

**UNITED STATES OF AMERICA  
FEDERAL ENERGY REGULATORY COMMISSION**

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**REPORT ON GENERATOR OFFERS IN THE MIDWEST  
INDEPENDENT TRANSMISSION SYSTEM OPERATOR  
MARKET LAUNCH**

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**Prepared by the Staff of the Federal Energy Regulatory Commission**

**June 30, 2005**

**I.  
EXECUTIVE SUMMARY**

The Staff of the Office of Market Oversight and Investigations conducted an expedited, fact-finding preliminary investigation into reports by the Midwest Independent Transmission System Operator (MISO) Independent Market Monitor (IMM) that many MISO market participants offered supply into the MISO day-ahead and real-time markets in excess of IMM-calculated reference cost levels during the first two months of MISO Energy Markets (April 1 through May 31, 2005, or the Day 2 period).

The MISO Transmission and Energy Markets Tariff (Tariff) required market participants to offer energy supply into the market at cost during the Day 2 period. The Commission also directed the IMM to refer offers in excess of a threshold of ten percent above reference cost levels (flagged offers) to OMOI for enforcement action.<sup>1</sup>

When the IMM notified OMOI of flagged offers in early April, OMOI commenced a preliminary investigation to determine whether any market participants were willfully violating the Tariff or manipulating MISO markets and, if so, whether enforcement action against market participants was warranted. OMOI evaluated voluminous data responses from 45 MISO members; held one or

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<sup>1</sup> *Midwest Independent Transmission System Operator*, “Order on Compliance Filing,” 109 FERC ¶ 61,285 P 203 (2004).

more follow-up calls with representatives of all 45 companies; held extended conferences with three market participants with particularly large numbers of flagged offers; screened MISO data to examine patterns of offers made by market participants; and studied the effects of Day 2 period offers upon the reference prices governing mitigation as of June 1, 2005.

Based upon the evidence gathered, staff concludes that the Day 2 period offers flagged by the IMM:

- Were mainly the result of a number of practical problems confronting participants in the new market, including difficulties establishing accurate reference levels and communications problems;
- Were not willful violations of the MISO Tariff;
- Were not an attempt to manipulate the market;
- Represented a relatively small component of overall supply—less than six percent of all energy offers were flagged, and only about one-third of flagged offers were scheduled;
- Might have affected the market only in unusual cases and to a very limited degree; this category represented only two-tenths of one percent of real-time energy offers during this period; and
- Did not harm competition.

Staff found that shortcomings by both the IMM and market participants complicated and delayed the process of ensuring that supply offers were consistent with generators' costs. The IMM provided insufficient staff resources to address reference level calculation and supply offer issues for the number of market participants involved. In addition, at the outset, the IMM failed to provide timely notice to market participants when their offers exceeded reference levels plus ten percent, and the notices lacked details needed to determine why the offers were referred to the Commission. In addition, early in the cost-based offer period, the IMM made errors in certain reference level calculations that led to flags for generation units that had, in fact, been offered properly. This was quickly discovered and corrected, however.

For their part, many market participants devoted insufficient resources to documenting their generation costs to the IMM. They also sometimes failed to examine reference level information and supply offer instructions available on a MISO computer interface and integrate such information into their supply offers. Such steps would have allowed them to have submitted offers more consistent with IMM reference levels and would have reduced disputes over reference level calculations.

Staff recommends that if a similar cost-based offer system is used in future market launches, market participants and the market monitor dedicate more time and resources to refining reference cost levels and supply offer procedures before market launch to avoid the appearance of non-compliance with a Commission order and to allow OMOI and the IMM to focus on truly problematic behavior by market participants.

Staff also recommends that this preliminary investigation be closed.

## **II. BACKGROUND**

In Docket Nos. ER04-691 and EL04-104, the Commission authorized MISO to commence energy markets operations on April 1, 2005. The Commission required that offerers of supply into MISO offer at cost for the first two months after MISO commenced operations.<sup>2</sup> Under Section 40.A of MISO's Commission-approved Tariff, costs during the first two months were to be based upon "appropriate" reference levels established by the IMM pursuant to Section 64.1.4 of the Tariff, with the IMM to oversee the administration of such offers.<sup>3</sup>

In order to ensure market participant compliance with these Tariff provisions, the IMM proposed, and the Commission accepted, that a threshold of ten percent above cost be used to screen for offers inconsistent with the cost-based offer requirement.<sup>4</sup>

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<sup>2</sup> *Midwest Independent Transmission System Operator, Inc.*, "Order Conditionally Accepting Tariff Sheets to Start Energy Markets and Establishing Settlement Judge Procedures," 108 FERC ¶ 61,163 at P 63 (2004).

<sup>3</sup> The MISO IMM developed a three-part reference price and offer system providing for prices for energy, start-up costs, and minimum generation costs. The Tariff provided that the market participants were to submit verifiable cost data to the IMM to establish reference prices; in the absence of verifiable data, the IMM could use average price data for similar units (peer group data), and could discuss costs with participants to establish appropriate reference levels for specific units. Each of the more than 1,100 MISO generating units thus would have six reference prices (energy, start-up, and minimum generation in both the day-ahead and real-time markets).

