



Monitoring  
Analytics

# **Activities of the Market Monitoring Unit 2020**

Independent Market Monitor for PJM  
December 14, 2021

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## Preface

This report is posted pursuant to Section VI.C of Attachment M to the PJM Open Access Transmission Tariff (the “PJM Market Monitoring Plan” or “Plan”), which directs the Market Monitoring Unit (“Market Monitor,” also known as the “MMU,” Independent Market Monitor for PJM” or “IMM”) “to prepare a detailed public annual report about the Market Monitoring Unit’s activities, subject to protection of confidential, proprietary, and commercially sensitive information and the protection of the confidentiality of ongoing investigations and monitoring activities.”<sup>1</sup>

Monitoring Analytics, LLC serves as the Independent Market Monitor for PJM.<sup>2</sup> PJM is a regional transmission organization (RTO) that is responsible for ensuring the reliability of the electric power supply system and operating the wholesale power market in 13 states and the District of Columbia. The MMU is responsible for promoting a robust, competitive and nondiscriminatory electric power market in PJM by implementing the PJM Market Monitoring Plan.

From mid March 2020 through the end of the year, the MMU continued to perform its responsibilities and functions almost entirely through remote work during the COVID-19 crisis. A required subset of the IT department reported to work on site to maintain the substantial hardware and systems necessary for the continued operation of the MMU.

The Federal Energy Regulatory Commission (FERC) assigns three core functions to MMUs: monitoring, reporting, and market design.<sup>3</sup> The PJM Market Monitoring Plan provides the Market Monitoring Unit shall objectively monitor the competitiveness of PJM Markets, investigate violations of FERC or PJM Market Rules, recommend changes to PJM Market Rules, prepare reports for the Authorized Government Agencies and take such other actions as are specified in the Plan.<sup>4</sup>

The PJM Market Monitoring Plan provides that the MMU is responsible for monitoring: compliance with the PJM Market Rules; actual or potential design flaws in the PJM Market Rules; structural problems in the PJM markets that may inhibit a robust and competitive market; the potential for a market participant to exercise market power or violate any of the PJM or FERC Market Rules; the actual exercise of market power or violation of the PJM or FERC Market Rules; PJM’s implementation of the PJM Market

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<sup>1</sup> PJM Open Access Transmission Tariff (OATT) Attachment M § VI.C.

<sup>2</sup> See 144 FERC ¶ 61,238 (2013).

<sup>3</sup> 18 CFR § 35.28(g)(3)(ii); see also *Wholesale Competition in Regions with Organized Electric Markets*, Order No. 719, FERC Stats. & Regs. ¶31,281 (2008) (“Order No. 719”), *order on reh’g*, Order No. 719-A, FERC Stats. & Regs. ¶31,292 (2009), *reh’g denied*, Order No. 719-B, 129 FERC ¶ 61,252 (2009).

<sup>4</sup> PJM Open Access Transmission Tariff (OATT) Attachment M § IV.A.

Rules or operation of the PJM markets; and such matters as are necessary to prepare reports.<sup>5</sup>

To perform its monitoring function, the MMU screens and monitors the conduct of market participants under the MMU's broad purview to monitor, investigate, evaluate and report on the PJM markets.<sup>6</sup> The MMU has direct, confidential access to the FERC.<sup>7</sup> The MMU may also refer matters to the attention of state commissions.<sup>8</sup>

The MMU monitors market behavior for violations of FERC Market Rules.<sup>9</sup> The MMU investigates and refers "Market Violations," which refers to any "tariff violation, violation of a Commission-approved order, rule or regulation, market manipulation, or inappropriate dispatch that creates substantial concerns regarding unnecessary market inefficiencies..."<sup>10 11</sup> The MMU also monitors PJM for compliance with the rules, in addition to market participants.<sup>12</sup>

Another important component of the monitoring function is the review of inputs to mitigation. The actual or potential exercise of market power is addressed in part through *ex ante* mitigation rules incorporated in PJM's market clearing software for the energy

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<sup>5</sup> OATT Attachment M § IV; 18 CFR § 1c.2.

<sup>6</sup> OATT Attachment M § IV.

<sup>7</sup> OATT Attachment M § IV.K.3.

<sup>8</sup> OATT Attachment M § IV.H.

<sup>9</sup> OATT Attachment M § II(d)&(q) ("FERC Market Rules" mean the market behavior rules and the prohibition against electric energy market manipulation codified by the Commission in its Rules and Regulations at 18 CFR §§ 1c.2 and 35.37, respectively; the Commission-approved PJM Market Rules and any related proscriptions or any successor rules that the Commission from time to time may issue, approve or otherwise establish... "PJM Market Rules" mean the rules, standards, procedures, and practices of the PJM Markets set forth in the PJM Tariff, the PJM Operating Agreement, the PJM Reliability Assurance Agreement, the PJM Consolidated Transmission Owners Agreement, the PJM Manuals, the PJM Regional Practices Document, the PJM-Midwest Independent Transmission System Operator Joint Operating Agreement or any other document setting forth market rules.")

<sup>10</sup> The FERC defines manipulation as engaging "in any act, practice, or course of business that operates or would operate as a fraud or deceit upon any entity." 18 CFR § 1c.2(a)(3). Manipulation may involve behavior that is consistent with the letter of the rules, but violates their spirit. An example is market behavior that is economically meaningless, such as equal and opposite transactions, which may entitle the transacting party to a benefit associated with volume. Unlike market power or rule violations, manipulation must be intentional. The MMU must build its case, including an inference of intent, on the basis of market data.

<sup>11</sup> OATT Attachment M § II(h-1).

