London Economics International LLC

PJM ARR/FTR Review: Q&A Session

prepared for the PJM ARR/FTR Task Force

January 26, 2021

Objective of this session is to answer clarifying questions on LEI's Report issued in December 2020

Discussion Items

1) Recap

Summary of findings and recommendations

2) ARRs

Recommendations, questions received, and Q&A session

3) FTRs

Recommendations, questions received, and Q&A session

4) General

Q&A session

Agenda

1	**Recap**
2	ARR Q&A
3	FTR Q&A
4	General Q&A

Is the current ARR/FTR mechanism appropriate for ensuring that load receives the optimum value of the transmission system?

Key Questions

1) What was the original intent of auction revenue requirements ("ARR") and financial transmission rights ("FTRs")? Was it to address a problem?

2) Are they fulfilling, in the best way possible, their initial purpose and/or addressing the identified problem?

3) If not, why not? If so, how is this measured and verified?

4) Is the initial purpose still an ongoing issue; if it is addressing a problem, are there alternative ways to eliminate the problem entirely?

5) Are there additional purposes and/or sources of value to the market that ARRs and FTRs are, or should be, fulfilling or delivering? If so, what are these purposes; how do they optimize value to load and other market participants; and how is this value optimization measured and verified?

6) What other mechanisms can provide alternative ways to achieve some of these purposes?

7) Are there changes in the market design, execution, etc. that would improve delivery of these instruments' purpose?

Tasks

1. Identify the objective functions of the ARR/FTR
2. Define measurable criteria for the evaluation of different aspects of the FTR markets
3. Identify and evaluate issues in the ARR/FTR
4. Assess ARR/FTR in other markets
5. Propose and recommend enhancements to the current ARR/FTR

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

Purpose #1

Facilitate the return of overpayment in LMP (congestion charges) back to load

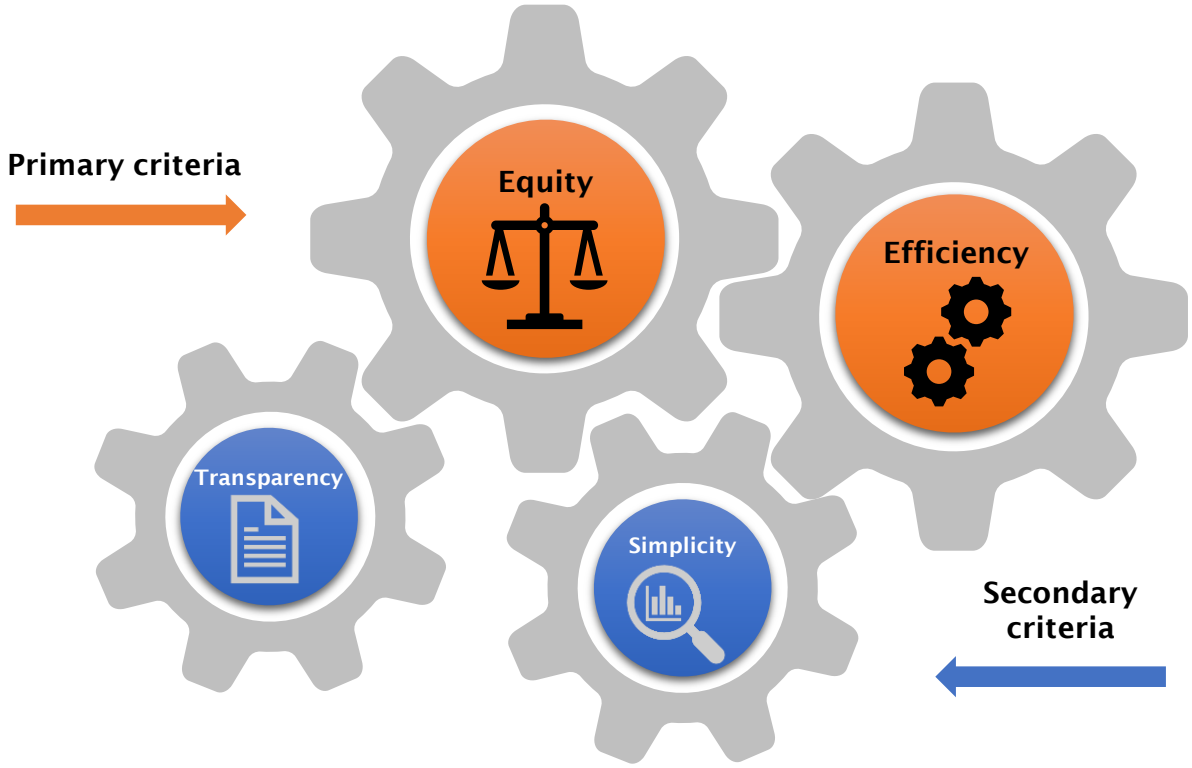
- Payments made by all **load serving entities exceed the payments to all generators** when there is congestion
- Overpayment should be **returned to load**, because load paid and continues to pay for the transmission system