<sup>4</sup> *Midwest Independent Transmission System Operator*, "Affidavit of David B. Patton," Docket No. ER04-691-000 at p. 11 (Oct. 10, 2004); *Midwest*

The Commission required that the IMM flag and report offers above the ten percent threshold level to OMOI for possible action. The Commission did “not expect bidding that exceeds the 10 percent thresholds,” because “market participants will have a clear idea of their reference prices.” The Commission also said that “referring them for enforcement action is appropriate” and expected that this would be “sufficient to deter this behavior.”<sup>5</sup>

The IMM distributed information on reference pricing to market participants months before the market start, but many participants did not give it full attention sufficiently in advance. As market start drew near, the IMM conducted energy market trials in March and notified market participants on March 22 and March 30, 2005, that many trial offers exceeded the IMM’s reference levels by more than ten percent. The IMM later told staff that many market participants adjusted their reference data or changed their offers, and this resulted in fewer offers above the ten percent threshold when the markets commenced. On April 5, 2005, the IMM provided OMOI with data flagging offers in excess of the ten percent threshold that had been made in the day-ahead and real-time markets since April 1. The IMM’s data flagged roughly 9 percent of dispatchable units making offers in the day-ahead market and indicated that more than half of the 66 participants in the MISO markets had made flagged offers.

OMOI immediately commenced a fact-finding preliminary investigation to determine the cause of the flagged offers. On April 6 OMOI sent data requests to 41 market participants, all of whom responded by April 11.<sup>6</sup> The market participants supplied voluminous data regarding their supply offers and cost calculations.

On April 13, 2005, the IMM discussed flagged offers at a Commission Open Meeting and noted that only offers associated with energy actually taken would result in possible adverse effects to MISO energy markets. The IMM estimated that in the day-ahead market on a typical day since market launch, less than three percent of dispatched resources had offers above IMM-determined thresholds and only 0.3 and 0.4 percent of day-ahead and real-time market offers not taken, respectively, represented offers that, had the offers been made at the

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*Independent Transmission System Operator*, “Order on Compliance Filing,” 109 FERC ¶ 61,285 P 203 (2004).

<sup>5</sup> 109 FERC ¶ 61,285 at P 203.

<sup>6</sup> Subsequent reports by the IMM flagged four additional companies.

reference levels, would have been taken and would have lowered prices. In addition, the IMM said that many units were must-run units that would not be offered under the MISO market rules and, therefore, would not affect the MISO market regardless of the price reflected in offers for such units.

Staff called all market participants that had received data requests, beginning with those receiving the largest number of flags, to better understand the reasons for the referrals from the IMM. Staff also held extended conferences with three companies with particularly large megawatts of flagged offers. Staff closely monitored the pattern of offers referred by the IMM, which declined to a relatively small number by the end of May.

From June 1, 2005 onward, reference level prices have been calculated by the IMM in accordance with the MISO Tariff based on accepted offers in the Day 2 period. Staff was concerned that including flagged offers could inflate offer-based reference prices. To evaluate this, staff obtained data to study whether any instances of accepted-offer reference levels as of June 1, 2005 (which, as calculated under the Tariff, may reflect flagged offers made and accepted in the preceding two month period) exceed the end-of-May cost-based reference levels (which presumably would be relatively accurate after two months of efforts by the IMM and market participants to reconcile divergent cost estimates). The results of this study, discussed *infra*, indicate that the June 1 reference levels were not adversely affected.

### **III.** **REASONS FOR THE FLAGGED OFFERS**

Most market participant explanations for offers flagged by the IMM fell within two broad categories, as discussed below:

#### **A. Problems Reconciling IMM and Market Participant Costs**

Both the IMM and the market participants, in their data submissions and their conversations with staff, said that market participants' problems reconciling their cost data with the IMM's reference cost calculation methodology was a major cause of offers flagged for exceeding the reference level thresholds.

Market participants, ranging from high-volume offerers to small operators, complained that the IMM did not accurately calculate costs. Market participants said that they therefore offered what they believed their costs to be, and used the IMM's reference levels as a "signpost" or did not consult the reference levels at all. Another market participant said that it had believed that its own cost calculation methodology was so conservative that its units would not be flagged

by the IMM. Market participants' failure to check and coordinate with the IMM's reference levels contributed to their offers being flagged because, among other things, some market participants were misallocating costs (*e.g.*, incorporating start-up and minimum generation costs into energy costs).

Subsequent examination and comparison of cost and reference level data by the IMM and market participants led in some cases to revision of reference levels by the IMM and in other cases to concessions by some market participants that their internal cost figures were inaccurate. For many market participants, complying with the IMM methodology for generation costs forced a level of rigor and attention to costs, and cost components, that was unfamiliar to them. Although the IMM had distributed instructions on submitting reference prices well in advance of the market start, many market participants did not do enough to submit verifiable costs, and to resolve differences with the IMM, before market launch.

