UNITED STATES OF AMERICA
BEFORE THE
FEDERAL ENERGY REGULATORY COMMISSION

PJM Interconnection, L.L.C.	)	Docket No. ER22-797

PROTEST OF THE INDEPENDENT MARKET MONITOR FOR PJM

Pursuant to Rule 211 of the Commission's Rules and Regulations,[1] Monitoring Analytics, LLC, acting in its capacity as the Independent Market Monitor ("Market Monitor") for PJM Interconnection, L.L.C. ("PJM"),[2] submits this protest to the filing submitted by PJM on January 10, 2022 ("January 10th Filing").

The January 10th Filing proposes a number of changes to the ARR/FTR market design. The stated goal of the filing is to enhance the equity of the ARR design and the efficiency of the FTR design. PJM's filing fails to address the basic equity issues in the assignment of congestion revenue rights to load. PJM's filing fails to address the fundamental issues with the FTR design and proposes relatively minor changes to the efficiency of the FTR design.

The Market Monitor recommends that the Commission reject the January 10th Filing, which not been shown to be just and reasonable. The January 10th Filing continues the fundamental flaws in the existing PJM ARR/FTR market and in some cases makes them worse. The PJM ARR/FTR design continues to require comprehensive reform. The Market

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1 18 CFR § 385.211 (2021).

2 Capitalized terms used herein and not otherwise defined have the meaning used in the PJM Open Access Transmission Tariff ("OATT"), the PJM Operating Agreement ("OA") or the PJM Reliability Assurance Agreement ("RAA").

Monitor recommends that the Commission institute a proceeding to investigate, under Section 206 of the Federal Power Act, whether the PJM ARR/FTR market design is just and reasonable.[3] A Section 206 investigation would allow the Commission to consider multiple proposals for reform, develop its own proposal, and adopt a durable solution that results in true reform.

I. PROTEST

A. Load Pays All Congestion; All Congestion Should Be Returned to Load.

With the introduction of LMPs in PJM, congestion revenue rights were provided directly to load, as FTRs, in recognition of the fact that load was required to pay more for low cost generation than is paid to low cost generation.[4] The difference is congestion. Load pays congestion revenues.[5] The rights to congestion revenues belong to load. LEI, in its review of the PJM ARR/FTR market, reached the same conclusion (LEI at 2, 5 and 30).[6]

But there was a flaw built in from the very beginning of the FTR design that had no significant impact initially but which was ultimately the source of all the issues with the FTR mechanism. That flaw was the idea that congestion was based on contract paths in a network system rather than a result of the actual operation of the complex network. The flaw was especially ironic given that most load was served by intrazonal generation subject to cost of service regulation rather than contracts with extrazonal generation. That flaw was inconsistent with the most basic logic of LMP and the resultant fissure has continued to

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[3] 16 U.S.C. § 824e.

[4] *See* 81 FERC ¶ 61,257 at 62,241 (1997).

[5] For more details see, for example, 2021 Quarterly State of the Market Report for PJM: January through September, Section 13: Financial Transmission and Auction Revenue rights.

[6] Review of PJM's Auction Revenue Rights and Financial Transmission Rights, London Economics International LLC (Dec. 16, 2020), <https://www.pjm.com/-/media/committees-groups/taskforces/afmtf/postings/lei-review-of-pjm-arrs-and-ftrs-report.ashx> ("LEI Report").

widen. The origin of FTRs was the recognition that the way to hold load harmless from making the excess payments created by the LMP system was to return the excess payments to load. The rights to congestion belong to load. If implemented correctly, FTRs would be the financial equivalent of firm transmission service for load. If implemented correctly, FTRs would be a perfect offset against congestion for load. The result of the current FTR mechanism is a significant reduction in the value of FTRs as an offset to congestion for load. PJM's proposal does nothing to address this issue.

As a result of this fundamental flaw in the design of the property right in the current ARR/FTR market, load cannot claim in aggregate, or on an individual customer basis, the congestion they pay due to binding transmission constraints in the network market solution. Further, there is no effective way for load, as the owner of path based property rights, to effectively participate as the supply side in the ARR/FTR market.

In contrast to how congestion is actually collected on a network basis, ARRs are path based property rights that generally require the use of predetermined source points, usually within the load's zone, and sink at the load zone. ARRs are allocated to zonal load based on historical generation to load transmission contract paths, in many cases based on 1999 contract paths. ARRs are allocated within zones based on zonal base load (Stage 1A) and zonal peak loads (other stages). ARR revenue is the result of the prices that result from the sale of FTRs through the FTR auctions. ARR revenue for each zone is the revenue for the ARRs that sink in each zone.

Congestion paid by load in a zone is the total difference between what the zonal load pays in congestion charges net of payments to the generation that serves the zonal load, including generation in the zone and outside the zone.

Congestion is the difference between what load pays for energy and generation is paid for energy due to LMP differences caused by binding transmission constraints. An individual load's congestion is the difference between what that load pays for energy and what every network generator was paid to serve that load. Congestion is not the difference between what the load paid for energy and what the one generator it designated as the

source points of its ARR was paid to serve load. All load is served by some portion of all network available generation in the market solution, regardless of artificial designations of electron ownership in the network. An efficient and effective market for congestion must align with this fundamental reality.

The amount and proportion of congestion offset that can be realized under PJM ARR/FTR market rules by load serving entities varies by planning period. The realized offsets are a function of the assignment of ARRs, the valuation of ARRs in the FTR auctions and the congestion revenue from self scheduled ARRs. Under the ARR design, the load owns the rights to congestion revenue, but the ARR design allows load to either claim the FTRs directly (through a process called self scheduling), or the rights to a revenue stream based on the auction clearing prices of the FTRs. Under the ARR design, the right to all congestion revenues should belong to load. All congestion revenue should be claimable by load. But the actual implementation under PJM ARR/FTR market design produces a very different result.

The realized total congestion offset paid to loads in the first seven months of the 2021/2021 planning period was only 45.3 percent of actual congestion costs.[7] However, the results vary significantly by zone. Loads in some zones, like BGE, receive substantially more in offsets than their total congestion payments. Loads in other zones, like ATSI, receive substantially less in offsets than their total congestion payments. The offsets are a function of the assignment of ARRs and the valuation of ARRs in the FTR auctions.

