

Memorandum

To: ISO Board of Governors
From: Eric Hildebrandt, Manager, Market Analysis & Mitigation
Keith Casey, Director, Market Monitoring
Date: August 29, 2007
Re: Decision on Bid Caps for Start-up and Minimum Load Bids under MRTU

This memorandum requires Board action.

EXECUTIVE SUMMARY

Management is seeking Board approval of specific bid caps for generator start-up and minimum load bids under MRTU. These caps are necessary to address a recently identified deficiency in the market power mitigation provisions that could result in excessive market power if left unchecked. The proposed caps can be implemented administratively and therefore will have no impact on the MRTU market systems or the MRTU implementation schedule.

Under MRTU, generating resources can submit bids with three separate components: (1) unit start-up, (2) operation at minimum generation levels (or "minimum load energy"), and (3) energy provided when operating above this minimum level. Bids for energy above minimum operating levels are subject to Locational Market Power Mitigation (LMPM) rules and system level bid caps. However, the current MRTU tariff includes an option under which generators could submit start-up and minimum load bids which would be fixed for a six month period, but are not subject to any other market power mitigation limitations. In 2006, this was identified as a potential gap in MRTU market power mitigation rules that would need to be addressed prior to MRTU market open.

Based on analysis by the CAISO Department of Market Monitoring (DMM) and input from stakeholders and the CAISO's Market Surveillance Committee (MSC), DMM is proposing to file MRTU tariff modifications to limit start-up and minimum load bids that may be submitted under the current MRTU market design, as described below:

- For units within Local Capacity Areas (LCAs), which represent the areas in which locational market power is most likely to exist, start-up and minimum load bids could not exceed 200 percent of the unit's projected start-up and minimum load costs.
- For units outside of LCAs, start-up and minimum load bids under the bid-based option could not exceed 400 percent of the unit's projected start-up and minimum load costs.

These proposed provisions have been specifically designed to be implemented without any changes in the MRTU market software. Over the longer term, the CAISO will assess other options for mitigation of start-up and minimum load bids which may be integrated into the MRTU software and allow for more targeted mitigation only when units are constrained

on due to uncompetitive transmission constraints. The proposed tariff modifications are generally supported by major Load Serving Entities (LSEs), the California Public Utilities Commission (CPUC), and the CAISO's MSC. However, several representatives of generation owners have expressed concerns about the proposed modifications. In developing this final proposal, DMM has sought to balance concerns expressed by these various parties.

MOTION,

Moved, that the ISO Board of Governors authorize Management to make all necessary and appropriate filings with the Federal Energy Regulatory Commission to establish caps on start-up and minimum load bids under MRTU as described in the memorandum dated August 29, 2007.

BACKGROUND

Under MRTU, generating resources can submit bids for three separate operational or cost components:

- Unit start-up,
- Operation at minimum generation levels (or "minimum load energy"), and
- Energy provided when operating above this minimum level.

This three-part bidding system is designed to encourage participants to submit bids that are more reflective of the actual operational cost components of each resource, and to allow the CAISO to perform more efficient commitment and dispatch of generating resources.

Bids for energy above minimum operating levels are subject to Locational Market Power Mitigation (LMPM) rules designed to limit the potential exercise of market power within localized areas, where uncompetitive market conditions may often exist due to transmission limitations and ownership of a relatively high portion of supply by one or two suppliers. However, current MRTU rules do not include any similar provisions for directly limiting start-up and minimum load bids that may be submitted by participants. Instead, participants will be allowed to select from two options for establishing start-up and minimum load bids used in the day-ahead and real-time energy markets:

- **Cost-Based.** Under this option, the resource's start-up and minimum load bids are calculated directly by the CAISO based on the unit's actual operating characteristics (e.g., start-up fuel consumption) and associated fuel costs. Start-up and minimum load bid costs are updated on a daily basis to account for changes in the cost of gas in the daily spot market.
- **Bid-Based.** Under this option, a resource owner submits start-up and minimum load bids but is not allowed to change this bid for the subsequent six months. The current MRTU tariff indicates that these bids need not be related to actual operating costs.

The CAISO's initial assessment was that extremely high start-up and minimum load bids under this second bid-based option would be deterred by the fact that since these bids would be in effect for a minimum six month period, a generator submitting excessively high bids would run the risk of pricing a unit out of the market during many days when it would be profitable to operate. However, the DMM is concerned that a variety of bidding strategies could be employed to exercise locational market power through excessively high start-up and minimum load bids. Therefore, starting in late 2006, the DMM initiated a process to consider whether bids under the bid-based option should be subject to some type of cap in order to protect against the potential exercise of local market power through submission of very high start-up and minimum load bids.

