

# Memorandum

**To:** ISO Board of Governors  
**From:** Eric Hildebrandt, Director, Market Monitoring  
**Date:** March 13, 2013  
**Re:** **Market Monitoring Report**

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*This memorandum does not require Board action.*

## EXECUTIVE SUMMARY

In April 2012, the ISO implemented a new method for mitigating local market power in the day-ahead and real-time markets. This memo summarizes the performance of these new mitigation procedures.

The ISO's new procedures for mitigating local market power were put to the test under challenging market and system conditions in 2012. During the summer months, the potential for the exercise of local market power in Southern California increased substantially due to relatively tight supply and demand conditions, frequent congestion and an increase in the portion of capacity offered at uncompetitively high bid prices. The new mitigation procedures limited local market power effectively and accurately. Specific indicators of this new method's impact include the following:

- **Mitigation helped keep prices significantly lower in high load hours.** The impact of the ISO's new bid mitigation procedures was particularly notable during high load hours when the potential for local market power was highest. During the highest load days of the summer months, mitigation was frequently triggered by congestion into the SCE and SDG&E areas. When mitigation was triggered in the SCE area, average peak hour prices remained below \$100/MWh or about 10 to 35 percent less than would have resulted without mitigation.
- **More accurate projection of congestion.** The ISO's new mitigation procedures project when congestion may occur in the day-ahead market much more accurately. This is important since mitigation is triggered only when congestion is projected to occur in this pre-market process. This new method has accurately predicted congestion in the day-ahead market with over 90 percent accuracy, compared to 45

percent under the previous method. This improvement reflects the fact these new pre-market procedures incorporate all bids used in the day-ahead market, including convergence (or virtual) supply and demand bids.

- **More accurate classification of non-competitive constraints.** Under the ISO's prior mitigation approach, the structural competitiveness of transmission constraints was assessed based on planning studies done months in advance and many constraints were not eligible to be deemed competitive. With the new method, this assessment is performed automatically by the market software based on actual system and market conditions. Using this approach, the accuracy with which constraints are classified as either competitive or uncompetitive has increased from about 30 percent to 90 percent.
- **Elimination of unnecessary mitigation.** Under the ISO's prior mitigation procedures, modeling differences in the pre-market runs used to determine mitigation sometimes triggered bid mitigation unnecessarily for resources when local market power did not likely exist. The new mitigation approach applies bid mitigation only to resources that can directly relieve congestion on a constraint found to be non-competitive. As noted above, the new pre-market mitigation procedures identify very accurately when congestion would occur and when transmission constraints were uncompetitive under actual market conditions. Thus, the new method has almost completely eliminated the triggering of bid mitigation when the potential for local market power does not exist.

More detailed results of this analysis will be provided by the Department of Market Monitoring in our 2012 *Annual Report on Market Issues and Performance*, due for completion in April 2013.

## **BACKGROUND**

Local market power can exist when congestion occurs into areas of the ISO grid within which there is not a sufficiently competitive amount of supply to meet demand, given transmission limitations. The ISO's local market power mitigation procedures are designed to limit the ability of suppliers to raise prices within areas of the ISO grid which are uncompetitive due to transmission limitations. These mitigation procedures are applied prior to the ISO day-ahead and real-time market so that bids can be lowered if local market power exists before running the actual market. When bids are mitigated, they are capped using default energy bids reflecting each resource's marginal operating costs.