Purpose #2

Enable hedging of the marginal cost of congestion in LMPs between different nodes and support forward market activity through the offering of FTRs

- 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 identified four criteria drawn from best practices in regulatory economics and policy design



Equity	Efficiency	Transparency	Simplicity
Reflects the fair treatment of affected parties	Involves the optimal allocation of resources to those that value them the most	Timely access to relevant information for purposes of decision-making in an auction or regulatory context	Simpler theories should be preferred to more complex ones, so long as it does not compromise the mechanism's functionality

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Current ARR/FTR mechanism produces reasonable outcomes for load in PJM

1. Majority of congestion charges collected in day-ahead energy market have been returned to load

   In last two years, enhancements have increased the aggregate payout to load

2. A path-based construct continues to be relevant in the present day due to the significant amount of load that is contracted bilaterally or self-supplied

3. FTR auctions are generally efficient and should be retained with mininmal changes

4. Dual system of property rights (encompassing ARRs and FTRs) creates value for load and should be preserved

5. Historical gen-to load ARR allocation process and rules-based surplus allocation may be creating equity issues between LSEs

Review of ARR/FTR constructs at three other US RTOs/ISOs identified some valuable "lessons learned"

Differences that would not be beneficial or relevant to PJM's construct:

1. Use of simple allocation rules (like pro rata to load) in combination with a single right system (like in ERCOT) would **reduce the flexibility and value** that PJM load gets from ARRs, and would **conflict with the zonal transmission rate design**
2. Reduction of FTR paths (like in CAISO) may **reduce the efficiency of the FTR auctions** and **undermine the value of the ARR property right** and **longer-term benefits** to load from liquid forward markets

Other differences that could be improvements and for further consideration by PJM and its stakeholders:

1. PJM should investigate the feasibility of **introducing more granular ARR products** (peak, off-peak, and seasonal)
2. PJM should also **revisit the FTR forfeiture** rule based on the experiences of other ISOs/RTOs

PJM and its stakeholders should focus on improving the equity-related features, while preserving the efficiency-related mechanics

Equity

- Develop an objective definition of equity; establish a more detailed understanding of zonal patterns of congestion
- Expand biddable points and time of use periods for ARRs
- Add flexibility to self-scheduling rules
- Explore alternatives to historical path assignment of ARRs
- Explore alternative allocation approaches for distributing surplus congestion

Efficiency

- Maintain PJM's annual, monthly and long-term FTR auctions
- Continue to allow non-load participation and the current set of biddable points
- Monitor competition and profitability trends over time
- Determine a minimum premium for options
- Evaluate changes to the current FTR forfeiture rule

Transparency and simplicity

- Issue a network model manual
- Provide detailed documentation of network model changes over time
- Periodically retain transmission expert to independently review the network model

Agenda

1	Recap
2	**ARR Q&A**
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ARR mechanism should be adjusted, including the assignment process and rules for what paths are eligible for ARR

- **LEI recommends a series of enhancements to address the main issues**
  - these enhancements are inter-related and should be considered as a "package" as much as possible

1. Consensus among stakeholders on what is an equitable allocation
2. Examine historical sources of congestion charges
3. Increase network capacity allocated in ARR process
   - Allow load to nominate outside-its-zone nodes at earlier stages of the allocation process
   - Permit load to nominate non-traditional ARR paths such as gen-to-gen paths or gen-to-hub paths
   - Disaggregate 24-hour ARRs into on-peak /off-peak products that can be self-scheduled separately
4. Provide ARR holders with flexibility in self-scheduling
   - Allow load to self-schedule in select months during the annual FTR auction
   - Let ARR holders set "limit order" and only hold ARRs if the FTR auction price is above their target price

Question #1: Revenue adequacy / underfunding

"Currently, PJM is conservative in its allocation of ARRs. This prevents the devaluation of FTR paths due to the risk of FTR revenue inadequacy, which in turn benefits the market in terms of having the FTR product be a dependable financial hedge and avoids discounting the ARRs (as market participants would pay less for FTRs that are not fully funded"

1a

Does LEI agree that it is important that PJM continue to avoid overselling the system transfer capability in the form of allocated ARRs / FTRs?