PROPOSED MODIFICATIONS

DMM is recommending that the CAISO address the potential for excessive local market power by filing MRTU tariff language to limit start-up and minimum load bids that may be submitted under the bid-based option as described below:

- For units within Local Capacity Areas (LCAs), start-up and minimum load bids under the bid-based option could not exceed 200 percent of the unit's projected start-up and minimum load costs.
- For units outside of LCAs, start-up and minimum load bids under the bid-based option could not exceed 400 percent of the unit's projected start-up and minimum load costs.

Since bids for start-up and minimum load costs remain in effect for a minimum six month period, one of the key issues that needed to be addressed in developing caps for start-up and minimum load bids for gas-fired units was how to determine the price of gas used in calculating these caps. Under the proposed approach:

- Gas prices used in calculating caps for gas-fired units would be based on the highest price for monthly gas contracts at Henry Hub over a forward-looking six month period at the time the bids are submitted. The cap for that unit would then remain at that level for the next six months.¹
- In the event that daily spot market gas prices ever increase to the point where a unit's start-up or minimum load costs (calculated based on daily spot market gas prices) exceed the bid submitted under the bid-based option, the unit would be provided with the option to switch to the cost-based option. However, the unit would then remain under the cost-based option for the rest of the six month period. This provision was designed to address concerns expressed by some generators that limiting bids under the bid-based option could increase the risk that spikes in the spot market for gas could cause their actual start-up or minimum load cost to exceed their bids.

COMPARISON WITH OTHER ISOS

The proposed approach for limiting caps for start-up and minimum load bids would provide a level of local market power mitigation which DMM believes is comparable to that which exists in other ISOs. However, the proposed approach differs from the specific approach used to mitigate start-up and minimum load bids in other ISOs due to differences in overall market design. In addition, due to the need to adopt an approach that can be implemented by the CAISO without significant MRTU software design changes, the proposed approach is simpler and less "dynamic" than mitigation approaches in other ISOs.

PJM

Market power mitigation provisions incorporated in the CAISO MRTU market design are based closely on the package of provisions employed by PJM. Like the CAISO MRTU market design, PJM provides generation owners with a cost-based or bid-based option for the start-up and minimum load components of a unit's offer, and prevents a generation owner from switching to a different option for a minimum six month period. If a generator selects the bid-based option, they must

¹ For example, in order to calculate bid caps applicable for units starting the bid-based option in February 2008, the maximum price of the six monthly NYMEX gas contracts at Henry Hub for the months February through June 2008 would be used. The cap for these units would then remain fixed at that level for six months. The bid caps for any units submitting bids in subsequent months would be calculated in the same manner.

submit the same start-up and minimum load bid during the entire six month period, and may not submit lower bids. Contrary to the CAISO's initial understanding of PJM's LMPM procedures, start-up and minimum load bids for units under the bid-based option are mitigated to cost-based levels whenever a unit is constrained on due to a transmission constraint that is deemed to be non-competitive. However, this more dynamic approach employed by PJM could not be implemented under the CAISO's current MRTU design since software modifications could not be made to incorporate mitigation of bid-based start-up and minimum load cost bids directly into the MRTU LMPM procedures.

Other Major ISOs

The other three major ISOs (NYISO, ISO-NE and MISO) all have a common "conduct and impact" form of local market power mitigation, under which start-up and minimum load (or no load) bids are subject to mitigation based on results of two sequential tests: a *bid conduct test* and a *market impact test*. Under this approach, bids are not mitigated unless a unit's total bid cost recovery payments (including start-up, minimum load, and energy bids) exceed a certain threshold level. Under this form of market power mitigation, units are classified as being located in either transmission *constrained* or *unconstrained areas*, based on historical or expected patterns of congestion. Units within constrained areas are subject to stricter thresholds for conduct and impact tests than units within non-constrained areas. Although thresholds used in these tests are not directly comparable to the caps being proposed for the CAISO markets due to differences in how the thresholds are applied, comparisons provide a reasonable indication of the overall level of mitigation provided under the different approaches and are roughly comparable to the CAISO proposed bid caps.²

CRITERIA USED TO SELECT PROPOSED OPTION

DMM believes the approach incorporated in its final recommendation represents the best approach for limiting start-up and minimum load bids under the bid-based option for the following reasons:

