



Monitoring
Analytics

**Activities of the
Market Monitoring Unit
2019**

Independent Market Monitor for PJM
December 14, 2020

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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.”¹

Monitoring Analytics, LLC serves as the Independent Market Monitor for PJM.² 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.

The Federal Energy Regulatory Commission (FERC) assigns three core functions to MMUs: monitoring, reporting, and market design.³ The Market Monitoring Plan provides that 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.⁴

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

¹ PJM Open Access Transmission Tariff (OATT) Attachment M § VI.C.

² See 144 FERC ¶ 61,238 (2013).

³ 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).

⁴ PJM Open Access Transmission Tariff (OATT) Attachment M § IV.A.

⁵ OATT Attachment M § IV; 18 CFR § 1c.2.

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.⁶ The MMU has direct, confidential access to the FERC.⁷ The MMU may also refer matters to the attention of state commissions.⁸

The MMU monitors market behavior for violations of FERC Market Rules.⁹ The MMU will investigate and refer "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..."^{10 11} The MMU also monitors PJM for compliance with the rules, in addition to market participants.¹²

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 market, the capacity market and the regulation market. If a market participant fails the TPS test in any of these markets its offer is set to the lower of its price-based or cost-based offer. This prevents the exercise of market power and ensures competitive pricing, provided that the cost-based offer accurately reflects short run marginal costs. Cost-

⁶ OATT Attachment M § IV.

⁷ OATT Attachment M § IV.K.3.

⁸ OATT Attachment M § IV.H.

⁹ 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.")

¹⁰ 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.

¹¹ OATT Attachment M § II(h-1).

¹² OATT Attachment M § IV.C.

based offers for the energy market and the regulation market are based on short run marginal costs, also referred to as incremental costs.¹³ 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 performs its reporting function by preparing annual and quarterly state of the market reports, 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 of the PJM markets.¹⁴ The MMU initiates and proposes changes to the design of such markets or the PJM Market Rules in stakeholder or regulatory proceedings.¹⁵ 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.¹⁶ The MMU may 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.¹⁷ The MMU may provide in its annual, quarterly and other reports "recommendations regarding any matter within its purview."¹⁸

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

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

¹³ See OATT Attachment M–Appendix § II.A.

¹⁴ OATT Attachment M § IV.D.

¹⁵ *Id.*

¹⁶ *Id.*

¹⁷ *Id.*

¹⁸ OATT Attachment M § VI.A.

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 forms the basis for all MMU activities.

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.¹⁹

If the MMU determines that it has sufficient credible information that PJM's or a participant's market behavior requires investigation, it is required to submit a formal confidential referral of such behavior to the Commission's Office of Enforcement.²⁰ Such referrals typically include substantial analysis of the issue referred. After a referral, the MMU provides further assistance to FERC staff at their request.

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.

¹⁹ OATT Attachment M § IV.I.1.

²⁰ *Id.*

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 the functioning of the SCED and LPC software and operator interventions. The MMU monitors PJM's payment of uplift, 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 enforcement of the must offer rule in the energy market and in the capacity market. 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.

In addition, 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.²¹

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."²² In fulfilling this role in 2019, the MMU monitored participant behavior and discussed relevant matters with FERC staff and 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

²¹ OATT Attachment M § IV.I.2.

²² OATT Attachment M, § IV.J.1.

the application of penalties for incorrect cost-based offers; the application of uplift rules; credit and default issues; FTR issues; reactive power; regulation; the real-time energy market dispatch and pricing processes; 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.

Reporting²³

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 each market.²⁴ The reports also provided detailed recommendations related to market design and the detailed rules related to market design.²⁵

- 2018 State of the Market Report for PJM (March 14, 2019).
- ORDC Simulation Results (April 26, 2019).
- 2019 Quarterly State of the Market Report for PJM: January through March (May 9, 2019).
- ORDC Simulation Results: Volume 2 (May 10, 2019).
- ORDC Simulation Results: Volume 2 Revised (May 24, 2019).
- 2019 Quarterly State of the Market Report for PJM: January through June (August 8, 2019).

²³ Public reports by the MMU are posted at <<http://www.monitoringanalytics.com>>.

²⁴ OATT Attachment M § VII.A

²⁵ See 2019 State of the Market Report for PJM: Volume 2, Section 2: Recommendations, (March 14, 2020).

