

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

Independent Market Monitor for PJM)	Docket No. EL19-47-000
v.)	
PJM Interconnection, L.L.C.)	
)	
Office of the People’s Counsel for District of Columbia)	Docket No. EL19-63-000
Delaware Division of the Public Advocate)	
Citizens Utility Board)	
Indiana Office of Utility Consumer Counselor)	
Maryland Office of People’s Counsel)	
Pennsylvania Office of Consumer Advocate)	
West Virginia Consumer Advocate Division)	
PJM Industrial Customer Coalition)	
v.)	
PJM Interconnection, L.L.C.)	(not consolidated)

BRIEF OF THE INDEPENDENT MARKET MONITOR FOR PJM

Pursuant to the order issued March 18, 2021, granting the complaints in the above proceedings (“March 18th Order”),¹ Monitoring Analytics, LLC, acting in its capacity as the

¹ *Independent Market Monitor v. PJM, et al.*, 174 FERC ¶ 61,212.

Independent Market Monitor (“Market Monitor”) for PJM Interconnection, L.L.C.² (“PJM”), submits this brief.

I. ARGUMENT

A. Summary

In the March 18th Order, the Commission determined (at P 65) that the current default MSOC “is incorrectly calibrated such that it may unjustly and unreasonably prevent the appropriate review of offers, thereby allowing potential exercises of market power.” The Commission asked the parties to file briefs (at P 72) to address “whether an alternative method for market power mitigation in the PJM capacity market would better address the concern that the current methodology precludes the Market Monitor from reviewing offers that raise market power concerns and mitigating offers where appropriate.” The Market Monitor’s criteria in developing a method for market power mitigation in the capacity market is based on ensuring that any potential offers that may set price in the capacity auctions are reviewed for the potential to exercise market power through a review of unit specific avoidable costs including risks.

The Market Monitor concludes that the historical number of performance assessment intervals (“PAI”) has been very low, that the implied nonperformance charge rate (or penalty rate) defined by that low PAI is very high, and that the use of a lower number of PAI to calculate the market seller offer cap (“MSOC”) compared to the number of PAI used to define the nonperformance charge rate is reasonable and required under the current design. The result of using a lower number of expected PAI in calculating the MSOC than the number used to calculate the nonperformance charge rate is that the current offer cap of Net CONE times B is multiplied by the ratio of the two PAI, a fraction

² Capitalized terms used herein and not otherwise defined have the meaning used in the PJM Open Access Transmission Tariff (“OATT”) or the PJM Operating Agreement (“OA”).

significantly less than 1.0. The Market Monitor’s current estimate of that fraction is 60 PAI (or five PAH) divided by 360 PAI (or 30 PAH), or one sixth, or 0.17.³

As a result, the MSOC equals the net avoidable cost rate (“ACR”) plus expected net penalty payments and less expected net bonus payments. The Market Monitor also concludes that there is no reliable, market based way to define expected PAI and that therefore the current approach should be replaced with unit specific ACR review. Given the current actual levels of PAI and the current penalty rate, the use of net ACR is the status quo based on the capacity performance (“CP”) market design. The Market Monitor recommends that the potential use of PAI in the calculation of the MSOC be eliminated as unavoidably and unduly subjective and that the unit specific net ACR be the defined market seller offer cap for every unit, with the option to use technology specific default gross ACRs.

B. The ACR Method for MSOC and the Logic of Capacity Performance

The current default MSOC in the PJM tariff (*Net CONE * B*) is based on the opportunity for a capacity resource to earn bonus payments without taking on a capacity obligation.⁴ The bonus payments earned are directly proportional to the number of PAI and the bonus payment rate during each PAI. Given the low number of PAI and the low bonus payment rate, this opportunity is so low that the competitive offer for such resources is based on their net ACR.

Under these conditions, the equation for the unit specific market seller offer cap is:

$$\text{if } \bar{A} < \bar{B}, \text{ then } p = \text{Net ACR} + (PPR \times H \times (\bar{B} - \bar{A}))/12 \quad (1)$$

³ See Complaint of the Independent Market Monitor for PJM, Docket No. EL19-47-000 (February 21, 2019)(“IMM Complaint”) at 16. In the IMM Complaint, the Market Monitor stated: “The default MSOC should be set at a reasonable and supportable level based on the current nonperformance charge rate and based on a reasonable and supportable PAH, five hours.”

