

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

Midwest Independent Transmission)	Docket No. ER08-1256-000
System Operator, Inc.)	
)	
)	

**MOTION TO INTERVENE AND COMMENTS
OF THE
MIDWEST ISO'S INDEPENDENT MARKET MONITOR**

Pursuant to Rules 212 and 214 of the Rules of Practice and Procedure of the Federal Energy Regulatory Commission (“FERC” or “Commission”), 18 C.F.R. §§ 385.212 and 214 (2007), Potomac Economics respectfully moves to intervene in the above-captioned proceeding concerning the July 11, 2008, filing by the Midwest Independent Transmission System Operator, Inc. (“Midwest ISO”). Potomac Economics is the Independent Market Monitor (“IMM”) for the Midwest ISO.

I. NOTICE AND COMMUNICATIONS

All correspondence and communications in this matter should be addressed to:

Dr. David B. Patton
Potomac Economics, Ltd.
9990 Fairfax, Boulevard, Suite 560
Fairfax, VA 22030
(703) 383-0720

II. NATURE OF THE PROCEEDING AND MOTION TO INTERVENE

On July 11, 2008, the Midwest ISO submitted for filing Tariff revisions related to ex post pricing. Intervention is appropriate where the movant may be directly affected by the outcome

of the proceeding and has a direct interest in the same that cannot adequately be represented by any other party.¹ Potomac Economic's intervention and participation is in the public interest. As the Midwest ISO's IMM, assuming the responsibility and function of monitoring activities within the Midwest ISO Region, Potomac Economics is required under the provisions of the Midwest ISO's Open Access Transmission and Energy Markets Tariff ("EMT") to monitor and evaluate the market outcomes and market rules to promote the efficiency and competitiveness of the Midwest ISO markets. Potomac Economics may also be bound or adversely affected by the Commission's actions herein. For these reasons, Potomac Economics respectfully requests that it be permitted to intervene in this proceeding with full rights as a party hereto.

III. COMMENTS

As the IMM for the Midwest ISO, we evaluate the Midwest ISO's market design and outcomes. This has included evaluations of the Midwest ISO's ex post pricing rules, the most recent of which is contained in the 2007 State of the Market Report. The purpose of this filing is to explain concerns regarding ex post pricing that are based on the results of these evaluations and to support the proposal by the Midwest ISO to modify its pricing rules.

Our review of ex post pricing methods in the Midwest ISO, and in other markets in which we are engaged, has revealed that the ex post pricing mechanism fails to achieve its primary goal of improving incentives to respond to dispatch instructions, introduces an upward bias into prices, and creates other periodic market distortions.

I support the proposed changes to the Midwest ISO energy and ancillary services pricing mechanism. The changes to the pricing mechanism will remove a source of market inefficiency and thereby improve the quality of the real-time price signals produced in the Midwest ISO energy and ancillary services market.

¹ See 18 C.F.R. § 385.214(b)(2)(ii).

A. Ex Ante and Ex Post Prices

Like PJM and New England, the Midwest ISO settles its real-time market using “ex post” prices (i.e., prices that are computed after the operating period is over). The ex post prices are used for settlements and are calculated after the operating period based on the actual power flows and output. “Ex ante prices” are produced by the real-time dispatch model and are consistent with the cost-minimizing set of dispatch instructions. The prices are set to levels that give generators an incentive to follow their dispatch instructions. Hence, consistency between the ex ante and ex post prices is important for ensuring that suppliers have the incentive to follow the ex ante dispatch instructions.

Ex post prices are produced by separate model from the UDS known as the LMP Calculator. At the end of each interval, the LMP Calculator re-calculates dispatch quantities and prices using inputs that are different in several respects from the inputs used by UDS. For each flexible resource, a “real-time offer price” is used in place of its offer curve. For a resource following dispatch instructions, its “real-time offer price” equals the ex ante price at its location or, if it is operating at its maximum output level, the offer price corresponding to its’ actual production level.

For a resource that is under-producing by a significant amount, the “real-time offer price” equals the offer price corresponding to the resource’s actual production level. Each flexible resource is treated as having a small dispatchable range around its actual production level, where the upward range is much smaller than the downward range (e.g. approximately 0.1 MW up and 2 MW down). The purpose of the ex post pricing method is to generate a set of prices that is consistent with the actual production levels of generators in the market, rather than their dispatch instructions.

While it is useful to correct any errors affecting the ex ante pricing solution prior to settlement, other price changes made by the ex post pricing method create inefficiencies in the market.

The following sections describe the problems created by the current ex post pricing methodology. The evaluation in this section addresses three areas:

- Why the current ex post pricing method does not improve incentives to follow dispatch instructions.
- Why the current implementation of ex post pricing produces a small but persistent upward bias in real-time prices.
- How occasional distortions caused by the current ex post pricing method lead to inefficient pricing in congested areas.

