



*Market Monitoring Unit*

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**REPORT  
TO  
THE FEDERAL ENERGY REGULATORY COMMISSION**

**ENFORCEMENT REMEDIES**

**Market Monitoring Unit  
PJM Interconnection, L.L.C.**

**April 1, 2001**

## **Introduction**

On November 25, 1997, the Commission approved the comprehensive restructuring of the PJM marketplace, establishing PJM as an Independent System Operator (“ISO”).<sup>1</sup> The Commission further authorized PJM to administer the PJM Power Exchange (“PJM PX”).

In its order, the Commission found that the restructuring of PJM “will significantly alter the operation of the electric power market within PJM” and that, as a result, “it is important to monitor its implementation to assess undue discrimination and market operation” and to evaluate “how the pool and non-pool markets and transmission pricing arrangements are working.” The Commission directed PJM to submit a proposed market monitoring plan that would allow PJM to monitor and report to the Commission on the potential to exercise market power within PJM. The Commission stated that the plan should evaluate the operation of both pool and bilateral markets to detect either design flaws or structural problems.<sup>2</sup>

On June 29, 1998, PJM filed a Market Monitoring Plan (“Plan”) in compliance with the Commission’s Order. The Plan was filed as an amendment to the PJM Tariff in order to ensure the PJM Board’s independence in administering and revising the Plan.<sup>3</sup> By order issued March 10, 1999 the Commission accepted the Plan filed by PJM as part of the PJM Tariff to be effective April 1, 1999.<sup>4</sup> The Commission found that the ability of the Market Monitoring Unit (“MMU”) to effectively and broadly monitor and investigate the PJM Market to be essential in view of its contemporaneous decision to approve market-based pricing authority on offers to sell energy into the PJM-PX.<sup>5</sup>

The March 10 Order requires the MMU to report to the Commission by April 1, 2001 on: (1) the MMU’s assessment of the standards, indices and criteria by which it will evaluate data and information collected; (2) the MMU’s evaluation of additional enforcement remedies, if any.<sup>6</sup>

This Report is filed pursuant to item (2) above in the Commission’s March 10 Order.

## **PJM’s Market Monitoring Plan**

The Market Monitoring Plan establishes the MMU as a separate market monitoring unit of PJM with a broad range of monitoring responsibilities. Among other responsibilities, under the Plan, the MMU is to monitor the activities of participants in the PJM PX for the potential exercise of market power, monitor all bilateral and other electric power

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<sup>1</sup> Pennsylvania-New Jersey-Maryland Interconnection, 81 FERC ¶ 61,257 (1997) (“November 25 Order”).

<sup>2</sup> 81 FERC at 62,282.

<sup>3</sup> The Plan appears in the PJM Tariff at Original Sheet No. 184 through First Revised Sheet No. 190. Section references herein are to Sections of the Plan.

<sup>4</sup> See PJM Interconnection, L.L.C., 86 FERC ¶ 61,247 (1999) (“March 10 Order”).

<sup>5</sup> Id. at 61,887 n.4 (citing Atlantic City Elec. Co., 86 FERC ¶ 61,248 (1999)).

<sup>6</sup> The Commission also stated: “We direct the MMU to provide copies of its filing to the PJM board and state commissions by that time as well.” 86 FERC ¶ 61,247 (1999).

transactions, and monitor participants for their compliance with the rules, standards, procedures, and practices of PJM.

While the MMU does not have enforcement powers, the Plan does provide the MMU with the authority to take specific corrective actions, to the extent the MMU deems necessary, as a result of monitoring activities. These corrective actions are, in summary:

1. Engage in discussions to bring issues to the attention of market participants and attempt to resolve issues informally.
2. Recommend modifications to the PJM Tariff, Operating Agreement or other PJM rules, standards, practices and procedures.
3. Issue demand letters requesting that market participant(s) discontinue identified actions in violation of the rules, standards, practices or procedures governing the operation of the PJM markets.
4. Recommend actions to PJM Committees or the PJM Board.
5. Make regulatory filings to address design flaws, structural problems, compliance, market power or other issues and to seek remedial measures or make recommendations for regulatory action.
6. Consider and evaluate a broad range of additional enforcement mechanisms that may be necessary to assure compliance with PJM's rules, standards, procedures and practices.