In July 2011, the Board approved significant changes to the ISO's procedures for identifying and mitigating local market power in the day-ahead and real-time market. These changes

were approved by FERC and implemented in April 2012. These market rule changes included the following:

- Convergence (or virtual) bids are now included in the mitigation run of the market software performed to determine whether any bids should be lowered prior to the actual day-ahead market run. This helps ensure that mitigation run results more closely reflect actual dispatch and congestion patterns of the day-ahead market. This is important since mitigation is triggered only when congestion is projected to occur in this pre-market process.
- The mitigation run of the market software is also performed using market bids for physical demand, rather than the load forecast. This also helps ensure that results of the mitigation run more closely reflect actual dispatch and congestion patterns of the day-ahead market.
- The structural competitiveness of congested transmission constraints is assessed as part of this automated pre-market mitigation process. This dynamic approach ensures that the competitiveness of constraints is assessed based on actual system and market conditions. Accurately assessing the competitiveness of a constraint is important since mitigation is triggered when congestion is projected to occur on a constraint deemed to be non-competitive. Previously, the competitiveness of transmission constraints was assessed using static studies performed in advance by DMM each quarter based on projected system and market conditions.
- Under the new procedures, mitigation of bids is triggered only when congestion is projected to occur on constraints found to be uncompetitive in this pre-market process. Under the prior approach, mitigation was triggered if a resource's dispatch increased between two separate pre-market runs of the software, representing the network model with and without non-competitive constraints, respectively. Bid mitigation was sometimes triggered unnecessarily under this method due to minor modeling and dispatch differences in these two pre-market runs.

In April 2012, the ISO implemented these enhancements in the day-ahead market. This memo presents an assessment of the performance of these enhancements in the day-ahead market from April through December 2012.

## MITIGATION IN DAY-AHEAD MARKET

### *Frequency and impact of mitigation*

The ISO's new procedures for mitigating local market power were put to the test under challenging market and system conditions in 2012. During the summer months, the potential for the exercise of local market power in Southern California increased substantially compared to prior years for a number of reasons:

- Tighter supply and demand conditions existed due to the loss of 2,000 MW of base load generation from the SONGS units, coupled with higher peak loads.
- Congestion was more frequent and a severe on transmission constraints into the SCE and SDG&E areas.
- An increased portion of capacity within Southern California was offered at uncompetitively high bid prices. On many peak hours, 1,500 MW of gas-fired generation within the LA Basin was offered at prices over \$200/MWh up the \$1,000/MWh bid cap.

The new mitigation procedures in place effectively limited the potential for local market power created by these conditions. The impact of these new procedures was particularly notable in the high load hours of the summer months when the potential for local market power was highest.

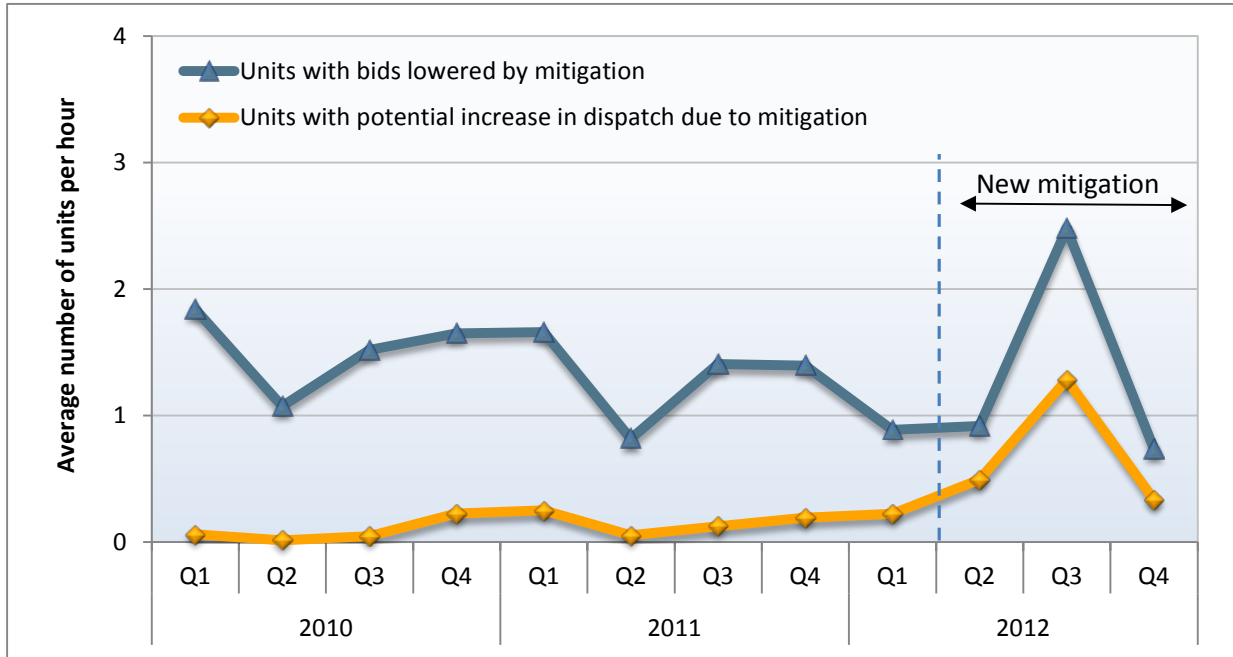
Figure 1 shows the average number of resources per hour having their bids lowered as a result of mitigation each quarter since 2010 (blue line). Figure 1 also shows the average number of units which DMM estimates was dispatched at a higher level in the day-ahead market as a result of this mitigation (yellow line). As shown in Figure 1, the number of units having their bids lowered and being dispatched at a higher level due to this mitigation increase notably in the summer months of 2012 (Q3) under the ISO's new bid mitigation procedures.