B. Theoretical Ex Post Pricing Does Not Improve Incentives to Follow Dispatch Instructions

Ex post pricing has been justified, in part, as a means to provide resources with incentives to follow dispatch instructions. However, ex post pricing does not efficiently provide such an incentive for several reasons. First, suppliers that are primarily scheduled day-ahead will not be substantially harmed by small adjustments in the real-time price. Second, with the exception of the periodic price effects in congested areas, the pricing methodology will not usually result in significant changes in prices when a unit does not follow dispatch instructions. In general, this is the case because many other units will have real-time offer prices in the ex post model equal to the ex ante price that can replace the unit not following dispatch. Hence, it is very unlikely that the ex post pricing enhances incentives to follow dispatch instructions.

In fact, because ex post pricing can sometimes substantially affect prices in congested areas, it can diminish suppliers' incentives to follow ex ante dispatch instructions when prices in the congested area are volatile. A much more effective means to send targeted incentives to respond to dispatch instructions is the use of uninstructed deviation penalties.

A final theoretical concern is that ex post prices are theoretically less efficient than ex ante prices. The ex ante dispatch and prices represent the least cost dispatch of the system, given bids, offers, and binding constraints. If a unit is unable to respond to the dispatch instruction, then it implies that less supply is available to the market, and thus, the price should have been set by a more expensive offer. In other words, a higher-cost offer would have been taken if the market had known the unit could not respond. In such a case, however, the ex post pricing method would reduce the energy prices from the ex ante level.

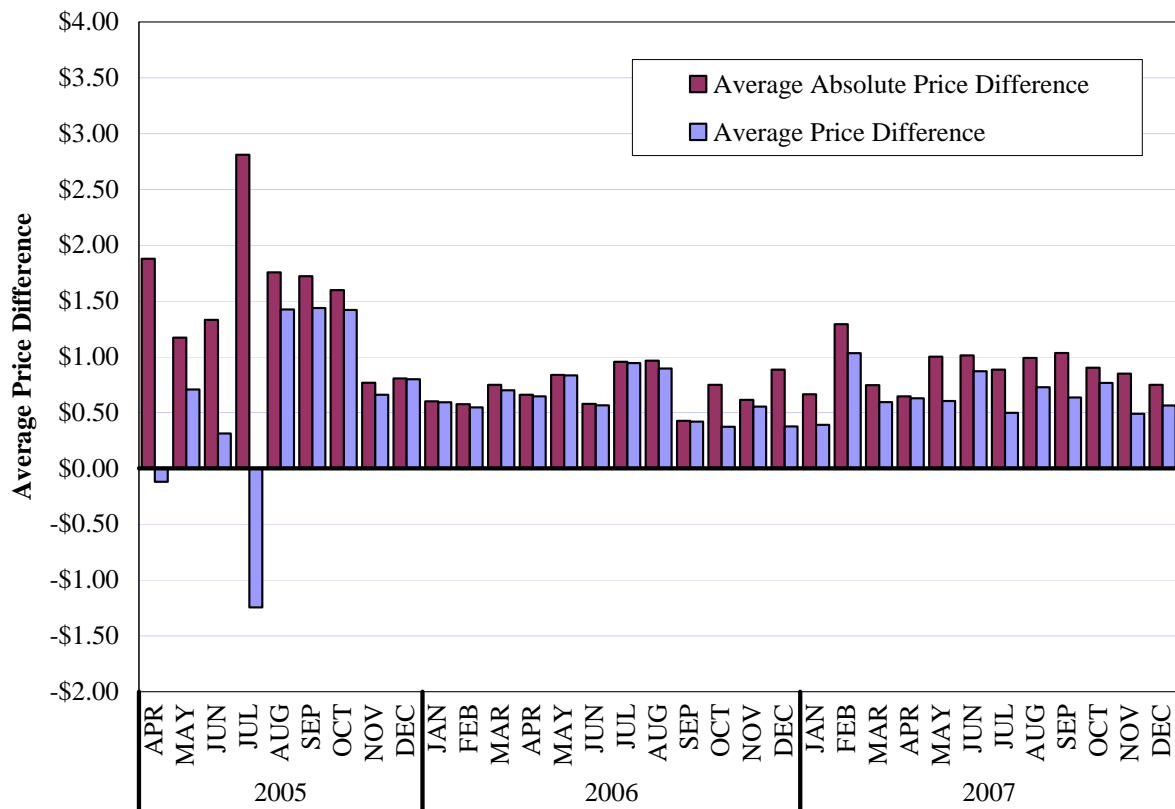
The ex post pricing methodology is designed to satisfy two objectives. First, it allows the Midwest ISO to calculate energy prices that correct for errors that may have been included in the ex ante dispatch and prices. Second, it re-solves prices, adjusting for generation that is not following dispatch instructions. While the correction of errors in the ex ante solution is beneficial, the other changes made by the ex post pricing methodology are inefficient. Ex post pricing methodologies in general result in real-time prices that are inconsistent with the market's dispatch instructions, which can undermine generators' incentives to follow such instructions. Hence, we recommended in the 2007 State of the Market Report that the Midwest ISO replace the current ex post pricing methodology with an approach that would utilize the ex ante prices produced by UDS, corrected for metering or other errors. This is consistent with the Midwest ISO proposal in this docket.