<sup>12</sup> OATT Attachment M § IV.C.

market, the capacity market and the regulation market. If a market participant fails the TPS test in any of these markets its offer should be set to the lower of its price-based or cost-based offer. The MMU monitors offer capping and identifies situations when offer capping does not prevent the exercise of market power. Effective offer capping prevents the exercise of market power and ensures competitive pricing, provided that the cost-based offer accurately reflects short run marginal costs.

The MMU performs its reporting function by preparing annual and quarterly state of the market reports, including detailed market design recommendations, and detailed reports on specific market issues. The MMU issues reports on each RPM base residual auction. The MMU's reports also respond to the needs of FERC, state regulators, or other regulatory authorities, to assist policy development, decision making in regulatory proceedings, and in support of investigations. The MMU participates in FERC technical conferences as appropriate.

In order to perform its role in PJM market design, the MMU evaluates existing and proposed PJM Market Rules as well as the design and implementation of the PJM markets.<sup>13</sup> The MMU initiates and proposes changes to the design of such markets or the PJM Market Rules in stakeholder or regulatory proceedings.<sup>14</sup> In support of this function, the MMU engages in discussions with stakeholders, state commissions, PJM management, and the PJM Board; participates in PJM stakeholder meetings regarding market design matters; publishes proposals, reports or studies on such market design issues; and makes filings with the Commission on market design issues.<sup>15</sup> The MMU may also recommend changes to the PJM Market Rules to the staff of the Commission's Office of Energy Market Regulation, state commissions, and the PJM Board.<sup>16</sup> The MMU may provide in its annual, quarterly and other reports "recommendations regarding any matter within its purview."<sup>17</sup>

The MMU posts market data, public reports, presentations, regulatory filings and market messages on the Monitoring Analytics web page at: <http://www.monitoringanalytics.com>.

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<sup>13</sup> OATT Attachment M § IV.D.

<sup>14</sup> *Id.*

<sup>15</sup> *Id.*

<sup>16</sup> *Id.*

<sup>17</sup> OATT Attachment M § VI.A.

# Monitoring

## ***Market Surveillance***

The MMU analyzes and monitors all of the PJM markets, including the Day-Ahead Energy Market, the Real-Time Energy Market, the RPM Base Residual Auctions and Incremental Auctions, the Regulation Market, the Primary Reserve Markets both Synchronized and Nonsynchronized, the Day-Ahead Scheduling Reserve Market and the Annual, Monthly, Long Term and Balance of Planning Period Auction Markets in Financial Transmission Rights (FTRs). The MMU monitors the provision of other cost-based ancillary services including black start service and reactive service. The MMU analyzes and monitors transmission issues, including transmission outages, transmission line ratings, competition to build transmission facilities, and the impact of transmission on competition. The MMU analyzes and monitors generation and transmission planning issues, including the queue process. This ongoing market analysis and monitoring are the basis for all MMU activities.

Correctly defined cost-based offers for the energy market and the regulation market should be based on short run marginal costs. The MMU reviews units' fuel cost policies to ensure that they define, in an algorithmic, verifiable and systematic way, how the market value of fuel is calculated in cost-based offers. The MMU calculates energy market opportunity costs for environmentally limited units. The MMU reviews emissions rates, heat rates, and variable operations and maintenance costs, as well as the submitted cost-based offers. If a cost-based offer does not adhere to the PJM Market Rules, the MMU recommends that PJM issue a penalty, as defined in OA Schedule 2.

For example, the MMU monitors participant development of inputs to prospective mitigation, including Avoidable Cost Rates and net revenues in RPM; unit-specific offers in the capacity market under the Minimum Offer Price Rule; offer caps for capacity resources, including unit specific offer caps and risk premia; fuel costs, maintenance costs, cost-based offers and operating parameters in the energy markets, including eligibility for Frequently Mitigated Unit (FMU) adders. In the course of this monitoring, the MMU provides feedback to participants and engages in discussions about the appropriateness of costs and cost levels. The MMU monitors compliance with the RPM and CP must offer rules and reviews exception requests to these rules. The MMU monitors compliance with the Minimum Offer Price Rule (MOPR) and reviews unit specific exception requests. The MMU verifies and confirms the results of the Three Pivotal Supplier Test in the capacity market. The MMU monitors compliance with the must offer rule for capacity resources in the day-ahead energy market. The MMU monitors costs included in black start service rates. The MMU reviews proposed deactivations to identify potential market power issues. The MMU prepares monthly notifications to PJM generation owners regarding the status of Frequently Mitigated Units per Schedule 1, Section 6.4.2 of the PJM Operating Agreement. The MMU also monitors other tariff requirements related to offers in the energy market, the capacity market and the ancillary services markets.

If the MMU determines that it has identified a significant market problem or a potential market violation by a market participant or PJM that may require further inquiry, a referral, and/or action by the Commission, the MMU is required to notify the Commission's Office of Enforcement.<sup>18</sup>

If the MMU determines that it has sufficient credible information that PJM's or a participant's market behavior may require investigation, it is required to submit a formal confidential referral of such behavior to the Commission's Office of Enforcement.<sup>19</sup> Such referrals typically include substantial analysis of the issue referred. After a referral, the MMU provides further assistance to FERC staff as requested.

The MMU monitors how PJM implements the market rules. For example, the MMU replicates the clearing of the capacity market and provides feedback to PJM when it identifies issues, and monitors the clearing of the energy market, including operator interventions. The MMU monitors uplift payments, especially the determination of whether a resource follows PJM's dispatch instructions and whether a resource is eligible for uplift payments. The MMU monitors PJM's application of the Three Pivotal Supplier Test in the energy, capacity and regulation markets. The MMU analyzes the causes of shortage pricing events. The MMU monitors the testing and application processes for demand response, energy efficiency, and distributed energy resources. The MMU monitors outage reporting and the outage approval process. The MMU verifies and confirms the results of PJM's application of the FTR forfeiture rule, a retroactive mitigation measure, prior to PJM billing PJM members. The MMU provides detailed information to market participants who have questions about the application of the rule to the participant's portfolio. The MMU monitors the profitability of virtual transactions and whether the profitability is the result of false arbitrage based on modeling and operational differences between the day-ahead and real-time energy markets.

