2009 Quarterly State of the Market Report for PJM:
January through September

Monitoring Analytics, LLC
Independent Market Monitor for PJM

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PREFACE

PJM has filed to amend Attachment M (PJM Market Monitoring Plan) to the PJM Open Access Transmission Tariff in order to provide, consistent with Order No. 719,[1] a requirement that the Market Monitoring Unit (MMU) "report on aggregate market performance on no less than a quarterly basis to Commission staff, to staff of interested state commissions, and to the management and board of directors of the RTOs or ISOs."[2] Upon acceptance by the Commission, Section VI.A of Attachment M would read:

> The Market Monitoring Unit shall prepare and submit contemporaneously to the Commission, the State Commissions, the PJM Board, PJM Management and to the PJM Members Committee, annual state-of-the-market reports on the state of competition within, and the efficiency of, the PJM Markets, and quarterly reports that update selected portions of the annual report and which may focus on certain topics of particular interest to the Market Monitoring Unit. The quarterly reports shall not be as extensive as the annual reports. In its annual, quarterly and other reports, the Market Monitoring Unit may make recommendations regarding any matter within its purview. The annual reports shall, and the quarterly reports may, address, among other things, the extent to which prices in the PJM Markets reflect competitive outcomes, the structural competitiveness of the PJM Markets, the effectiveness of bid mitigation rules, and the effectiveness of the PJM Markets in signaling infrastructure investment. The annual reports shall, and the quarterly reports may include recommendations as to whether changes to the Market Monitoring Unit or the Plan are required.[3]

Although the tariff language is not yet approved,[4] Monitoring Analytics, LLC, which serves as the Market Monitoring Unit defined in Attachment M, has determined to meet the requirement for a quarterly report on the basis of the requirement established in Order No. 719. Accordingly, the MMU submits this *2009 Quarterly State of the Market Report for PJM: January through September*.

1 125 FERC ¶61,071 at PP 395, 413–19 (2008), *order on reh'g*, 128 FERC ¶61,059.
2 125 FERC ¶61,071 at PP 395, 413–19 (2008), *order on reh'g*, 128 FERC ¶61,059.
3 PJM OATT, "Attachment M: PJM Market Monitoring Plan," Sixth Revised Sheet No. 452–452A (proposed to become effective June 29, 2009).
4 On May 27, 2009, Monitoring Analytics filed a Protest and Compliance Proposal of the Independent Market Monitor for PJM in FERC Docket No. ER09-1036. The Compliance Proposal addressed issues related to the independence of the market monitoring function but contained no proposed modifications of the provision quoted above.

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SECTION 1 - INTRODUCTION

The PJM Interconnection, L.L.C. operates a centrally dispatched, competitive wholesale electric power market that, as of September 30, 2009, had installed generating capacity of 167,269 megawatts (MW) and more than 500 market buyers, sellers and traders of electricity in a region including more than 51 million people in all or parts of Delaware, Illinois, Indiana, Kentucky, Maryland, Michigan, New Jersey, North Carolina, Ohio, Pennsylvania, Tennessee, Virginia, West Virginia and the District of Columbia.[1] As part of that function, PJM coordinates and directs the operation of the transmission grid and plans transmission expansion improvements to maintain grid reliability in this region.

PJM Market Background

PJM operates the Day-Ahead Energy Market, the Real-Time Energy Market, the Reliability Pricing Model (RPM) Capacity Market, the Regulation Market, the Synchronized Reserve Markets, the Day Ahead Scheduling Reserve (DASR) Market and the Long Term, Annual and Monthly Balance of Planning Period Auction Markets in Financial Transmission Rights (FTRs).

PJM introduced energy pricing with cost-based offers and market-clearing nodal prices on April 1, 1998, and market-clearing nodal prices with market-based offers on April 1, 1999. PJM introduced the Daily Capacity Market on January 1, 1999, and the Monthly and Multimonthly Capacity Markets in mid-1999. PJM implemented an auction-based FTR Market on May 1, 1999. PJM implemented the Day-Ahead Energy Market and the Regulation Market on June 1, 2000. PJM modified the regulation market design and added a market in spinning reserve on December 1, 2002. PJM introduced an Auction Revenue Rights (ARR) allocation process and an associated Annual FTR Auction effective June 1, 2003. PJM introduced the RPM Capacity Market effective June 1, 2007. PJM implemented the DASR Market on June 1, 2008.[2, 3]

Total Price of Wholesale Power

The total price of wholesale power is the total price per MWh of purchasing wholesale electricity from PJM markets. The total price includes the price of energy, capacity, ancillary services, transmission service, administrative fees, regulatory support fees and uplift charges. This total price is an average price and actual prices vary by location.