Figure 2 shows the average amount of additional energy scheduled in the day-ahead market as a result of bid mitigation.<sup>1</sup> As shown in Figure 2, mitigation had a much greater impact in 2012 under the new procedures, particularly during peak hours. During the super peak hours (14 to 16) of 2012, an average of over 100 MWh has been scheduled in the day-ahead market as the result of these new bid mitigation procedures. On the highest load summer hours, bid mitigation resulted in an average of over 600 MWh of additional generation in Southern California being scheduled in the day-ahead market.

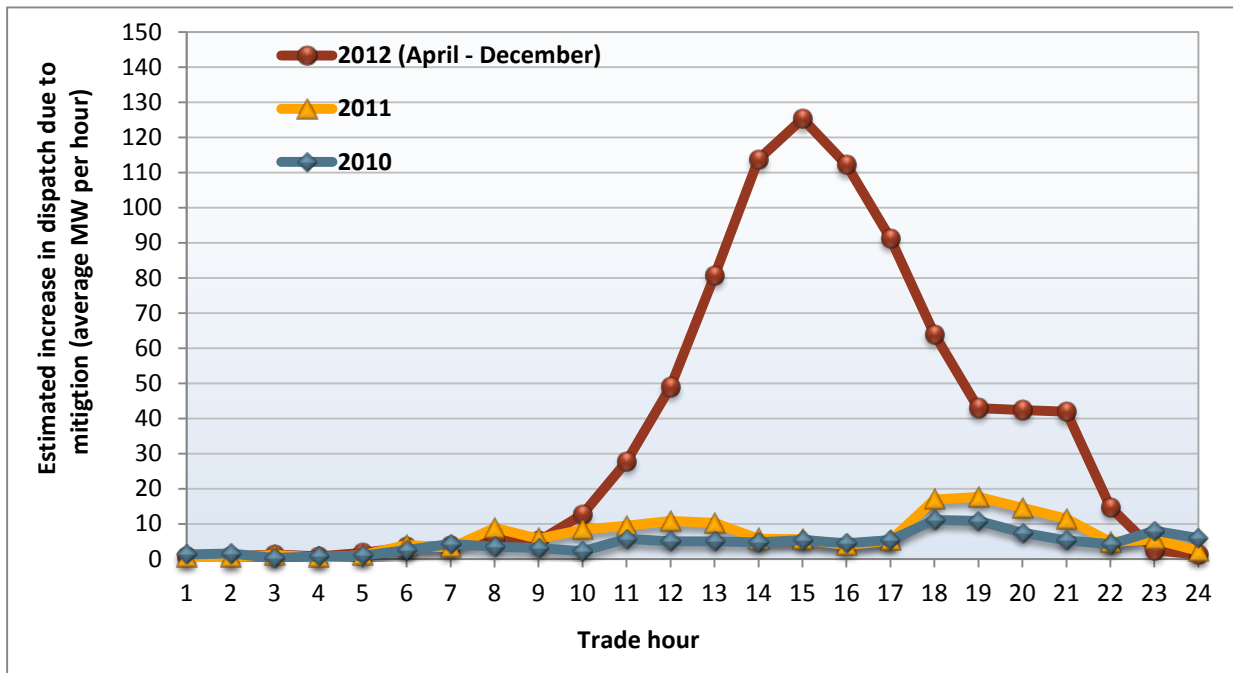
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<sup>1</sup> The methodology used to calculate these metrics is illustrated in Section A.4 of Appendix A of DMM's 2009 Annual Report on Market Issues & Performance, April 2010, <http://www.caiso.com/2777/27778a322d0f0.pdf>.

