times, and other resource characteristics are the foundation for effective bidding rules. The ISO currently requires scheduling coordinators to provide information reflecting physical characteristics. Specifically, the tariff requires:

⁴⁸ All resources are on the proxy cost methodology with 125 percent cap, use-limited resources have opportunity cost adders, and the current rules hold for using the same commitment cost bid between day-ahead and real-time.

⁴⁹ See <http://www.caiso.com/market/Pages/NetworkandResourceModeling/Default.aspx> link to the excel file for the most recent Generator Resource Data Template.

4.6.4 Identification Of Generating Units

Each Participating Generator shall provide data identifying each of its Generating Units and such information regarding the capacity and the operating characteristics of the Generating Unit as may be reasonably requested from time to time by the CAISO. All information provided to the CAISO regarding the operational and technical constraints in the Master File shall be accurate and actually based on physical characteristics of the resources except for the Pump Ramping Conversion Factor, which is configurable.

Many of the resource characteristics are difficult to verify as they may legitimately require some engineering judgment to balance excessive wear and tear and the technical capabilities of the resource. The ISO believes that the vast majority of resource characteristics should be static over a period of time reflecting resource vintage and use. The ISO currently does not have default thresholds and does not mitigate resource characteristics.

1. What characteristics, if any, should allow for engineering judgment? How can ISO verify this assessment independently?
2. How often should resource characteristics be allowed to change?
3. Should ISO establish default resource characteristics for different generation technology types and use these parameters when a resource is mitigated? For example, combined cycles of a certain vintage may have heat rates within one range but for every 10 years the heat rates will change to a different range.
4. Should the ISO establish upper and lower bounds for resource characteristics regardless if there is mitigation?

2. Schedule for policy stakeholder engagement

The proposed schedule for the policy stakeholder process is listed below.

| Date | Event |
|----------|--------------------------|
| 12/3/14 | Issue paper posted |
| 12/10/14 | Stakeholder call |
| 12/30/14 | Stakeholder comments due |

3. Next steps

The ISO will discuss this issue paper with stakeholders on a conference call on December 10, 2014. Stakeholders should submit written comments by December 30, 2014 to biddingrules@caiso.com.