

FTR/ARR PJM Filing Key Facts

Presentation By: Energy Trading Institute December 2021

Meeting Agenda

- Summary of expected PJM filing and stakeholder process
- Concerns with the IMM's participation in the stakeholder process and potential protest to the 205 filing
- Benefits of the PJM/Joint Stakeholders proposal for all sectors in PJM
- Benefits and recommendations outlined by London Economics International in their independent study of the FTR/ARR market commissioned by PJM at OPSI's request

PJM Upcoming Expected 205 Filing on FTRs

Background:

- Two-year process to reassess market design orthodoxy with respect to FTRs and ARRs
- Determine if customers receive the appropriate benefit from the FTR market design

Result:

- Significant stakeholder consensus (including load) that ratifies:
 - Existing market design orthodoxy that FTRs are a crucial aspect of competitive electricity markets based on LMP
 - Importance of the point to point (source to sink) nature of the FTR product to meeting market participants' commercial needs
 - Essential role of the ISO to foster and facilitate a market for congestion hedges in the LMP system
- Independent consultant (London Economics or LEI) concluded that the FTR market is working as intended and estimated total annual benefits of \$523 million to \$1.2 billion to load. LEI:
 - “FTR auctions are generally efficient and should be retained with minimal changes”
 - The current set of auctions should be retained, as well as the full set of biddable points
 - LEI found that FTRs and ARRs benefit load both by returning congestion charges back to load and by improving the efficiency of the competitive market through enhanced liquidity, transparency and facilitation of hedging

PJM Proposal: Key Changes

ARR Changes:

- Guarantee 60% of network service peak load to protect native load hedging ability by offering additional up-front capability.
- Expanded source/sink combinations in ARR allocation, which will ensure priority rights for load.
- Additional self-schedule options by class type to advance load choice flexibility

FTR Changes:

- Add a weekend/holiday peak product for additional hedging flexibility
- Increase the bid limit in the FTR auction from 10,000 to 15,000
- \$1/MW period- class floor clearing pricing for FTR option paths

Transparency:

- Post network model user guide
- Post market limits utilized for binding constraints

Stakeholder Process Feedback and Upcoming Concerns

- Stakeholders voted overwhelmingly in support of the PJM/Joint Stakeholder package described above.
- Consumer advocates had an alternative package that was identical to the PJM/Joint Stakeholder proposal in all respects except would have shifted surplus auction and congestion revenue entirely to load, potentially leaving FTRs underfunded and/or fewer ARR available to LSEs
- IMM proposal got very little support in the stakeholder process (1.3 out of 5 on a sector-weighted basis).
- IMM proposal is impractical and divorced from the commercial realities of market participants who use ARRs and FTRs to hedge from and to specific nodal locations and/or load zones and hubs
- IMM proposed congestion rent allocation remains poorly understood by all stakeholders despite two-years' worth of IMM slide decks in the ARR/FTR Task Force
- “Equity” aspect of the IMM proposal is at best arguable notwithstanding the deleterious impact on competitive markets
- IMM participation in the stakeholder process was extremely divisive

IMM Proposal Critique

IMM Proposal:

- Does away with FTRs and ARRs
- Directly assigns spot market congestion to load as a rebate through an obtuse allocation system that the IMM invented (involves multiple reference buses and pro-rations to assign congestion rents)
- IMM argues that its “Zonal Offset Metric” demonstrates inequities and cross-subsidies in PJM’s ARR allocation

IMM Proposal Critique:

- Value destructive for LSEs: The current ARR construct creates financial instruments (in the form of ARRs) that have commercial value and are transparent, easily priced and can be monetized by LSEs flexibly in different ways. The IMM proposal would destroy this value. LSEs told LEI they value the existing ARR/FTR product as a source to sink construct.
- Value destructive for all market participants that use FTRs: FTRs were actually designed to serve as the financial equivalent to firm transmission in an LMP system, replacing the physical transmission rights that were the subject of FERC’s Open Access Order 888. Market participants need FTRs to wheel power and hedge congestion risk!
- IMM argues that the sole purpose of FTRs is to return congestion rents to load (an argument rejected by FERC and not consistent with the market design history). That auction revenues can be returned to those who invested in the transmission grid is an ancillary benefit of the design, not the purpose.
- If a simpler allocation is desired, why use the IMM’s convoluted metric rather than simply allocate according to load ratio share, or pro-rata to transmission customers in proportion to their transmission investment, or...?
- If the simpler allocation is desired, why not preserve the FTR auction which is essential to the LMP market design and market participants’ ability to manage congestion risk, and use the IMM (or some other) allocation approach to distribute the congestion rents from the FTR auction?