Table 1-1 Total price per MWh: January through September 2009 (New Table)

Category	$/MWh	Percent
Load Weighted Energy	$39.57	73.4%
Capacity	$9.03	16.8%
Transmission Service	$3.54	6.6%
Operating Reserves (Uplift)	$0.44	0.8%
Regulation	$0.33	0.6%
Reactive	$0.32	0.6%
PJM Administrative	$0.31	0.6%
Transmission Cost Recovery	$0.18	0.3%
Transmission Owner (Schedule 1A)	$0.08	0.1%
Synchronized Reserves	$0.03	0.1%
Black Start Services	$0.02	0.0%
RTO Startup and Expansion	$0.01	0.0%
NERC/RFC	$0.01	0.0%
Load Response	$0.00	0.0%
Total	$53.87	100.0%

1 See the *2008 State of the Market Report for PJM*, Volume II, Appendix A, "PJM Geography" for maps showing the PJM footprint and its evolution.
2 See also the *2008 State of the Market Report for PJM*, Volume II, Appendix B, "PJM Market Milestones."
3 Analysis of 2009 market results requires comparison to prior years. During calendar years 2004 and 2005, PJM conducted the phased integration of five control zones: ComEd, American Electric Power (AEP), The Dayton Power & Light Company (DAY), Duquesne Light Company (DLCO) and Dominion. By convention, control zones bear the name of a large utility service provider working within their boundaries. The nomenclature applies to the geographic area, not to any single company. For additional information on the integrations, their timing and their impact on the footprint of the PJM service territory, see the *2008 State of the Market Report for PJM*, Volume II, Appendix A, "PJM Geography."

Conclusions

This report assesses the competitiveness of the markets managed by PJM during the first nine months of 2009, including market structure, participant behavior and market performance. This report was prepared by and represents the analysis of the independent Market Monitoring Unit (MMU) for PJM.

The MMU concludes that in the first nine months of 2009:

- The Energy Market results were competitive;
- The Capacity Market results were competitive;
- The Regulation Market results were competitive;
- The Synchronized Reserve Market results were competitive;
- The Day Ahead Scheduling Reserve Market results were competitive; and
- The FTR Auction Market results were competitive.

Recommendations

The PJM Market Monitoring Plan provides under the heading "Market Design," in the section setting forth the MMU's function and responsibilities:

> PJM is responsible for proposing for approval by the Commission, consistent with tariff procedures and applicable law, changes to the design of the PJM Markets. If the Market Monitoring Unit detects a design flaw or other problem with the PJM Markets, the Market Monitoring Unit may initiate and propose, through the appropriate stakeholder processes, changes to the design of such market. In support of this function, the Market Monitoring Unit may engage in discussions with stakeholders, State Commissions, PJM Management, or the PJM Board; participate in PJM stakeholder meetings or working groups regarding market design matters; publish proposals, reports or studies on such market design issues; and make filings with the Commission on market design issues.[4]

4 PJM OATT Attachment M § IV.D.

In addition, the PJM Market Monitoring Plan provides, in describing the State of the Market Report: "In such reports, the Market Monitoring Unit may make recommendations regarding any matter within its purview."[5] Pursuant to its explicit mandate under the PJM Market Monitoring Plan, the MMU recommends retention of key market rules, specific enhancements to those rules and implementation of new rules that are required for continued competitive results in PJM markets and for continued improvements in the functioning of PJM markets. The MMU's recommendations from the *2008 State of the Market Report for PJM* remain recommendations.

In this *2009 Quarterly State of the Market Report for PJM: January through September*, the MMU makes specific recommendations, some of which were included in the *2009 Quarterly State of the Market Report for PJM: January through June*. Further details can be found in the referenced sections.

New Recommendations in Quarter Three

- Section 3, Energy Market Part 2, at "Modifications to Scarcity Pricing" (page 47):[6]
  - If there is scarcity pricing in the energy market, the market design must ensure that units receiving scarcity revenues in the capacity market do not also receive scarcity revenues in the energy market. This would be double payment of scarcity revenues.
  - The current single scarcity price signal should be replaced by locational signals.
  - The objective should be to create a system that recognizes scarcity in needed reserves, that redispatches units to maintain needed reserves and to meet the need for energy, and that provides market signals consistent with this redispatch and with any failure to maintain needed reserves.