1b

Given that ARR holders already receive excess congestion rents over the amount needed to fund FTRs, does LEI agree that increasing the quantity of ARRs allocated to LSEs should only be done as long as such an increase does not result in underfunding which would devalue the LSEs ARRs?

Question #2: Allocation of congestion that is supply-side rather than load driven

"LEI notes that the current allocated ARRs only account for 72% of PJM congestion charges (with the surpluses accounting for much of the remained). The PJM grid has evolved over time such that historical congestion into LSE load pockets has waned with transmission upgrades and new congestion has arisen due to the location of new remote generation (renewables and new CCs) causing generation pocket congestion. These new congested units are not associated with historical ARR paths. This may in part explain why network capacity allocated to ARRs is not maximized"

2a

Given that both surplus FTR auction revenues (above ARR allocation) and the FTR surplus allocations (congestion rents that exceed ARR payouts) are rebated to ARR holders, why is there a concern that the amount of network capacity allocated to load in the ARR allocation process is not being maximized?

2b

If the new congestion on the system is not really associated with delivering congestion to load zones, on what basis can any LSE claim entitlement to the associated ARR paths? I.e., why isn't an allocation pro rata to ARR target allocations (assuming they are revised fairly), or pro rata to transmission service charges by zone, the fairest way to allocate such rights, rather than associate the ARRs with specific LSEs?

Question #3: Increasing the flexibility of LSEs to select ARR paths

"ARR holders are already on equal footing with FTR holders to bid for valuable FTR paths. Any ARR holder can reconfigure its portfolio of congestion hedges by purchasing a different set of FTRs from its ARR entitlement in the FTR auction."

3a.1 If LSEs are given greater flexibility to select ARR paths, would this not create rent-seeking opportunities associated with the ARR selection process?

3a.2 Would this be counterproductive in creating a market opportunity for expert FTR trading firms to help select the ARRs for an LSE and get a share of the pie in return?

3a.3 Would LSEs that have less expertise in congestion analysis be at a competitive disadvantage compared to LSEs with greater sophistication in understanding congestion, especially if the whole system is revised so that the ARR selection process is a source of commercial competition among LSEs?

Question #3: Increasing the flexibility of LSEs to select ARR paths

"In Section 8.3.4, LEI suggests that PJM might base ARR allocations on bi-lateral contract information that LSEs might share with PJM. While it is enticing to seemingly better align ARR allocation with "actual system usage," such an approach may be counterproductive."

3b

If bi-lateral contracting with a supply resources in a congested area creates an entitlement to congestion rents, would this paradoxically create commercial value for the supply resource who will be able to command a significant share of the ARR rights?

I.e. the constrained down supplier would require a share of the ARR entitlement in exchange for the bilateral arrangement. Historically, this happened in PJM, with respect to Stage 2 incremental FTRs. In fact, bilateral contracts regularly were entered between LSEs in high-priced locations and generation units in low priced locations with the sole objective of the trade to create incremental ARRs which were then split 50-50 between the generator and the LSE.

3c

Wouldn't ARR holders in aggregate be better off with a simple and fair process of allocating congestion rents to transmission customers (LSEs, etc.), rather than one where the ARR entitles' relative commercial success depends on bi-lateral contracts with generators in congested locations or on their ability to make complex commercial judgements regarding future unknown congestion on the system?

3d

Is LEI concerned that increasing the flexibility of LSEs to pick ARR paths may lead to an increased risk of underfunding as more of the expected congestion on the system is picked up via allocation, leaving less cushion to off-set revenue inadequacy?

Question #4: Monthly ARR allocation process

"The recommendations in the LEI report do not include the creation of the monthly ARR allocation process, which is not explained. AEP-Regulated ComOps would like to offer the following reasons so that LEI could reconsider the idea of the monthly ARR allocation process. Why is the monthly ARR allocation needed?