IMM Proposal Critique (Cont.)

IMM Proposal Critique (Cont.):

- IMM's Zonal Offset Metric actually changes materially from year to year and really is not indicative of cross-subsidies in the ARR allocation or the FTR market, but rather the fact that spot prices are volatile and vary from the ex ante prediction of their value.
- The IMM's proposal assumes that bilateral markets will simply form to replace the FTR market.
 - This assumption is flawed as the bilateral markets settle based on PJM market settlements and are unlikely to be liquid without a price signal from the RTO itself
 - Liquidity and transparency from FTR auctions serves to discipline the premia demanded, absent FTRs, by financial intermediaries offering LSEs and suppliers bespoke locational basis hedges at hundreds of different nodal locations
 - The FTR and bilateral markets are complementary in enhancing forward market trading, hedging, liquidity and transparency
- Economically inefficient to directly assign congestion rents to load as a rebate
 - Distorts LMP price signals, and incentives for energy consumption and transmission investment
 - Customer in congested area would not face LMP, but LMP minus the congestion rebate

IMM Proposal Critique (Cont.)

Does Load Actually “Pay” the Congestion? It’s Not A Simple Question!

- IMM’s flawed logic:

- The purpose of the ARR/FTR design is to return congestion to load
- Congestion is the surplus payment by load that results from differences in LMP in a transmission constrained system
- Congestion is the surplus after generation is paid and virtuals are settled
- Congestion is paid by load
- Load should get congestion back to in order to get market results similar to pre-LMP market (average cost)

- Is load actually paying more due to congestion?

- For sure, load/exports pay more than generators/imports receive and the difference is congestion
- And the LMP system results in a least-cost dispatch for meeting load
- But how to know whether load is paying more or generators are being underpaid?
- Consider the all too common case where a renewable gen pocket is transmission constrained with negative prices
 - Clearly loads are not paying more in this case in terms of higher cost relative to the alternative to an LMP system
 - Further, consider the importance of open access to hedging instruments for the suppliers inside the constrained pocket – the IMM would deny them access to FTRs

IMM Critique (Cont.)

New Renewable Entry Can Both Increase Congestion and Lower Cost to Load



The argument: "Load Pays ALL the Congestion, So Load is Entitled to 100% of the Congestion Rents as a Directly Allocated Rebate" is both simplistic and mis-leading.

- First, as the example shows, load does not really pay "all the congestion."
- Second, electricity market competition under LMP requires a competitive market for congestion hedges where FTRs are available on a non-discriminatory basis to those that value them most. This market design ultimately benefits PJM loads by reducing the risk premia in customer standard offer auctions such as BGS.

IMM Proposal Critique (Cont.)

Market Design Needs to Foster Competition and Facilitate Customer Renewable Preferences

- As various states pursue aggressive renewable standards and corporations seek to meet new ESG goals, there is rapid growth in development of renewables as well as corporate renewable buyers.
- Demand for renewables and reliance on renewables can result in significant congestion. It is critical that renewable buyers and developers have the appropriate tools to hedge against this potential congestion.
- As demonstrated by the LEI data provided herein, a significant amount of new generation developed in PJM utilized FTRs as a necessary provision to obtain financing. Simply put, these units would not have been able to obtain financing without a proper hedging mechanism in place.

Key Findings of PJM Commissioned Independent ARR/FTR Market Review

- In response to requests from the PJM states and other stakeholders, PJM retained LEI to conduct an independent review of the ARR/FTR market.
- LEI produced the following report assessing the market:
<https://pjm.com/-/media/committees-groups/task-forces/afmtf/postings/lei-review-of-pjm-arrs-and-ftrs-report.ashx>

LEI Found that FTRs (and ARRs) Benefit Load Both by Returning Congestion Charges Back to Load and by Improving the Efficiency of the Competitive Market Through Enhanced Liquidity, Transparency and Facilitation of Hedging