5 PJM OATT Attachment M § VI.A. *See also* Order No. 719 at P 357 ("[W]e do expect the MMU to advise the Commission, the RTO or ISO, and other interested entities of its views regarding any needed rule and tariff changes. Likewise, in the event an RTO or ISO files for a proposed tariff change with which the MMU disagrees, we expect the RTO or ISO to inform the Commission of that disagreement, although not necessarily to include a written proposal with its filing."), codified at 18 C.F.R. § 35.28 (g)(3)(ii)(A) ("The Market Monitoring Unit must perform the following core functions: (A) Evaluate existing and proposed market rules, tariff provisions and market design elements and recommend proposed rule and tariff changes to the Commission-Approved independent system operator or regional transmission organizations, to the Commission's Office of Energy Market Regulation staff and to other interested entities such as state commissions and market participants").

6 For ease of reference, all the recommendations from the quarterly state of the market reports related to scarcity are listed here, including those from Quarter Two and Quarter Three.

- PJM needs to develop better measurements of available primary reserves prior to implementing a resource constraint based scarcity pricing mechanism as current measures are not adequate.

- Any scarcity pricing mechanism should also include an explicit, transparent set of rules governing the recall of energy produced by capacity resources and the defined conditions under which such recalls will occur.

- To avoid market power, the provision of reserves must continue to be based on unit characteristics included in a participant's energy offers, not on the basis of separate offers to provide reserves.

- The reserve penalty factor curve methodology also requires a mechanism to eliminate the effect of non-market administrative emergency measures used during scarcity situations.

- Section 4, Interchange Transactions, at "Loop Flows at PJM's Northern Interfaces" (page 78): The MMU recommends that a change in the interface pricing methodology be addressed directly. The MMU recommends that the parties consider the uniform adoption of a Generation Control Area (GCA) to Load Control Area (LCA) pricing methodology, similar to that used by PJM, to set transaction prices based on the actual flow of energy from source to sink. With the appropriate pricing, the incentive for market participants to schedule around specific RTOs/ISOs would be eliminated.

Continuing Recommendations from Quarter Two

- Section 2, Energy Market Part 1, at "DSR" (page 7): A substantial improvement in measurement and verification methods must be implemented in order to ensure the credibility of PJM demand-side programs. Recent changes to the settlement review process represent clear improvements, but do not go far enough.

- Section 4, Interchange Transactions, at "Up-To Congestion" (page 77): The MMU recommends that PJM consider eliminating all internal PJM buses for use in up-to congestion bidding. In effect, the use of specific buses is equivalent to creating a scheduled transaction which will not equal the actual corresponding power flow.

- Section 4, Interchange Transactions, at "Data Required for Full Loop Flow Analysis" (page 79): The MMU recommends that PJM and the Midwest ISO reiterate their initial recommendation to create an energy schedule tag archive, as this would contribute to the transparency necessary for a complete loop flow analysis. The data required for a meaningful loop flow analysis include tag data, market flow impact data, actual flowgate flow data and balancing authority ACE data for the Eastern Interconnection. The MMU recommends that the RTOs request action, and that both NERC and FERC consider taking the action required to make these data available to the RTOs and market monitors to make a full market analysis possible.

- Section 4, Interchange Transactions, at "Conclusion" (page 80): In order to manage interactions with non market areas, PJM has entered into coordination agreements with other balancing authorities as a first step. … PJM also entered into agreements with specific balancing authorities for separate interface pricing that have been questioned with respect to transparency and equal access. PJM needs to ensure that such pricing is transparent, accurately reflects actual LMP impacts on PJM, and that all participants have access to the defined pricing when in the same position. The goal of such pricing agreements should be to replicate LMP price signals that reflect the actual loads and the actual dispatch of units.

- Section 5, Capacity market, at "Conclusion, Market Design" (page 99): The market rules should explicitly require that offers into the Day-Ahead Energy Market be competitive, where competitive is defined to be the short run marginal cost of the units. The short run marginal cost should reflect opportunity cost when and where appropriate.

- Section 5, Capacity Market, at "Conclusion, Market Design" (page 99): A unit which is not capable of supplying energy consistent with its day-ahead offer should reflect an appropriate outage rather than indicating its availability to supply energy on an emergency basis.

- Section 5, Capacity Market, at "Conclusion, Market Power" (page 101): The performance incentives in the RPM Capacity Market design need to be strengthened.

- Section 6, Ancillary Services, at "Black Start Services" (page 114): The MMU recommends that PJM, FERC and state regulators reevaluate the way in which black start service is procured in order to ensure that procurement is done in a least cost manner for the entire PJM market.

- Section 6, Ancillary Services, at "Conclusion" (page 115): The MMU recommends that the DASR Market rules be modified to incorporate the application of the three pivotal supplier test.

- Section 8, Financial Transmission and Auction Revenue Rights, at "Conclusion" (page 158): The MMU recommends that the rules for ARR reassignment when load shifts should address the fact that in the case of ARRs self scheduled as FTRs, the underlying FTRs do not follow the load while the ARRs do.