If the MMU believes that market design flaws exist that could be remedied by rule changes, the MMU is required to make a referral to the Commission's Office of Energy Market Regulation.<sup>20</sup>

## ***Discussions with Market Participants***

The PJM Market Monitoring Plan provides that in addition to informing Commission staff, the MMU may "Engage in discussions regarding issues relating to the PJM Market Rules or FERC Market Rules in order to understand such issues and to attempt to resolve informally such issues or other issues."<sup>21</sup> In fulfilling this role in 2020, the MMU

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<sup>18</sup> OATT Attachment M § IV.I.

<sup>19</sup> *Id.*

<sup>20</sup> OATT Attachment M § IV.I.2.

<sup>21</sup> OATT Attachment M, § IV.J.1.

monitored participant behavior and discussed relevant matters with market participants. In addition, the MMU received and investigated confidential complaints.

The MMU regularly discusses issues with market participants from all parts of the market. For example, the MMU engaged in discussions with market participants, including generation owners, renewable suppliers, demand side providers, industrial customers, financial participants, public power entities, transmission owners, load serving entities, state public utility commissions, environmental interests, and public advocates.

### ***Discussions with PJM***

The MMU engaged in frequent discussions with PJM about, among other things, the fuel cost policy approval process, specific generator fuel cost policies, cost-based offers, and the application of penalties for incorrect cost-based offers; the calculation of variable operating and maintenance expense includable in energy offers; the application of uplift rules; credit and default issues; FTR issues; reactive power; regulation; the real-time energy market dispatch and pricing processes; specific high price events; reserve measurement and deployment; market efficiency transmission projects.

### ***Communications with Regulators***

The MMU provides information to regulators, subject to compliance with applicable rules protecting confidentiality:

The MMU communicated with FERC staff regarding current issues; provided data in response to requests from FERC staff; met with the FERC Office of Enforcement; met with state regulators; met with the Organization of PJM States, Inc. (OPSI); and met with the Consumer Advocates of PJM States (CAPS) to answer questions and discuss a range of topics.

### ***Referrals***

The MMU filed six confidential referrals of market violations under OATT Attachment M § IV.I.1, with the Office of Enforcement.

### ***Reporting***<sup>22</sup>

#### ***Reports and Analyses***

Publication of four state of the market reports fulfilled the reporting requirements in the tariff and Commission regulations on market monitoring policy by providing a comprehensive analysis of PJM markets and an assessment of the competitiveness of

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<sup>22</sup> Public reports by the MMU are posted at <<http://www.monitoringanalytics.com>>.



each market.<sup>23</sup> The reports also provided detailed recommendations related to market design and the details rules related to market design.<sup>24</sup>

#### **Other Reports:**

- CONE and ACR Values – Preliminary (January 21, 2020).
- 2019 State of the Market Report for PJM (March 12, 2020).
- Potential Impacts of the MOPR Order (March 20, 2020).
- Potential Impacts of the Creation of Maryland FRRs (April 16, 2020).
- 2020 Quarterly State of the Market Report for PJM: January through March (May 14, 2020).
- Potential Impacts of the Creation of New Jersey FRRs (May 13, 2020).
- Report to the Ohio Public Utilities Commission - Congestion in Ohio (May 15, 2020).
- Report to the North Carolina Utilities Commission - Congestion in the Dominion Service Territory in North Carolina (July 13, 2020).
- MMU Cost-Based Offer Technical Guide v1 (July 16, 2020).
- Potential Impacts of the Creation of Ohio FRRs (July 17, 2020).
- MMU Cost-Based Offer Technical Guide – Appendix A (July 21, 2020).
- 2020 Quarterly State of the Market Report for PJM: January through June (August 13, 2020).
- 2020 PJM Generation Capacity and Funding Sources: 2007/2008 through 2021/2022 (September 15, 2020).
- 2020 Quarterly State of the Market Report for PJM: January through September (November 12, 2020).
- Independent Market Monitor Report on PSEG FRR 2.0 - NJBPU Investigation of Resource Adequacy Alternatives (November 23, 2020).
- Activities of the Market Monitoring Unit: 2019 (December 14, 2020).

#### ***Market Messages***

- Net Revenues for PJM RPM Base Residual Auctions in 2020 (January 16, 2020).
- Generation Capacity Resources in PJM Region Subject to RPM Must Offer Obligation for 2020/2021, 2021/2022 and 2022/2023 Delivery Years (February 21, 2020).
- Press Release - 2019 State of the Market Report for PJM (March 12, 2020).
- IMM Fuel Cost Policy Templates Revisions (March 30, 2020).

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<sup>23</sup> OATT Attachment M § VII.A

<sup>24</sup> See 2019 State of the Market Report for PJM: Volume 2, Section 2: Recommendations, (March 14, 2020).

- Generation Capacity Resources in PJM Region Subject to RPM Must Offer Obligation for 2021/2022 and 2022/2023 Delivery Years (June 30, 2020).
- MMU Cost-Based Offer Technical Guide - Draft v1 (July 16, 2020).
- MIRA –Fuel Cost Policy Point of Contact (August 3, 2020).
- Press Release - 2020 Quarterly State of the Market Report for PJM: January through June (August 13, 2020).
- Members Committee Letter – 2020 Quarterly State of the Market Report for PJM: January through June (August 13, 2020).
- Generation Capacity Resources in PJM Region Subject to RPM Must Offer Obligation for 2021/2022 and 2022/2023 Delivery Years (September 30, 2020).
- Press Release - 2020 Quarterly State of the Market Report for PJM: January through September (November 12, 2020).
- Members Committee Letter – 2020 Quarterly State of the Market Report for PJM: January through September (November 12, 2020).
- CRF Issues in the Capacity Market (December 4, 2020).
- IMM Notification to Members of Subpoena (December 9, 2020).
- Generation Capacity Resources in PJM Region Subject to RPM Must Offer Obligation for 2021/2022 and 2022/2023 Delivery Years (December 29, 2020).

