

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

**Centralized Capacity Markets in
Regional Transmission Organizations and
Independent System Operators**)) **Docket No. AD13-7-000**

**Winter 2013-2014 Operations and Market
in Regional Transmission Organizations and
Independent System Operators**)) **Docket No. AD14-8-000**

**PJM INTERCONNECTION, L.L.C.
REPORT ON FUEL ASSURANCE ACTIVITIES**

Pursuant to the Commission’s *Order on Technical Conferences* issued in the above-referenced proceedings on November 20, 2014,¹ PJM Interconnection, L.L.C. (“PJM”) hereby submits this report on the status of its efforts to address market and system performance issues associated with generator access to sufficient fuel supplies and the firmness of generator fuel arrangements (hereafter, “fuel assurance”).

I. INTRODUCTION

The Commission has asked each regional transmission organization and independent system operator (“RTO/ISO”) to (1) describe the nature of fuel assurance concerns specific to the RTO/ISO, (2) describe the strategy or strategies the RTO/ISO has implemented or intends to implement to address market and system performance issues in

¹ Order on Technical Conferences, *Winter 2013-2014 Operations and Market Performance in Regional Transmission Organizations and Independent System Operators*, 149 FERC ¶ 61,145 (2014) (“Order”).

light of its fuel assurance concerns, and (3) detail the programs and mechanisms that the RTO/ISO will employ to carry out its strategies.²

Risks associated with fuel insecurity were highlighted in PJM during the extreme weather events of January 2014, when fuel supply inadequacies and generator outages in the PJM region led to tight system conditions.³ That experience made clear that enhancements were needed in PJM's market and system processes regarding fuel assurance. For example, fuel-related contractual constraints on generator availability during the extreme weather events of January 2014 challenged PJM operators and contributed to sharp increases in uplift payments in January 2014. Moreover, inflexible pipeline tariff provisions and gas marketer demands for multi-day gas commitments severely constrained generators and drove up prices during this critical period, even during weekend and non-peak hours.⁴

Adding to the urgency of its fuel assurance efforts, PJM is experiencing a trend toward greater reliance on gas-fired generation, with substantial retirements of coal-fired resources and a generator interconnection queue overwhelmingly weighted towards gas-fired resources. Cumulatively since 2008, and projecting forward to 2019, over 26,000 megawatts of coal- and oil-fired generation in the PJM region have retired or are

² Order at P 20.

³ See PJM Interconnection, L.L.C., *Analysis of Operational Events and Market Impacts During the January 2014 Cold Weather Events* (May 8, 2014); available at <http://www.pjm.com/~media/documents/reports/20140509-analysis-of-operational-events-and-market-impacts-during-the-jan-2014-cold-weather-events.ashx> ("2014 Cold Weather Report").

⁴ For more information regarding natural gas pipeline supply issues and generator availability, and PJM's recommendations to the Commission, see PJM's comments in response to *Commissioner Phillip D. Moeller's Inquiry Into the Trading of Natural Gas, and the Proposal to Establish an Electronic Information and Trading Platform*, Docket No. AD14-19-000, filed October 1, 2014.

expected to retire, driven by environmental regulatory changes, changing fuel prices, and the development of new, more efficient gas-fired generators.

PJM's fuel assurance activities are significant and continuing, with ongoing stakeholder discussions, a number of manual and tariff changes, and active Commission dockets. Below are summaries of various PJM strategies, programs, and mechanisms aimed at improving fuel assurance in the PJM region.

II. CAPACITY PERFORMANCE

The most significant PJM initiative to improve fuel assurance in the PJM region is the Capacity Performance Proposal now before the Commission.⁵ While the Capacity Performance Proposal maintains the successful, overall structure of the Reliability Pricing Model,⁶ it represents a significant enhancement to the definition of the capacity product procured via that mechanism. Under the Capacity Performance Proposal, owners and operators of generation capacity resources, including capacity storage resources, would have strong economic incentives to invest in fuel assurance and improved operation and maintenance, including firm fuel transportation arrangements, dual-fuel capability, on-site storage, and weatherization. Those investments would provide the PJM region with greater assurance of energy delivery and reserves during emergency conditions.

⁵ PJM Interconnection, L.L.C., *Reforms to the Reliability Pricing Market ("RPM") and Related Rules in the PJM Open Access Transmission Tariff ("Tariff") and Reliability Assurance Agreement Among Load Serving Entities ("RAA")*, Docket No. ER15-623-000, filed December 12, 2014 ("Capacity Performance Proposal").

⁶ All capitalized terms that are not otherwise defined herein shall have the same meaning as they are defined in the PJM Open Access Transmission Tariff or Amended and Restated Operating Agreement of PJM Interconnection, L.L.C.

Further, PJM has proposed to make capacity market offer caps more flexible to allow fuel assurance costs to be included in sell offers. In most cases, Capacity Market Sellers would submit offers capped at the net cost of new entry, which should allow individual sellers, within reason, adequate room to determine how best to meet their fuel availability and other capacity performance requirements. In the alternative, Capacity Market Sellers would be permitted to establish a cap above the net cost of new entry if they show, through an avoidable cost rate calculation, they require such a cap. PJM has proposed a new category of allowable expenses to the avoidable cost rate calculation specifically addressing fuel assurance called “Avoidable Fuel Availability Expenses.”