C. Evaluation of Ex Post Pricing from 2007 State of the Market Report

Our analysis in the State of the Market Report evaluates the consistency between ex post and ex ante prices. The figure below summarizes the results of our analysis, showing both the average difference in the five-minute ex post and ex ante prices, as well as the average of the absolute value of the hourly difference in the prices. This second metric indicates how large the differences are, regardless of the direction of the difference.

The figure shows there is a persistent bias in the ex post calculator that causes the ex post price to be generally higher than the ex ante price by approximately three percent. The persistent bias results from a combination of two factors. First, loss factors change slightly between the ex ante price calculation and the ex post price calculation as the pattern of generation and load changes. Even though many units' "real-time offer prices" are equal to the ex ante price (which should make them economically equivalent), the changes in loss factors affect the relative offer costs of the resources. The second factor is that the dispatchable range of each resource is generally 20 to 40 times larger in the downward direction than the upward direction.

**Ex Ante and Ex Post Price Differences
2005- 2007: All Hours**



In a typical interval, there may be 100 or more flexible resources. At locations where the loss factors increase the most from the ex ante to the ex post model, resources will appear most costly and be moved downward in the ex post model. Since the downward dispatchable range is much larger than the upward dispatchable range, many resources will be ramped up to their

maximum to replace the unit that is ramped down. In a random interval we examined without congestion, three units were moved down and more than 70 units were moved up. As the units moving up reach their assumed maximum, increasingly more expensive units will set the ex post prices. Hence, the resource that is marginal in the ex post calculation usually has a loss factor that is higher than in the ex ante calculation, thereby leading to an upward bias in prices.

In conclusion, our evaluation of the effects of ex post pricing indicates that it:

- Creates a small upward bias in real-time prices in uncongested areas;
- Introduces small potential inefficiencies by setting prices that are not consistent with dispatch instructions; and
- Periodically distorts the value of congestion into constrained areas.

Perhaps the only significant benefit of ex post pricing is that it allows the ISO to correct the real-time prices when the ex ante prices are affected by corrupt data or communication failures. The other changes in prices introduced by the current ex post pricing process fail to provide a credible incentive to follow dispatch instructions, introduces a small upward bias and creates additional pricing distortions. Therefore, the current ex post pricing mechanism merits reform.

D. The Proposed Real Time Ex Post Pricing Process

Under the proposed revisions, the Midwest ISO ex post pricing process would employ the same data inputs and dispatch optimization system as used in the ex ante dispatch solution, subject only to input data validation and correction. As such corrections are infrequent, the proposed pricing process will settle the energy and ancillary services markets at ex post prices that are substantially the same as the ex ante prices used to dispatch the system. The reform would eliminate existing sources of bias and other inefficiencies introduced by the current ex post pricing methodology.

The revised pricing process retains the price certainty benefits of ex ante pricing, since prices change infrequently. In addition, because the resulting prices will be more consistent with least cost dispatch of the system, the revised pricing process will provide better incentives for suppliers to respond to dispatch instructions and improve the operation of the Midwest ISO system.

IV. CONCLUSION

Given the theoretical and practical problems with ex post pricing, we have recommend that the ISO consider an ex post pricing process that would correct ex ante prices for settlement, rather than the current ex post pricing methodology.

For the reasons set forth above, I recommend that the Commission approve Midwest ISO's revisions to Section 40.2.17 of the Tariff as proposed.

Respectfully submitted,

/s/ David B. Patton

David B. Patton, President
Potomac Economics
Midwest ISO Independent Market Monitor

Dated: August 1, 2008

CERTIFICATE OF SERVICE

I hereby certify that I have this day e-served a copy of this document upon all parties listed on the official service list compiled by the Secretary in the above-captioned proceeding, in accordance with the requirements of Rule 2010 of the Commission's Rules of Practice and Procedure (18 C.F.R. § 385.2010).

Dated this 1st day of August 2008.