#### **PJM Market Power Mitigation Authority**

Important elements of the PJM market design serve to mitigate against the exercise of market power and thus reduce the need for the MMU to require explicit enforcement authority. These market design elements include: the flexibility for market participants to structure the terms and length of contracts to meet their needs, the energy market offer cap, the regulation market offer cap, limitations on the exercise of local market power, the required submission of cost data, limitations on the frequency of setting start up and no load offers, the existence of capacity markets, the publication of energy market offer data and the required coordination of generator outages. In addition, the MMU has proposed, PJM Members have adopted and FERC has approved, several rule changes which strengthen the mitigation authority of existing PJM rules. These rule changes include: limitations on the use of operating constraints to evade the offer cap, requirements regarding transmission outage notification and rules limiting the ability to benefit from creating congestion in the day ahead market.

An essential feature of PJM markets is their flexibility. For example, participants in the energy markets buy and sell energy from internal and external resources, via bilateral arrangements and via PJM's spot market. Bilateral contracts can be of whatever term the parties to the contract believe appropriate.

The Amended and Restated Operating Agreement of PJM Interconnection L.L.C. (OA) includes a \$1,000/MWh offer cap for the energy markets. No supplier can offer energy to PJM at a price greater than \$1,000, except under emergency conditions as described below. The offer cap is an essential tool that limits the exercise of market power by generation owners during times when the demand for energy is high and inelastic. The

offer cap played this role during the summer of 1999 and has also served to limit the exercise of market power at other times.<sup>7</sup> PJM does have the authority to accept offers of greater than \$1,000/MWh for emergency energy. Such offers of emergency energy do not set the market clearing price.<sup>8</sup>

The OA includes a \$100 offer cap for the regulation market. As with the energy market offer cap, the regulation market offer cap is an essential tool which limits the exercise of market power in the regulation market, which is cleared jointly with the energy market, and helps ensure that the two markets function effectively together.

The OA includes provisions designed to limit the exercise of local market power by giving PJM the authority to cost cap units when the units are must run for reliability.<sup>9</sup> When PJM's daily analysis indicates that a specific unit will be required to operate during the following day to resolve a reliability issue associated with the transmission system, PJM can limit the offer of that unit to its marginal cost plus 10%. While the unit cannot set LMP higher than its cost plus 10%, the unit will receive the higher of marginal cost plus 10% or system LMP. This rule prevents the unilateral exercise of market power by a unit with local market power. The local must run offer caps do not apply to generation resources used to relieve the Western, Central or Eastern interface limits which, when binding, were considered to define markets with adequate resources to be competitive. In addition the local must run offer caps do not apply in local markets which FERC has explicitly defined to be competitive.

The OA requires all units subject to the local market power mitigation rule to submit a cost curve that reflects the unit's marginal operating costs. The details of the components of such costs are defined in the Cost Development Guideline Manual. This data is important for market monitoring and is used to monitor the spreads between price offers and underlying costs.

The OA guarantees that a unit, if selected to operate under economic dispatch, will receive its offer price including start up and no load costs. Any cost recovery that is not covered by the market price paid to the unit is paid via operating reserves. This guarantee provides an incentive to offer a marginal operating rate without consideration for the recovery of start up and no load costs by ensuring full recovery. The OA also includes a provision that limits changes to the start up and no load components of generator offers for market-priced units.<sup>10</sup> Generating units are permitted to change their start up and no load offers only twice per year. This rule was designed to limit the exercise of market power by providing incentives for competitive behavior. The rule provides an incentive to units to submit start up and no load offers consistent with long term economic dispatch goals and provides a disincentive to units to increase start up and no load offers at times

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<sup>7</sup> See PJM Interconnection State of the Market Report 1999.

<sup>8</sup> Amended and Restated Operating Agreement of PJM Interconnection, L.L.C., Schedule 1, Section 1.10.1a.

<sup>9</sup> Amended and Restated Operating Agreement of PJM Interconnection, L.L.C., Schedule 1, Section 6.

<sup>10</sup> Amended and Restated Operating Agreement of PJM Interconnection, L.L.C., Schedule 1, Section 1.9.7(b).

when PJM needs the energy from all units. In such cases, the OA would require loads to pay for the start up and no load components of such offers via operating reserves.

Capacity obligations have played a critical role in maintaining grid reliability and in contributing to the effective, competitive operation of the energy market in PJM. Load Serving Entities (LSEs) in PJM are required to acquire capacity resources equal to their load obligations including a reserve margin. Adequate capacity resources, as defined by the OA and Reliability Assurance Agreement Among Load Serving Entities in the PJM Control Area (RAA), provide the assurance that energy will be available to loads in PJM on even the highest load days. A critical link between capacity obligations and reliability is that generation owners sell a recall right to the energy from their generation when they sell capacity resources. This enables PJM to recall energy exports from capacity resources when PJM invokes Emergency procedures.<sup>11</sup> The recall right establishes the link between capacity and the actual delivery of energy when it is needed.