⁴ See IMM Complaint Attachment A.

$$\text{if } \bar{A} > \bar{B} \text{ then } p = \text{Net ACR} + (\text{CPBR} \times H \times (\bar{B} - \bar{A}))/12 \quad (2)$$

Where:

p is the market seller offer cap in dollars per MW-year UCAP;

Net ACR is the unit's avoidable cost net of energy and ancillary service revenues in dollars per MW-year UCAP, calculated as (*Gross ACR* – *Net E&AS Revenues*);

PPR is the nonperformance charge rate in dollars per MWh;

CPBR is the expected capacity performance bonus rate in dollars per MWh;

H is the expected number of PAI during the delivery year (five minute intervals per year);

\bar{B} is the average balancing ratio during the PAI; and

\bar{A} is the average unit performance during the PAI.

If the unit's performance (A) is worse than the system balancing ratio (B), the unit will pay a penalty and that if the unit's performance is better than the system balancing ratio, the unit will receive a bonus. If the unit is expected to pay a net penalty during the delivery year, the MSOC is net ACR plus the net penalty. If the unit is expected to receive a net bonus, the MSOC is net ACR minus the net bonus.

Given the low historical and low expected number of PAI, and the fact that the bonus payment rate is significantly less than the nonperformance charge rate, the Market Monitor concludes that the best and the simplest approach to the MSOC is the unit specific ACR based method. To facilitate the process, capacity resources would have the option to use technology specific default gross ACRs that the Commission has recently approved in the Minimum Offer Price Rule ("MOPR") proceeding in Docket No. EL16-49-003.⁵ The default net ACR value for a capacity resource would be the default gross ACR, net of unit specific forward looking net energy and ancillary service revenues. Technology types that

⁵ 173 FERC ¶ 61,061 (October 15, 2020).

do not have a default gross ACR defined in the OATT would be subject to unit specific ACR.

The ACR calculation in the PJM tariff allows resources to include a Capacity Performance Quantifiable Risk (“CPQR”) component, which allows market sellers to reflect the risk associated with nonperformance on a unit specific basis.⁶ Capacity market sellers can include risk in the unit specific ACR based MSOC by calculating the CPQR based on unit specific values for A, B and H, and by calculating expected nonperformance charges or bonuses. The Market Monitor will review both the expected net penalty/bonus estimate and the CPQR calculations, including unit specific performance history.

The Market Monitor recommends that the Commission approve this method to calculate market seller offer caps, and direct PJM to update the tariff to define the MSOC as specified by equations (1) and (2).

C. ACR Implementation

The Market Monitor has experience with calculating unit specific and default ACR offer caps in the capacity market. The Market Monitor believes that the process is manageable from an administrative perspective.

Gross ACR is defined in the OATT.⁷ Net revenues are defined in the OATT.^{8 9} The Market Monitor currently calculates the net revenues for every unit and makes the net revenues available through Member Information Reporting Application (MIRA). The net revenues are calculated on a forward looking basis, consistent with the tariff. The Market Monitor also discusses any differences in net revenues calculated by market participants

⁶ OATT Attachment DD § 6.8(a).

⁷ OATT Attachment DD § 6.8(a).

⁸ OATT Attachment DD § 5.14(h-1)(2)(B)(ii).

⁹ OATT Attachment DD § 6.8(d-1).

and resolves any questions consistent with the data and the tariff. The Market Monitor makes a gross ACR template available that follows the tariff requirements in order to make the calculation of gross ACR more efficient.¹⁰ In both the case of a unit specific gross ACR and a default gross ACR, the net ACR is calculated using unit specific net revenues.