Many market participants complained that the IMM's reference level models were complicated, that the IMM's modeling instructions for cost submissions and supply offers were difficult to follow, and that the IMM did not sufficiently communicate the manner by which reference levels were calculated.<sup>7</sup> This alleged lack of transparency in the IMM's calculation methodology was cited by many market participants as an obstacle to accurately modeling energy, minimum generation, and start-up costs. Other modeling difficulties included: uncertainty over the correct number of points to use in modeling a reference curve (*e.g.*, ten-point curves were necessarily more accurate than the two-point curves submitted by some market participants, but many market participants did not realize a two-point curve could result in flagged offers for part of the total offer curve); how to model units with shared ownership between different market participants; how to model units that could, and did, run on multiple fuels; and how to model so as to capture intra-day changes in fuel prices, exogenous events, and disparities between the IMM's fuel costs and actual market conditions.

Accurately modeling fuel costs proved particularly vexing for many market participants. Market participants with units fueled by gas complained that the

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<sup>7</sup> The IMM noted that it had provided guidance to market participants regarding submission of costs to establish reference levels, and how supply offers and cost submissions might best model them, well before the Day 2 launch, including instructions for units with special characteristics. In many cases, however, market participants focused on other market start-up issues or lacked the internal resources to address the reference levels issues adequately. As a result, the IMM often relied on peer group cost data in establishing unit reference prices.

IMM based its reference levels on a daily index of prices for gas, whereas market participants are often forced to buy more expensive intra-day gas. That is because under the MISO dispatch system, market participants do not know whether their units will be called to run until 5:00 p.m., at which time they may be forced into the intra-day market for gas.<sup>8</sup> Some market participants claimed that the added-cost effect of buying in the intra-day market could easily exceed the ten percent threshold. The IMM also agreed with market participant complaints that its index-based method for calculating costs does not reflect the actual costs for coal incurred by some market participants.

Another supply offer difficulty was the IMM's briefly setting up some start-up reference levels incorrectly. The IMM inadvertently set a too-low \$4 start-up cost for many units, a problem that was corrected by mid-April.

## **B. Poor Communication and Inadequate Resources**

An oft-cited market participant explanation for flagged offers was poor communication, including both poor intra-company communication as well as poor communication by market participants with the IMM and/or the MISO portal.<sup>9</sup>

Internal communication problems included some market participants' failure to dedicate sufficient resources to manage generation assets in MISO, including cost submission and supply offer activities. One generator, for example, did not come into compliance until late May in large part because only one engineer had been tasked with monitoring reference level compliance for a large number of generation units. Similarly, some larger market participants said it was difficult to coordinate personnel to properly integrate the checking of reference levels, calculation of offers, and communication with the MISO portal because such functions were split up among different company divisions.

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<sup>8</sup> Similarly, others stated that because the data for the gas price index (for determining fuel costs) is a day old before it is analyzed by the IMM, the IMM's reference levels may be out of sync with actual market conditions.

<sup>9</sup> The MISO portal is the communication link used by participants to exchange reference level and supply offer information with MISO for day-ahead and real-time market operations. It became apparent during the investigation that there were operational limits in the use of the portal and that many market participants did not utilize the portal effectively.

In addition, the IMM had only one staff member on site at MISO to deal with all MISO participants' inquiries on reference levels. Insufficient IMM on-site staffing exacerbated communication difficulties and delayed resolution of data issues, as the single individual responsible for resolving reference levels and supply offer issues for all market participants was overwhelmed by inquiries. Given the predictable surge of contacts needed to address reference prices and to resolve flagged offers, the IMM should have provided more resources on site during market launch. On the other hand, market participants who were able to contact the IMM generally said they obtained help needed to identify sources of flagged offers and that the IMM responded promptly to their questions and submissions of data.

A critical impediment to market participants' compliance with the cost-based offer rules was that the IMM provided only sporadic notices of flagged offers during the first few weeks after the start of Day 2 energy markets, and relatively limited information regarding offers throughout the Day 2 period. The first IMM notice to market participants was provided on April 6, 2005, and the next on April 19, 2005. This delay led many market participants to believe that their offers were consistent with their reference levels; however, the number of their flagged offers was mounting. Market participants also said that flags for offers sent to them by the IMM lacked sufficient detail regarding the cause for the flags and that this slowed their ability to address the underlying issues identified by the flag.

The MISO portal itself was another factor. It was the repository of reference level information and the location where market participants offered supply. However, many market participants did not look to the MISO portal to examine reference levels assigned to them by the IMM. Some market participants said that they found retrieving information difficult unless they had proprietary software to "scrape" data from the portal. Due to space limitations, certain data was truncated and was available to companies for only a limited period of time. Similarly, submitting cost data to the IMM for reference level adjustment proved cumbersome for market participants that had many generation units unless they had XML-based software, which they had to buy from a third-party vendor. The IMM had distributed information regarding obtaining such software to market participants in early 2005; however, many market participants claimed that they only learned of, and implemented, such software in the middle of the Day 2 period.