- PJM Generation Capacity and Funding Sources 2007/2008 through 2021/2022 Delivery Years (September 12, 2019).
- Analysis of Replacement Capacity for RPM Commitments: June 1, 2007 to June 1, 2019 (September 13, 2019).
- 2019 Quarterly State of the Market Report for PJM: January through September (November 14, 2019).
- Activities of the Market Monitoring Unit: 2018 (November 18, 2019).
- Potential Impacts of the Creation of a ComEd FRR (December 18, 2019).
- Report to the North Carolina Utilities Commission - Congestion in the Dominion Service Territory in North Carolina (July 15, 2019).

Market Messages

- MIRA - Fuel Cost Policy Module (February 14, 2019).
- Generation Capacity Resources in PJM Region Subject to RPM Must Offer Obligation for 2019/2020, 2020/2021 and 2021/2022 Delivery Years (February 22, 2019).
- Press Release - 2018 State of the Market Report for PJM (March 14, 2019).
- Members Committee Letter – 2018 State of the Market Report for PJM (March 14, 2019).
- Press Release - 2019 Quarterly State of the Market Report for PJM: January through March (May 9, 2019).
- Members Committee Letter - 2019 Quarterly State of the Market Report for PJM: January through March (May 9, 2019).
- IMM Notification to Members of Subpoena (June 4, 2019).
- Generation Capacity Resources in PJM Region Subject to RPM Must Offer Obligation for 2020/2021, 2021/2022 and 2022/2023 Delivery Years (June 28, 2019).
- Press Release - 2019 Quarterly State of the Market Report for PJM: January through June (August 8, 2019).
- Members Committee Letter – 2019 Quarterly State of the Market Report for PJM: January through June (August 8, 2019).
- MIRA Cost Offer Assumptions Module (August 19, 2019).
- Generation Capacity Resources in PJM Region Subject to RPM Must Offer Obligation for 2020/2021, 2021/2022 and 2022/2023 Delivery Years (September 6, 2019).
- IMM Response to Grid Strategies Report (September 17, 2019).
- Press Release - 2019 Quarterly State of the Market Report for PJM: January through September (November 14, 2019).
- Members Committee Letter- - 2019 Quarterly State of the Market Report for PJM: January through September (November 14, 2019).
- Generation Capacity Resources in PJM Region Subject to RPM Must Offer Obligation for 2020/2021, 2021/2022 and 2022/2023 Delivery Years (December 26, 2019).

Data Postings

Marginal Fuel Posting

- 201811_Marginal_Fuel_Postings.csv
- 201812_Marginal_Fuel_Postings.csv
- 201901_Marginal_Fuel_Postings.csv
- 201902_Marginal_Fuel_Postings.csv
- 201903_Marginal_Fuel_Postings.csv
- 201904_Marginal_Fuel_Postings.csv
- 201905_Marginal_Fuel_Postings.csv
- 201906_Marginal_Fuel_Postings.csv
- 201907_Marginal_Fuel_Postings.csv
- 201908_Marginal_Fuel_Postings.csv

Percentage of PJM Load by State

- PJM Load by State - 2018

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 2019, 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. EUCI. FTR Market Design; Washington, D.C., (January 29, 2019).
- Speaker. EUCI. Virtual Products and Energy Markets; Washington, D.C. (January 29, 2019).
- Speaker. PJM: Competitive Wholesale Power Markets. Massachusetts Institute of Technology; Boston, MA (March 22, 2019).
- Speaker. PJM: Competitive Wholesale Power Markets. Heritage Foundation; Washington, D.C. (March 29, 2019).
- Speaker. OPSI Spring Meeting; Columbus, OH (April 8-9, 2019).
- Speaker. New Jersey Board of Public Utilities Offshore Wind Roundtable; Princeton, NJ (April 22, 2019).
- Speaker. PJM: Competitive Wholesale Power Markets. Electricity Consumers Resource Council (ELCON); Washington, DC (May 1, 2019).
- Speaker. Price Formation in Wholesale Power Markets, EUCI; Philadelphia, PA (May 2-3, 2019).
- Speaker. Year in Review. PJM Annual Meeting; Cambridge, MD (May 7-9, 2019).
- Speaker. Competitive Wholesale Power Markets and Subsidies. Illinois Chamber of Commerce; Chicago, IL (May 16, 2019).