While the amount of congestion that is returned to the load varies by planning period, PJM's ARR/FTR design has consistently failed to return the congestion revenues to the load that paid it. It is not possible for load to recover all of the congestion that they pay

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7 *See* 2021 Quarterly State of the Market Report for PJM: January through September; *See* Appendix A.

under the current design in which the rights to congestion revenues are assigned based on fictitious contract paths.

B. Property Rights Are Essential for Efficient Markets; Load Owns the Property Rights to Congestion Revenue.

LEI recognized (at 60-83), that the current market design was flawed because it does not return congestion to the load that paid it. LEI characterized this inability for load to recover all the congestion they paid as leakage from the ARR rights holders to the FTR market.

But LEI failed to recognize that the fundamental cause of the leakage of congestion revenue from ARR holders is the path based structure of the property rights themselves. Instead, LEI asserted (LEI at 5) that the creation of an FTR property right, defined as the price differences on a fixed contract path, is the fundamental second purpose of the ARR/FTR construct. LEI confuses the design of the property right with the purpose of the property right. LEI fails to recognize the inconsistency between this asserted property right and the primary goal of the ARR/FTR design to return congestion to the load that paid it.

A fundamental issue in any efficient market is the definition of property rights and ownership of property rights. Efficient price discovery is not possible unless rights are well defined. Congestion belongs to load. Load owns the property right. Load should have the ability to claim all congestion paid by that load. If load cannot collect all the congestion it pays by collecting all the rights available to it as the owner of those rights, there is a problem with the definition of the property right. Correcting the ARR/FTR market requires defining congestion revenue rights so that it is possible for each load to claim the rights to all the congestion they pay. Correcting the flaws in the market that prevent congestion from being returned to the load that paid it cannot be achieved by expanding or modifying path based rights.

PJM's proposals for improving the ARR/FTR market relative to its purpose of returning congestion to load are all based on arbitrarily modifying or expanding path based rights. Arbitrarily expanding or modifying the path based rights available to the load and

the market will not correct the arbitrary allocation of congestion among ARR holders or between ARR holders and participants in the FTR market. Arbitrarily expanding or modifying the path based rights available to the load and the market will simply change the arbitrary allocation of congestion among ARR holders and participants in the FTR market.

C. Proposed Changes to Stage 1A ARR Allocations Will Not Improve the Assignment of Congestion Property Rights to Load.

PJM and LEI have failed to address the significant distributional consequences of the current ARR/FTR design. The level of actual congestion offset provided to load varies significantly and arbitrarily by zone. PJM has never supported this misallocation although the Market Monitor has documented it and PJM should itself be aware of it. PJM's proposed changes do not address this misallocation and create additional, unsupported and arbitrary distributional consequences. PJM's design fails this basic test of reasonableness and PJM has no defense for it, or even an explanation.

The Market Monitor's approach to the ARR/FTR design would ensure that all load has the right to receive 100 percent of the congestion it actually pays, no more and no less.

PJM's proposed rule changes to increase Stage 1A ARR allocations to 60 percent of Network Service Peak Load (NSPL) ("Stage 1A Proposal") will not improve the alignment of congestion property rights to load. Instead, PJM's Stage 1A Proposal will exacerbate the current misalignment.

Table 1 shows, for the 2021/2022 planning period, the proportion of ARR MW assigned by zone, by allocation stage and source point within or external to the zone where the ARR load is located. Table 1 shows that, in aggregate, 80.8 percent of Stage 1A MW are sourced from historical resources within the same zone as the ARR's owner's load, while Table 4 shows that 81.3 percent of congestion collected from load is due to network constraints outside the ARR's holder's zone. Table 1 and Table 4 show a misalignment of Stage 1A rights allocated to load and the sources of congestion paid by load. The result of this misalignment is that ARR holders are not able to recover the actual congestion they pay

and the amount of congestion that can be recovered varies arbitrarily by zone (See Table 6, Table 7, and Table 8).

PJM's Stage 1A Proposal will not correct the alignment of congestion property rights relative to actual network sources used by load. PJM's Stage 1A Proposal increases Stage 1A MW allocation on paths that are inconsistent with actual network service and the sources of actual congestion paid by load. Under the PJM rules, Stage 1A paths are limited to historical resources or their replacement in the case of a historical unit retirement.[8]

Table 1 Proportion of ARR MW by zone, allocation stage and sourcing point: 2021/2022 planning period

	Stage 1A		Stage 1B		Stage 2		Total MW	
	Out of Zone	In Zone	Out of Zone	In Zone	Out of Zone	In Zone	Out of Zone	In Zone
ACEC	19.7%	27.2%	7.6%	40.5%	0.4%	4.6%	27.8%	72.2%
AEP	9.0%	56.9%	1.4%	27.4%	0.0%	5.2%	10.4%	89.6%
APS	7.8%	52.8%	2.6%	35.5%	0.1%	1.2%	10.5%	89.5%
ATSI	16.6%	50.6%	1.9%	14.8%	2.7%	13.4%	21.2%	78.8%
BGE	39.8%	30.3%	0.4%	11.7%	4.6%	13.3%	44.8%	55.2%
COMED	0.0%	74.6%	0.0%	15.9%	0.0%	9.4%	0.0%	100.0%
DAY	62.1%	5.3%	1.6%	5.7%	8.5%	16.8%	72.2%	27.8%
DOM	0.3%	61.1%	0.0%	37.6%	0.0%	0.9%	0.4%	99.6%
DPL	23.1%	49.5%	2.6%	9.3%	6.1%	9.5%	31.7%	68.3%
DUKE	28.9%	30.7%	0.1%	24.8%	0.6%	14.8%	29.6%	70.4%
DUQ	52.7%	0.0%	19.7%	2.0%	10.2%	15.4%	82.6%	17.4%
EKPC	28.2%	50.5%	0.3%	0.0%	21.0%	0.0%	49.5%	50.5%
EXT	50.0%	0.0%	49.6%	0.0%	0.4%	0.0%	100.0%	0.0%
JCPLC	1.6%	71.4%	0.1%	1.2%	17.2%	8.6%	18.9%	81.1%
MEC	29.1%	55.8%	1.2%	8.8%	0.0%	5.0%	30.3%	69.7%
PE	16.8%	62.6%	0.1%	16.7%	0.0%	3.8%	16.9%	83.1%
PECO	2.5%	58.2%	7.5%	29.0%	0.3%	2.5%	10.3%	89.7%
PEPCO	20.8%	24.5%	0.6%	0.8%	0.9%	52.3%	22.3%	77.7%
PPL	0.0%	69.0%	0.0%	20.4%	1.3%	9.3%	1.3%	98.7%
PSEG	18.8%	34.1%	5.8%	18.1%	10.2%	13.0%	34.8%	65.2%
REC	0.0%	0.0%	0.0%	0.0%	100.0%	0.0%	100.0%	0.0%
Total	12.3%	52.0%	2.1%	22.7%	2.3%	8.5%	16.8%	83.2%
Proportion within Each Stage	19.2%	80.8%	8.7%	91.3%	21.5%	78.5%	16.8%	83.2%