Prior to the introduction of the capacity performance market design, offers were capped at unit specific ACR. There were also default gross ACR values, used with unit specific net revenues calculated by the Market Monitor, for those units that did not wish to calculate their own unit specific gross ACR values. Of the 1,168 generation resources offered in the 2015/2016 Base Residual Auction held prior to the introduction of the capacity performance design, 188 generation resources (16.1 percent) had unit specific ACR based offer caps, 474 generation resources (40.5 percent) had default ACR based offer caps, eight generation resources (0.6 percent) had opportunity cost-based offer caps, 32 planned generation resources (2.7 percent) had uncapped offers, and 466 generation resources (39.9 percent) were price takers.¹¹ Of the 1,199 generation resources offered in the 2016/2017 Base Residual Auction held prior to the introduction of the capacity performance design, 139 generation resources (11.6 percent) had unit specific ACR based offer caps, 486 generation resources (40.6 percent) had default ACR based offer caps, 13 generation resources (1.1 percent) had opportunity cost-based offer caps, 31 planned generation resources (2.6 percent) had uncapped offers, and 530 generation resources (44.2 percent) were price

¹⁰ Monitoring Analytics, LLC, Tools for PJM Markets, RPM-ACR Template Version 14.1, <http://www.monitoringanalytics.com/tools/docs/IMM_RPM_ACR_Template_v14.1_20201215.xlsx>.

¹¹ See “Analysis of the 2015/2016 RPM Base Residual Auction,” <http://www.monitoringanalytics.com/reports/Reports/2013/Analysis_of_2015_2016_RPM_Base_Residual_Auction_20130924.pdf> (September 24, 2013).

takers.¹² Of the 1,202 generation resources offered in the 2017/2018 Base Residual Auction held prior to the introduction of the capacity performance design, 126 generation resources (10.5 percent) had unit specific ACR based offer caps, 400 generation resources (33.3 percent) had default ACR based offer caps, five generation resources (0.4 percent) had opportunity cost based offer caps, 28 planned generation resources (2.3 percent) had uncapped offers, and 643 generation resources (53.5 percent) were price takers.¹³ Of the 1,132 generation resources offered in the 2021/2022 Base Residual Auction held after the introduction of CP, eight generation resources (0.7 percent) had unit specific offer caps, 984 (86.9 percent) had the net CONE times B offer cap, 11 planned generation resources (1.0 percent) had uncapped offers, and 129 generation resources (11.4 percent) were price takers.¹⁴

D. The Results

1. PAI and Bonus Payments

The only PAI since PJM implemented Capacity Performance in 2016, for which PJM assessed nonperformance charges and paid performance bonus payments, were on October 2, 2019, for 24 intervals, or two hours.¹⁵ This event occurred after the IMM Complaint was filed and provided additional insight into the details of PJM's interpretation of the Capacity

¹² See "Analysis of the 2016/2017 RPM Base Residual Auction," <http://www.monitoringanalytics.com/reports/Reports/2014/IMM_Analysis_of_the_20162017_RPM_Base_Residual_Auction_20140418.pdf> (April 18, 2014).

¹³ See "Analysis of the 2017/2018 RPM Base Residual Auction," <https://www.monitoringanalytics.com/reports/Reports/2014/IMM_Analysis_of_the_2017_2018_RPM_Base_Residual_Auction_20141006.pdf> (October 6, 2014).

¹⁴ See "Analysis of the 2021/2022 RPM Base Residual Auction - Revised," <http://www.monitoringanalytics.com/reports/Reports/2018/IMM_Analysis_of_the_20212022_RPM_BRA_Revised_20180824.pdf> (August 24, 2018).

¹⁵ See Monitoring Analytics LLC, *2019 State of the Market Report for PJM*, Section 3 Energy Market, at Analysis of October 2 Events at 180 – 185.

Performance rules, excuse of nonperforming resources, and the relationship between the bonus payment rate and the nonperformance charge rate.

All the PAI that occurred prior to October 2, 2019, were for local voltage control based on transmission issues, and PJM did not assess nonperformance charges to any resources. For the 24 PAI that occurred on October 2, 2019, the bonus performance payment rate was an average of 13 percent of the nonperformance charge rate. This supports the Market Monitor's view that it is incorrect to assume that the capacity performance bonus payment rate equals the nonperformance charge rate.