- Speaker. PSEG Board of Directors Meeting; New Brunswick, New Jersey (June 18, 2019).
- Speaker. Market Monitoring in PJM. United States Energy Association Webinar; (USEA) Webinar (September 3, 2019).
- Speaker. Market Monitoring in PJM. National Association of Regulatory Utility Commissioners and National Energy and Utilities Regulatory Commission (NARUC); Webinar (September 25, 2019).
- Speaker. Northern Illinois Energy Users; Chicago, Illinois (October 2, 2019).
- Speaker. Price Formation is Complete: Now What? 12th Annual Platts Nodal Trader Conference; New York, NY (October 24-25, 2019).
- Speaker. OPSI Market Monitoring Advisory Committee. OPSI Annual Meeting; Baltimore, Maryland. (October 28, 29-2019).
- Speaker. PJM Market Update. ACES PJM Summit; Rising Sun, MD (November 12, 2019).

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.”²⁶ In FERC Order No. 719 and its order on compliance for PJM, the Commission has emphasized this MMU core function.²⁷ In Order No. 861, the Commission reaffirmed the MMU’s role in ensuring a

²⁶ OATT Attachment M § IV.D.

²⁷ 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 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

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.²⁸ 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 the Commission to develop a competitive market design. In an August 30, 2019, order, the Commission affirmed its determination that the Market Monitoring Plan permits the MMU to file a complaint against PJM.²⁹

FERC Proceedings

In 2019, 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.

- **RCMP (ER19-383)**. Answer and Motion for Leave to Answer of the Independent Market Monitor for PJM (January 10, 2019).
- **Gas Contingency Switching (ER19-644)**. Comments of the Independent Market Monitor for PJM (January 11, 2019).
- **Market Efficiency FSA Project Queue Exclusion (Docket No. ER19-562)**. Comments of the Independent Market Monitor for PJM (January 11, 2019).
- **Market Efficiency Cost Benefit Analysis (Docket No. ER19-80)**. Comments of the Independent Market Monitor for PJM (January 11, 2019). Answer and Motion for Leave to Answer of the Independent Market Monitor for PJM (February 14, 2019).
- **Energy Storage Resources Order No. 841 (Docket No. ER19-469)**. Comments of the Independent Market Monitor for PJM (February 2, 2019). Answer and Motion for Leave to Answer of the Independent Market Monitor for PJM (February 27, 2019). Comments of the Independent Market Monitor for PJM (May 22, 2019).

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”).

²⁸ 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).

²⁹ *PJM Interconnection, LLC*, 168 FERC ¶ 61,141, Docket No. ER16-372 (August 30, 2019) at P10.

- **Fuel Cost Policy Complaint (Docket No. EL19-27).** Answer and Motion for Leave to Answer of the Independent Market Monitor for PJM (February 11, 2019). IMM Letter Objecting to Release of Data (November 27, 2019).
- **CONE x B Offers (Docket No. EL19-xxx).** Complaint of the Independent Market Monitor for PJM (February 21, 2019). Answer and Motion for Leave to Answer of the Independent Market Monitor for PJM (April 30, 2019).
- **IMM Default MSOC Complaint (Docket No. EL19-47).** Complaint of the Independent Market Monitor for PJM (February 21, 2019). Answer and Motion for Leave to Answer of the Independent Market Monitor for PJM (May 24, 2019). Comments of the Independent Market Monitor for PJM (December 13, 2019).
- **Proposed Amendments to Price Response Demand Rules (Docket No. ER19-1012-000).** Comments of the Independent Market Monitor for PJM (February 28, 2019) and Comments of the Independent Market Monitor for PJM (May 22, 2019).
- **VOM Complaint and Maintenance Add (Docket No. EL19-8-001 and ER19-210-001).** Comments of the Independent Market Monitor for PJM (March 7, 2019). Comments of the Independent Market Monitor for PJM (May 31, 2019). Answer and Motion for Leave to Answer of the Independent Market Monitor for PJM (July 1, 2019).
- **Market Monitoring and Market Based Rate Authorization NOPR (Docket No. RM19-2).** Comments of the Independent Market Monitor for PJM (March 19, 2019). Answer and Motion for Leave to Answer of the Independent Market Monitor for PJM (May 22, 2019).
- **CPV Waiver Request (Docket No. ER19-1083).** Comments of the Independent Market Monitor for PJM (March 19, 2019). Answer and Motion for Leave to Answer of the Independent Market Monitor for PJM (April 12, 2019).
- **Peak Shaving Adjustment Proposal (Docket No. ER19-511).** Comments of the Independent Market Monitor for PJM (March 27, 2019) and Answer of the Independent Market Monitor for PJM (April 26, 2019).
- **ACR Review Waiver (Docket No. ER19-1404).** Comments of the Independent Market Monitor for PJM (April 2, 2019).
- **Cube Yadkin Complaint (EL19-51).** Answer and Motion for Leave to Answer of the Independent Market Monitor for PJM (April 10, 2019).
- **Brookfield Energy Complaint (EL19-34).** Answer and Motion for Leave to Answer of the Independent Market Monitor for PJM (April 11, 2019).
- **Electric Storage Interests Regulation Settlement (Docket No. EL17-64).** Comments Opposing Settlement of the Independent Market Monitor for PJM (May 13, 2019). Reply Comments of the Independent Market Monitor for PJM (May 23, 2019).
- **Price Formation (Docket Nos. EL19-58 and ER19-1486).** Protest of the Independent Market Monitor for PJM (May 15, 2019). Answer and Motion for Leave to Answer of the Independent Market for PJM (May 30, 2019). Answer of the Independent Market Monitor for PJM (July 15, 2019).