1. Currently the frequency of the ARR allocation is inadequately commensurate with that of the FTR auction. On an annual basis, there are 18 auctions available for FTRs (long-term: 5x, annual: 1x, and monthly: 12x). In contrast, there is only one allocation for ARRs even though firm transmission customers pay for the transmission system.
2. ARR holders cannot respond to the changes in market congestion by adjusting their ARR portfolios over the course of a planning year.
3. New capacity resources, especially for rate-based ones, which come online in the middle of a planning year, do not have the associated ARRs/FTRs initially to hedge congestion risk. The unhedged period could be in terms of months to a year.
4. The FTR surplus was $180.8M for 2018/19 and $217.8M for 2019/20, which indicates that the transmission capability were withheld too much to be available to ARR holders. Once the withheld transmission capability becomes available over the course of a planning year, only FTR market participants benefit from it. ARR holders should be given additional opportunities as well to utilize the withheld transmission capability that PJM release.
5. Based on LEI's survey (Figure 19 at page 65 of the full report), it clearly shows that there is a strong support for the monthly ARR allocation."

4

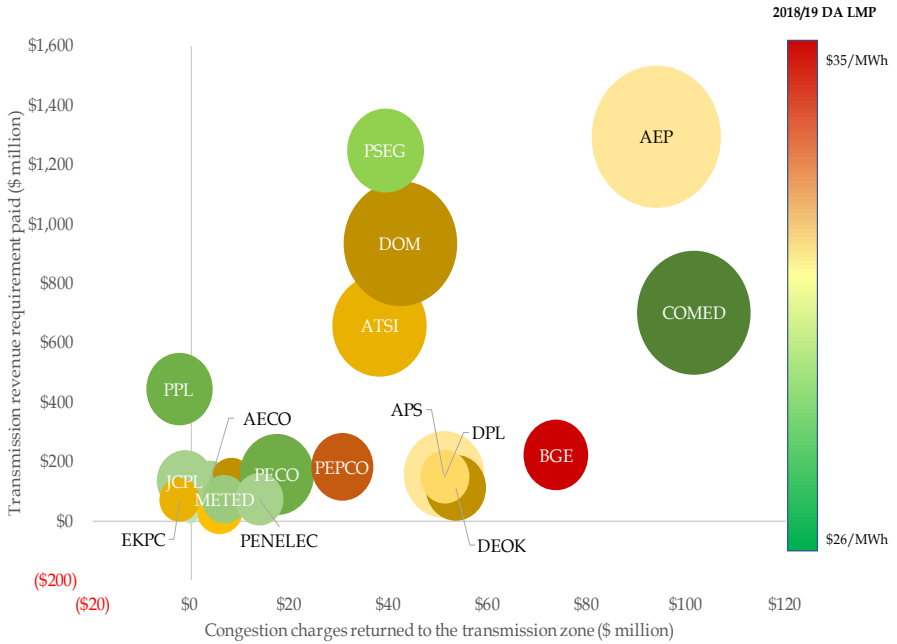
What is LEI's perspective on the idea of monthly ARR allocation?

Question #5: EKPC not contemplated on charts

5

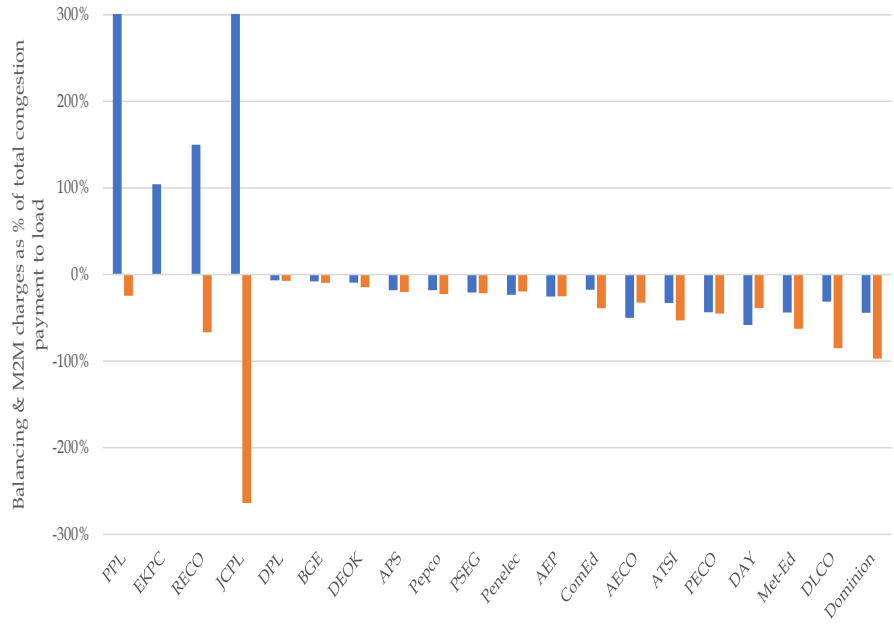
Why were all members not shown on the charts? For example, EKPC was not shown on the winners/losers chart. Would be nice to see on which side we fall

