

# Memorandum

**To:** ISO Board of Governors  
**From:** Eric Hildebrandt, Director, Market Monitoring  
**Date:** July 6, 2011  
**Re:** **Market Monitoring Report**

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***This memorandum does not require Board action.***

## EXECUTIVE SUMMARY

Management is proposing to modify several key aspects of its current provisions for mitigating local market power, or market power arising due to transmission constraints that limit competition from different suppliers within specific parts of the ISO grid. These changes will allow these procedures to account for the impact of virtual bids and will ensure that bid mitigation is better targeted at units needed to relieve congestion on uncompetitive transmission constraints. The changes will also allow the competitiveness of transmission constraints to be determined directly by the market software based on actual market and system conditions. Currently, transmission constraints are deemed to be either competitive or non-competitive based on *competitive path assessment* studies performed on a seasonal basis four times per year.

The Department of Market Monitoring (DMM) strongly supports the proposed changes, which have been developed through a close collaboration between DMM, other ISO staff and the ISO's Market Surveillance Committee (MSC). These changes reflect extensive stakeholder input and are generally supported by a wide range of market participants. However, DMM encourages the ISO to implement the new competitive path assessment methodology as part of the real-time market pre-dispatch run performed every 15 minutes prior to the proposed fall 2012 implementation date if possible.

## BACKGROUND

Within each of the major transmission constrained areas of the ISO system, one or two entities control a major portion of the generating capacity needed to meet loads in these areas. This concentration of ownership creates the potential for local market power within these areas. Consequently, the ISO's nodal market design includes strong measures to protect against local market power in transmission constrained areas.

The ISO's current local market power mitigation procedures have been in place since the start of the new market over two years ago. Over this time, these procedures have proven very effective at preventing the exercise of local market power. As discussed in DMM's prior two annual reports, mitigation of bids has been triggered relatively infrequently and has generally had a modest impact

on market outcomes when triggered.<sup>1</sup> However, effective local market power mitigation rules in the day-ahead and real-time markets encourage buyers and sellers to enter into forward energy contracts. This, in turn, further reduces the incentives and opportunity to exercise market power by reducing the amount of energy controlled by merchant suppliers being financially settled based on day-ahead and real-time market prices. In addition, effective mitigation rules deter attempts to exercise local market power in the ISO's spot markets. Thus, DMM views effective local market power mitigation as a key part of the foundation of the ISO's overall market design.

The ISO's current local market power mitigation process includes two basic steps:

- **Competitive path assessment.** First, an assessment of market structure is performed to classify transmission constraints (or paths) as either *competitive* or *non-competitive*. This is referred to as the *competitive path assessment*. This assessment is based on a three pivotal supplier test. This test determines whether congestion on a constraint can be relieved without the generation effective in relieving this constraint controlled by the three largest suppliers. If some supply controlled by these three major suppliers is needed to relieve a constraint, these suppliers are pivotal and have the opportunity to exercise local market power. In such cases, the transmission path is deemed to be structurally uncompetitive. DMM currently performs this assessment four times per year, with resulting designations being used for the following three month season.
- **Bid mitigation procedures.** Second, prior to the day-ahead and hour-ahead markets, two runs of the market software are made to identify units that may need to be dispatched at a higher level to relieve congestion on paths previously deemed to be non-competitive. The first run includes only competitive constraints. A second run is then made with all constraints, including paths deemed to be non-competitive. Generating units that must be dispatched at a higher level in this second run are subject to bid mitigation, since this additional supply may be needed to relieve congestion on non-competitive constraints. Units subject to mitigation may have their market bids lowered to a *default energy bid* based on their marginal operating cost plus a 10 percent adder. The actual market is then run using these final bids.

While the current local market power mitigation procedures have proven to be effective, the ISO is proposing further refinements to these procedures. The following sections summarize modifications being proposed to each of these two components of the local market power mitigation process. A later section of the memo provides a discussion of some issues identified in the MSC's opinion on these proposed changes.

## PROPOSED MODIFICATONS

### Competitive Path Assessment

Management's proposal includes several key improvements to the competitive path assessment methodology currently used to deem constraints as either competitive or non-competitive.

- Currently, this assessment is performed four times each year based on a range of potential system conditions during the following season of the year. Thus, this seasonal assessment

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<sup>1</sup> For instance, see DMM's *2010 Annual Report on Market Issues and Performance*, April 2011, pp.81-82 and pp.97-99, <http://www.caiso.com/2b66/2b66baa562860.pdf>.

is performed from one to four months in advance of market runs that use the resulting path designations. The designation of constraints as *competitive* or *non-competitive* is then fixed for all hours of this entire season. Under Management's proposal, this assessment will be performed as part of the day-ahead and real-time market process based on actual system, market, and resource information used in clearing these markets. This new approach is referred to as the *dynamic competitive path assessment*. This dynamic approach also allows the structural competitiveness of transmission path designations to change based on actual system and market conditions. For instance, a constraint may be deemed structurally competitive during off-peak hours or a low load day, but still be deemed non-competitive under higher load conditions. This represents a dramatic improvement in accuracy compared to the current approach.