Table 2 provides, by zone, the effect of PJM's proposal to increase each load's Stage 1A ARR allocations from 100 percent of network system baseload (NSBL) to 60 percent of NSPL for each PJM zone for the 2018/2019, 2019/2020, 2020/2021 and 2021/2022 planning periods. PJM is correct (at 8) that the Stage 1A Proposal will increase Stage 1A MW

8 *See* "PJM Manual 6: Financial Transmission Rights," Rev. 267 (Aug. 25, 2021) at 23.

allocations available to every load entity. In aggregate, PJM's proposed change to Stage 1A ARR allocations would have, if implemented in the 2020/2021 planning period, increased Stage 1A MW allocations by 21,717.5 MW, or 30.9 percent, over Stage 1A MW allocations under the current rules. However, the increase in Stage 1A MW allocations and associated values provided by PJM's Stage 1A proposal vary significantly by zone, but without a stated reason. Table 2 shows zonal Stage 1A MW increases of from 7.4 percent to 241.1 percent in the 2021/2022 planning period. Stage 1A MW show increases from 19 to 3,897.9 MW in the 2021/2022 planning period. These increases are arbitrary, and are not related to relative over or under collection of congestion from allocated rights relative to actual congestion paid (see Table 6, Table 7 and Table 8). Further, the increases in Stage 1A MW do not correct the discrepancies between allocated Stage 1A ARR paths available to load and the sources of actual congestion paid by load (See Table 1 and Table 4).

Table 2 Stage 1A allocations based on NSBL versus Stage 1A allocations based on 60 percent NSPL

	Zonal Base Load: Current Stage 1A MW				PJM Proposal: Stage 1A MW				PJM Proposal Percent Increase in Stage 1 A Nominations			
Zone	18/19	19/20	20/21	21/22	18/19	19/20	20/21	21/22	18/19	19/20	20/21	21/22
AECO	1,011.20	990.50	987.80	921.50	1,524.48	1,554.78	1,642.38	1,580.70	50.8%	57.0%	66.3%	71.5%
AEP	12,482.10	12,855.40	12,171.30	11,526.20	12,988.32	13,643.40	13,498.74	12,968.94	4.1%	6.1%	10.9%	12.5%
APS	4,768.30	4,917.60	4,734.00	4,439.20	5,252.76	5,605.32	5,757.66	5,182.56	10.2%	14.0%	21.6%	16.7%
ATSI	6,368.70	6,618.40	6,209.60	5,634.30	7,230.96	7,694.70	7,540.08	7,479.12	13.5%	16.3%	21.4%	32.7%
BGE	3,012.30	2,994.60	2,982.30	2,925.00	3,868.86	3,975.90	4,023.42	4,020.18	28.4%	32.8%	34.9%	37.4%
COMED	9,171.60	9,229.30	8,924.40	8,234.10	12,210.54	12,809.64	12,569.22	12,132.00	33.1%	38.8%	40.8%	47.3%
DAY	1,570.60	1,634.90	1,572.00	1,439.00	1,935.24	2,002.32	1,955.16	1,985.28	23.2%	22.5%	24.4%	38.0%
DEOK	2,591.00	2,651.30	2,466.20	2,322.80	3,021.60	3,116.94	3,030.96	2,985.00	16.6%	17.6%	22.9%	28.5%
DOM	9,461.20	9,698.60	9,815.70	9,749.70	11,796.84	12,739.20	11,958.30	12,036.36	24.7%	31.4%	21.8%	23.5%
DPL	1,752.70	1,775.80	1,655.80	1,671.20	2,287.50	2,401.38	2,458.68	2,451.36	30.5%	35.2%	48.5%	46.7%
DUQ	1,318.70	1,366.30	1,270.60	1,168.90	1,609.26	1,677.06	1,597.14	1,600.50	22.0%	22.7%	25.7%	36.9%
EKPC	1,268.30	1,249.80	1,167.30	1,160.00	1,716.06	2,058.48	1,844.46	1,631.82	35.3%	64.7%	58.0%	40.7%
JCPL	2,279.00	2,226.00	2,138.90	2,104.30	3,432.60	3,585.90	3,634.26	3,541.92	50.6%	61.1%	69.9%	68.3%
METED	1,427.10	1,514.10	1,403.80	1,358.80	1,738.20	1,816.68	1,791.78	1,785.78	21.8%	20.0%	27.6%	31.4%
OVEC	13.70	29.70	27.00	19.00	17.40	84.30	74.40	64.80	27.0%	183.8%	175.6%	241.1%
PECO	3,891.20	3,873.00	3,716.40	3,565.20	4,884.66	5,164.74	5,056.98	4,888.74	25.5%	33.4%	36.1%	37.1%
PEPCO	2,833.90	2,790.40	2,700.70	2,553.00	3,658.44	3,847.20	3,714.42	3,531.96	29.1%	37.9%	37.5%	38.3%
PPL	3,824.70	3,969.90	3,757.40	3,692.50	4,440.66	4,608.78	4,763.28	4,356.00	16.1%	16.1%	26.8%	18.0%
PENELEC	1,657.50	1,726.10	1,665.20	1,626.00	1,733.94	1,798.32	1,809.00	1,746.78	4.6%	4.2%	8.6%	7.4%
PSEG	4,288.90	4,259.90	4,117.00	3,980.40	5,740.14	5,986.98	5,851.50	5,734.38	33.8%	40.5%	42.1%	44.1%
RECO	143.30	142.70	140.20	134.10	241.02	248.88	235.86	238.50	68.2%	74.4%	68.2%	77.9%
Total	75,136.00	76,514.30	73,623.60	70,225.20	91,329.48	96,420.90	94,807.68	91,942.68	21.6%	26.0%	28.8%	30.9%

PJM's Stage 1A proposal will not improve the alignment of allocated congestion rights relative to the sources of actual congestion paid by load.