Staff observed a sharp spike in flagged offers in early May. This turned out to be a lack of communication between the IMM and the market participants over the timing of the winter/summer cost switchover on the inclusion of NOx emissions costs. The IMM's switchover was in June, but many market

participants made the change in their offers in May. Since the additional costs were in their offers but not reflected in the IMM's reference levels, a large number of offers were flagged until this misunderstanding was resolved.

#### **IV. QUANTITY AND PATTERN OF FLAGGED OFFERS**

An analysis of the offers flagged by the IMM shows that referred offers constituted only a relatively small amount of megawatts offered and, generally, decreased in amount during the two month period.

On average during the period, flagged offers in the day-ahead market constituted 5.7 percent of total energy offered into the market, 8.2 percent of minimum generation in the market, and 5.5 percent of start-up in the market.<sup>10</sup> In the real-time market, flagged offers constituted 4.4 percent of energy and 5.5 percent of minimum generation (start-up offers are largely inapplicable to the real-time market). On average during this period, 30 market participants made offers that were flagged in the day-ahead market for one or more categories on a given day, and 23 market participants were flagged in the real-time market.

These statistics exaggerate the potential effect of flagged offers. Many flagged units are must-run units that would not be likely to set the day-ahead market price. In real-time, only quick-start units or units actually online are eligible to set the market price. In addition, only units that are scheduled can set the market price, and only 36 percent of flagged offers for day-ahead energy were actually scheduled.

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<sup>10</sup> Start-up and minimum generation offers represent, respectively, the level necessary to bring a generation unit to a state where it is ready to produce energy and the cost of maintaining units at the minimum level necessary for MISO dispatch. These types of offers are generally less critical than energy offers from a market standpoint, because these offers do not set price. In the day-ahead market, start-up and minimum generation costs can affect which units are committed for energy, but do not directly determine dispatch or prices. These offers, however, may affect uplift costs because suppliers will be compensated for the cost of minimum generation and start-up to the extent that these costs are not covered by the locational marginal price, or market clearing price, in the energy market, so evaluation of them is still necessary. In the real-time market, start-up costs play only a limited role, since most units (for example, coal units) will be started up on a day-ahead basis. The key units in real-time are units that can provide energy when needed – online and quick start units – and start-up costs are not relevant to the former and generally very low for the latter.

Moreover, most flagged offers do not raise concerns about withholding energy from the market. This is true because if both the cost-based reference price and the actual supply offer are above (or below) the market price, then the flagged offer has no effect on the market price. Conversely, only offers associated with energy that had a cost-based price at or below the market price, and a supply offer above the market price, have the effect of raising the market price above the cost-based level. That occurs because these offers remove lower cost supply from the market and potentially raise the market price as a result. Further, in many cases, offers flagged by the IMM represented offers in which only a small range of production out of the total megawatt capacity of a given unit exceeded reference levels.

When these factors are taken into account, as Appendix 1 (Figure IV-1) demonstrates, the total amount of flagged energy offers made on an average day in the real-time market during the two month period was about 1,100 MW, approximately 4.4 percent of the total offers of 26,000 MW in the real-time market. When only scheduled offers are considered, the level of flagged offers drops to 800 MW, or 3.3 percent. Furthermore, on average there were only 40 MW of energy offers in the real-time market with an offer price above the market clearing price (LMP) and costs lower than the LMP. These offers, which are the only ones capable of moving the market in a manner that raises prices levels, represent 0.2 percent of the overall market over the two month period, and never represented over 0.9 percent of the total energy offered in real-time on any day. Staff deems this insignificant.

The amount of megawatts in flagged offers generally decreased over the two month period, as did the number of units and market participants with flagged offers at any one point in time. This is shown in Appendix 2 (Figure IV-2). During the market trial period before launch on April 1, participants with flagged offers received notices that their trial period offers were above the threshold and identification of units that were offered above cost. Many problems were identified during the pre-start period. There were 266 units flagged for energy offers in the trial period, but the day-ahead market opened on April 1, 2005, with only 111 units being flagged. After market start, the prevalence of flagged offers varied through the two month period but generally declined, reflecting increased consultation between the IMM and participants, as well as participant discussions with staff.

While more than 40 market participants were flagged by the IMM, the majority of flagged offers were made by a smaller number of companies. The pattern of flagged offers varied significantly among these companies during the two month cost-based period.

In the day-ahead market, flagged start-up offers declined from a high of around 10,000 MW in late April to a low of around 300 MW in late May; similarly, flagged minimum generation offers declined from a high of around 8,000 MW to a low of around 300 MW. While flagged offers did not disappear entirely, staff views the level in this latter period as statistically insignificant for the market as a whole.