Recap: Purpose of FTRs/ARRs www.londoneconomics.com ■ 5

LE
LONDON
ECONOMICS

FTRs (and ARRs) serve two purposes, both of which create benefits for load

<p>Purpose #1</p> <p>Facilitate the return of overpayment in LMP (congestion charges) back to load</p>	<ul style="list-style-type: none">▪ Payments made by all load serving entities exceed the payments to all generators when there is congestion▪ Overpayment should be returned to load, because load paid and continues to pay for the transmission system
<p>Purpose #2</p> <p>Enable hedging of the marginal cost of congestion in LMPs between different nodes and support forward market activity through the offering of FTRs</p>	<ul style="list-style-type: none">▪ FTR auction results provide a granular understanding of expected network congestion, which helps market participants hedge congestion risk more effectively▪ Price discovery emanating from FTR auctions supports liquidity in forward markets, which reduces the transaction costs of hedging and bilateral contracting▪ In the long run, load benefits from a liquid and efficient forward market through lower transaction costs, lower financing costs and optimal reallocation of risk

LEI RECOMMENDATIONS

- **FTR Recommendations:**

- **“FTR auctions are generally efficient and should be retained with minimal changes.”**
- **The current set of auctions should be retained, as well as the full set of biddable points.**
- PJM could further enhance its documentation around the network model, including potentially a periodic independent review of the network model and key assumptions.
- PJM should continue to monitor activities in the FTR auction and competition.

- **ARR Recommendations:**

- **Enhancements should focus on the ARR allocation process.**
- PJM should explore alternative ARR allocation processes. **“Historical gen-to load ARR allocation process and rules-based surplus allocation may be creating equity issues between LSEs.”**
- LSEs should be able to nominate other biddable points during the ARR allocation process and have additional flexibility in self-scheduling ARRs. PJM should also consider introducing more granular ARR products (for example, sub-annual periods), and permit LSEs to self-schedule an ARR for a sub-period of the year (in the monthly or in the long term FTR auctions).

Granular FTR Market Shapes A Robust Forward Market

- **FTR Auctions Directly Correlated to Forward Market Activity:**

To understand how PJM FTR market activities influence the forward market, LEI worked with Nodal Exchange to examine trends in volumes of basis-related futures right after PJM FTR auction result are published. The data indicates that volumes of futures traded on Nodal Exchange increase significantly after each FTR auction. The uptick in volumes indicates the presence of price discovery process and influence of FTR auctions over futures activity in PJM. (LEI Report, p. 74)

- **Path-Based Construct Provides Solid Price Signals and is Directly Linked to Bilateral Arrangements:**

LEI considered to what extent the path-based construct (of FTRs and ARRs) is relevant to bilateral arrangements. The path-based construct of FTRs provides an ability to perfectly hedge congestion risk at a nodal level, as FERC acknowledged when FTRs were first created. A review of transactions associated with bilateral energy contracts reported to FERC's Electric Quarterly Reports ("EQR") database shows that in the past five years (2015-2019), over 35% of the value of physical contracts with delivery in PJM used a node (instead of a hub, zone, or aggregate) as the delivery point. Transactions with nodal-based delivery points were reported to have a cumulative transaction value of over \$75 billion over five years. Moreover, in the past two years, the share of transactions using nodes as a delivery point has increased to over 50% (in value terms, or \$26 billion on average per annum). This fact indicates the market's overall confidence in using nodes as a commercial pricing point. (LEI Report, p. 15)