- **Offer Flexibility (Docket No. ER16-372-005).** Request for Clarification, or in the Alternative Rehearing, of the Independent Market Monitor for PJM (May 30, 2019). Comments of the Independent Market Monitor for PJM (June 6, 2019). Answer and Motion for Leave to Answer of the Independent Market Monitor for PJM (June 10, 2019). Answer of the Independent Market Monitor for PJM (July 1, 2019).
- **Reactive Declaratory Order Petition (Docket No. EL19-70).** Comments of the Independent Market Monitor for PJM (June 3, 2019). Answer and Motion for Leave to Answer of the Independent Market Monitor for PJM (July 12, 2019).
- **Panda Reactive (ER17-1821-000, -002).** Brief on Exceptions of the Independent Market Monitor for PJM (June 12, 2019). Reply of the Independent Market Monitor for PJM in Opposition to Unilateral Offer of Settlement (July 30, 2019).
- **FTR Forfeiture Rule (Docket Nos. EL14-37-001 and ER17-1433-000).** Answer of the Independent Market Monitor for PJM (July 17, 2019). Answer and Motion for Leave to Answer of the Independent Market Monitor for PJM (August 19, 2019). Reply Brief of the Independent Market Monitor for PJM (December 18, 2019).
- **Capacity Resources and Must Offer Exception Process (Docket No. ER19-2417).** Answer and Motion for Leave to Answer of the Independent Market Monitor for PJM (August 23, 2019).
- **NOI Transmission Incentives (Docket No. PL19-3).** Reply Comments of the Independent Market Monitor for PJM (August 23, 2019).
- **Transmission Line Ratings (Docket No. AD19-15).** Comments of the Independent Market Monitor for PJM (September 4, 2019). Post- Technical Conference Comments. (November 4, 2019).
- **Common Performance Metrics for RTOs/ISOs (Docket No. AD19-16).** Comments of the Independent Market Monitor for PJM (September 11, 2019).
- **Fast Start Pricing (Docket No. ER19-2722).** Comments of the Independent Market Monitor for PJM (September 17, 2019). Answer and Motion for Leave to Answer of the Independent Market Monitor for PJM (September 27, 2019). Answer of the Independent Market Monitor for PJM (October 25, 2019).
- **Fast Start Pricing Investigation (Docket No. EL18-43).** Comment of the Independent Market Monitor for PJM (October 15, 2019).
- **Grid Enhancing Technologies (AD19-19).** Comment of the Independent Market Monitor for PJM (November 6, 2019).
- **TranSource IARRs Complaint (Docket No. ER20-83).** Comment of the Independent Market Monitor for PJM (November 7, 2019). Answer and Motion for Leave to Answer of the Independent Market Monitor for PJM (November 26, 2019).
- **Price Responsive Demand Rules (Docket No. ER20-271).** Comments of the Independent Market Monitor for PJM (November 21, 2019). Answer of the Independent Market Monitor for PJM (December 19, 2019).
- **TO's Rate Filing Settlement (Docket No. ER19-2105).** Answer and Motion for Leave to Answer of the Independent Market Monitor for PJM (November 22, 2019).

- **PAIs (Docket No. ER15-623, EL15-29, EL19-27).** Comment of the Independent Market Monitor for PJM (December 13, 2019).

