



**Monitoring  
Analytics**

Monitoring Analytics, LLC  
2621 Van Buren Avenue, Suite 160  
Valley Forge Corporate Center  
Eagleville, PA 19403  
Phone: 610-271-8050  
Fax: 610-271-8057

**VIA ELECTRONIC FILING**

July 22, 2014

Kimberly D. Bose, Secretary  
Nathaniel J. Davis, Sr., Deputy Secretary  
Federal Energy Regulatory Commission  
888 First Street, NE  
Washington, D.C. 20426

Re: PJM Interconnection, L.L.C., Docket No. ER11-4628-000

Dear Secretary Bose:

Monitoring Analytics, LLC, acting in its capacity as the Independent Market Monitor for PJM, submits the attached report assessing the performance and effects of Price Responsive Demand (PRD) in PJM's markets as directed by the order issued in the above referenced proceeding on May 14, 2012.<sup>1</sup>

If you have any questions or concerns about this filing, please call the undersigned at (610) 271-8053.

Sincerely,

Jeffrey W. Mayes, General Counsel

---

<sup>1</sup> 139 FERC ¶ 61,115 at P 33.



Monitoring  
Analytics

# Price Responsive Demand

The Independent Market Monitor for PJM

July 22, 2014

This page intentionally left blank.

## Introduction

The Independent Market Monitor for PJM (MMU) submits this report in compliance with requirements set forth in the Commission's PRD Order (ER11-4628-000).<sup>1</sup> The Commission required that the MMU report on the performance of PJM's price responsive demand (PRD) program 60 days after PJM's release of the results of its May 2014 base residual auction. This report, prepared by the MMU, reviews the market penetration and functionality of Price Responsive Demand (PRD) (for the 2016/2017 and 2017/2018 Delivery Years) and provides recommendations for improvements. To date there has been no participation by any PRD Resources in any RPM auction for the transition period of the 2016/2017 Delivery Year through the 2018/2019 Delivery Year.

## Overview

A fully functional demand side of the electricity market means that end use customers or their designated intermediaries will have the ability to see real time energy price signals, will have the ability to react to real time prices and will have the ability to receive the direct benefits or costs of the resultant changes in real time energy use. In addition, customers or their designated intermediaries will have the ability to see current capacity prices, will have the ability to react to capacity prices and will have the ability to receive the direct benefits or costs of the corresponding changes in the demand for capacity. A functional demand side of these markets means that customers will have the ability to make decisions about levels of power consumption based both on the value of the uses of the power and on the actual cost of that power.

With exception of large wholesale customers in some areas, most customers in PJM are not on retail rates that directly expose them to the wholesale price of energy or capacity. As a result, most customers in PJM do not have the direct ability to see, respond to or benefit from a response to price signals in PJM's markets. PJM's demand side programs are generally designed to allow customers (or their intermediaries in the form of load serving entities (LSEs) or curtailment service providers (CSPs)) to either directly, or through intermediaries, be paid as if they were directly paying the wholesale price of energy and capacity and avoiding those prices when reducing load. PJM's demand side programs are designed to provide direct incentives for load resources to respond, via load reductions, to wholesale market price signals and/or system emergency events.

PRD resources are included in both the capacity market and the energy market as reductions to demand. This is a critical improvement on the existing DR construct which includes demand response resources as supply in the capacity market. PRD resources

---

<sup>1</sup> PJM Interconnection, L.L.C., 139 FERC ¶ 61,115 (2012).

are represented in PJM's capacity market as reductions to an LSE's capacity obligations at PRD Provider specified capacity prices in the Base Residual Auction (BRA) or the Third Incremental Auction (IA).<sup>2</sup> PRD resources are represented in PJM's energy market as node specific demand schedules.<sup>3</sup> PRD providers are required to submit real time energy market demand curves (made up of price and MW pairs), on a node specific basis, for its capacity market cleared or FRR committed PRD Resources.<sup>4</sup> Through automated price responsive systems or centralized control, a PRD Provider causes load resources, on a node specific basis, to respond to the real-time LMP, although responses to LMP are not mandatory under PRD. The PRD resource, or its LSE, benefits from the resulting load reductions as a reduction in its energy bill.

Outside of Maximum Emergency Generation events, PRD resources are not obligated to reduce demand according to their submitted demand schedules. During a Maximum Emergency Generation event, PRD resources must reduce their demand to match their submitted demand schedules, if LMP is at or above a customer's price threshold, or face penalties.<sup>5</sup> For a PRD provider with PRD resources at more than one bus in a zone, the PRD provider's compliance during performance events is measured by the aggregate load target of all of the PRD provider's affected nodes in the zone, rather than on an individual node specific basis.<sup>6</sup> A PRD provider with a portfolio of resources at multiple affected nodes can use its PRD resources that reduce more than their demand curve requirement at their respective nodes to offset its PRD resources that reduce less than

---

<sup>2</sup> See LSE PRD Credit, RAA Schedule 6.1 (Price Responsive Demand) § G.