2. Actual PAI

In the IMM Complaint, the Market Monitor argued for the use of five PAH (60 PAI) as the reasonable expected PAH while retaining 30 PAH (360 PAI) as the determinant of the nonperformance penalty rate.¹⁶ In addition to the IMM Complaint, the Market Monitor made two filings in response to PJM's informational filings on the number of PAH/PAI for each year since the introduction of the current market seller offer cap ("MSOC") under the capacity performance capacity market design.^{17 18} In the four delivery years since the implementation of Capacity Performance, the number of PAI have been zero, six, 18 and 24 for the 2016/2017, 2017/2018, 2018/2019, and 2019/2020 Delivery Years. In the 2020/2021 Delivery Year that began June 1, 2020, there have been zero PAI to date. Since the IMM Complaint was filed, on February 21, 2019, there have been 24 PAI, all on October 2, 2019. Table 1 provides a summary of the PAI that occurred in PJM beginning June 1, 2016, to date.

¹⁶ See IMM Complaint at 6.

¹⁷ See Comments of the Independent Market Monitor, Docket No. ER15-623, EL15-29 and EL19-47 (December 13, 2019).

¹⁸ See Comments of the Independent Market Monitor, Docket No. ER15-623, EL15-29 and EL19-47 (December 17, 2020).

Table 1 Performance assessment intervals in PJM: 2016/2017 through 2020/2021 Delivery Years¹⁹

Delivery Year	Number of PAI		Date	Location	Resources Assessed for Performance
	(5 minute intervals)	Number of PAH (Hours)			
2016/2017	0	0	NA	NA	NA
2017/2018	6	0.5	May 29, 2018	AEP (Edison area)	No
2018/2019	18	1.5	July 18, 2018	AEP (Lonesome Pine area)	No
2019/2020	24	2	October 2, 2019	AEP, BGE, Dominion, Pepco	Yes
2020/2021	0	0	NA	NA	NA

3. PJM’s Implementation of the Capacity Performance Design

The logic for the definition of a competitive offer by capacity performance resources relies on assumptions. The validity of the assumptions can be checked against the facts that result from PJM’s actual implementation of the capacity performance design. In the CP proceeding, PJM and the Market Monitor assumed, and the Commission accepted, that the bonus payment rate would be equal to the capacity nonperformance charge rate, or penalty rate. The bonus payment rate is a function of the total penalty charges. The bonus performance resources are paid a MW share of the collected nonperformance charges during a PAI. The assumption that the bonus payment rate would equal the nonperformance charge rate was based on the assumption that PJM would trigger PAI only during emergencies when demand was very high and when PJM would need most of the system resources to meet demand. This would limit the number of resources excused to those that would be explicitly backed down by PJM for reliability reasons. In other words, it was assumed that PJM’s implementation would be a no excuses design.

The Market Monitor argued in the CP proceeding that the PJM proposed trigger for PAI was subjective, and that it should be based on a quantifiable, transparent metric of the

¹⁹ The data for the 2020/2021 Delivery Year includes data through the date of this filing. The delivery year runs through May 31, 2021.

need for capacity in the PJM system.²⁰ For example, in ISO New England, under the Pay for Performance design, resources are assessed for performance during Capacity Scarcity Conditions (“CSCs”) that occur when the system or local area is short on ten and thirty minute nonspinning reserves.²¹ Reserve shortages are determined based on a predefined reserve requirement, and the reserve calculation that is embedded in the real-time dispatch tool.

The October 2, 2019, PAI provided actual data and evidence on the issues with PJM’s triggers, and PJM’s treatment of excused MW. The PAI on October 2, 2019, was triggered when PJM declared a pre-emergency load management reduction action in the AEP, BGE, Dominion and Pepco zones based on anticipated high load relative to the available supply. The actual load was significantly lower than forecasted.²²

On October 1, 2019, the day before the PAI, PJM did experience high load relative to the available supply. The system conditions were reflected in the market outcomes with multiple intervals of high prices, and reserve shortages.²³ The decision to declare a pre-emergency load management reduction action on October 2, 2019, was based on an expectation of the repetition of the events on October 1, 2019, which did not materialize. This illustrates the shortcomings of triggering PAIs based on PJM operator declared

²⁰ See Comments of the Independent Market Monitor for PJM, Docket No. ER15-623 and EL15-29 (January 20, 2015) at 18–20.