One of the sources of the current misalignment of allocated congestion rights relative to actual congestion paid by load is the level of Stage 1A overallocations in the current ARR/FTR market. PJM's Stage 1A proposal will result in increased Stage 1A violations and associated revenue inadequacies for FTRs.[9]

Table 3 shows total Stage 1A MW overallocations by zone and planning period for the 2018/2019 through 2021/2022 planning periods. In the 2021/2022 planning period, under the existing rules, there were constraint infeasibilities on 53 internal to same ARR zone PJM constraints totaling 5,881 MW. Stage 1A rights, infeasible or not, must be granted, without proration, to the requesting ARR holder. Stage 1A ARR MW allocations that are simultaneously infeasible relative to the PJM day-ahead market model cause revenue inadequacy on the associated ARR/FTR paths. FTR paths that are over allocated are revenue inadequate because expected target allocations associated with these FTRs (price differences times FTR MW) will exceed the congestion collected by constraints affecting these paths (price differences times market flows). Because PJM attempts to guarantee 100 percent payout of FTR target allocations, any revenue inadequacy caused by Stage 1A rights have to be made up by arbitrary reductions in the congestion rights made available to ARR holders in Stage 1B and Stage 2.

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9 See "Auction Revenue Rights and Financial Transmission Rights Tariff and Operating Agreement Revisions" Docket No. ER22-797-000, January 10, 2022.

Table 3 Total Stage 1A overallocations by zone and planning period: 2018/2019 through 2021/2022

	Total Overallocated ARR MW			
Zone	18/19	19/20	20/21	21/22
AECO	23.00	-	-	0.60
AEP	4,394.09	2,242.90	4,610.80	3,423.70
APS	257.40	70.90	533.00	837.70
ATSI	302.60	293.20	814.30	678.60
BGE	67.90	723.70	663.50	979.30
COMED	5,177.20	3,178.90	4,948.40	3,090.90
DAY	590.90	338.20	196.60	257.70
DEOK	738.10	1,869.90	1,126.70	1,456.70
DOM	44.60	125.00	250.90	661.90
DPL	28.16	647.70	-	109.40
DUQ	9.70	55.40	131.90	74.80
EKPC	5.90	53.40	102.40	100.70
JCPL	6.91	391.90	14.70	-
METED	-	206.30	69.10	287.70
OVEC	-	-	-	-
PECO	713.50	161.60	3.20	0.40
PEPCO	58.90	233.70	365.00	287.70
PPL	-	60.90	5.60	0.60
PENELEC	-	104.00	28.80	1,538.50
PSEG	158.23	242.40	114.90	0.20
RECO				
Total	12,577.09	11,000.00	13,979.80	13,787.10

D. Expanding ARR Source and Sink Options Will Not Improve the Assignment of Congestion to Load.

Increasing available ARR path choices cannot help ensure that load has rights to the congestion that each load pays because paths are an inaccurate contract path representation of the sources of congestion in a network. In addition, increasing available ARR path choices in the same design that substantially increases stage IA ARR assignments will have little effect because fewer ARRs will remain for the later rounds.

PJM proposes to expand ARR path options for Stage 1B and Stage 2 rounds of the ARR election process. PJM proposes to allow Stage 1B ARR elections to include valid zones, hubs, and external interface pricing points as source points in addition to the existing Active Historical Resources and Qualified Replacement Resources. PJM proposes (at 7) to allow Stage 2 ARRs to elect any zone, generators, hubs and external Interface Pricing Points as source and/or sink point. The current rules limit Stage 2 source points to generators,

zones, hubs and external interface pricing but require the elected ARRs to sink at the customer's load aggregate.

There is no basis for PJM's claim (at 7) that the proposed expansion of permitted source/sink combinations for ARR allocation will improve load's priority rights to congestion revenues and enhance alignment of ARRs with actual congestion payments. PJM provides no logical or market support for this position (at 7).

In order to improve the alignment of available allocated congestion property rights to the congestion actually paid by load, PJM's proposal would have to improve the alignment of allocated and available property rights with the sources of actual congestion paid by load. Addressing this mismatch, in aggregate, would require limiting source and sink points for both ARRs and FTRs to paths that are consistent with the physical delivery of energy in the PJM network model. FTR source and sink pairs are available on paths, such as gen to gen, that do not correspond to physical load service and do not collect congestion. Payments to these FTRs represents a leakage of congestion revenue away from loads that pay congestion, to FTR holders. Expanding ARR elections to these source and sink points that are irrelevant to the collection of actual congestion paid by load does improve the alignment of available rights and the sources of actual congestion, it creates a greater discrepancy. Rather than expanding ARR elections to source and sink points that are irrelevant to congestion recovery, these source and sink points should be eliminated as options for FTR requests.

E. Limiting IARR Projects to Stage 1ARR Paths.

PJM proposes (at 9) requiring that IARR requests source and sink at valid Stage 1 ARR buses ("IARR Proposal"). PJM states (at 10) that this limitation will "ensure that requests are only made and granted on paths where meaningful transfer capability would be added to the system." PJM states (at 10) that under the current rules there "exists opportunities for customers to request IARRs from two buses close in electrical proximity" where the IARR could be very valuable as a self scheduled FTR in rare, short term and

abnormal circumstances, but provide no real value to the PJM system for purposes of increasing transfer capability in the system. Essentially the issue is that the IARR request can result in an inexpensive, low risk congestion right (a self scheduled FTR) on a path, like a generator to generator path, that has no meaningful effect on the network functioning of the system between generation and loads and no actual congestion being generated.