- Another benefit of the proposed approach is that it will explicitly account for system and resource constraints in real-time when assessing path competitiveness. The current approach assesses path competitiveness using a simulation model that only accounts for constraints encountered in a day-ahead market model. In the real-time market, options for managing congestion can be significantly more constrained by unavailability of longer-start generating resources and unit *ramp rates* – or the rate at which generating resources can produce more electricity to relieve congestion. The new path assessment being proposed will account for the more constrained nature of the real-time market and result in greater accuracy in identifying uncompetitive situations.
- Currently, only inter-ties and major zonal transmission constraints (Path 15 and 26) are automatically deemed competitive. Other paths are eligible to be deemed competitive only if the ISO has managed congestion on these constraints for at least 500 hours over the prior 12 month period. All other constraints are deemed non-competitive by default. This approach severely limits the number of constraints that could be deemed competitive. Because of the improved information that will be used in the path assessment and mitigation process under Management's proposal, all constraints will be eligible to be tested and deemed competitive. This will result in more constraints being deemed competitive when warranted by actual system and market conditions. With this more dynamic path assessment procedure in place, DMM is comfortable eliminating the current provisions that significantly limit the paths eligible to be deemed competitive.

## **Bid Mitigation Procedures**

Management is also proposing a new test for triggering bid mitigation when congestion may occur on paths deemed to be non-competitive, so that local market power may be exercised. In Management's memo on this topic, this new approach is referred to as the *local market power decomposition methodology*. This approach identifies each generating resource that may receive a higher price as a result of congestion on an uncompetitive path and can relieve congestion on this constraint. Since these units may have local market power, these resources are then subject to bid mitigation. As with the current approach, the market bids of units subject to mitigation are only lowered if these bids exceed a *default energy bid* based on their marginal operating cost plus a 10 percent adder. The actual market is then run using these final bids.

The bid mitigation approach in Management's proposal includes several key improvements to the current bid mitigation process:

- The proposed method results in a more targeted application of bid mitigation. This new approach will subject units to bid mitigation only if congestion is projected to occur on an uncompetitive constraint and these units can relieve this congestion. As previously noted, the current bid mitigation approach involves two separate pre-market runs of the market software. Mitigation is triggered when a unit's dispatch is higher under the second of these pre-market runs. The ISO and DMM have found that this two-run approach can result in bid mitigation for resources as a result of minor modeling differences in these two pre-market runs.<sup>2</sup> The new approach eliminates this possibility since it is based on a single pre-market run (with all constraints enforced) and subjects units to bid mitigation only if they are able to relieve congestion that is projected to occur on a non-competitive constraint.
- The proposal also includes an additional assessment of potential congestion on non-competitive constraints in the real-time market that will be performed each 15 minutes. This assessment will occur about twenty minutes prior to the 5-minute real-time market in which generation resources within ISO system are dispatched. Currently, the bid mitigation procedures for the real-time market are performed as part of the hour-ahead scheduling process – which actually occurs over an hour in advance of the start of each operating hour. Significant differences exist between the result of this hour-ahead scheduling process and conditions in the 5-minute real-time market in which units are dispatched and prices are determined. This can result in no bid mitigation when congestion on uncompetitive constraints occurs in real-time, as well as mitigation when non congestion occurs in real-time. Analysis of past market data by DMM shows that performing mitigation procedures on a 15-minute basis closer to the trade hour rather than as part of the hour-ahead scheduling process may reduce the cases when congestion occurs in real-time, but not in the pre-market mitigation process by about 50 percent.<sup>3</sup> This analysis also indicates that performing mitigation each 15-minutes may also result in a 10 percent reduction in cases when mitigation is triggered but no congestion actually occurs in the 5-minute real-time market.
- Another feature of the proposed approach is that it is expected to significantly reduce the computational time needed for local market power mitigation procedures by requiring only one pre-market run rather than two separate pre-market runs. DMM recognizes that this can ultimately provide additional market efficiencies by freeing up computational time needed for other software enhancements. DMM notes that reducing software run times can also result in better market outcomes since it allows more time to review market results and, in some cases, re-run the software if an model in error found to have effected initial market results.

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<sup>2</sup> For example, a unit may be dispatched at a higher level in this second run even when no congestion occurs in the model solution simply due to software tolerance bands incorporated in the software. These tolerance bands allow the software optimization to stop once a certain degree of optimality has been achieved. The incidence of mitigation due modeling issues appears to have increased over the last year as additional enhancements and complexity has been added to the software. See Page 16 of the May 13, 2011, presentation to stakeholders on *Local Market Power Mitigation Enhancements*<sup>3</sup> at <http://www.caiso.com/2b7b/2b7bee8e66e0.pdf>.

<sup>3</sup> See the DMM whitepaper "Revised Draft Final Proposal - Dynamic Competitive Path Assessment" posted July 1, 2011, in the 2011 Special Reports and Presentations section at <http://www.caiso.com/docs/2005/10/04/2005100412253314368.html>.