Congestion charges returned to load in each zone relative to various factors (2018/19)



Source: Figures 9 and 24 in the PJM ARR/FTR Review Report

Congestion charges returned to load in each zone relative to various factors (2018/19)



Source: Figure 90 in the PJM ARR/FTR Review Report

Question #6: Conclusions/recommendations on ARR allocation

One of your conclusions/recommendations is that ARR allocations should be reformed to better hedge/match the delivery of supply arrangements made by load serving entities. You also acknowledge that the load paid for transmission through regulated rates.

6a

Should ARRs be allocated to hedge any deliveries the load wants, or should there be some consideration of what deliveries can actually be done with the transmission facilities that were actually paid for through regulated rates? For example, the original ARR allocation was based on a 1998 test year, because it was thought that the transmission lines hanging in the air at the time could accommodate all deliveries to load in 1998. This resulted in ARRs awarded from generation in a zone to load in a zone and some long-term transactions across zones.

6b

Should a load serving entity be granted ARRs to deliver supply from a remote location out of zone if the transmission necessary to do that delivery was not completely paid for in regulated rates?

6c

Further, if the system has changed dramatically since 1998 -- should we consider just getting rid of ARRs and auctioning off the ENTIRE system? Load would get no hedges for paying for transmission through regulated rates, but a lot more of the system would be available for purchase. Wouldn't a greater supply of FTRs drive down the price?

Question #7: Allocating all rights to LSEs or firm transmission holders

7

Purpose #1 on slide 6 says "Overpayment should be returned to load because load paid for and continues to pay the transmission system". How is this return of congestion achieved by not allocating ALL ARR/FTR rights to LSE or firm transmission holders and letting them decide what they want to do with their rights?

Through the monthly and LT FTR auctions, PJM gives away rights paid for by LSE NITS customers and Firm Transmission customers at arbitrary rates. Those who have paid for the system should be allowed to decide what they want done with their rights and the price (a.k.a. auction reserve price) at which they are willing to relinquish those rights.

Question #8: ARR granularity

8

Would the introduction of new products like on-peak / off-peak, etc. as recommended by LEI further erode LSE rights in the transmission system their customers have paid for? If no, explain how not. It seems adding these products will further disaggregate the market.

Q&A Session

Any questions?

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Current set of FTR auctions should be retained (including LT FTR auction); rules regarding participation and biddable points should remain unchanged

- Reducing FTR nodes increase surplus, as share of congestion charges returned to load – increasing reliance on rule-based allocation
- Increasing ARR flexibility solves the same problem using more market-based activities

→ When possible, increase ARR flexibility instead of restricting FTR activities

FTR auction clearing engine should be enhanced to prevent underpriced FTR options

PJM should revisit whether the FTR forfeiture rule is effective

PJM and the IMM should continue to monitor trading activity in the FTR auction

Question #1: Counterflow

1

If an FTR path is not available why does LEI believe market participants should be enabled to create a counterflow bet which creates virtual capability and not real capability? If the path is not available, then the LSE should include the additional cost of the congestion on the path in their bid as opposed to adding risk to the market through a financial hedge.

Question #2: Biddable points

2

LEI recommends more biddable points. Biddable points were previously reduced in an effort to reduce gaming by market participant that were exploiting model deficiencies/errors. Was the prior gaming issue and member action reviewed and analyzed by LEI prior to the recommendation? Why would the same negative market outcomes not occur again due to this recommendation?

Question #3: Efficiency and optimal allocation of resources

3

Why and how is "optimal allocation" achieved by giving the right to "those that value them the most"?

Does this (erroneously) presume everyone has the same end goal and strategy for the use of ARRs and FTRs?

Q&A Session

Any questions?

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Question #1: Leakage

1

We would like additional information / explanation on how leakage is a "cost" of doing business and provides greater liquidity and efficiency.

Question #2: Benefits related to FTR and forward market linkage

2a

Are there other perceived market liquidity benefits that are achieved by allowing financial players in the FTR market beyond the forward energy market?

2b

Why does the PJM FTR market need to be the marketplace for financial FTR positions? Couldn't the same or similar liquidity be created by using outside exchanges such as ICE to facilitate electricity basis swaps without putting the additional risk on PJM members and diluting the transmission system capability and subsequent value away from LSEs and their customers?

Q&A Session

Any questions?