The Market Monitor supports PJM's IARR Proposal for the same reason the Market Monitor opposes PJM's source and sink proposal. Requests for congestion rights between nodes that do not support the delivery of physical power from generation to load and do not correspond to sources of network congestion collection do not provide value to the system and do not contribute to the functioning of the ARR/FTR market. IARR requests between generator nodes, for instance, do not make sense for all the reasons PJM states in its argument. IARR and any associated FTRs on these paths are a source of congestion leakage from load. Requests for congestion rights, be they for IARR, ARRs or FTRs, should only be allowed and granted on paths that reflect or support meaningful network service in the two settlement market.

But PJM's argument does not go far enough. Stage 1A paths generally do not require transmission investment. The overallocation of Stage 1A paths is based on the underlying fiction that power flows on defined paths and that congestion exists on defined paths. PJM should recommend the elimination of IARRs for all the reasons stated in PJM's filing.

F. Increased FTR Products Options Will Not Improve Market Efficiency.

PJM's proposes (at 10) to expand FTR products to include on-peak weekday, on peak weekend and holiday, every day off peak and 24 hour FTR products. Under PJM's current ARR/FTR market design there are on peak, off peak and 24-hour FTRs available. PJM states (at 10) that this proposal will support a more efficient FTR market. PJM claims (at 3) that these proposed changes will "enhance market liquidity and future price discovery."

The issue with the efficiency of the FTR market is not the number of FTR products available. The issue with the efficiency of PJM's FTR market is the absence of an effective way for load to act as the supply side in the market. Load owns the rights to the congestion but has limited control over what is sold, how much is sold and the price at which it is sold. Efficient markets require the interaction between willing suppliers and buyers in a market with clearly defined property rights. PJM is offering numerous FTR products and FTR paths, but is not setting up ARR allocations, ARR paths and ARR optionality that match. It is not possible for load, in aggregate or on an individual participant basis, to self schedule all of its allocated ARR rights and claim all congestion. Absent this fundamental construction, the congestion rights defined in the market are flawed and incomplete. A market based on flawed and incomplete rights cannot provide an efficient market signal.

G. Price Floors are Evidence of a Flawed Market Design.

PJM is proposing (at 11) to introduce a $1 price floor for clearing FTR options in the PJM FTR auctions. PJM recognizes that the current design permits the creation of options that are significantly underpriced, but not the broader implications of that underpricing for the ARR/FTR design. PJM states (at 11) that PJM proposal implements "LEI's recommendation to adopt a clearing floor for FTR Options to prevent the creation of FTR Options that are underpriced, or essentially providing a means for risk free profit."

The availability of risk free profit in the PJM FTR market is evidence of a flawed market design. A price floor is a band-aid and not a fix for the underlying problem. The underlying problem is that the property rights to congestion revenues are not correctly defined. As a result, it is not possible for load to effectively participate as the seller of congestion revenue rights in the ARR/FTR design. Absent the rational reserve prices that would result from load acting as a seller with property rights, the market provides underpriced, risk free options at the expense of load.

II. CONCLUSION

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

Respectfully submitted,

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APPENDIX A

Issues in the Current ARR/FTR Design

Table 4 shows the share of ARR MW and auction revenue for ARRs with paths that source inside or outside the zone where the load is located and compares it to the proportion of congestion being collected by constraints located internally or externally to the zone for the 2021/2022 planning period (June 2021 through December 2021).

Table 4 shows that 83.2 percent of the ARR MW and 65 percent of the ARR revenue are from ARRs that are sourced from generation inside the zone where the ARR load is located while 16.8 percent of the ARR MW and 35 percent of the ARR revenue are from ARRs that source from generation or points outside the zone where the ARR load is located. Table 1 also shows that only 18.3 percent of congestion paid by load, system wide, is due to constraints located within the same zone as the load that is paying that congestion. On a zone specific basis, the discrepancy between the identified source and sink points for ARR paths available to load and the location of network constraints causing load to pay congestion revenue varies wildly and arbitrarily.

Table 4 illustrates one of the fundamental issues with the path based approach which originated in a cost of service design where most load was served by, or assumed to be served by, generation in the same zone as load. Table 4shows the share of ARR MW and ARR revenue by whether the source point is in or out of the load zone, and the congestion revenue paid by load by whether the constraint causing the congestion is internal or external to the zone. In the PJM market, which operates as an integrated network, a significant proportion of congestion is based on constraints that are not in the same zone as load. Due to the misalignment of ARR rights and the sources of network congestion paid by load, the path based approach cannot reflect the actual congestion paid by load and path based rights cannot be used to claim all congestion paid by the load.

Table 4 ARRs MW, revenue and congestion by source point: 2021/2022 planning period

Zone	Proportion of ARR MW by Source		Proportion of ARR Value ($) by Source		Proportion of Congestion Caused by Constraints	
	Out of Zone	In Zone	Out of Zone	In Zone	External to the Zone	Internal to the Zone
ACEC	27.8%	72.2%	51.2%	48.8%	93.5%	6.5%
AEP	10.4%	89.6%	11.2%	88.8%	78.5%	21.5%
APS	10.5%	89.5%	16.1%	83.9%	96.7%	3.3%
ATSI	21.2%	78.8%	96.7%	3.3%	98.0%	2.0%
BGE	44.8%	55.2%	81.3%	18.7%	83.9%	16.1%
COMED	0.0%	100.0%	0.0%	100.0%	79.9%	20.1%
DAY	72.2%	27.8%	99.7%	0.3%	96.1%	3.9%
DOM	0.4%	99.6%	0.8%	99.2%	73.3%	26.7%
DPL	31.7%	68.3%	37.2%	62.8%	34.2%	65.8%
DUKE	29.6%	70.4%	76.0%	24.0%	91.2%	8.8%
DUQ	82.6%	17.4%	93.1%	6.9%	97.9%	2.1%
EKPC	49.5%	50.5%	88.1%	11.9%	99.9%	0.1%
EXT	100.0%	0.0%	100.0%	0.0%	92.3%	7.7%
JCPLC	18.9%	81.1%	84.7%	15.3%	100.0%	0.0%
MEC	30.3%	69.7%	41.0%	59.0%	49.7%	50.3%
OVEC	0.0%	0.0%	0.0%	0.0%	94.7%	5.3%
PE	16.9%	83.1%	38.3%	61.7%	85.1%	14.9%
PECO	10.3%	89.7%	7.1%	92.9%	75.7%	24.3%
PEPCO	22.3%	77.7%	89.6%	10.4%	96.7%	3.3%
PPL	1.3%	98.7%	0.0%	100.0%	70.6%	29.4%
PSEG	34.8%	65.2%	44.9%	55.1%	99.5%	0.5%
REC	100.0%	0.0%	100.0%	0.0%	33.9%	66.1%
Total	16.8%	83.2%	35.0%	65.0%	81.3%	18.7%