²¹ ISO New England Inc. Internal Market Monitor, “2018 Annual Markets Report,” (May 23, 2019) at 156 (§ 6.2.2 (Pay-for-Performance Outcomes)).

²² In a report reviewing the PAI, PJM stated: “The most striking anomaly was load levels in the AEP and Mid-Atlantic zones that came in significantly below forecast.” See PJM, “A Review of the October 2019 Performance Assessment Event,” (2019) at 1, which can be accessed at <https://www.pjm.com/-/media/markets-ops/rpm/review-of-october-2019-performance-assessment-event.ashx>.

²³ See Monitoring Analytics, LLC, *2019 State of the Market Report for PJM*, Section 3 Energy Market at 176–180 (Analysis of October 1 Events).

emergency actions or pre-emergency load management reduction, instead of using a quantitative metric that is readily available to PJM, such as reserves.²⁴

Given this implementation, it can no longer be assumed that PAI would occur when the PJM region, or a subset of zones in the PJM region are experiencing capacity scarcity conditions. The data is also evidence that the current implementation of performance assessment, in particular the expected and actual bonus payments, cannot be relied on as a basis for the market seller offer cap in the capacity market.

4. Nonperformance Charge Rate (Penalty Rate)

The nonperformance charge rate (in dollars per MWh) in PJM is currently defined as the Net CONE (in dollars per MW-year ICAP) for the LDA in which a resource is located divided by 30 hours, or 360 intervals, per year.²⁵ When the expected number of PAH is significantly lower than 30 hours, the performance incentives that are the core of the pay for performance design are weakened. The nonperformance charges assessed to a resource are the product of two inputs: the nonperformance charge rate (\$/MWh) and the performance shortfall (MW).

As designed, the performance shortfall MW are calculated as:

$$\text{Performance Shortfall} = \text{UCAP} \times B - \text{Actual Output}$$

Under PJM's implementation, the performance shortfall MW are calculated as:

$$\text{Performance Shortfall} = \text{UCAP} \times B - \text{Actual Output} - \text{Excused MW}$$

Under PJM's implementation of the CP design, if the nonperformance charge rate were calculated with a lower number of PAI, five hours for example, the nonperformance charge rate would increase to six times the current levels that use 30 hours as the denominator. (See Table 2) However, PJM excuses most of the performance shortfall MW.

²⁴ There are existing issues with the accuracy of reserve measurement in PJM, but they can be resolved by improving generator modeling in the energy market.

²⁵ OATT Attachment DD § 10A(e).

For the October 2, 2019, PAIs, PJM excused nearly 80 percent of the total initial shortfall MW.²⁶ PJM's implementation of performance assessment is significantly flawed because nonperformance is excused, and simply increasing the nonperformance charge rate will not fix the issue.

The Market Monitor concludes that based on PJM's implementation of the Capacity Performance design, increasing the nonperformance charge rate would do nothing to incent better performance, and that the definition of a competitive offer cannot rely on the opportunity to earn bonuses. Incorporating a multiple of the current penalty charge for nonperformance when added to the high LMPs faced by nonperforming generators during shortage events would increase risk without a corresponding improvement in incentives.²⁷ The default MSOC, which is fundamentally based on this opportunity to earn bonuses, cannot be relied on to correctly define a competitive offer or to ensure that marginal resources are reviewed for market power, and that customers are protected from the exercise of market power.

Table 2 shows the nonperformance charge rate calculated based on PAH of 30, 10 and 5.

²⁶ See Monitoring Analytics, LLC, *2019 State of the Market Report for PJM*, Section 3: Energy Market, at Table 3-74 and Table 3-75 for details on the initial shortfall MW, and a breakdown of the excused MW.

²⁷ See Monitoring Analytics, LLC, *2020 State of the Market Report for PJM*, Section 3: Energy Market, at Table 3-72 and 3-73.