## V.

### **EFFECT OF FLAGGED OFFERS ON JUNE 1 REFERENCE LEVELS**

As of June 1, 2005, the IMM is using accepted offers from the Day 2 period as the primary means of calculating reference levels and determining when market mitigation, which is tied to exceeding thresholds above the reference levels in the Tariff, can occur. Flagged offers made and accepted in April and May could possibly distort the subsequent accepted-offer reference levels and, thereby, future market mitigation. Staff conducted a study to identify any such distortion. Staff reviewed data showing any instances where June 1, 2005, reference levels exceeded the end-of-May cost-based reference levels (which staff presumed would be relatively accurate after two months of efforts by the IMM and market participants to reconcile divergent cost estimates). Generally, the data showed little or no effect of flagged offers on average reference levels as of June 1, and closer review of individual company offer-based reference levels did not reveal any pattern of problematic supply offers.

Staff found that changing the calculation of the energy reference levels from May 31, 2005 to June 1, 2005 in fact lowered, rather than raised, the reference levels, suggesting that the flagged offers did not adversely affect June 1 reference levels. For units with an offer-based reference level on June 1, 2005, the average reference level was \$33; the average cost-based reference level on May 31, 2005, was \$40. This difference indicates that the decrease in June reference prices, brought about by offers below the IMM reference cost estimate, more than offset any increase in reference price from the accepted offers above their reference levels.<sup>11</sup>

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<sup>11</sup> An explanation for this is that market participants might have been offering below the IMM cost estimate when they believed the actual costs were below the IMM estimate, which can occur when the IMM uses peer group data higher than the company cost estimates for the unit, or when the IMM derives a cost curve from the underlying cost data provided by the IMM that differs from the one developed by the company. Given these potential differences in cost estimates, market participant offers made below IMM costs should not be surprising, because offering a unit above the IMM reference cost runs the risk of failing to be dispatched when dispatch could, in fact, be profitable.

Staff also examined whether some units appeared to be offering in a “hockey stick” pattern, with higher output levels offered at substantial increases to cost, but lower output levels offered much closer to cost. The offer pattern could conceivably cause energy to be taken at a higher price than it otherwise would have been because of extreme prices at the far end of an offer curve. Staff found no evidence of such conduct, as is described in Appendix 3 (Figure V-1).

## **VI.** **ANALYSIS AND OBSERVATIONS**

### **A. The Preliminary Investigation Should Be Closed**

Staff recommends that no enforcement action be taken against market participants whose offers were referred to the Commission during the Day 2 period. There is no statistical, documentary, or anecdotal evidence of intent by market participants to manipulate Day 2 energy markets or of willful violations of the Tariff provisions. Most market participants made good faith efforts to provide verifiable data to the IMM to change the reference levels to reflect their actual costs, and thus to make offers below IMM thresholds, following receipt of IMM notice that offers exceeded the threshold over reference prices, staff’s data requests, and subsequent staff follow-up. In addition, the flagged offers disproportionately represented offers by a handful of large generators. Staff examined these market participants in greater depth and concluded there were no indicia of attempted market manipulation. Staff recommends closing the preliminary investigation.

### **B. Greater Planning and Preparation Should Precede a Cost-based Offer Period**

The MISO Day 2 experience suggests that a cost-based supply offer requirement is a difficult standard for the IMM to administer and for market participants to meet. The IMM can validate the true costs of the more than 1,100 generation units that offer into MISO, and all factors that affect the output of the units, only with great difficulty. Administering such a system during the launch of a market is a resource-intensive function that diverts the attention of market participant employees and places stress on the IMM at the very time when many other critical functions are demanding their attention.

A benefit of having had the IMM report flagged offers to OMOI is that the preliminary investigation appears to have caused market participants to examine the accuracy of their cost data, and to work with the IMM to establish accurate reference levels, more rapidly than would otherwise have been the case. However,