Another factor that contributes to ARR holders not being to collect all congestion paid by load is that FTR source and sink pairs are available on source and sink path pairs that do not correspond to physical load service and do not collect congestion. Table 5 shows the MW proportion of FTRs by source and sink node type for cleared buy and self scheduled bids in the 2021/2022 Annual FTR Auction. Generator to generator FTRs comprise 53.7 percent of all cleared FTR buy and self scheduled bids, up 5.7 percentage points from the previous planning period. It is not clear why generator to generator FTRs make up such a disproportionate share of total FTRs. Congestion results from load paying

more for generation than generators receive. By definition, congestion is between network available generator sources and load sinks. Generator to generator paths do not represent the delivery of generation to load. FTRs between generators simply create a speculative opportunity because they can be a low cost or zero cost FTR in the current design with a significant payoff if there is a price difference between the two nodes.

Table 5 Annual auction FTR node type matrix by proportion of MW: 2021/2022

	Sink Type					
Source Type	Aggregate	Generator	Hub	Interface	Residual Metered Aggregate	Zone
Aggregate	1.8%	5.1%	0.2%	0.0%	0.2%	0.4%
Generator	11.1%	53.7%	4.2%	0.7%	5.3%	8.4%
Hub	0.3%	0.8%	0.5%	0.0%	0.3%	1.3%
Interface	0.1%	0.4%	0.0%	0.0%	0.1%	0.1%
Residual Metered Aggregate	0.1%	0.5%	0.0%	0.0%	0.0%	0.0%
Zone	0.4%	1.4%	0.6%	0.0%	0.5%	1.3%

As a hypothetical, Table 6 shows the total congestion offset that would be available to ARR holders via allocated ARRs, by zone, if the ARRs holders held all their allocated ARRs in the 2019/2020, 2020/2021, and the first seven months of the 2021/2022 planning period and did not self schedule any. In aggregate, the share of congestion revenues available to load from ARRs alone was significantly lower than congestion costs in the 2020/2021 and 2021/2022 planning period. For the 2019/2020 planning period, FTR bidders paid more in the auctions than the actual day-ahead target allocations for the same paths. The unexpected reduction in energy prices in 2020 led to a corresponding unexpected reduction in target allocations and in actual congestion. This resulted in an offset over 100 percent because the resulting total ARR value for the 2019/2020 planning period was greater than actual congestion costs. FTR prices were lower in the Annual FTR Auction for 2020/2021, reducing the offset for the 2020/2021 planning period.

Table 6 Offset available to load if all ARRs are held: 2021/2022 planning period

	19/20 Planning Period				20/21 Planning Period				21/22 Planning Period*			
	ARR Held TA	Bal+M2M Charges	Congestion+ M2M	Offset	ARR Held TA	Bal+M2M Charges	Congestion+ M2M	Offset	ARR Held TA	Bal+M2M Charges	Congestion+ M2M	Offset
ACEC	$7.8	($2.1)	$3.7	155.9%	$4.4	($2.7)	$5.5	31.2%	$2.2	($1.1)	$6.1	17.8%
AEP	$169.0	($28.2)	$81.9	172.0%	$85.3	($38.1)	$110.9	42.6%	$53.7	($16.1)	$116.7	32.2%
APS	$63.8	($10.4)	$31.9	167.3%	$50.5	($14.8)	$45.2	79.0%	$26.8	($6.1)	$51.1	40.6%
ATSI	$35.4	($13.9)	$36.8	58.3%	$20.5	($19.5)	$50.6	2.1%	$12.5	($7.6)	$55.1	9.0%
BGE	$67.1	($6.7)	$15.3	396.2%	$61.1	($9.1)	$24.8	209.2%	$54.8	($3.8)	$26.9	189.0%
COMED	$64.2	($19.8)	$65.2	68.1%	$43.2	($28.5)	$78.3	18.8%	$27.9	($11.1)	$84.6	19.9%
DAY	$11.4	($3.9)	$9.7	77.2%	$6.4	($5.3)	$11.0	9.8%	$3.4	($2.1)	$13.3	9.8%
DOM	$67.4	($16.9)	$59.2	85.2%	$67.5	($37.9)	$87.9	33.7%	$61.6	($3.1)	$107.9	54.2%
DPL	$50.9	($8.7)	$17.4	242.4%	$32.8	($6.7)	$36.2	72.0%	$28.2	($1.5)	$31.7	84.1%
DUKE	$44.2	($6.0)	$14.9	256.9%	$28.8	($8.4)	$17.4	117.5%	$16.5	($18.7)	$19.8	-10.8%
DUQ	$5.4	($3.2)	$5.1	43.0%	$5.8	($4.0)	$6.2	28.7%	$3.4	($2.3)	$8.4	13.6%
EKPC	$2.4	($2.9)	$7.4	-7.2%	$3.0	($4.2)	$8.4	-13.3%	$2.3	($1.5)	$10.8	6.9%
EXT	$2.0	($2.2)	($1.7)	10.6%	$0.5	($13.8)	$11.0	-120.7%	$0.4	($2.9)	$10.3	-23.9%
JCPLC	$6.0	($4.6)	$9.2	14.5%	$6.1	($6.1)	$12.9	-0.1%	$1.2	($2.7)	$15.2	-10.0%
MEC	$7.7	($4.2)	$8.7	40.2%	$3.9	($5.3)	$16.5	-8.4%	$5.1	($5.1)	$14.6	-0.3%
OVEC	NA	$0.1	$0.5	14.6%	NA	($0.3)	$0.9	-28.8%	NA	($0.1)	$0.4	-21.0%
PE	$18.1	($3.8)	$10.8	132.3%	$9.3	($6.5)	$16.4	16.7%	$8.7	($4.2)	$17.3	25.9%
PECO	$24.0	($8.2)	$13.4	118.3%	$15.1	($10.9)	$24.9	17.0%	$12.2	($2.5)	$30.1	32.0%
PEPCO	$30.6	($6.1)	$13.7	178.3%	$29.1	($8.3)	$20.5	101.6%	$15.5	($3.5)	$23.5	51.0%
PPL	$37.6	($8.5)	$20.5	142.2%	$26.1	($11.5)	$30.8	47.4%	$21.4	($4.6)	$34.2	49.4%
PSEG	$46.2	($8.9)	$18.4	202.5%	$24.7	($13.9)	$25.0	43.2%	$20.2	($4.8)	$29.3	52.7%
REC	$0.6	($0.3)	$0.6	46.2%	$0.2	($0.6)	$2.1	-17.0%	$0.2	($0.2)	$2.8	-0.3%
Total	$761.8	($169.4)	$442.7	133.8%	$524.3	($256.2)	$643.4	41.7%	$378.0	($105.4)	$710.0	38.4%