Importantly, the Capacity Performance Proposal would pair the additional flexibility to include costs associated with investments to assure resource performance with more severe economic consequences for resource non-performance. The proposal would replace the currently ineffective Peak Hour Performance evaluation with the concept of Performance Assessment Hours, during which resources would be subject to a non-performance charge of close to \$4,000 per megawatt-hour for failure to deliver energy when needed by PJM. A combination of increased offer flexibility and more significant consequences for non-performance will encourage sellers to invest in fuel assurance and improved operation and maintenance, so that their resources can perform when needed.

In summary, the Capacity Performance Proposal would give Capacity Market Sellers of generation capacity resources strong economic incentives to invest in fuel

assurance, and would provide fair, market-based mechanisms by which sellers may recover costs associated with those investments.⁷

III. ENERGY MARKET PARAMETER LIMITED SCHEDULES

As part of the Capacity Performance Proposal, PJM made a companion filing with enhancements to the rules by which Market Sellers may establish the operating parameters associated with the energy market offers for their generation resources.⁸ In both day-ahead and real-time operations, PJM schedules the most economically efficient set of resources needed to meet load and reserve requirements. However, operating parameters of individual generation resources, including minimum run times or environmental limitations, can reduce PJM's flexibility in scheduling and dispatching resources day-ahead and in real-time. Moreover, PJM's current energy market rules allow sellers in certain circumstances to condition their day-ahead offers on parameter limitations that unreasonably extend beyond physical operational characteristics and include economic or budgetary considerations, often related to fuel procurement. Those unreasonable parameter limitations further reduce PJM's flexibility in scheduling and dispatching resources. Therefore, in the Companion Filing, PJM has proposed energy market reforms that would require offers from capacity resources to be based strictly on

⁷ A number of parties have filed protests to various aspects of the Capacity Performance Proposal. PJM provides this summary of the Capacity Performance Proposal at the Commission's request in accordance with the Order, but is not suggesting that those protests need to be resubmitted in response to this aspect of this report. PJM asks the Commission to take administrative notice of the entire Capacity Performance Proposal docket as it reviews this report.

⁸ See *PJM Interconnection, L.L.C.*, Docket No. EL15-29-000, pp. 5-15, filed December 12, 2014 ("Companion Filing").

the specific physical operational characteristics of those resources, and not on economic or budgetary considerations, including considerations related to natural gas supply.

For example, during certain January 2014 peak natural-gas demand days, various pipeline operators required customers, including generators in the PJM region, to take natural gas from their systems in even, incremental amounts over a 24-hour natural gas day, *i.e.*, from 10:00 a.m. to 10:00 a.m. Those requirements forced generators to run during periods when they traditionally would be uneconomic. In those circumstances, the generators were required to either run or face significant operational or economic penalties imposed by the pipeline operators. When controlling the grid in January 2014, PJM operators had no choice but to dispatch generators that were relatively inflexible, because of pipeline issues and unreasonable parameter limitations. Those generators could not cycle on and off from hour to hour and were kept online through the overnight and uneconomic periods in order to be available during peak electricity demand hours. Because those generators operated outside of the timeframes when they were actually needed, they were compensated via make-whole payments, with costs assigned to load.⁹

However, load is already paying for capacity resources to be flexible and operate according to the resources' physical operational characteristics. Therefore, in the Companion Filing, PJM has proposed rule changes that would disqualify parameter-limited resources from receiving make-whole payments, in certain circumstances, for excess hours of operation. For example, if a resource is unable to operate on the basis of the parameters that otherwise would be defined by the physical operational characteristics of the resource, but instead must operate less flexibly for reasons such as fuel supply

⁹ PJM also has experienced this phenomenon during the current winter of 2014-2015, but to a lesser extent than was experienced during the more severe winter of 2013-2014.

limitations, and the Market Seller therefore submits parameters to PJM that deviate from those established by PJM for the resource, then the seller would forfeit any make-whole payments when operating the resource based on its less flexible parameters. Because make-whole payments would be forfeited in those instances, sellers would have greater incentive to invest in fuel assurance including dual-fuel capability and on-site storage.

IV. GAS UNIT COMMITMENT COORDINATION

In response to the events described in the 2014 Cold Weather Report, on May 29, 2014, the PJM Operating Committee presented its Gas Unit Commitment Coordination (“GUCC”) issue charge and problem statement to the PJM Markets and Reliability Committee (“MRC”). Through numerous meetings and significant PJM and stakeholder efforts, the GUCC stakeholder process introduced changes in real-time operations including improved clarity in dispatcher communications and notifications, improved generator data accuracy, more transparency and standardization in the commitment of units with long lead times due to fuel restrictions, and better sharing of updated unit parameters including notification times, dual-fuel capability and availability, fuel inventories, and resource parameter limitations. On November 20, 2014, the PJM Operating Committee presented the MRC with a GUCC proposal, including proposed changes to Manual 11 (*Energy & Ancillary Services Market Operations*) and Manual 13 (*Emergency Operations*), which the MRC endorsed.¹⁰

¹⁰ See the meeting minutes from the November 20, 2014 MRC meeting, available at <http://www.pjm.com/~media/committees-groups/committees/mrc/20141218/20141218-item-01-mrc-draft-minutes-20141120.ashx>.