## ***Data Postings***

### **Marginal Fuel Postings**

- 201909\_Marginal\_Fuel\_Postings.csv (January 20, 2020).
- 201910\_Marginal\_Fuel\_Postings.csv (January 20, 2020).
- 201911\_Marginal\_Fuel\_Postings.csv (January 20, 2020)
- 201912\_Marginal\_Fuel\_Postings.csv (March 25, 2020).
- 202001\_Marginal\_Fuel\_Postings.csv (March 25, 2020).
- 202002\_Marginal\_Fuel\_Postings.csv (April 1, 2020).
- 202003\_Marginal\_Fuel\_Postings.csv (May 14, 2020).
- 202004\_Marginal\_Fuel\_Postings.csv (June 1, 2020).
- 202005\_Marginal\_Fuel\_Postings.csv (July 1, 2020).
- 202006\_Marginal\_Fuel\_Postings.csv (August 3, 2020).
- 202007\_Marginal\_Fuel\_Postings.csv (September 2, 2020).
- 202008\_Marginal\_Fuel\_Postings.csv (October 5, 2020).
- 202009\_Marginal\_Fuel\_Postings.csv (November 4, 2020).
- 202010\_Marginal\_Fuel\_Postings.csv (December 3, 2020).

### **Percentage of PJM Load by State**

- PJM Load by State - 2019 (XLS) (June 3, 2020).

- PJM Load by State - 2020 (XLS) (December 3, 2020).

## **Components of the PJM Price of Wholesale Power**

- Monthly Total Price Table - 2020 (XLSX) (December 10, 2020).
- Monthly Total Price Table - 2019 (XLSX) (December 3, 2020).
- Monthly Total Price Table - 2018 (XLSX) (December 3, 2020).
- Monthly Total Price Table - 2017 (XLSX) (October 14, 2020).
- Monthly Total Price Table - 2016 (XLSX) (October 14, 2020).
- Monthly Total Price Table - 2015 (XLSX) (October 14, 2020).
- Monthly Total Price Table - 2014 (XLSX) (October 14, 2020).
- Monthly Total Price Table - 2013 (XLSX) (October 14, 2020).
- Monthly Total Price Table - 2012 (XLSX) (October 14, 2020).
- Monthly Total Price Table - 2011 (XLSX) (October 14, 2020).
- Monthly Total Price Table - 2010 (XLSX) (October 14, 2020).
- Monthly Total Price Table - 2009 (XLSX) (October 14, 2020).

## ***Industry Briefings***

As part of its reporting role, the MMU provided briefings and presentations to industry groups and the Federal Energy Regulatory Commission (FERC). In 2020, the MMU shared the results of its analyses, experience and knowledge regarding competitive markets, market monitoring and market power mitigation at various conferences and meetings.

- Speaker. "How will the new MOPR impact PJM?" Power Markets Today, Webinar, February 26, 2020.
- Speaker. "Electricity Issues and Modeling Workshop," Resources for the Future, Washington, D.C. March 5, 2020.
- Speaker. "Pursuing State Clean Energy Policies/Resources in the Wake of FERC's MOPR Decision," Raab Roundtable in the PJM Footprint, Webinar, April 28, 2020.
- Speaker. IL Senate Energy Working Group meeting, May 4, 2020.
- Speaker. "Potential Impacts of the MOPR Order," Ohio Manufacturers' Association's Quarterly Energy Committee, May 21, 2020.
- Speaker. "Capacity Market Alternatives for States," Power Markets Today, Webinar. July 15, 2020.
- Speaker. "PJM vs. ERCOT: Which Organized Market Model Better Accommodates Clean Energy Resources? A Debate," North American Smart Week Energy, Webinar, September 18, 2020.
- Speaker. "Exploration of the Fixed Resource Requirement ("FRR") Option," New Jersey Board of Public Utilities, Webinar, September 18, 2020.

- Speaker. “Measuring the All-in Cost of Delivered Power,” ELCON (Electricity Consumers Resource Council), Webinar, September 29, 2020.
- Speaker. “FERC MOPR Order Update,” ARIPPA (Appalachian Regional Independent Power Producers), Webinar, October 6, 2020.
- Speaker. “Are Nodal Markets Prepared for the Distributed Grid of the Future?” Nodal Trader, Webinar, October 22, 2020.
- Speaker. “Introduction to Wholesale Power Markets,” NCEP (National Council on Electricity Policy) Webinar, October 26, 2020.
- Speaker. “Role of the Independent Market Monitor,” ODEC Annual Compliance Meeting, Webinar, December 1, 2020.
- Speaker. “Fixed Resource Requirement Work Session,” New Jersey Board of Public Utilities, Webinar November 9, 2020.
- Speaker. “Consumer Choice: can customers procure specific resource types through the market and how would that impact reliability,” Electricity Customer Alliance, Webinar, November 18, 2020.
- Speaker. “State-Level Policies and Other External Factors that Influence Regional Capacity Market Operations and Pricing,” EUCL, Webinar, December 16, 2020.
- Speaker. “Did FERC’s MOPR Orders Address the Real Problems and Provide Real Solutions for PJM and Potentially Other Capacity Markets?” EUCL, Webinar, December 17, 2020.