<sup>3</sup> Throughout this report, node will represent a specific price node.

<sup>4</sup> RAA Schedule 6.1 (Price Responsive Demand) § F.

<sup>5</sup> The PRD resource submitted demand level target, termed the Maximum Emergency Service Level (MESL), is subject to a PRD load ratio adjustment factor. The MESL Adjustment Factor equals the greater of [1.0] or [(actual Zonal load– actual total PRD load in Zone) / (Final Zonal Peak Load Forecast – final Zonal Expected Peak Load Value of responding PRD in Zone)]. This adjustment factor increases the MESL target (increases the allowed load MW at each defined PRD price point) when the actual zonal load for the day is higher than the zonal peak forecast for the day.

<sup>6</sup> RAA Schedule 6.1 (Price Responsive Demand) § K. Note, there is a contradiction between RAA and Manual 18 on the measurement methodology. Manual 18 indicates that in the case of a PRD provider with PRD resources at more than one bus in a zone, the PRD provider's compliance during performance events is measured in terms of the aggregate MW shortfalls of all of the PRD provider's affected registrations in the zone, rather than on an individual node specific basis.

their demand curve requirement at their respective nodes in a given measurement period.

PRD demand curves, when submitted, are assumed to be responsive at the specified prices in PJM's solution software, regardless of whether the PRD has an obligation (based on declared Maximum Emergency Generation events) to perform. This means that a PRD resource demand curve may set LMP if the demand curve becomes the marginal resource in the solution software. A PRD resource bid price is currently limited to the \$1,000 offer cap applied to generation resources.<sup>7</sup>

PRD resources are not required to have telemetry to PJM operations. Absent system telemetry and direct dispatch capability by PJM consistent with that used for generation resources, PRD should not be eligible to set price in PJM's Real-Time Electricity Market. PJM's system does not assume responses, nor allow price setting, by generation resources unless the generation is actively following PJM's dispatch instructions and there is supporting telemetry.

To qualify as a PRD resource, customers are required to have dynamic retail rates,<sup>8</sup> meters that can record usage in an hourly interval or less, automated systems and centralized control by the PRD provider that can guarantee customer specific load response.<sup>9</sup> To participate in the PJM Capacity Market, a PRD provider must submit a PRD Plan by January 15, before the BRA or third IA of that year.<sup>10</sup> The PRD plan consists of different energy price thresholds at which a PRD provider guarantees, during maximum emergency generation events, to immediately reduce node specific consumption to a specified MW level. PRD bid in the capacity market appears as shifts in the auction's demand curve based on the PRD provider's specified capacity prices for a specific reduction in the LSE's capacity obligation. A PRD provider that clears in the capacity market must reduce its load to its Maximum Emergency Service Level (MESL) when PJM initiates a Maximum Emergency event and when LMP is at or higher than its

---

<sup>7</sup> RAA Schedule 6.1 (Price Responsive Demand) § D.4.

<sup>8</sup> Examples of qualifying dynamic retail rates are 1) LMP, 2) time of use electricity rates (with at least a peak and off peak price component) or 3) rates with peak time rebates. PJM "Manual 18: Capacity Market," Revision 22 (April 24, 2014), p. 30-31

<sup>9</sup> PJM "Manual 18: Capacity Market," Revision 22 (April 24, 2014), p 30.

<sup>10</sup> PJM "Manual 18: Capacity Market," Revision 22 (April 24, 2014), p 31.

specified price threshold. A PRD provider that is unable to reduce, on an affected node (aggregate or individual) basis, to their MESL level will pay penalties.<sup>11</sup>

PRD is a better approach than PJM's other demand response programs. In PRD, load resources see, respond to and benefit at the nodal level from a response to wholesale market price signals rather than receiving side payments. PJM's Economic Load Response program, for example, provides payment for energy reductions based on the zonal, rather than nodal, wholesale energy prices at the time of declared reductions in load, where declared reductions are measured against customer base line consumption levels that have significant measurement issues. PJM's Emergency Demand Response program allows participating load resources to sell in the ability to reduce load by specified MW amounts in times of declared emergencies as capacity supply MW in PJM's capacity market.<sup>12</sup> These MW are treated as supply although they are reductions in demand. Under the PRD program, MW of demand reduction are appropriately treated as demand.

