



such unduly discriminatory treatment on a prima facie basis, without any explanation of why such different treatment may be justified.”

The FMC’s argument that PJM’s proposal is unduly discriminatory has no merit. There is no basis for the assertion that PJM’s proposed change in the set of biddable locations for virtual products constitutes a discriminatory treatment of virtual products. In order for there to be discriminatory treatment among the products, products in a similar position must be treated differently. PJM is not proposing different treatment.

PJM proposed (at 10) to limit INCs and DECs to biddable locations where physical generation can offer MW (injections at generation bus) and load can bid MW (withdrawal at zones).<sup>3</sup> PJM is proposing the same treatment for physical generation and physical load and INCs and DECs. PJM also proposed to allow INCs and DECs to offer and bid at interfaces and hubs. PJM’s proposal (at 9) does not permit virtual offers and bids at locations, such as Extra High Voltage nodes where no physical generation offers and no physical load bids.

PJM’s proposed treatment of bidding locations for UTCs is based on the unique characteristics of UTCs. While UTCs act as both an injection and a withdrawal, UTCs do not clear in PJM’s optimization like separate injections and withdrawals. INCs and DECs clear on the basis of their designated node specific strike prices. UTCs clear as a matched injection and withdrawal based on a designated spread between node prices. UTCs are a unique virtual product with unique characteristics in how they affect the market clearing. Limiting UTCs to interfaces, hubs and zones based on the unique characteristics of UTCs, does not constitute undue discriminatory treatment of UTCs.

PJM’s proposals to limit biddable nodes for virtual products does not discriminate against any entity or type of market participant. All participants or entities are eligible to make use of INCs, DECs and UTCs. The proposed list of biddable nodes for INCs and

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<sup>3</sup> PJM Filing, Docket No. ER18-88-000 (Oct. 17, 2017) (“PJM”).

DECs and the proposed list of biddable nodes for UTCs are the same regardless of entity or type of market participant.

**B. PJM’s Proposal Will Allow Virtual Activity at Locations Where Load Can Bid and Participate in the PJM Market.**

Protesters argue that “PJM’s proposal to limit biddable locations will make it impossible to transact in the Day-Ahead Energy Market at the locations where load physically sinks and where the locational marginal prices (“LMPs”) for load are formed.”<sup>4</sup>

Protesters are incorrect. Load bids at the zonal level. Zonal load bids are distributed to individual buses by PJM using distribution factors. Thus, the PJM proposal provides the same bidding opportunities for DECs as are available for load bids in the day-ahead market.

Contrary to Protesters, the current approach to bidding locations discriminates in favor of virtuals by providing the ability to make nodal offers that is not available to physical load.

**C. PJM’s Proposed Set of Biddable Locations Will Not Reduce Opportunities for Market Power Mitigation.**

Protesters argue that virtual transactions are needed at individual load nodes in order to mitigate the exercise of market power by load.<sup>5</sup> There is no basis for this frequently repeated assertion, and Protesters have provided no evidence to support it.

The assertion is not relevant to the Protesters’ point. Load can only bid zonally so the ability of virtuals to also bid zonally will provide virtuals all the opportunities they require to respond to load bidding behavior. Limiting virtual bids to the zonal level aligns the virtuals’ bidding opportunities with physical loads’ bidding opportunities. PJM’s proposal allows INCs and DECs to offer and bid at zones.

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<sup>4</sup> E.g., DC Energy et al.at 1–2.

<sup>5</sup> *Id.* at 12.

Protesters argue that virtual transactions are needed at individual generator nodes in order to mitigate market power.<sup>6</sup> There is no basis for this frequently repeated assertion either, and Protesters have provided no evidence to support it.

Again, the assertion is not relevant to the Protestors' point. Generators make their offers at generator nodes so the ability of virtuals to bid at generator buses will provide virtuals all the opportunities they require. If virtuals want to counter any behavior of generators, offering or bidding at generator buses is the way to do so. Limiting virtual bids to the generator buses aligns the virtuals' bidding opportunities with generators' bidding opportunities. PJM's proposal allows INCs to offer and DECs to bid at generator nodes.