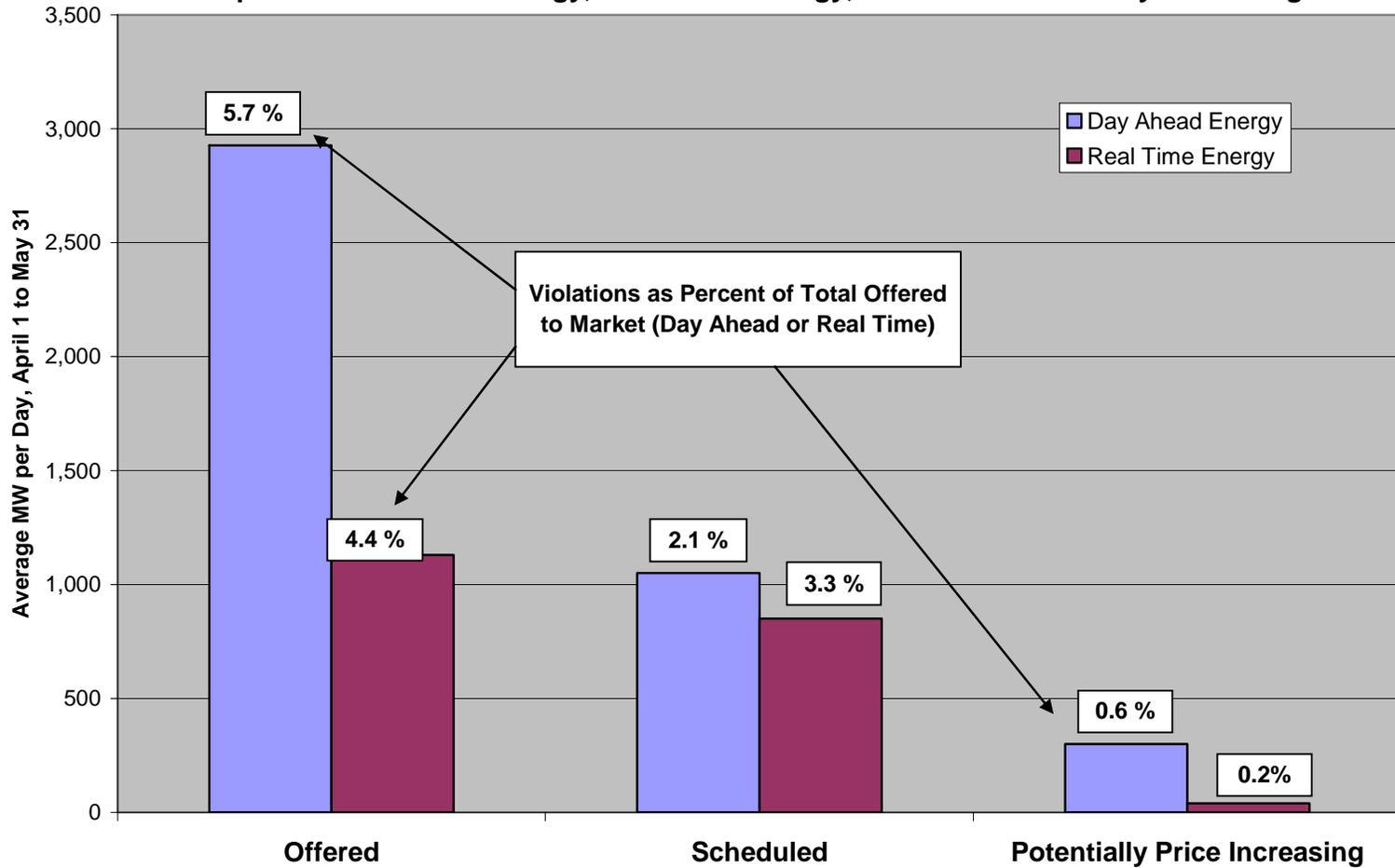
it appears that this result would have been better achieved through a more extended period of testing and adjustment with the IMM prior to the commencement of the energy market.

In addition, excessive attention to cost-based offers, and the fear of disproportionate enforcement by the Commission, can also result in a chilling effect upon offering of supply by market participants. Staff was concerned that its investigation might cause market participants to divert units that they would have otherwise dispatched into MISO just to avoid possible IMM flags. Some market participants actually said that they offered supply at prices below what they believed their true costs to be (but in line with the IMM reference levels) because of an inability to validate unit costs with the IMM. Both of these outcomes may be harmful to a competitive marketplace, and concerns regarding contributing to such outcomes led staff to take a cautious approach in this investigation.

If the Commission decides to impose cost-based offer requirements during future market launches, staff's analysis suggests several actions that could be taken to improve results. Market participants and the market monitor must dedicate sufficient time and personnel resources to such efforts. While the MISO IMM laid the groundwork for refinement of reference levels and cost-based offers in emails and meeting many months before market launch, the MISO experience suggests that such steps may be inadequate, and the relevant measure is instead how much time is spent by the market monitor and market participants testing and refining the offer and cost calculation processes through trials. An insufficient amount of time was allowed for trials in this case, given the complexity of adjusting reference levels. In addition, the market monitor should give consideration to improved analytical processes and communication technologies that would help it and market participants communicate more effectively with each other.