## ISSUES RAISED IN MSC OPINION

DMM and the ISO worked closely with the ISO's Market Surveillance Committee in developing Management's proposal. Numerous modifications were made in the final proposal in response to MSC input. The MSC has issued an opinion that is generally supportive of the proposed modifications, but highlights several issues and concerns they feel warrant further analysis or monitoring.<sup>4</sup>

### Real-time market mitigation

The MSC notes that because of differences in loads, generator availability and network conditions, congestion might change between real-time pre-dispatch performed each 15-minutes (upon which mitigation will be based) and the 5-minute real-time dispatch. This means that there will be instances in which non-competitive constraints will be congested in 5-minute real-time dispatch, but will not be subject to bid mitigation because congestion was not projected to occur in the real-time pre-dispatch process performed every 15 minutes. The MSC recommends that the ISO and DMM carefully analyze and monitor the frequency and impact of such *under-mitigation*, and explore options for addressing this issue, such as performing the mitigation process as part of the 5-minute real-time dispatch.

As previously noted, the proposed approach greatly reduces the potential for this scenario to occur by moving the mitigation process up from the hour-ahead scheduling process (performed over an hour prior to the operating hour ) up to the pre-dispatch process performed every 15 minutes, about 20 minutes prior to each 5-minute interval. Based on analysis of historical data, DMM estimates that under the new approach this scenario will occur roughly two percent of the time congestion occurs in the 5-minute real-time market. Thus, while DMM will continue to monitor this issue, we believe Management's proposal will provide a high degree of protection against local market power in the real-time market and represents a significant improvement relative to the current approach. While DMM would certainly support mitigation on a 5-minute basis, we question the feasibility of this at this time.

### Day-ahead energy schedules

The MSC supports the proposed approach for basing that quantity of available supply used to assess the competitiveness of paths in the real-time market based on the amount by which each unit could increase or decrease its output given ramp limitations and other real-time operating constraints. However, the MSC recommends that the portion of each unit's output scheduled in the day-ahead market be excluded from the amount of capacity a supplier could potentially withdraw from the market to profitably exercise local market power. The rationale for this approach is that energy scheduled in the day-ahead market represents a financial commitment and must be "bought back" at the real-time price if a unit operates below its day-ahead schedule in real-time. Thus, a generator may not profit from any increase in the real-time price caused by the withholding of this energy. DMM agrees that the energy sold in the day-ahead market can reduce or even eliminate the incentive to withhold this energy in the real-time market. However, DMM believes that structural

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<sup>4</sup> *Opinion on Local Market Power Mitigation and Dynamic Competitive Path Assessment*, adopted by the Market Surveillance Committee on July 1, 2011. Heretofore referred to as "MSC Opinion".  
<http://www.caiso.com/docs/2000/09/14/200009141610025714.html>.

competitiveness in the real-time market should still be assessed based on the amount of capacity an entity controls in real-time in terms of real-time bids and operating levels. DMM's rationale of this approach is that suppliers controlling generating capacity can profit from higher real-time prices in a variety of ways beyond their net sales in the real-time market:

- With the introduction of virtual bidding into the ISO market, suppliers controlling generation in the real-time market may now take substantial financial positions that allow them to profit from any increase in ISO real-time prices.
- Suppliers controlling generation in the real-time market may also engage in bilateral transactions outside the ISO markets that are indexed to prices generated by the ISO market. These external transactions may allow a generator to benefit by its ability to influence prices within the ISO. External transactions include bilateral energy contracts and exchange swaps such as those on the Intercontinental Exchange (ICE) or Nodal Exchange.<sup>5</sup>
- Finally, a supplier controlling a portfolio of units in the ISO may profit from higher real-time prices through sales from other units, even if it must "buy back" energy when some of their units operate below their day-ahead schedules.

Thus, DMM is proposing to retain forward scheduled energy in the calculation of withheld capacity because there remains incentive to leverage this energy in the exercise of local market power.

## **CONCLUSIONS**

DMM strongly supports the proposed changes to local market power migration procedures being proposed by Management. Management's proposal effectively addresses issues previously identified by DMM that could undermine the effectiveness of current procedures, and incorporates many of DMM's recommendations concerning key details of these new procedures.

The ISO is planning to implement changes to the competitive path assessment methodology in two phases.

- In April 2012, the new competitive path assessment will be implemented in the day-ahead market.
- In the fall of 2012, the new competitive path assessment will be implemented in the real-time pre-dispatch process run every 15-minutes.

DMM encourages the ISO to implement the new competitive path assessment methodology as part of the real-time market pre-dispatch run prior to the proposed fall 2012 implementation date if possible. As noted in Management's memo, the ISO has committed to implement the dynamic competitive path assessment in the real-time market process in the fall of 2012 if possible.

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<sup>5</sup> Intercontinental Exchange (ICE <https://www.theice.com/homepage.jhtml>) and Nodal Exchange (<http://nodalexchange.com/>) offer spot and future energy contracts.