**Figure 1. Average number of units with bids mitigated in day-ahead market**

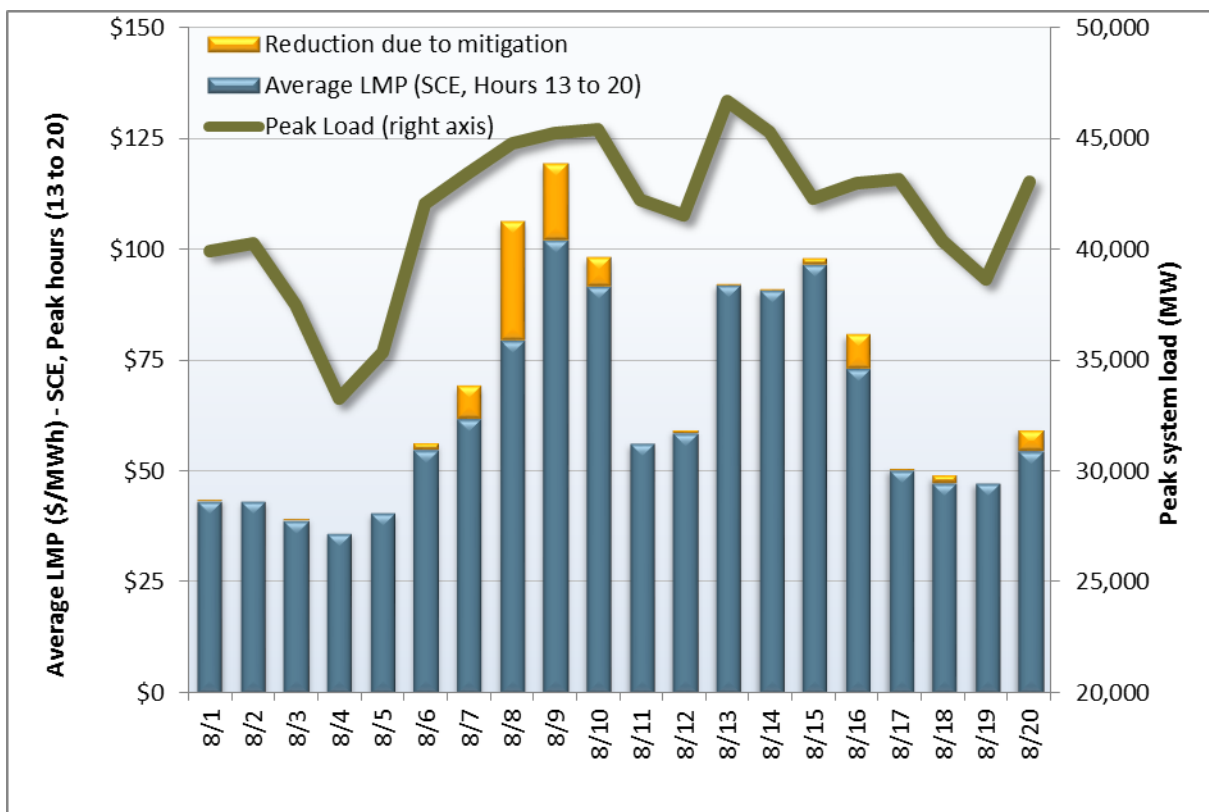


**Figure 2. Potential increase in day-ahead energy dispatch due to local market power mitigation (average MW per hour)**



During the highest load days of the summer, mitigation was frequently triggered by congestion into the SCE and San Diego areas. Figure 3 shows the impact of local market power mitigation on the SCE area price during peak hours during August 1- 20, 2012. On these days, mitigation generally kept average peak hour prices below \$100/MWh, or about 10 to 35 percent lower than prices that would have resulted without mitigation. The impact of mitigation on prices in the SDG&E area was even greater during this period.

**Figure 3. Impact of local market power mitigation on prices in SCE area (Peak hours, 13 to 20)**



### Accuracy of mitigation

Analysis by DMM also indicates that that enhancements implemented in April 2012 have made the ISO's local market power mitigation procedures highly accurate. Accuracy of mitigation is important for two reasons:

- When congestion occurs on constraints that are structurally uncompetitive, uncompetitively high bids from resources that can relieve this congestion are

mitigated to levels reflective of marginal costs. This ensures competitive outcomes when local market power exists.

- Accurate mitigation also ensures that mitigation is not triggered unnecessarily when local market power does not exist or for resources that are not effective at relieving congestion on uncompetitive constraints.

DMM has developed a variety of other metrics to assess the accuracy of local market power mitigation procedures.

**Projection of congestion.** The ISO's new pre-market mitigation procedures project when congestion may occur in the market much more accurately. This is important since mitigation is triggered only when congestion is projected to occur in this pre-market process. This new method has accurately predicted congestion in the day-ahead market with over 90 percent accuracy, compared to 45 percent under the previous method. This improvement reflects the fact these new pre-market procedures incorporate all bids used in the day-ahead market, including convergence (or virtual) supply and demand bids.