**D. PJM's Proposed Set of Biddable Locations Will Improve Efficiency of the PJM Market by Reducing False Arbitrage Opportunities.**

Protesters complain, "If PJM eliminates its market participants' ability to place virtual transactions at the individual load nodes where power sinks in the Real-Time Market, there will be no way to efficiently converge Real-Time LMPs at those individual load nodes and their related constraints."<sup>7</sup>

There is no basis for this frequently repeated assertion, and Protesters have provided no evidence to support their claim that virtual behavior converges day-ahead and real-time prices.

Protesters overlook the systematic and fundamental modeling differences between the day-ahead market model and the real-time physical market model. Protesters assume that virtual behavior results in price convergence at individual nodes. This assumption is not correct.

The day-ahead market model is only an approximation of the real-time model. For example, Protesters acknowledge that the inclusion of a bus in the day-ahead market that

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<sup>6</sup> *Id.* at 3.

<sup>7</sup> DC Energy et al. at 7.

does not exist in the real-time physical model (a dead bus) is a modeling problem that will create opportunities for making profit without creating any convergence. But there are systematic modeling differences between the day-ahead and real-time market that go well beyond the inclusion of dead buses. A primary example of these modeling differences between the day-ahead and real-time models are the differences between the set of transmission constraints enforced in the day-ahead and real-time market models.

As a result of their impact on the day-ahead market solution time, PJM limits the number of potentially binding constraints that it includes in the day-ahead solution. On average, PJM only models about 25 percent of the physical transmission elements in the day-ahead market. PJM is selective in the constraints it enforces in the day-ahead market, based on its expectations regarding real-time prices, real-time congestion and the set of generation units PJM believes it will require in the real-time market. The day-ahead enforced constraints and their limits change over time, and can change hourly within the day. PJM selects day-ahead constraints that are most important in aligning the hourly results of the day-ahead and real-time markets. Profitable nodal trading opportunities caused by these modeling differences do not improve the efficiency of the market. These are false arbitrage opportunities. If the price differences between the day-ahead and real-time market within a zone are created by the exclusion of a constraint in the day-ahead market, no amount of virtual activity will align the market results. The only outcome will be a wealth transfer among participants.

The effect of systematic modeling differences on day-ahead and real-time prices are minimized at PJM's aggregates, as they reflect zonal load weighted day ahead and load weighted real time averages of hourly nodal prices. Limiting bidding points to these aggregates reduces the opportunities for false arbitrage.

PJM's actions in selecting constraints in the day-ahead market are explicitly designed to converge the day-ahead and real-time market results and generally succeed in that effort. Virtual transactions that take advantage of PJM's mistakes when the day-ahead constraints do not match real-time constraints are simply extracting revenues from the

market that would otherwise belong to load or generation and are not contributing to efficiency or convergence.

**E. UTCs Do Not Converge Congestion or Prices.**

Protesters argue that “UTCs are not so different from INCs and DEC—they are really equivalent to an INC/DEC pair that allows for arbitrage and convergence of day ahead (DA) and real time (RT) congestion in the PJM market.”<sup>8</sup> Protesters argue that “UTCs are far more effective than individual INCs and DEC at converging congestion between DA and RT, resulting in overall better price formation, and therefore should be allowed at any location where an INC or DEC is permitted.”<sup>9</sup>

The profitability of a UTC is the net of the profitability of the injection and withdrawal sides. A UTC is profitable if the profit on one side of the UTC transaction exceeds the losses on the other side. A UTC can simultaneously have a profitable side and a losing side. This makes the UTC an inferior product relative to INCs and DEC for Protesters’ stated purpose. DC Energy et al.’s (at 14) claim that “[a]ny energy price divergence on one side of the transaction is directly offset by convergence on the other side” suggests that there is no net effect and no convergence resulting from UTCs.