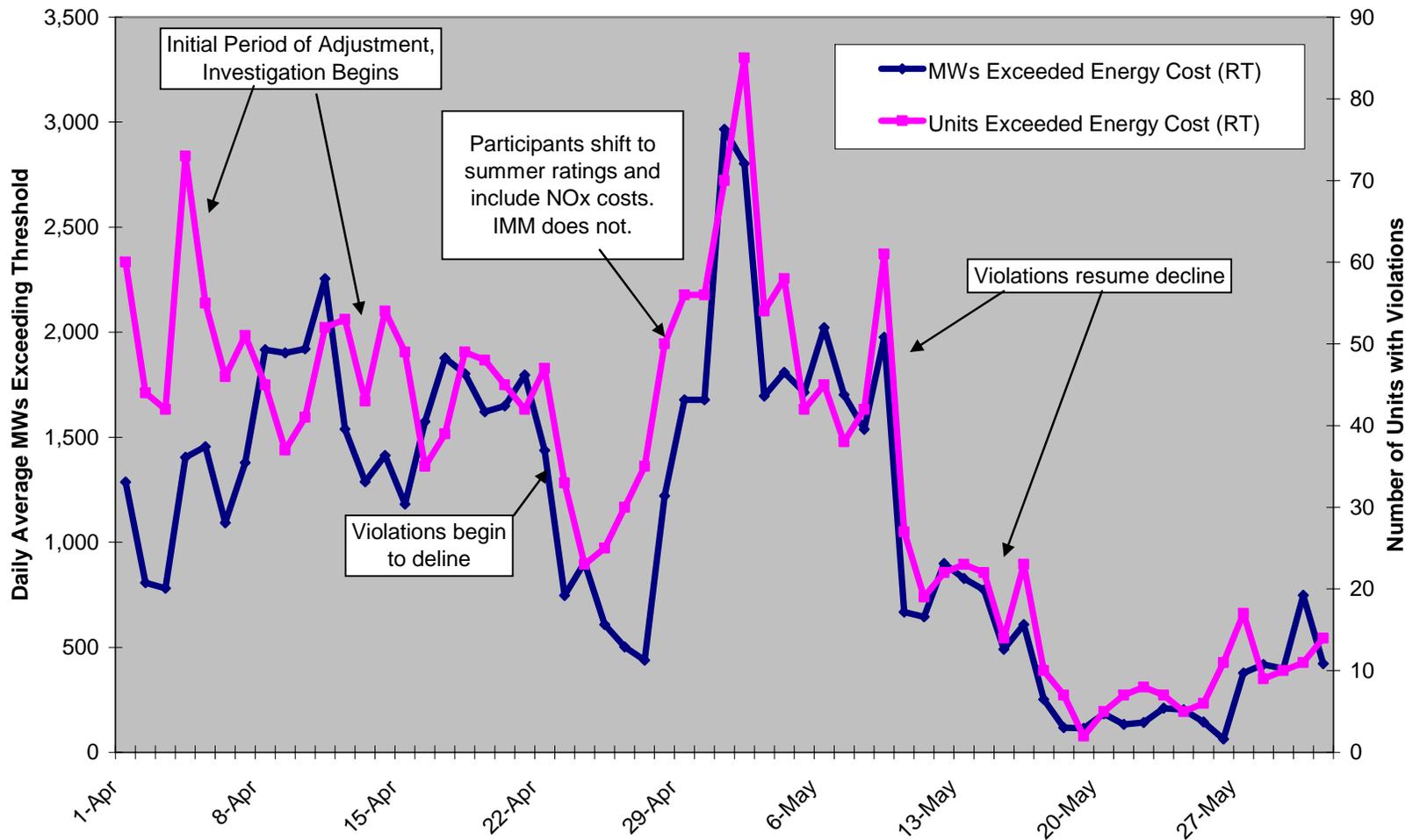
The market monitor also should develop and present to the Commission, long before the commencement of energy markets, a more intelligent and flexible reporting system that would allow more accurate identification of possibly problematic offers to the OMOI while allowing for the unexpected problems that accompany launch of a new market. The Commission could also consider choosing a higher threshold for reporting, or a graduated set of thresholds, that allows for reasonable divergence between offers and cost-based reference levels at the outset of a market.

**Appendix 1 (Figure IV-1)**  
**Energy Offer MWs Exceeding IMM Cost Plus 10%**  
**Comparison of Offered Energy, Scheduled Energy, and Offers Potentially Increasing Price**



Source: IMM Reports to OMOI Enforcement on daily offers exceeding IMM cost-based threshold plus 10%.

**Appendix 2 (Figure IV-2): Units and MWs Exceeding IMM Cost Plus 10% Threshold  
Real Time Energy Markets, April-May 2005**