## ***Market Design***

Attachment M, Section IV.D provides “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.”<sup>25</sup> In FERC Order No. 719 and its order on compliance for PJM, the Commission has emphasized this MMU core function.<sup>26</sup> In Order No. 861, the Commission reaffirmed the MMU’s role in ensuring a

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<sup>25</sup> OATT Attachment M § IV.D.

<sup>26</sup> See 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

competitive market design. Order No. 861 eliminated market power screens from the requirements for the approval of market based rates in RTO markets, relying on the role of market monitoring and market power mitigation to ensure competitive markets.<sup>27</sup> Fulfilling its role in promoting effective market power mitigation and competitive markets requires the MMU to file comments and complaints before the Commission to provide the necessary information for FERC to develop a competitive market design. Following the process outlined in Order No. 861, the MMU has filed comments in the market based rates filings for PJM market sellers challenging the presumption that market power mitigation, as currently implemented by PJM, is sufficient to ensure competitive market pricing. In an August 30, 2019, order, FERC affirmed its determination that the Market Monitoring Plan permits the MMU to file complaints against PJM.<sup>28</sup>

## ***FERC Proceedings***

In 2020, the MMU intervened in proceedings at the FERC, filed substantive pleadings, most of which addressed market design issues and participated in numerous settlement and technical conferences with FERC staff in an effort to achieve compensation for reactive capability that is consistent with the PJM market design.

- **Anbaric Complaint (Docket No. EL20-10).** Answer of the Independent Market Monitor for PJM (January 8, 2020).

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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"). In its order of December 18, 2009, on PJM's filing in compliance with Order No. 719, the Commission required additional changes to ensure that the PJM Market Monitoring Plan fully conforms to Order No. 719's requirements concerning the role of MMUs in market design. 125 FERC ¶61,250 at P 113 (2009) ("PJM's OATT fails to specify the MMU's responsibility for evaluating existing and proposed market rules, tariff provisions and market design elements, and for recommending proposed rule and tariff changes to PJM, the Commission's Office of Energy Market Regulation and to other interested entities (i.e., state commissions and market participants). Attachment M, section IV.C, in this regard, provides only that, if the MMU "detects a design flaw or other problem with the PJM Markets," it may initiate and propose changes to such market design. This language, however, is limited to "design" issues relating to existing provisions and thus does not address the full scope of the core MMU function addressed by the Commission in Order No. 719").

<sup>27</sup> Refinements to Horizontal Market Power Analysis for Sellers in Certain Regional Transmission Organization and Independent System Operator Markets, Order No. 861, 168 FERC ¶ 61,040 (July 18, 2019).

<sup>28</sup> *PJM Interconnection, LLC*, 168 FERC ¶ 61,141, Docket No. ER16-372 (August 30, 2019) at P10.

- **UTC Uplift Allocation (Docket No. EL14-37).** Answer of the Independent Market Monitor for PJM (January 13, 2020).
- **MOPR Order (Docket Nos. EL16-49 and EL18-178).** Request for Clarification of the Independent Market Monitor for PJM (January 17, 2020). Answer and Motion for Leave to Answer of the Independent Market Monitor for PJM (February 5, 2020). Second Request for Clarification of the Independent Market Monitor for PJM (February 18, 2020). Request for Clarification of the Independent Market Monitor for PJM (May 15, 2020). Comments of the Independent Market Monitor for PJM ((May 15, 2020). Comments of the Independent Market Monitor for PJM (June 22, 2020). Answer and Motion for Leave to Answer of the Independent Market Monitor for PJM (July 23, 2020).
- **Tenaska FCP (Docket No. EL19-27).** Request of Rehearing of the Independent Market Monitor for PJM (January 17, 2020).
- **Immediate Need Reliability Exemption (Docket No. EL19-91).** Answer of the Independent Market Monitor for PJM (February 12, 2020).
- **PLS (Docket No. ER20-955).** Protest of the Independent Market Monitor for PJM (February 25, 2020). Answer and Motion for Leave to Answer of the Independent Market Monitor for PJM (March 24).
- **CIPS (Docket No. ER20-841).** Answer and Motion for Leave to Answer of the Independent Market Monitor for PJM (February 27, 2020).
- **Cost Containment (Docket No. ER19-2915-000, -001).** Answer and Motion for Leave to Answer of the Independent Market Monitor for PJM (February 28, 2020). Answer and Motion for Leave to Answer of the Independent Market Monitor for PJM (March 18, 2020). Answer and Motion for Leave to Answer of the Independent Market Monitor for PJM (March 20, 2020).
- **Manual 4 (Docket No. ER20-841).** Answer and Motion for Leave to Answer of the Independent Market Monitor for PJM (March 16, 2020).
- **Ramp Rates (Docket No. ER20-1414).** Comments of the Independent Market Monitor for PJM (April 17, 2020).
- **Carbon Pricing in FERC Jurisdictional Organized Regional Wholesale Electricity Markets (Docket No. AD20-14).** Comments of the Independent Market Monitor for PJM (April 20, 2020). Comments of the Independent Market Monitor for PJM (September 18, 2021).
- **Goldman Sachs MBR (Docket No. ER20-547).** Answer and Motion for Leave to Answer of the Independent Market Monitor for PJM (April 22, 2020).
- **LS Power Transaction (Docket No. EC20-49, EC20-65 and EC20-55).** Motion for Leave to File Comments Out of Time, Motion to Establish Comment Date and for Shortened Answer Period of the Independent Market Monitor for PJM (April 27, 2020). Comments of the Independent Market Monitor for PJM (June 1, 2020). Letter of the Independent Market Monitor for PJM (June 15, 2020). Answer of the Independent Market Monitor for PJM (June 24, 2020).