A second link between capacity obligations and reliability is the requirement that owners of capacity resources offer the output of these resources into PJM's day ahead market. When load serving entities purchase capacity, they also pay for the assurance that the resources will be available to provide energy on a daily basis and not solely in emergencies. Day ahead offers are financially binding; resource owners must provide the energy offered at the offered price either from the specified unit or by purchasing the energy at the spot market price and reselling it at the offer price.

As required by FERC's March 10 Order, PJM publishes energy market offer data for all units which make offers into PJM's energy market. This data permits market participants and others to monitor the markets and to form independent judgements about the competitiveness of the PJM energy market. The added scrutiny from interested parties tends to serve as a check on the exercise of market power.

The RAA requires owners of capacity resources to submit planned outage schedules to PJM so that PJM can coordinate planned outage schedules including all generation resources and planned transmission outages.<sup>12</sup> The RAA also requires that owners of capacity resources submit data on all actual outages. The RAA rules governing outages help to ensure that generation owners do not physically withhold generation from the markets in an attempt to exercise market power. The data submission requirements permit the detailed tracking of both planned and unplanned outages and the detailed reasons for each.

### **Market Monitoring Unit Initiatives**

In addition to these market design elements, the Market Monitoring Unit has recommended several design changes to address market power issues. These changes were adopted by PJM members and are now part of PJM market rules.

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<sup>11</sup> PJM Emergency procedures are defined in the PJM Manual for Emergency Operations.

<sup>12</sup> Reliability Assurance Agreement Among Load Serving Entities in the PJM Control Area, Article 9.

### ***Operating Constraints***

The MMU identified a market design flaw relating to operating constraints that generators designate as part of their market-based price offers when PJM issues Maximum Emergency Generation Alerts. Maximum Emergency Generation Alerts occur when PJM anticipates that system conditions may require the use of all available economic offers, typically during extreme weather conditions. Under these conditions, generation owners had been able to effectively circumvent the \$1,000 cap on energy offers specified in Schedule 1 of the PJM OA by including certain operating constraints in their offers.

When a unit is economically dispatched, based on its per MWh offer, the OA guarantees that it will be paid its full costs, including start up and no loads costs but also including the costs associated with operating constraints. For example, by including an arbitrary 24-hour minimum runtime as an operating constraint with a \$1,000 per MWh offer, a generation owner could ensure that it would receive up to \$1,000 per MWh for 24 hours, even though the unit's energy may have been economic (and therefore dispatched by PJM) for only a few hours. The payments for the \$1,000 per MWh energy would be made from operating reserves for the hours when the unit was not economically dispatched. MMU investigations determined that this design flaw resulted in purchasers of electricity during the summer of 1999 paying substantially in excess of the amount that they would have paid but for this practice.

The recommended solution was to evaluate the effective all-in offer price during the hours when the offer is economic, i.e., when the spot market energy portion of the offer is less than or equal to the relevant LMP. The effective all-in offer price includes the operating reserves credit that the seller would have received over the entire day (absent this new rule) spread over the hours that the offer is economic. If that effective all-in price exceeds \$1,000/MWh, then there is no operating reserves credit to the seller. If the effective all-in offer price is less than or equal to \$1,000/MWh, then the seller receives operating reserves credits based on the submitted operating constraints. The new rules apply only on days when PJM calls a Maximum Generation Emergency or Maximum Generation Emergency Alert or schedules units in anticipation of such emergencies or alerts.

### ***Transmission Outage Notification***

The establishment of the Fixed Transmission Rights (FTR) auction created potential issues related to the timing of transmission outages. Any party with prior knowledge of transmission outages could use that information to take profitable positions in the FTR auction market. As transmission companies have knowledge of planned transmission outages prior to the posting of that information, there could be an issue if transmission companies or their affiliates take positions in the FTR market that are, or appear to be, based on information that is not publicly available prior to the close of the auction.

A complaint was filed with the MMU regarding a specific incident in which the timing of transmission outage notification was at issue. While the MMU found no evidence that inappropriate activity occurred in that case, in order to maintain confidence in the

markets and in order to minimize the potential for gaming the markets, the MMU recommended a solution to PJM. The proposed solution was to clarify and strengthen the transmission outage notification provisions of the PJM Manuals. If such general notification occurs prior to the close of the relevant FTR auctions, it gives all market participants an opportunity to hedge against the risk of congestion created by the scheduled outages.