The nodal nature of the PRD response also means that PRD resources have system operation and reliability advantages over demand side resources participating in PJM's other demand response program. Unlike PRD, the location of demand response is not known by PJM in the operational day.<sup>13</sup> While Emergency Demand Response resources are dispatchable, they respond on a zonal (or super zonal) basis, not on a nodal basis, and require at least a thirty minute notice under recent changes, rather than the near instant response required of PRD.<sup>14 15 16</sup>

While PRD is better than PJM's other demand side programs, the current implementation of the PRD program is not an attractive option for load resources relative to PJM's other demand side programs. This is reflected in the absence of PRD participation in any RPM auction for the transition period of the 2016/2017 Delivery Year

---

<sup>11</sup> PJM "Manual 18: Capacity Market," Revision 22 (April 24, 2014), p 38.

<sup>12</sup> PJM "Manual 18: Capacity Market," Revision 22 (April 24, 2014), p 132-135.

<sup>13</sup> PJM "Manual 11: Energy & Ancillary Services Market Operations," Revision 67 (June 1, 2014), p 108-109.

<sup>14</sup> PJM OATT. Attachment DD (Reliability Pricing Model) § 11 p. 2641.

<sup>15</sup> PJM OATT. Attachment DD-1(Procedures for Demand Resources and Energy Efficiency) p. 2655

<sup>16</sup> PJM "Manual 18: Capacity Market," Revision 22 (April 24, 2014), p 132-134.

and the 2017/2018 Delivery Year. This lack of participation is due primarily to the fact that the design of PRD is better than the design of existing demand side programs. The design of the other demand side programs makes them artificially attractive. PRD, by design, includes stronger compliance requirements and more limited aggregation opportunities across nodes. These requirements are necessary for PRD to act as effective, node specific price responsive demand in PJM's capacity and energy markets. However, the PRD program suffers from internally inconsistent rules regarding measurement of performance and inconsistent allocations of realized cost savings and penalties that disrupt the price signal, and therefore its value, to potential customers and providers. The rules favor participation by LSEs, not customers.

Properly revised, PJM's PRD program would allow end use customers, without intermediaries, to see, react to and receive the direct benefits or costs of changes in real-time energy use and capacity requirements, thereby providing a vehicle for effective demand side participation by customers in PJM's markets. The PRD program would provide an effective replacement for PJM's current DR programs with their critical design weaknesses. In the PRD program, participating LSEs should be required to pass on all the energy and capacity market savings, costs and penalties associated with PRD resources directly to the end use customer that is providing the PRD resource. The absence of a full pass through distorts, and in some cases eliminates, the incentives to participate in the PRD program.

The PRD program should be modified to require a stronger connection between LMP and the retail rates of customers that qualify to participate in the program. Customers should face real time LMP as a default at their price nodes, rather than just time of use rates in order to participate in the PRD program. Such exposure would allow end use customers, without intermediaries, to see, react to and receive the direct benefits or costs of changes in real-time energy use.

## ***Recommendations***

- The MMU recommends that the PRD program be reevaluated. The PRD program should be revised to allow end use customers, without intermediaries, to see, react to and receive the direct benefits or costs of changes in real-time energy use and in capacity requirements, thereby providing a vehicle for effective participation by customers in PJM's markets.
- The MMU recommends that participating LSEs be required to pass all the energy and capacity market savings, costs and penalties associated with PRD resources directly to the end use customer that is providing the PRD resource. The absence of a full pass through distorts, and in some cases eliminates, the incentives to participate in the PRD program.
- The MMU recommends that PJM limit eligible dynamic retail rate structures to retail rates that directly reflect LMP in order to provide end-use customers with an accurate price signal for electricity. Absent a direct link between the customer's time

of use rates and the customer's nodal LMP, retail rates distort the marginal incentives for customer power consumption.

- The MMU recommends that PJM require five minute interval meters for all PRD eligible end-use customers, rather than hourly interval meters, to provide more accurate measurement of partial hour compliance.
- The MMU recommends that PJM revise the penalty rules to make the PRD incentives consistent with the incentives in an all energy market. .
- The MMU recommends that PJM eliminate the MESL adjustment factor and measure compliance via a PRD resource's unadjusted MESL. Using the adjusted MESL will tend to undermine PRD reduction requirements during periods of greatest system stress, when the unadjusted MESL requirement would be most valuable to the system.
- The MMU recommends that PRD resource performance be measured at each specific node, rather than on the basis of a PRD provider's PRD portfolio within the zone.
- The MMU recommends that PJM eliminate discrepancies between the RAA and PJM's Manual 18.