- **Load Management Testing Requirements (Docket No. ER20-1590).** Comments of the Independent Market Monitor for PJM (May 8, 2020).
- **PJM Fuel Cost Policy (Docket No. ER20-1764).** Comment of the Independent Market Monitor for PJM (May 26, 2020). Answer of the Independent Market Monitor for PJM (June 25, 2020). Request for Rehearing of the Independent Market Monitor for PJM (August 27, 2020).
- **MISO Battery Transmission (Docket No. ER20-588).** Comment of the Independent Market Monitor for PJM (June 1, 2020). Answer of the Independent Market Monitor for PJM (June 16, 2020).
- **XO FTR Complaint (Docket No. EL20-41).** Protest and Motion for Rejection of the Independent Market Monitor for PJM (June 1, 2020). Motion to Consolidate of the Independent Market Monitor for PJM (June 5, 2020). Answer of the Independent Market Monitor for PJM (June 30, 2020).
- **ORDC Complaint (Docket Nos. EL19-58; ER19-1486)).** Request for Rehearing of the Independent Market Monitor for PJM (June 19, 2020). Answer of the Independent Market Monitor for PJM (June 29, 2020). Comments of the Independent Market Monitor for PJM (July 27, 2020). Comments of the Independent Market Monitor for PJM (September 9, 2020). Answer and Motion for Leave to Answer of the Independent Market Monitor for PJM (October 19, 2020).
- **Transmission Rate Incentives (Docket Nos. RM20-10).** Comments of the Independent Market Monitor for PJM (July 1, 2020).
- **Five Minute Dispatch and Pricing. (Docket Nos. ER19-2722 and ER20-2573).** Motion for Extension of Abeyance of the Independent Market Monitor for PJM (July 31, 2020). Protest of the Independent Market Monitor of PJM (August 21, 2020). Answer of the Independent Market Monitor for PJM (September 25, 2020). Answer and Motion for Leave to Answer of the Independent Market Monitor for PJM (October 9, 2020).
- **Panda Hummel Settlement (Docket No. ER19-391-002).** Reply to Offer of Settlement of the Independent Market Monitor for PJM (August 10, 2020).
- **AEP Battery Complaint (Docket No. EL20-58).** Comments of the Independent Market Monitor for PJM (August 21, 2020).
- **MBR Triennial Reviews (Docket Nos. ER18-1106-000,-002; ER17-1609-000,-003; ER10-1556-000, -009; ER10-2265-000, -017; ER10-3223-000, -009; ER10-2355-000, -010; ER16-10-000, -003; ER10-2947-000, -015; ER15-2013-000, -011; ER12-2510-000, -010; ER15-2014--000, -007; ER10-2435-000, -018; ER10-2442-000, -015; ER12-2512-000, -010; ER19-481-000,-003; ER15-2018-000, -006; ER15-2022-000, -006; ER10-2444-000, -017; ER10-2446-000,-013; ER15-2026-000, -006; ER10-2449-000, -015; ER17-1438-000, -002; ER10-2821-000, -007; ER12-1329-000, -007; ER10-3078-000, -005; ER19-2564-000, -001; ER13-1485-000, -011; ER14-1777-000, -010; ER10-3237-000, -011; ER15-289-000; ER17-19-000; ER16-733-000, -007; ER18-1960-000,-003; ER10-1632-000, -018; ER10-1626-000, -012; ER17-1609-000, -003; ER18-1106-000, -002; ER18-2264-000, -004; ER10-2051-000,**

ER10-2043-000,-010; ER10-2041-000, -001; ER18-1321-000, -004; ER10-2040-000, -010; ER10-2036-000, -011; ER10-2044-000, -011; ER20-2276-000; ER13-1667-000, -005). Protest of the Independent Market Monitor for PJM (August 28, 2020) Protest of the Independent Market Monitor for PJM (August 31, 2020). Answer and Motion for Leave to Answer of the Independent Market Monitor for PJM (September 29, 2020). Answer of the Independent Market Monitor for PJM (October 14, 2020).

- **Columbia Gas Transmission Rate (Docket No. RP20-1060).** Answer of the Independent Market Monitor for PJM (September 4, 2020).
- **Dominion Waiver Request (Docket No. ER20-2759).** Answer and Motion for Leave to Answer of the Independent Market Monitor for PJM. (October 9, 2020).
- **New MBR Filings (Docket No. ER21-44; ER20-2845-000; ER20-2846-000; ER20-2847-000; ER20-2881-000; ER21-258-000; ER21-573, ER21-574, ER21-575, ER21-577, ER21-578).** Comment of the Independent Market Monitor for PJM (October 28, 2020). Answer and Motion for Leave to Answer of the Independent Market Monitor for PJM (October 29, 2020). Protest of the Independent Market Monitor for PJM (November 20, 2020). Answer and Motion for Leave to Answer of the Independent Market Monitor for PJM re AltaVista (December 1, 2020). Answer and Motion for Leave to Answer of the Independent Market Monitor for PJM (December 22, 2020). Protest of the Independent Market Monitor for PJM (December 24, 2020).
- **Cost Benefit Projects (Docket No. ER21-162).** Comments of the Independent Market Monitor for PJM (November 10, 2020).
- **ELCC (Docket No. ER21-278).** Comments of the Independent Market Monitor for PJM (November 20, 2020). Answer and Motion for Consolidation of the Independent Market Monitor for PJM (December 14, 2020). Answer and Motion for Leave to Answer of the Independent Market Monitor for PJM (December 18, 2020).
- **Affiliate Financials (Docket No. EL21-14).** Answer and Motion for Leave to Answer of the Independent Market Monitor for PJM (December 15, 2020).
- **PAI's (Docket Nos. ER15-623, EL15-29, EL19-47).** Comments of the Independent Market Monitor for PJM (December 17, 2020).
- **FTR Default Proposal (Docket No. ER21-520).** Comments of the Independent Market Monitor for PJM (December 21, 2020).