FERC Technical Conferences

- Managing Transmission Line Ratings; Docket No. AD19-15 (September 10-11, 2019).
- Grid-Enhancing Technologies; Docket No. AD19-19 (November 3, 2019).

Settlement Proceedings

In 2019, the IMM participated in 33 settlement conferences and technical conferences in proceedings concerning the establishment of rates for reactive capability under Schedule 2 of the PJM OATT. The MMU sought to settle on the basis of terms addressing the power factor value, any provision for losses, unit specific rates, service to the MMU, and prevention of double recovery.

In 2019, the MMU participated in settlement proceedings in dockets, including, for reactive capability rates: docket nos. EL18-130, EL18-25, EL18-190, EL18-148, ER18-2497, ER19-266, ER19-90, ER19-2085, ER19-342, EL17-50, ER19-391, ER19-420, EL18-104, EL19-7, ER19-708, ER19-647, ER19-878, ER19-1077, ER19-708, ER19-1216, ER19-119, EL19-73, ER19-1730, EL16-108, ER19-1644, ER19-1632, ER14-1421, ER19-2506, EL19-55, ER19-1886, ER19-2745, and ER19-2683; EL19-7; and EL17-90 (Linden VFT complaint against PJM re transmission withdrawal rights); EL17-64 and -65 (Complaints against PJM Regulation Market); and EL18-184, EL18-185 (Complaint re Tilton pseudo tie).

State Proceedings

In 2019, the MMU addressed market topics in proceedings at state public utility commissions and state legislatures.

- **Pennsylvania Senate Environment and Energy Committee. Nuclear Subsidy Bill No. S-877 (May 10, 2019).**
- **North Carolina Utilities Commission. Docket No. E-22, Sub 418.** Report to the North Carolina Utilities Commission - Congestion in the Dominion Service Territory in North Carolina (July 15, 2019).

Court Proceedings

In 2019, the MMU addressed market topics and enforcement issues in proceedings in federal and state courts.

- **Superior Court of New Jersey Appellate Division, Case No. A-3939-18-T1 (November 6, 2019).** The IMM filed an appeal of the New Jersey BPU's approval of ZECS for certain facilities during the first annual period.
- **U.S. District Court for the Southern District of Ohio, CoalTrain Energy, L.P., et al., Case No. 2:16-cv-732-MHW-KAJ (August 29-30, 2019).** The IMM responded to subpoenas, including the deposition of Joseph Bowring, in a case seeking to enforce FERC's order finding defendants engaged in prohibited market manipulation.

Participation in Stakeholder Process

During 2019, the MMU presented information, analysis and recommendations to PJM Committees.³⁰

Markets and Reliability Committee (MRC)

- Manual 15 OCC Section Updates (January 23, 2019).
- IMM Reserve Market Proposal (January 24, 2019).
- FTR Forfeiture Rule (April 25, 2019).
- Parameter Limit Implementation (December 5, 2019).

Members Committee/MC Webinar (MC)

- Market Monitor Report (January 22, 2019).
- Market Monitor Report (February 19, 2019).
- Opportunity Cost Calculator - IMM Alternative Proposed Draft OA Revisions (February 21, 2019).
- Market Monitor Report (March 18, 2019).
- 2018 State of the Market Report for PJM (March 21, 2019).
- Market Monitor Report (April 22, 2019).
- Market Monitor Report (June 24, 2019).
- Market Monitor Report (August 19, 2019).
- Market Monitor Report (October 30, 2019).
- Market Monitor Report (December 2, 2019).

MC Special Session

- 2018 State of the Market Report for PJM (March 22, 2019).

MC Special Session – Energy price Formation

- Analysis of Price Formation Compromise (February 6, 2019).

Market Implementation Committee (MIC)

- RT SCED Problem Statement (April 10, 2019).
- Five Minute Dispatch and Pricing (July 10, August 8, 2019).
- IMM Friendly Amendment to Critical Issue Fast Track Proposal (August 26, 2019).
- FTR/ARR Market Construct Issue Charge (September 11, 2019).
- FTR/ARR Market Construct Problem Statement (September 11, 2019).
- FTR/ARR Problem Statement Discussion (October 16, 2019).

³⁰ OATT Attachment M § IV.D.