- **Local Market Power Mitigation.** DMM believes the proposed approach strikes a reasonable balance between the need to limit the potential for the exercise of local market power through extremely high start-up and minimum load bids, and FERC's stated preference for providing suppliers with a bid-based option for start-up and minimum load bids. In practice, DMM believes that units that would be most expected to submit excessive start-up and minimum load bids in the absence of any cap are units that could expect to be needed for local reliability and are within LCAs that have been defined by the CAISO. Additionally, the 200 percent cap is comparable to the threshold that is typically allowed in other ISOs when units are dispatched for local reliability within constrained areas. Meanwhile, the 400 percent cap for units outside of LCAs is slightly higher than the maximum impact threshold in effect in any other ISO for mitigation of start-up and minimum load bids for non-congested areas but provides reasonable protection for the unlikely event of market power in unconstrained areas.
- **Gas Price Risk.** DMM performed extensive analysis of the historical volatility of daily spot market gas prices in California relative to the forward price of monthly gas contracts at Henry Hub in order to assess the potential risk that extreme spikes in the daily spot market gas prices could make the actual start-up and minimum load costs of units (given spot market gas prices) higher than the proposed cap. This analysis indicates that the 200 percent cap would have provided sufficient "headroom" to cover the maximum spike in gas prices that has occurred over the last five years (relative to the NYMEX futures prices in the preceding six months) with a high level of confidence. Additionally, the proposal provides an escape hatch where, if daily gas prices do rise to levels that cause the actual start-up and

² For example, ISO New England imposes a bid conduct threshold of 125 percent of costs for a unit's start-up and minimum load bids, and applies a market impact threshold of 200 percent for total uplift payments relative to costs. The NYISO and MISO impose conduct thresholds for start-up bids of 150 percent of costs for constrained areas and 300 percent of costs for non-constrained areas, and apply a market impact threshold of 150 percent of costs for total uplift payments for units in constrained areas and an impact threshold of 300 percent of costs for units in non-constrained areas.

minimum load costs to exceed the submitted six-month bid, the supplier can seek to switch to the cost-based option for the duration of the six-month bid period.

- **Feasibility and Ease of Implementation.** A key advantage of this approach is that the necessary start-up and other operating data for all gas-fired units should already be collected under MRTU and entered into the CAISO's Master File. In effect, this approach utilizes the same data used under the cost-based option, but substitutes a different gas price, derived from a simple formula that can be easily calculated by the CAISO and all participants. DMM has also verified that this approach may be relatively easy to implement by the CAISO through controls on the values that may be entered by participants in the Master File, which allow the CAISO to verify and approve data before it is accepted in the Master File.
- **Transparency for Market Participants.** The proposed approach would provide a high degree of transparency for market participants relative to other options that were identified and considered. The proposed gas price index is based on publicly available data that would be available well in advance of the time when start-up and minimum load bids would need to be submitted to the CAISO. Meanwhile, all other inputs used in calculating the applicable start-up and minimum load cap for each unit would be based on data submitted by the generators themselves.

STAKEHOLDER PROCESS AND FEEDBACK

A range of options for capping start-up and minimum load bids under the bid-based option were presented and analyzed by DMM in an initial whitepaper issued on February 9, 2007, a supplemental whitepaper issued on May 15, 2007, and a paper on the final options considered issued on August 8, 2007.³ Conference calls with stakeholders to discuss these two whitepapers were held in 2007. Input from stakeholders and the CAISO's MSC was also obtained at February 13, 2007, and August 10, 2007, meetings of the MSC.

The CPUC, California Department of Water Resources (CDWR), and the state's two largest LSEs (SCE and PG&E) are generally supportive of the revised proposal. However, SCE, PG&E and CDWR suggested somewhat stricter provisions for mitigation of start-up and minimum load bids. For example:

- SCE expressed concern that, even with bid caps, a unit could create excessive uplift payments because of local market power and its market-based start-up and minimum load bids. To address this concern, SCE suggested that if a unit with market-based bids was frequently constrained on by the CAISO for reliability, the market-based bid should be replaced with a cost-based bid after a certain amount of reliability dispatches or uplift payments. DMM believes that this approach might be feasible and appropriate if the proposed caps are not as effective as expected at mitigating excessive uplift payments due to locational market power. Thus, DMM will monitor the effectiveness of the caps (along with other aspects of MRTU market power mitigation provisions) and will be prepared to file appropriate modifications with the Federal Energy Regulatory Commission (FERC) as needed.
- PG&E recommends the proposed threshold of 200 percent for units within LCAs be lowered to 150 percent, and notes that the 400 percent threshold may be excessive and exceeds the threshold in some other ISOs. Although the

³ *MRTU Market Power Mitigation: Options for Bid Caps for Start-Up and Minimum Load Costs*, Department of Market Monitoring, February 9, 2007 (<http://www.caiso.com/1b87/1b87a5451d380.pdf>)

MRTU Market Power Mitigation: Options for Bid Caps for Start-Up and Minimum Load Costs: Supplemental Addendum, Department of Market Monitoring, May 15, 2007 (<http://www.caiso.com/1be1/1be1b86023e30.pdf>)

MRTU Market Power Mitigation: Options for Bid Caps for Start-Up and Minimum Load Costs: Draft Revised Proposal, Department of Market Monitoring, August 8, 2007 (<http://www.caiso.com/1c34/1c34c8c15a770.pdf>)

proposed threshold of 200 percent is slightly higher than the 150 percent level applied in constrained areas by some other ISOs, DMM believes several factors warrant a slightly higher cap for the CAISO. First, DMM notes that the 150 percent impact threshold applied in other ISOs is based on costs which are updated daily to reflect fuel price changes. Since the CAISO cannot implement this type of dynamic approach at the start of MRTU, DMM believes some additional "headroom" must be provided to account for potential gas price increases over the six month period the bid may remain in effect.