## ***FERC Technical Conferences***

- Carbon Pricing in Wholesale Electricity Markets, Docket No. AD20-14, Comments of the Independent Market Monitor for PJM (September 18, 2020). Webinar. (September 30, 2020)

## ***Settlement Proceedings***

In 2020, the IMM participated in multiple settlement conferences, technical conferences, and hearing conferences, in proceedings concerning the establishment of rates for reactive capability under Schedule 2 of the PJM OATT. The issues included in these



cases included: the appropriate power factor; unit specific rates; applicability of the AEP method; deliverability of reactive to PJM grid; and prevention of double recovery.

In 2020, the MMU participated in settlement proceedings in numerous dockets, including, for reactive capability rates: docket nos. ER19-1643, ER19-2858, EL18-8, ER19-2745, ER20-263, ER20-287, ER20-80, EL19-98, ER20-17, ER20-490, ER19-2916, ER20-282, ER20-707, EL19-55, EL19-56, EL20-23, ER19-2858, ER19-391, ER20-714, ER20-756, ER20-860, EL20-12, ER19-391, EL20-24, ER20-1210, ER20-1455, EL20-17, ER19-2847, EL20-34, ER20-1936, ER20-2186, ER20-1455, ER20-2576, ER20-1936, ER20-2719, ER19-229, ER20-2148, ER20-2446, ER20-2819, ER20-2503, EL21-5, and ER21-21.

## ***State Proceedings***

In 2020, the MMU addressed market topics in proceedings at state public utility commissions and state legislatures:

### **New Jersey Board of Public Utilities**

- **Investigation of Resource Adequacy Alternatives (Docket No. EO20030203).** Comments of the Independent Market Monitor for PJM (May 20, 2020). Reply Comments of the Independent Market Monitor for PJM (June 24, 2020). Comments of the Independent Market Monitor for PJM (July 15, 2020).
- **Zero Emission Certificate Program for Eligible Nuclear Power Plants (Docket No. EO18080899).** Comments of the Independent Market Monitor for PJM (July 20, 2020). Motion of the Independent Market Monitor for PJM (August 26, 2020).

### **Illinois House of Representatives**

- **FERC and Capacity Market Reform.** Illinois House of Representatives Public Utilities Committee MOPR Hearing (February 21, 2021).

## ***Court Proceedings***

In 2020, the MMU addressed market topics and enforcement issues in proceedings in federal and state courts.

### **United State Court of Appeals District of Columbia Circuit**

- Petition for Review re ORDC FERC Orders No. 171 FERC ¶ 61,153 and 172 FERC ¶ 62,029 (September 18, 2020).

### **Superior Court of New Jersey Appellate Division**

- On December 9, 2020, the IMM presented oral arguments concerning its appeal of the BPU's ZECs Order, Docket No. A-003939-18.

## ***Participation in Stakeholder Process***

During 2020, the MMU presented information, analysis and recommendations to PJM Committees.<sup>29</sup> The MMU made formal presentations to these groups:

### **Markets and Reliability Committee (MRC)**

- IMM FCP Proposal (January 23, 2020).

### **Members Committee/MC Webinar (MC)**

- Market Monitor Report (January 21, 2020).
- Market Monitor Report (February 18, 2020).
- Market Monitor Report (March 23, 2020).
- Market Monitor Report (May 26, 2020).
- Market Monitor Report (June 15, 2020).
- Market Monitor Report (July 20, 2020).
- Market Monitor Report (September 14, 2020).
- Market Monitor Report (October 26, 2020).
- Market Monitor Report (November 16, 2020).
- Market Monitor Report (December 14, 2020).

### **MC Special Session**

- 2019 State of the Market Report for PJM (March 26, 2020).

### **Market Implementation Committee (MIC)**

- Synchronized Reserve Maintenance Costs Problem Statement (January 8, 2020).
- Synchronized Reserve Maintenance Costs Issue Charge (January 8, 2020).
- Potential Impacts of a ComEd FRR (February 5, 2020).
- Fast Start, Dispatch and Pricing (February 5, 2020).
- Stability Limits (May 13, 2020, July 8, 2020).
- Five Minute Dispatch and Settlements IMM Package (May 13, 2020).
- Forward Looking EAS Offset (June 3, 2020).
- Stability Limits (July 8, 2020, August 5, 2020)
- Real-Time Values (October 7, 2020; November 5, 2020)
- Cost offer calculator (October 7, 2020).
- Cost-based offer calculator proposal (November 5, 2020).
- PAI Settlement Issues (November 5, 2020).

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<sup>29</sup> OATT Attachment M § IV.D.

### ***MIC Special Session: Capacity Market MOPR Order***

- CONE and ACR Values – Preliminary (January 28, 2020).
- Unit Specific Nuclear ACR information (February 19, 2020).
- Gross CONE Unit Specific Exception Template (February 19, 2020).
- Monitoring Analytics ACR Template (February 28, 2020).
- Potential Compliance with P386 of FERC Order on Rehearing (May 6, 2020).

### ***MIC Special Sessions: Five Minute Dispatch and Pricing***

The IMM introduced an issue charge and problem statement at the MIC in 2019, and followed up with education and proposals in the stakeholder process into 2020. The IMM explained that the real-time market dispatch process (RT SCED) was not aligned with the real-time market pricing calculation (LPC). The stakeholder process ultimately led to approval of a joint proposal by PJM and the IMM. The proposal included PJM process changes to align the real-time dispatch process with five minute pricing, and associated tariff and manual changes that provided for that alignment and greater transparency of real-time market clearing.