- FTR/ARR Market Design Issues Problem Statement - Second Read (October 16, 2019).
- FTR/ARR Construct Issue Charge - Second Read (October 16, 2019).
- FTR/ARR Construct Issue Charge – Redline (October 16, 2019).
- FTR/ARR Construct Issue Charge – Clean (October 16, 2019).
- IMM MIC FCP Proposal (November 13, 2019).
- PLS Implementation Background Documents (December 11, 2019).
- Parameter Limited Schedules (December 11, 2019).
- PLS Compliance (December 11, 2019).

MIC Special Session – Electric Storage Resources

- Pumped Storage Costs (March 15, 2020).

MIC Special Session – Fuel Cost Policies

- FCP Penalty Proposal (March 20, 2020).
- FCP Aggregate TPS for Schedule 2 Penalties (April 17, 2019).
- MIC FCP Special Session Phase 1 Proposal (July 10, 2019).

MIC Special Session – Five Minute Dispatch and Pricing

The MMU participated in the stakeholder meetings at the MIC Special Sessions on five minute dispatch and pricing. The MMU identified issues regarding the inputs and assumptions in SCED, the misalignment of dispatch, pricing and settlement tools and issues with compliance with Order 825. The MMU presented its preliminary solution options to address the issues identified.

- Dispatch and Pricing Issues (October 2, 2019).
- Market Operations and Settlements Areas Affected by SCED and LPC (October 2, 2019).
- SCED/LPC Timeline (November 25, 2019).

MIC Special Session – Opportunity Cost Calculator (OCC)

The MMU continued its participation in the MIC Special Session on the opportunity cost calculator in 2019.

- Manual 15 Revisions (January 16, 2019).

Operating Committee Special Session - Fuel Requirements for Black Start Resources

- Black Start Minimum Tank Suction Level (January 8, 2019).

Planning Committee

- Benefit Cost Analysis Issue Charge (April 11, 2019).
- Benefit Cost Analysis Problem Statement (April 11, 2019).
- IMM Redlines re PJM Manual 14 F (October 17, 2019).

Finance Committee

- Monitoring Analytics 2018 Financial Results (March 26, 2019).
- 2018 Monitoring Analytics Financial Statements (May 7, 2019).
- Monitoring Analytics 2020 Preliminary Budget (August 20, 2019).
- Monitoring Analytics 2020 Proposed Budget (September 17, 2019).

Demand Response Subcommittee (DRS)

- The MMU presented a solution option for the Load Management Testing matrix on April 24, 2019.

Distributed Energy Resources Subcommittee (DERS)

- Solution Options for Utility Microgrid (July 15, 2019).

Energy Price Formation Senior Task Force (EPFSTF)

- Scarcity Revenue True Up (January 4, 2019, January 1, 2019, January 17, 2019, February 14, 2019).
- Day-Ahead Reserve Market Implementation Issues (January 11, 2019).
- Calculation of Forced Outage Rate Probability (January 11, 2019).
- Calculating Scarcity Rents (January 11, 2019).
- Following Dispatch (January 17, 2019).
- IMM Revised ORDC Proposal (January 17, 2019).
- Constraints in the DA and RT Markets (January 23, 2019).
- Calculation of Forced Outage Probability and the ORDC (January 23, 2019).
- Reserve Settlements (January 23, 2019).

Fuel Security Senior Task Force (FSSTF)

- Fuel Security Risks and Scenarios (May 24, 2019).

Financial Risk Mitigation Senior Task Force (FRMSTF)

- ARR/FTR Market Design (June 6, 2019).
- Reducing Risk in the Current ARR/FTR Market Design (June 25, 2019).
- ARR/FTR Market Design: Address Risk (June 25, 2019).
- PJM and IMM Offset Tables (July 17, 2019).
- Basic Congestion Concepts (July 17, 2019).
- IMM Auction Value – DA Difference (September 5, 2019).

Market Efficiency Process Enhancement Task Force (MEPTF)

- Benefit/Cost Analysis Discussion (June 7, 2019).
- Basic Congestion Concepts and Calculating Project Benefits (July 30, 2019).

Tech Change Forum

- Q4 MIRA Changes (October 21, 2019 and December 17, 2019)

Carbon Pricing Senior Task Force (CPSTF)

- Carbon Pricing Education (August 26, 2019).
- State RPS Fulfillment (October 24, 2019).

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 2019, the MMU met with the OPSI Advisory Committee on February 15, 2019.

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 11, 2019. The MMU requested comments from stakeholders concerning the MMU’s implementation of the PJM Market Monitoring Plan. The MMU discussed: following dispatch; FTR/ARR issues; reactive capability rates; and fuel cost policies.