Table 2 Nonperformance charge rate under different values for PAH

Zone	Net CONE (\$/MW-Day)	Non Performance Charge Rate (\$/MWh)		
		Using 30 PAH	Using 10 PAH	Using 5 PAH
AECO	\$251.59	\$3,061.1	\$9,183.2	\$18,366.3
AEP	\$215.51	\$2,622.0	\$7,866.1	\$15,732.2
APS	\$192.45	\$2,341.5	\$7,024.5	\$14,049.0
ATSI	\$218.79	\$2,661.9	\$7,985.8	\$15,971.6
BGE	\$214.87	\$2,614.2	\$7,842.7	\$15,685.3
COMED	\$235.27	\$2,862.5	\$8,587.4	\$17,174.7
DAY	\$214.82	\$2,613.7	\$7,841.0	\$15,681.9
DEOK	\$212.27	\$2,582.6	\$7,747.7	\$15,495.4
DOM	\$237.39	\$2,888.2	\$8,664.6	\$17,329.2
DPL	\$224.18	\$2,727.6	\$8,182.7	\$16,365.4
DUQ	\$212.95	\$2,590.8	\$7,772.5	\$15,545.0
EKPC	\$216.92	\$2,639.2	\$7,917.7	\$15,835.5
JCPL	\$253.03	\$3,078.5	\$9,235.6	\$18,471.2
METED	\$225.90	\$2,748.4	\$8,245.3	\$16,490.7
OVEC	\$204.86	\$2,492.4	\$7,477.3	\$14,954.6
PECO	\$244.83	\$2,978.7	\$8,936.2	\$17,872.5
PENELEC	\$157.47	\$1,915.9	\$5,747.7	\$11,495.5
PEPCO	\$246.34	\$2,997.1	\$8,991.4	\$17,982.8
PPL	\$237.69	\$2,891.9	\$8,675.6	\$17,351.3
PSEG	\$254.80	\$3,100.1	\$9,300.3	\$18,600.7
RECO	\$248.64	\$3,025.2	\$9,075.5	\$18,151.1
RTO	\$247.26	\$3,008.4	\$9,025.1	\$18,050.1

II. CONCLUSION

The Market Monitor respectfully requests that the Commission afford due consideration to this brief as the Commission resolves the issues raised in this proceeding.

Respectfully submitted,



Jeffrey W. Mayes

General Counsel
Monitoring Analytics, LLC
2621 Van Buren Avenue, Suite 160
Valley Forge Corporate Center
Eagleville, Pennsylvania 19403
(610) 271-8053
jeffrey.mayes@monitoringanalytics.com

Joseph E. Bowring
Independent Market Monitor for PJM
President
Monitoring Analytics, LLC
2621 Van Buren Avenue, Suite 160
Valley Forge Corporate Center
Eagleville, Pennsylvania 19403
(610) 271-8051
joseph.bowring@monitoringanalytics.com

Siva Josyula
Senior Analyst
Monitoring Analytics, LLC
2621 Van Buren Avenue, Suite 160
Eagleville, Pennsylvania 19403
(610) 271-8050
siva.josyula@monitoringanalytics.com

Alexandra Salaneck
Senior Analyst
Monitoring Analytics, LLC
2621 Van Buren Avenue, Suite 160
Eagleville, Pennsylvania 19403
(610) 271-8050
alexandra.salaneck@monitoringanalytics.com

Keri Dorko
Senior Analyst
Monitoring Analytics, LLC
2621 Van Buren Avenue, Suite 160
Eagleville, PA 19403
(610) 271-8050
Keri.Dorko@monitoringanalytics.com

Dated: April 28, 2021

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 this proceeding.

Dated at Eagleville, Pennsylvania, this 28th day of April, 2021.



Jeffrey W. Mayes

General Counsel

Monitoring Analytics, LLC

2621 Van Buren Avenue, Suite 160

Valley Forge Corporate Center

Eagleville, Pennsylvania 19403

(610) 271-8053

jeffrey.mayes@monitoringanalytics.com