- PG&E also notes that further clarification of the proposal with respect to the treatment of non-gas fired units may be needed. Specifically, while the CAISO had indicated earlier that non-gas suppliers would first submit cost data to the CAISO and then would be subject to a limit of 200 percent of these costs, PG&E believes that "additional details are needed with respect to CAISO expectations and possible validations of submitted cost data." The CAISO intends to address this concern by providing such additional details in the Business Process Manual (BPM) for Market Instruments.
- Both SCE and PG&E support implementation of a more dynamic "PJM-style" approach that mitigates start-up and minimum loads bids only when units are constrained on or dispatched up for local reliability as soon as possible. As previously noted, DMM agrees that considering implementation of a more dynamic approach should be a high priority as part of a future MRTU release.

No generators submitted comments on the CAISO's final proposal. However, two entities representing generators (WPTF and Williams) submitted comments in response to previous options and proposals presented in the stakeholder process. Both WPTF and Williams advocated relatively high "damage control" caps for start-up and minimum load bids (e.g., comparable to the system level \$500/MWh cap on energy under MRTU). Specific comments by WPTF and Williams included the following:

- Williams and WPTF expressed concern that the proposed bid caps represent a significant change in the overall package of market power mitigation provisions that was filed by the CAISO and approved by FERC, and contend that evidence of actual market power should be needed prior to making any modifications to this package of provisions. As previously noted, based on further review of the local market power provisions in the CAISO's MRTU filing and in place at other ISOs, DMM believes that start-up and minimum load bid caps are needed under the bid-based option in order to ensure effective mitigation of locational market power at the start of MRTU and that the proposed caps provide a level of market power mitigation that is comparable to other ISOs.
- Both Williams and WPTF indicated that to the extent units may have local market power that might be exercised through high start-up and minimum load bids, this should be mitigated through Local Resource Adequacy (RA) or other forward contracts. However, DMM notes that the RA program is only designed to ensure sufficient capacity is installed to meet reliability needs, and simply requires that RA units are subject to market power mitigation provisions in the CAISO tariff. In addition, to the extent that the market power mitigation provision of the current MRTU tariff may be undermined or circumvented by high start-up or minimum load bids, this potential market power would allow generators to demand a higher price in the forward contracting market that reflects this market power.
- Williams and WPTF expressed concerns that any caps could increase the gas price risk generators face under the bid-based option since bids could not be changed for six months. In response to this concern, DMM performed significant analysis of historical gas price volatility, which indicated that a 200 percent cap would provide sufficient "headroom" for generators to account for most potential short term price spikes in the spot market for gas. In addition, DMM modified the proposal to include an "escape hatch" that would allow generators to switch to the cost-based option for the remainder of the six month period if spot market gas prices did increase to the point where their actual costs might equal or exceed their six month bid. Finally, DMM also sought to address generators' concerns by

establishing a relatively high cap of 400 percent for units outside the more chronically transmission constrained areas (LCAs).

MSC Opinion

The CAISO's Market Surveillance Committee issued an opinion supporting the CAISO's final proposal. The MSC concluded that the 200 percent cap was necessary and appropriate for limiting the potential for local market power within more transmission constrained areas (LCAs). At the same time, the MSC concluded that the 200 percent cap provided sufficient "headroom" for generators to account for most potential short term price spikes in the spot market for gas. The MSC also supported the proposed "escape hatch" that would allow generators to switch to the cost-based option for the remainder of the six month period if spot market gas prices did increase to the point where their actual costs might equal or exceed their six month bid. The MSC noted that "in addition to simplicity, this particular proposal has the advantage of encouraging lower start-up and minimum load cost bids in the first place compared to the other alternatives."

The MSC also found that the proposal to have a higher cap (400 percent) was reasonable, because in these areas competition should provide sufficient incentives for suppliers to submit bids that are reasonably close to their actual costs.

Finally, the MSC also encouraged the CAISO to seek to implement a more dynamic "PJM-style" approach in a future release of MRTU that mitigates start-up and minimum load bids only when units are constrained on for local reliability.

CONCLUSION

CAISO Management requests authority to file necessary tariff language to establish caps on start-up and minimum load bids under MRTU as described in this memorandum.