As with INCs and DEC, UTC profitability is primarily a result of constraints not modeled by PJM in the day-ahead model that bind in the real-time market. As with INCs and DEC, UTCs did not bring convergence in LMPs, commitment, or dispatch between the day-ahead and real-time markets. UTC profits resulted from the modeling differences and continued until PJM included the relevant constraints in the day-ahead market. There is no evidence that UTCs contribute to price convergence or to market efficiency improvements in the PJM market.

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<sup>8</sup> Appian Way at 1.

<sup>9</sup> Appian Way at 1.

Limiting UTCs to aggregated, high volume trading locations will reduce opportunities to engage in false arbitrage generated by systematic modeling differences.

**F. PJM's Proposal Will Eliminate the Penny Bid Related Issues.**

Protesters note that “[p]enny bids are transactions on a path over a period of time which result in profit when a constraint binds at in the Real-Time market” but does not bind in day ahead.<sup>10</sup> Protesters assert that “[t]he fundamental issue driving penny bids is a lack of volume on the binding path.”<sup>11</sup> Protesters assert that “[e]liminating the majority of biddable points for virtual transactions will not resolve PJM’s issue with penny bids.”<sup>12</sup>

None of these assertions are valid.

Penny bids are UTC bids with very small price spreads. UTC penny bid strategies are a relatively low cost and low risk strategy for profiting from the false arbitrage opportunities created by PJM’s limit on the number of constraints that it includes in the day-ahead model. The strategy is to make a large number of these small bids across many paths with the expectation that one of the unmodeled constraints in the day-ahead market will bind in the real-time market. In other words, penny bids clear if there is little or no congestion on a path in the day-ahead model and profit if there is congestion on that path in real time. In such circumstances, the profits pursued through UTCs cannot bring convergence in LMPs, commitment, or dispatch between the day-ahead and real-time markets, no matter how many MW of UTC offer in the day-ahead market.

When the UTC penny bid strategy results in significant explicit balancing congestion costs, PJM updates the set of constraints it enforces in the day-ahead market to eliminate the specific modelling differences that were being exploited by UTCs. While PJM can respond

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<sup>10</sup> FMC at 19.

<sup>11</sup> *Id.*

<sup>12</sup> *Id.* at 21.

to and correct false arbitrage opportunities caused by differences in the enforced constraint list in the day ahead and real time market models, due to the inability to model all constraints, PJM cannot eliminate these modeling differences or these false arbitrage opportunities. PJM can only respond to them, ex post, as they appear. PJM's proposal to limit the UTC bid locations interfaces, zones and hubs will minimize false arbitrage opportunities for UTCs currently being pursued through penny bids as the effect of modeling differences in the day-ahead and real-time market are minimized at these aggregates.

## II. MOTION FOR LEAVE TO ANSWER

The Commission's Rules of Practice and Procedure, 18 CFR § 385.213(a)(2), do not permit answers to answers or protests unless otherwise ordered by the decisional authority. The Commission has made exceptions, however, where an answer clarifies the issues or assists in creating a complete record.<sup>13</sup> In this answer, the Market Monitor provides the Commission with information useful to the Commission's decision-making process and which provides a more complete record. Accordingly, the Market Monitor respectfully requests that this answer be permitted.

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<sup>13</sup> See, e.g., *PJM Interconnection, L.L.C.*, 119 FERC ¶61,318 at P 36 (2007) (accepted answer to answer that "provided information that assisted ... decision-making process"); *California Independent System Operator Corporation*, 110 FERC ¶ 61,007 (2005) (answer to answer permitted to assist Commission in decision-making process); *New Power Company v. PJM Interconnection, L.L.C.*, 98 FERC ¶ 61,208 (2002) (answer accepted to provide new factual and legal material to assist the Commission in decision-making process); *N.Y. Independent System Operator, Inc.*, 121 FERC ¶61,112 at P 4 (2007) (answer to protest accepted because it provided information that assisted the Commission in its decision-making process).



### III. CONCLUSION

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

Respectfully submitted,



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Dated: November 22, 2017

## 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 22<sup>nd</sup> day of November, 2017.



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