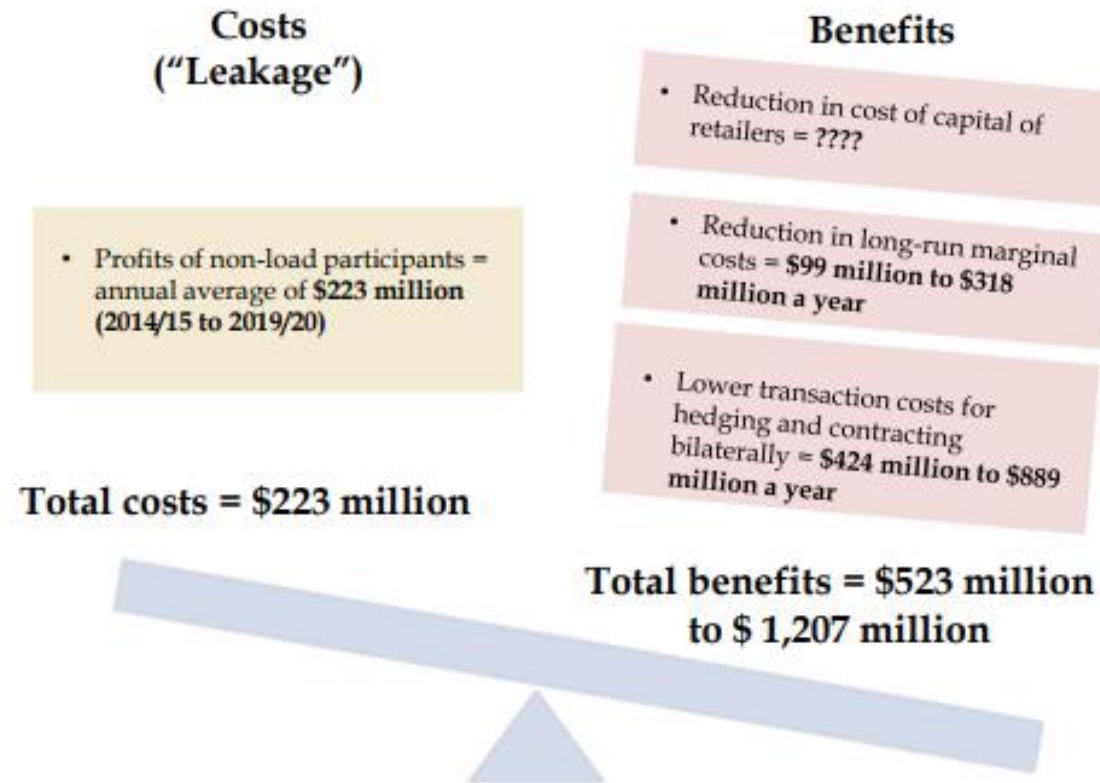
Granular FTR Market Shapes Grid 2.0

LEI's analysis of hedging activity related to financing of new generation demonstrates that developers and their commercial partners rely on the forward market to make critical investment decisions and assess the cost of financing.

The extensive use of financial hedges is another measurable reference point for the importance of forward market activity in creating long term benefits to load. LEI surveyed the financing arrangements of new gas-fired resources that entered commercial operation for the last three years in PJM. LEI's research confirmed that nearly 9.5 GW of new combined-cycle gas turbine ("CCGT") capacity that started commercial operations from 2017 to 2019 involved using financial hedges as part of their financing arrangements. These financial hedges were realized thanks to liquid forward markets. Furthermore – and importantly for the purpose of estimating long term benefits – market price risk associated with the financing of these investments was reduced as a consequence of these financial hedges. (LEI Report page 15)

FTR Markets Save Ratepayers Significant Dollars

Figure 8. Illustrative benefits versus costs



Note: In the two most recent planning periods (2018/19 and 2019/20), the "leakage" has averaged \$120 million, because (1) with the changes in the rules, PJM has been able to allocate network capacity to ARRAs more aggressively and (2) due to the absence of abnormal weather (which typically causes a significant increase in congestion charges).¹²

Confidential- For FERC Staff Only

Non-Load Entities Improve Price Discovery

LEI tested whether the participation of non-load entities in the FTR auctions improves FTR's predictive power of day-ahead congestions. LEI relied on a simulated auction results provided by PJM (as part of the PJM ARR/FTR White Paper analysis, PJM recreated FTR auction prices for planning period 2017/18 if no financial participants (i.e., non-load) traded FTRs). Comparison of the statistical properties of the simulated and actual auction results at predicting day-ahead congestion shows that the actual FTR auction, which includes both load and non-load participation, has a better predictive power of day-ahead congestion than the simulated auction results with "no financial participation." This indicates that non-load participation improves the price discovery feature of FTR auctions. (LEI Report, p. 75)

Return of Congestion Dollars is Not The Only Purpose of FTRs

- ***LEI Finds Return of Congestion Dollars is not the Sole Purpose of FTRs.***

Based on LEI's independent analysis, and consistent with the positions taken by market rules at other Independent System Operators ("ISOs"), the return of congestion charges is not the only purpose of FTRs. (LEI Report, p. 3)

- ***FERC Rejected the Same Argument in 2017 (Docket No. EL16-6-002 at 11):***

The Commission stated: "We reject the arguments that the sole purpose of FTRs is to return congestion revenue to load and the market should therefore be redesigned to accomplish that directive. FTRs were designed to serve as the financial equivalent of firm transmission service and play a key role in ensuring open access to firm transmission service by providing a congestion hedging function."