* First seven months of the 2021/2022 planning period

Table 7 shows the total congestion offset that would be available to ARR holders via allocated ARRs, by zone, if the ARR holders self scheduled all their allocated ARRs as FTRs in the 2019/2020, 2020/2021, and the first seven months of the 2021/2022 planning period. The calculated self scheduled FTR target allocations assume a 100 percent payout ratio. In aggregate, the first seven months of 2020/2021 planning period show an unusually high value of hypothetical self scheduled FTR target allocations compared to prior periods. This is due to significant ARR overallocations in 2021/2022 planning period relative to realized network capability and the exclusion of underfunding adjustments that are being experienced, to date, in the PJM FTR market.[10] The results show that the recovery of congestion varies significantly by zone and that the load in some zones recovers far more than the congestion paid and the load in other zones recovers far less. In aggregate, load

[10] The first seven months of the 2021/2022 planning period were revenue inadequate, with a payout ratio of 91.1 percent. The result of this inadequacy is that FTRs not impacted by the project area will subsidize the losses of those that are. Since the self scheduling of all ARR would change the FTRs that cleared in the FTR auctions, the level of revenue inadequacy in the case of full self scheduling is not known.

claiming all available ARRs as self scheduled FTRs does not allow load to claim all the congestion that they paid. This result is not consistent with a rational FTR/ARR design under which all load would be returned their congestion, but no more and no less.

Table 7 Offset available to load if all ARRs self scheduled: 2019/2020 through 2021/2022 planning periods

	19/20 Planning Period				20/21 Planning Period				21/22 Planning Period*			
	SS FTR	Bal+M2M Charges	Congestion +M2M	Offset	SS FTR	Bal+M2M Charges	Congestion +M2M	Offset	SS FTR	Bal+M2M Charges	Congestion +M2M	Offset
ACEC	$2.6	($2.1)	$3.7	15.6%	$1.8	($2.7)	$5.5	-16.4%	$0.3	($1.1)	$6.1	-12.9%
AEP	$62.7	($28.2)	$81.9	42.1%	$77.3	($38.1)	$110.9	35.3%	$67.3	($16.1)	$116.7	43.9%
APS	$31.2	($10.4)	$31.9	65.1%	$42.0	($14.8)	$45.2	60.3%	$39.5	($6.1)	$51.1	65.4%
ATSI	$27.9	($13.9)	$36.8	38.1%	$30.7	($19.5)	$50.6	22.1%	$34.4	($7.6)	$55.1	48.8%
BGE	$53.7	($6.7)	$15.3	308.0%	$79.7	($9.1)	$24.8	284.2%	$80.3	($3.8)	$26.9	283.8%
COMED	$40.6	($19.8)	$65.2	31.9%	$69.6	($28.5)	$78.3	52.4%	$40.4	($11.1)	$84.6	34.6%
DAY	$5.6	($3.9)	$9.7	17.4%	$8.0	($5.3)	$11.0	24.9%	$5.4	($2.1)	$13.3	25.2%
DOM	$32.8	($16.9)	$59.2	26.9%	$117.0	($37.9)	$87.9	90.0%	$121.9	($3.1)	$107.9	110.1%
DPL	$27.3	($8.7)	$17.4	107.3%	$56.4	($6.7)	$36.2	137.4%	$44.1	($1.5)	$31.7	134.5%
DUKE	$30.5	($6.0)	$14.9	164.2%	$40.9	($8.4)	$17.4	187.2%	$31.8	($18.7)	$19.8	66.1%
DUQ	$8.1	($3.2)	$5.1	95.2%	$8.9	($4.0)	$6.2	79.7%	$6.8	($2.3)	$8.4	54.0%
EKPC	$4.1	($2.9)	$7.4	16.8%	$6.6	($4.2)	$8.4	29.3%	$5.8	($1.5)	$10.8	39.4%
EXT	$0.9	($2.2)	($1.7)	74.3%	$0.3	($13.8)	$11.0	-122.3%	$0.7	($2.9)	$10.3	-21.2%
JCPLC	$2.3	($4.6)	$9.2	-25.5%	$0.9	($6.1)	$12.9	-40.2%	$2.8	($2.7)	$15.2	0.4%
MEC	$0.8	($4.2)	$8.7	-38.5%	$8.0	($5.3)	$16.5	16.5%	$18.1	($5.1)	$14.6	89.0%
OVEC	NA	$0.1	$0.5	NA	NA	($0.3)	$0.9	NA	NA	($0.1)	$0.4	-21.0%
PE	$11.2	($3.8)	$10.8	69.1%	$13.5	($6.5)	$16.4	42.8%	$13.3	($4.2)	$17.3	52.9%
PECO	$16.8	($8.2)	$13.4	63.8%	$14.0	($10.9)	$24.9	12.4%	$16.0	($2.5)	$30.1	44.7%
PEPCO	$23.2	($6.1)	$13.7	124.3%	$37.3	($8.3)	$20.5	141.7%	$30.7	($3.5)	$23.5	116.1%
PPL	$39.2	($8.5)	$20.5	149.9%	$43.7	($11.5)	$30.8	104.5%	$80.9	($4.6)	$34.2	223.6%
PSEG	$21.3	($8.9)	$18.4	67.2%	$43.2	($13.9)	$25.0	117.0%	$34.2	($4.8)	$29.3	100.3%
REC	$0.2	($0.3)	$0.6	-22.6%	$1.0	($0.6)	$2.1	21.0%	$0.6	($0.2)	$2.8	16.0%
Total	$443.0	($169.4)	$442.7	61.8%	$700.9	($256.2)	$643.4	69.1%	$675.3	($105.4)	$710.0	80.3%