PJM's members approved modifications to the rules governing transmission outage notification based on the MMU's recommendation. These modifications strengthen the notification provisions of the PJM Transmission Manuals and include appropriate incentives to provide adequate notice of transmission outages. The modified rules require all transmission owners to provide notice of transmission outages to PJM for posting on the OASIS by the first day of the month preceding the month of the outage. Thus notification is required prior to the close of the FTR auction which applies to the month of the outage. If such notification is not provided, PJM can require the transmission owner to reschedule the outage so as to minimize congestion costs. In addition, all transmission owners are required to submit planned outage schedules one year in advance and to update those schedules on a regular basis.

#### ***FTRs, Increment Offers and Decrement Bids***

Shortly after the introduction of the day ahead market, a market design flaw was discovered in the interaction between the day ahead market rules and the rules governing the FTR auction. The rules governing the submission of increment offers and decrement bids in the day ahead market permitted market participants to create congestion in the day-ahead market in order to make their FTRs more valuable.<sup>13</sup> Increment offers and decrement bids are financial commitments made in the day ahead market to supply power or take power off the system, respectively, at specified prices. It was possible, under the prior rules, for participants to obtain FTRs in the monthly FTR auction for specific paths and then used increment and decrement bids in the day-ahead market to cause transmission congestion across the paths where they had purchased FTRs. Congestion, and thus differences in LMPs, make FTRs valuable because the value of an FTR is equal to the MW FTR position from point A to point B times the difference in LMP between point A and point B.

A new market rule was developed, using a collaborative process involving all stakeholders, approved by members and filed on December 22, 2000 for implementation on December 23.<sup>14</sup> The rule requires market participants to return profits on FTR positions when those profits result from the use of increment and decrement bids in the day ahead market to create more congestion on a path in the day ahead market than exists on that path in the real time market. The rule allows market participants to recover congestion charges from FTRs in the day-ahead market as long the congestion created in the day ahead market is consistent with real-time congestion.

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<sup>13</sup> The rules governing increment offers and decrement bids are in the PJM Operating Agreement, Schedule 1, Section 1.10.1a(i).

<sup>14</sup> See PJM Interconnection, LLC, Docket No. ER01-773, Letter Order issued January 26, 2001.

## **Conclusion and Recommendation**

The Market Monitoring Unit has, to date, addressed the exercise of market power via proposed changes to the PJM market rules. The ability of the MMU to limit its actions to such recommendations is, in significant part, the result of the existing market design and rules in PJM. Current PJM rules include a variety of measures designed to disincent, limit and prevent the exercise of market power.

The MMU does not have the authority to compel responses to data requests addressed to market participants.<sup>15</sup> While the MMU can, and has, requested that FERC act to compel responses to discovery requests, this process is necessarily slow. In a fast moving market environment where market conditions and pricing can change dramatically from hour to hour and from day to day, the MMU could clearly benefit from the ability to compel responses to data requests. For example, if the offers of one or more market participants do not appear to be based on competitive considerations, it is important to be able to investigate the basis for such offers quickly before taking any substantive action against such participants. As the basis for generator offers can be complex, such evaluations can frequently resolve concerns efficiently and effectively without requiring a FERC filing. If the evaluations do not resolve the concerns, a FERC filing may be necessary.

The market power mitigation authority incorporated in PJM rules does not include the authority to limit specific market offers to a defined competitive level in order to prevent economic withholding. The MMU will make every effort to work with stakeholders on the design of market rules that incent competitive offers. However, it is possible that under certain circumstances, there will be no alternatives available to the MMU in responding to attempts to exercise market power via economic withholding.

FERC directed the MMU to evaluate additional enforcement remedies. The result of that evaluation is that there is good reason to provide to the MMU the ability to compel responses to data requests within specified timeframes. The result of that evaluation is also that the MMU does not now require an expansion of the enforcement authority of the MMU. However, it is possible that the MMU will face situations that are not reasonably resolvable by the necessarily somewhat lengthy process of proposing rules changes or filing requests for action directly with FERC. It is thus possible that, in the future, the MMU will request that FERC grant broader enforcement authority to the MMU than is currently encompassed in the Market Monitoring Plan.

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<sup>15</sup> PJM Market Monitoring Unit Report to the Federal Energy Regulatory Commission, Enforcing Data Requests, April 1, 2000.