The GUCC stakeholder process also introduced a mechanism by which a Market Seller can make intraday changes on an hourly basis to a generator's cost-based schedule in the real-time energy market. The ability to make intraday schedule changes is expected to improve the availability of generation and the efficiency of the markets by allowing sellers to include in their cost-based schedules a more accurate reflection of true fuel costs, which otherwise might result in out-of-market payments or taking a generator off-line rather than operating at a loss. PJM currently is implementing changes to its eMarket scheduling system to accommodate the various GUCC recommendations.

V. OTHER INITIATIVES

In preparation for winter 2014-2015, PJM engaged in numerous activities that affect fuel assurance. Those activities included: (1) a winter study and sensitivity analysis conducted by PJM's Operations Assessment Task Force, which included a gas shortage scenario based on pipeline restrictions; (2) a survey of generator fuel inventories and operational capabilities; (3) the development of a cold-weather resource capability test and preparation checklist for generators; (4) the rollout of new dispatch training that covers the changes since the winter 2013-2014 and reviews emergency procedures; (5) the development of a gas-fired generator database including information on dual-fuel capabilities and natural gas service provider (*e.g.*, interstate pipeline or local distribution company ("LDC")); (6) geographic information system mapping of gas-fired generators and natural gas pipelines; and (7) the establishment of protocols for the sharing of

nonpublic, operational information with interstate pipeline operators and intrastate LDCs operating within the PJM region.¹¹

The fuel survey identified in number 2 above was sent to all generation owners and operators in the PJM region. PJM used the survey to gather details on dual-fuel capabilities, including fuel types and fuel-switching capability. This information was used to provide PJM with better real-time and operating data on generator fuel capabilities and limitations. A significant portion of this fuel-switching capability was exercised during the winter testing windows described in number 3 above, which testing gave the Market Sellers with dual-fuel generators an opportunity to test their switching capabilities under operating conditions to help prepare for cold weather conditions. The training described in number 4 above reviewed all of PJM's new procedures, including the new GUCC processes, as well as the study results described in number 1 above. This training was provided to PJM operators and operating support staff, and was made available to the operators of PJM member companies.

PJM also established a gas analysis team whose purpose is to support PJM dispatchers in understanding the impact of natural gas availability on PJM's ability to reliably operate the grid. Responsibilities of the gas analysis team include: (1) sharing day-ahead generator commitments with participating interstate pipelines; (2) receiving and evaluating intraday and day-ahead generator scheduled quantities from participating interstate pipelines; (3) gathering information about pipeline status, critical notices, and operational capacity; (4) identifying generation resources of concern based on pipeline

¹¹ To date, PJM has established information-sharing protocols with all but one interstate natural gas pipeline operator, and continues to negotiate for the voluntary exchange of information with the remaining interstate pipeline operator and intrastate LDCs.

status, day-ahead commitment, gas nominations, and current operating status (*i.e.*, whether on-line or off-line); (5) developing a risk outlook matrix by PJM zone based on pipeline status and fuel availability; and (6) conducting weekly, seasonal, and critical-day teleconferences with pipeline operators to discuss their operational status, areas of concern, and outlook.

VI. CONCLUSION

PJM appreciates this opportunity to report on its fuel assurance activities, which include both near-term and longer-term initiatives. In the near term, PJM is actively working with generation owners and operators, natural gas pipeline operators, and others to address operational issues associated with fuel assurance. In the longer term, PJM's proposed capacity market reforms and enhancements to the definition of the capacity product are expected to encourage necessary investments in fuel assurance, including firm fuel transportation arrangements, dual-fuel capability, on-site storage, and weatherization.

Respectfully submitted,



Craig Glazer
Vice President – Federal Government Policy
PJM Interconnection, L.L.C.
1200 G Street, N.W.
Suite 600
Washington, D.C. 20005
(202) 423-4743
craig.glazer@pjm.com

James M. Burlew
Counsel
PJM Interconnection, L.L.C.
2750 Monroe Boulevard
Valley Forge Corporate Center
Audubon, PA 19403
(610) 666-4345
james.burlew@pjm.com

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CERTIFICATE OF SERVICE

I hereby certify that I have this day served the foregoing document upon each person designated on the official service list compiled by the Secretary in these proceedings.

Dated at Audubon, Pennsylvania, this 18th day of February, 2015.

/s/ James M. Burlew
James M. Burlew
Counsel
PJM Interconnection, L.L.C.
2750 Monroe Boulevard
Valley Forge Corporate Center
Audubon, PA 19403
(610) 666-4345

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