Table 8 shows the actual day-ahead congestion and balancing congestion and M2M charges paid by load in each zone along with the congestion offsets paid to load: FTR auction revenue, self scheduled FTR revenue adjusted by the payout ratio for FTRs if below 100 percent, and the allocation of end of planning period surplus for the first seven months of the 2021/2022 planning period.[11] Congestion paid by load in a zone is the total difference between what the zonal load pays in congestion charges net of payments to the generation

[11] *See* 2020 State of the Market Report for PJM, Volume II, Section 11: Congestion and Marginal Losses.

that serves the zonal load, including generation in the zone and outside the zone.[12] Table 8also shows payments by load for balancing congestion and M2M payments. The total congestion offset paid to load is the sum of all of those credits and charges. ARR revenue for each zone is the revenue for the ARRs that sink in each zone. The zonal offset percentage shown in Table 8 is the sum of the congestion related revenues (offset) paid to load in each zone divided by the total congestion payment made by load in each zone.

Table 8 Zonal ARR and FTR total congestion offset (in millions) for ARR holders: 2021/2022 planning period (first seven months of the 2021/2022 planning period)

Zone	ARR Credits	Adjusted FTR Credits	Balancing+ M2M Charge	Surplus Allocation	Total Offset	Day Ahead Congestion	Balancing Congestion	M2M Payments	Total Congestion	Offset
ACEC	$2.2	($0.0)	($1.1)	$0.0	$1.0	$7.2	($1.0)	($0.1)	$6.1	17.1%
AEP	$25.1	$25.5	($16.1)	$0.0	$34.5	$132.8	($15.1)	($1.0)	$116.7	29.6%
APS	$17.6	$12.9	($6.1)	$0.0	$24.5	$57.2	($5.7)	($0.4)	$51.1	47.8%
ATSI	$12.2	$0.5	($7.6)	$0.0	$5.2	$62.6	($7.0)	($0.5)	$55.1	9.4%
BGE	$52.8	$2.4	($3.8)	$0.0	$51.4	$30.8	($3.6)	($0.3)	$26.9	190.7%
COMED	$24.6	$4.3	($11.1)	$0.0	$17.8	$95.7	($10.3)	($0.8)	$84.6	21.1%
DAY	$3.0	$0.5	($2.1)	$0.0	$1.5	$15.3	($1.9)	($0.1)	$13.3	11.3%
DUKE	$14.6	$1.0	($3.1)	$0.0	$12.5	$22.9	($2.9)	($0.2)	$19.8	63.0%
DUQ	$3.3	$0.2	($1.5)	$0.0	$2.0	$9.9	($1.4)	($0.2)	$8.4	23.3%
DOM	$18.5	$76.8	($18.7)	$0.0	$76.6	$125.8	($17.8)	($0.1)	$107.9	71.0%
DPL	$21.8	$8.4	($2.3)	$0.0	$28.0	$34.7	($2.1)	($0.9)	$31.7	88.2%
EKPC	$2.3	$0.0	($1.5)	$0.0	$0.7	$12.3	($1.4)	($0.1)	$10.8	6.8%
EXT	$0.4	$0.0	($2.9)	$0.0	($2.5)	$13.2	($2.9)	$0.0	$10.3	(23.9%)
JCPLC	$1.2	$0.0	($2.7)	$0.0	($1.5)	$17.9	($2.5)	($0.2)	$15.2	(9.8%)
MEC	$4.6	$1.4	($5.1)	$0.0	$0.9	$19.7	($5.0)	($0.1)	$14.6	5.8%
OVEC	$0.0	$0.0	($0.1)	$0.0	($0.1)	$0.5	($0.1)	$0.0	$0.4	(21.0%)
PECO	$12.0	$0.3	($4.2)	$0.0	$8.1	$34.2	($3.8)	($0.3)	$30.1	26.8%
PE	$6.0	$5.9	($2.5)	$0.0	$9.4	$19.9	($2.4)	($0.1)	$17.3	54.4%
PEPCO	$13.5	$3.3	($3.5)	$0.0	$13.3	$27.0	($3.3)	($0.2)	$23.5	56.8%
PPL	$19.5	$7.1	($4.6)	$0.0	$22.0	$38.7	($4.2)	($0.3)	$34.2	64.5%
PSEG	$19.6	$1.3	($4.8)	$0.0	$16.1	$34.1	($4.4)	($0.4)	$29.3	55.0%
REC	$0.2	$0.0	($0.2)	$0.0	($0.0)	$3.0	($0.2)	($0.0)	$2.8	(0.3%)
Total	$275.0	$151.8	($105.4)	$0.0	$321.3	$815.5	($99.1)	($6.4)	$710.0	45.3%

12 See "Constraint Based Congestion Calculations," PJM ARR FTR Market Task Force (July 17, 2020) <https://www.pjm.com/-/media/committees-groups/task-forces/afmtf/2020/20200722/20200722-item-03a-constraint-based-congestion-calculations.ashx>.

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 2nd day of February, 2022.

Jeffrey W. Mayes
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