- Dispatch and Pricing Issues – IMM Proposal (January 29, 2020).
- Five Minute Dispatch and Settlements IMM Package (May 1, 2020).
- Five Minute Dispatch and Settlements Fast Start Example (May 1, 2020).
- Operating Agreement and Manual Updates for Transparency (July 24, 2020).
- Load Bias Analysis (July 24, 2020).

### ***MIC Special Session: Real Time Values***

The MMU proposed a solution to the issues with the definition and use of Real Time Values (RTVs).

### ***MIC Special Session: Capacity Market Capability of Energy Storage Resources***

- Storage Resource Capacity Determination (February 24, 2020).

### ***MIC Special Session – Fuel Cost Policy Enhancement***

- MIC FCP Special Session Recommendation (May 29, 2020).

### ***MIC Special Session – Reserve Price Formation Order***

- Reserve Measurement and Eligibility (June 10, 2020).
- Forward Looking EAS Offset (June 10, 2020).
- Forward Looking EAS Offset (June 17, 2020).
- IMM EAS Offset Example (June 17, 2020).

### ***Operating Committee (OC)***

- Black Start Issues (September 3, 2020).

- Black Start Issues Revised (September 9, 2020).
- Issues with Proposed Intelligent Reserve Deployment (October 8, 2020; November 6, 2020).

## **Planning Committee (PC)**

- IMM Proposals: BC Analysis (February 4, 2020).

## **Finance Committee (FC)**

- Monitoring Analytics 2019 Financial Results (March 24, 2020).
- Monitoring Analytics 2020 Preliminary Budget (August 19, 2020).
- Monitoring Analytics 2020 Proposed Budget (September 9, 2020).

## **ARR FTR Market Task Force (AFMTF)**

- Congestion and Congestion Rights History (January 13, 2020).
- Updated ARR/FTR Offset and Price Convergence Data (February 19, 2020).
- PJM Bill Does Not Include Actual Congestion Paid (March 25, 2020).
- ARRs and FTRs (April 29, 2020).
- ARR/FTR Comments (April 29, 2020).
- Two Settlement Congestion Calculations (July 22, 2020).
- Constraint Based Congestion Calculations (July 22, 2020).

## **Cost Development Subcommittee (CDS)**

The CDS resumed meetings in late 2020 after an eight year hiatus.

- Cost-Based Offer Education (December 15, 2020).

## **Demand Response Subcommittee (DRSC)**

- Unit Specific MOPR Requests (June 11, 2020).

## **Financial Risk Mitigation Senior Task Force (FRMSTF)**

- FTR Liquidation: Canceling FTRs (July 21, 2020, September 29, 2020).
- Issues with PJM's FTR Default Management Proposal (September 29, 2020)

## **High Voltage Direct Current Senior Task Force (HVDCSTF)**

- Issues with HVDC as Capacity (October 19, 2020).

## **Capacity Capability Senior Task Force (CCSTF)**

- ELCC-IMM Proposal (August 7, 2020).
- ELCC-IMM Proposal (August 12, 2020).

## **Carbon Pricing Senior Task Force (CPSTF)**

- Carbon Pricing in PJM (May 19, 2020).
- National Clean Energy Standard Panel (September 23, 2020).

## **DER and Inverter Based Resources Subcommittee**

The MMU participated in discussions covering public distribution microgrids, solar/battery hybrid resources, and the integration of distributed energy resources in the PJM markets as defined by FERC Order 2222.

## **Tech Change Forum**

- 2020-Q2 Changes Member Information Reporting Application (MIRA) (May 20, 2020).
- 2020-Q3 Changes Member Information Reporting Application (MIRA) (October 20, 2020).

## **Other Activities**

### ***OPSI Advisory Committee***

The OPSI Advisory Committee is established pursuant to Section III.G of Attachment M of the OATT, which provides:

“There shall be an OPSI Advisory Committee comprised of five (5) representatives appointed by the Organization of PJM States, Inc. The OPSI Advisory Committee shall meet with the Market Monitoring Unit on a regular basis and as otherwise necessary to receive and discuss information relevant to this Plan. In addition to the specific responsibilities regarding budget and termination set forth in Sections III.E and III.F, the OPSI Advisory Committee may provide advice to the Commission, Market Monitor, the PJM Board, stakeholder committees, and stakeholder working groups regarding any matter concerning the Market Monitor, Market Monitoring Unit or Market Monitoring Plan. Any formal advice shall be in writing and, subject to confidentiality provisions, shall be made publicly available.”

In 2020, the MMU met with the OPSI Advisory Committee on Tuesday, October 20, 2020.

### ***Market Monitoring Unit Advisory Committee***

The Market Monitoring Unit Advisory Committee (“MMUAC”) is established pursuant to Section III.H of Attachment M of the OATT, which provides:

“There shall be an MMU Advisory Committee, chaired by the Market Monitor that is open to all stakeholders and representatives of Authorized Government Agencies. The MMU Advisory Committee shall act as a liaison between stakeholders and the MMU and shall provide advice from

time to time on matters relevant to the MMU's responsibilities under this Plan. The MMU Advisory Committee shall have no authority to direct, supervise, review, or otherwise interfere with the functions of the MMU under this Plan, nor any authority to terminate or propose to terminate the Market Monitor.”

The MMU convened a meeting of the MMUAC on December 4, 2020. The MMU requested comments from stakeholders concerning the MMU’s implementation of the PJM Market Monitoring Plan. The MMU discussed: issues with Manual 15: Cost Development Guidelines; the MMU’s market based rates filings; weather normalized load calculations to determine the effect of COVID-19 on PJM load; the MMU’s proposal for redesigning the ARR/FTR market; capacity market design issues with the effective load carrying capability (ELCC) calculation; requests for service in FERC dockets; and a summary of MMU activities in 2020.