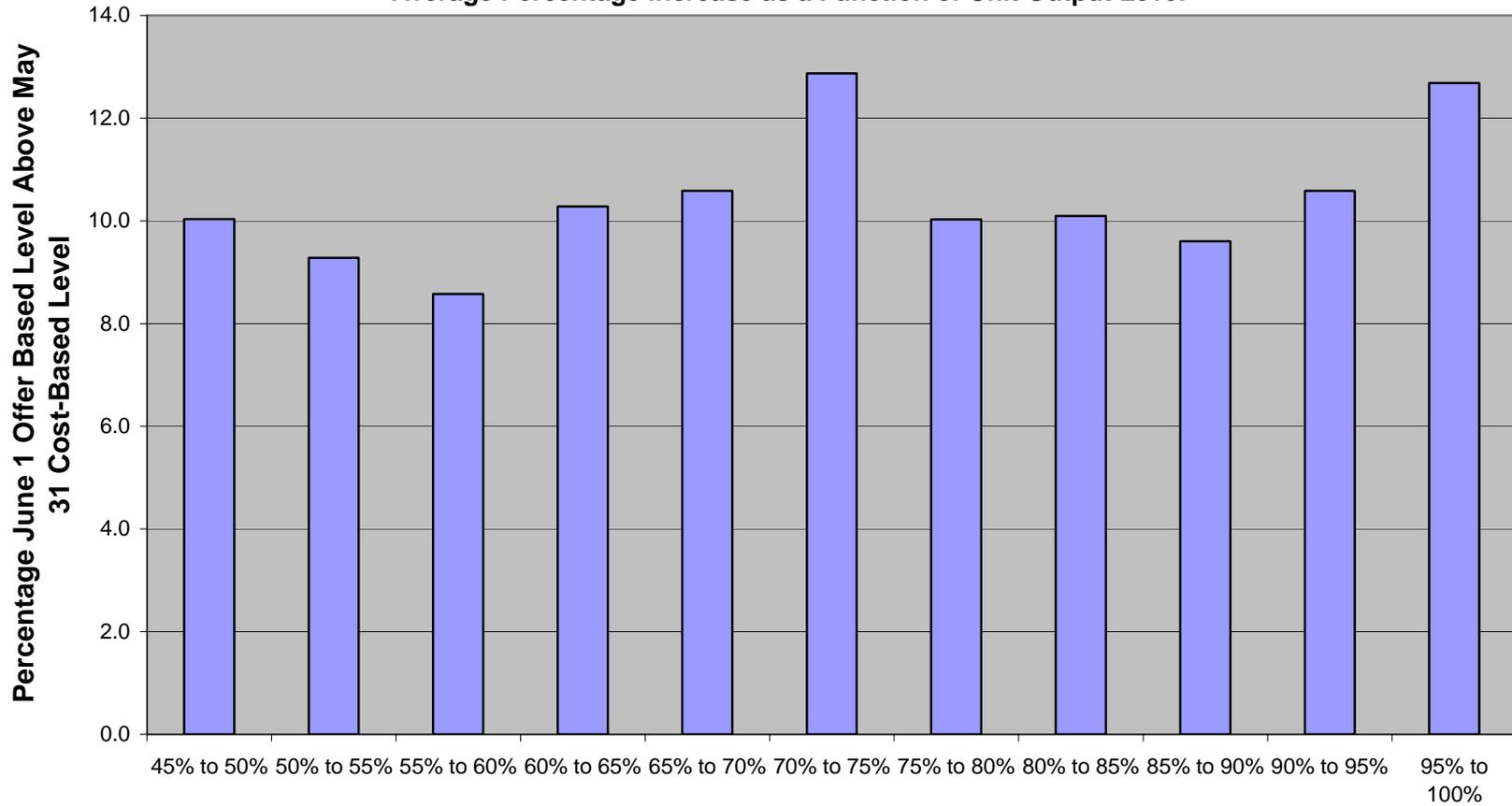
Source: IMM Reports to OMOI Enforcement on daily offers exceeding IMM cost-based threshold plus 10%.  
See attached notes.

## NOTES (Figure IV-2)

Four distinct periods are identified in Figure IV-2:

1. Initial adjustment for the first two or three weeks. During this period, continuing consultation with the IMM occurred, but many of the remaining energy offers required changes to internal participant procedures and participants generally did not make significant changes that reduced the level of energy flagged offers. The IMM also required time to review and validate participant cost information and revise the reference prices.
2. Initial reductions in number and megawatts of flagged offers in the fourth week of April. The level of flagged offers was reduced during this period, both as a result of adjustments by the IMM to incorporate more participant cost information and adjustments by participants to better align their energy offers with the IMM offer curves.
3. Significant increases in flagged offers toward the end of April. During this period, several large suppliers shifted their costs from winter cost values to summer cost values that included additional costs for NO<sub>x</sub>. However, while these participants shifted to a summer basis on May 1, the IMM did not shift until June 1. Most of the necessary adjustments to align IMM and participant costs took place by the second week in May.
4. Continued decline in flagged offers to a relatively low level. After the first week in May, flagged offers declined quickly from a high of 85 units and 2,966 MW in the first week of May to a low of 2 units and 118 MW in the third and fourth weeks of May. This reflected that a few companies that constituted the majority of flagged offers in mid-May finally significantly reduced their levels of flagged offers. A final spike by one company for energy flagged offers (which the company said was caused by inadvertent failure to adjust offers to model lower NO<sub>x</sub> levels calculated for its units by the IMM) occurred at the very end of May and marred what would otherwise have been very low marketwide levels of flagged offers for the end of the two-month period.

**Appendix 3 (Figure V-1):  
June 1 Offer-Based Reference Levels vs May 31 Cost-Based Level\*  
Average Percentage Increase as a Function of Unit Output Level**



**Output Level as a Percent of Maximum Output Offered**

\*Includes only Output Where Offer-Based Reference Level Exceeds Cost-Based Reference Level. See attached notes.

Source: IMM Reports to OMOI Enforcement on Energy Reference Levels, May 31 and June 1, 2005.

### **NOTES (Figure V-1)**

Figure V-1 shows the results of examining offer patterns for indications of hockey stick bidding. If hockey stick offers were occurring at the generating unit level, one would expect offers near the maximum output of the unit to show a greater percentage increase over costs. Offer-based reference levels above costs in Figure V-1 range from 8 to 13 percent; while the highest output levels (95 to 100 percent of maximum output) are slightly higher than some lower levels, they are not the highest range, and do not suggest significant hockey stick offer concerns.