**Identification of non-competitive constraints.** Under the ISO prior mitigation approach, the structural competitiveness of transmission constraints needed to be assessed based on planning studies done months in advance and many constraints were not eligible to be deemed competitive. With the new method, this assessment is performed automatically by the market software based on actual system and market conditions. After implementation of this new approach, the accuracy with which constraints are classified as either competitive or uncompetitive has increased from about 30 percent to 90 percent.

**Elimination of unnecessary mitigation.** Under the ISO's prior mitigation procedures, modeling differences in the pre-market runs used to determine mitigation sometimes triggered bid mitigation unnecessarily for resources when local market power did not likely exist. The new mitigation approach applies bid mitigation only to resources that can directly relieve congestion on a constraint found to be non-competitive. As noted above, analysis shows that the new pre-market mitigation procedures identified very accurately when congestion would occur and when transmission constraints were uncompetitive under actual market conditions. Thus, the new method has almost completely eliminated the triggering of bid mitigation when the potential for local market power did not exist.

## CONCLUSION

The ISO's new procedures for mitigating local market power in the day-ahead market proved to be highly accurate and effective during the summer of 2012. In spring 2013, the ISO will fully implement these procedures in the real-time market. Specifically, the ISO will implement the automated method of dynamically assessing the competitiveness of constraints based on actual system and market conditions. In addition, the process for

determining bid mitigation of real-time energy bids will also be performed every 15 minutes as part of the real-time pre-dispatch process that occurs about 37 minutes prior to the 5-minute real-time market. Currently, mitigation of real-time energy bids is performed as part of the hour-ahead scheduling process. These additional enhancements should further improve the accuracy and effectiveness of mitigation in the real-time market.