



**London Economics International LLC**

# **Lessons Learned from U.S. Financial Transmission Rights (“FTRs”) markets**

**Webinar: Hedging Locational Price Risk under LMP:  
Experiences from North America and Application to Europe**

co-hosted by the U.S. Future Power Market Forum and the  
European Future Power Market Platform

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**\*\*\*confidential \*\*\* draft \*\*\*\***

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Who is LEI?

2

What's the reason we have FTR markets in the US?

3

What is the importance of auctions for managing entitlements?

4

Findings from LEI's work in MISO and PJM

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# FTRs are a byproduct of the decision to move to nodal (“locational marginal price”) wholesale energy market design

## Purpose #1

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

- Payments made by all load serving entities into the spot energy market 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**

# All US RTOs with nodal (locational marginal) pricing have some form of FTRs and auctions; however, not all have ARR

**“ARR” stands for Auction Revenue Rights and are typically allocated to load \*transmission customers) based on their historical usage of transmission and/or other rules**

RTO/ISO	ARR?	Basis for ARR allocation	ARR products	FTR?	FTR auction cadence	FTR product types
CAISO	No	N/A	N/A	Congestion Revenue Rights	Annual, monthly	Annual and monthly; peak and offpeak
ERCOT	No	N/A	N/A	Congestion Revenue Rights	Long-term (2x a year), and monthly	Long-term (3 years in 6-month block), monthly (peak, offpeak, and 24 hour)
ISO-NE	Yes but not functionally similar*	LSE’s annual load ratio share in each load zone	N/A	FTR	Seasonal, monthly	Seasonal and monthly; peak and offpeak
MISO	Yes	Firm historic use of transmission system	Annual, monthly	FTR	Annual, monthly	Annual, monthly; peak and offpeak
NYISO	No	N/A	N/A	Transmission congestion contracts	Spring/Autumn Centralized, monthly	Long term (up to 2 years), short term (6-months); peak and offpeak
PJM	Yes	LSE’s load-ratio share and historical generation-to-load paths	Annual, monthly	FTR	Annual, monthly, long-term (done annually)	Annual, monthly, long-term; peak and offpeak
SPP	Yes	Firm transmission service reservation	Annual	Transmission congestion rights	Annual, monthly, seasonal	Annual and monthly; peak and offpeak

\*defines ARRs as entitlements to receive a share of the revenues collected from the FTR auctions. ARRs cannot be converted into FTRs

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# ARRs set out the entitlements, but the market value of those entitlements is set in the FTR auctions, which also support hedging, price discovery, and forward market liquidity

## Why are ARR a good idea?

- When ARR entitlements align with generator-to-load bilateral position they can be a perfect hedge
- ARR gives the holder options on how much risk they want to take – they can secure a fixed payment stream (or incur a known cost if the ARR allocation is negative), rather than being exposed to the uncertainty of variable congestion charges or credits in the day ahead energy market
- In surveying utilities that serve load, LEI found that many utilities preferred the simpler/lower risk approach to monetize their ARR even when it was no longer a hedge

## Why do we need to auction FTRs?

### 1) Efficient allocation of rights

- The auction process reallocates FTRs to those who value them most; allows ARR holders to shed risk of holding an FTR through day ahead settlement

### 2) Market-based price discovery

#### Increase in PJM futures volume following posting of the FTR auction results, 2017-2020

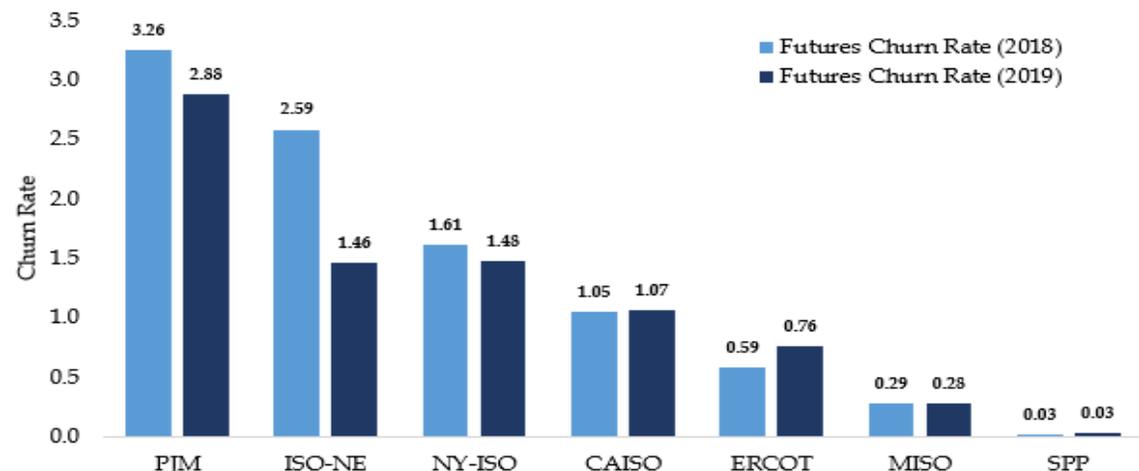
Trading Year	Following Annual Auction	Following LT Auction	Following BOPP Auction
2017	141%	45%	29%
2018	83%	111%	9%
2019	79%	35%	53%
2020	240%	41%	90%

Note: BOPP = Balance of Planning Period

Source: LEI. Review of PJM's Auction Revenue Rights and Financial Transmission Rights. p. 75.

### 3) Hedging and liquidity in forward markets

#### Futures Churn Rate of select RTOs in 2018 and 2019



Source: LEI's PJM Report p. 100.

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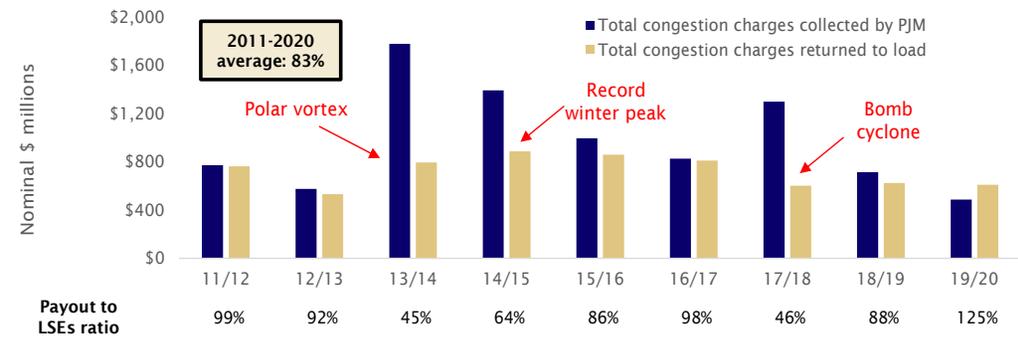
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**Findings from LEI's work in MISO and PJM**

# LEI found that ARRs and FTR auctions were not perfect, but they were working and delivering on their value proposition

## PJM

### Total congestion charges collected by PJM vs. returned to load



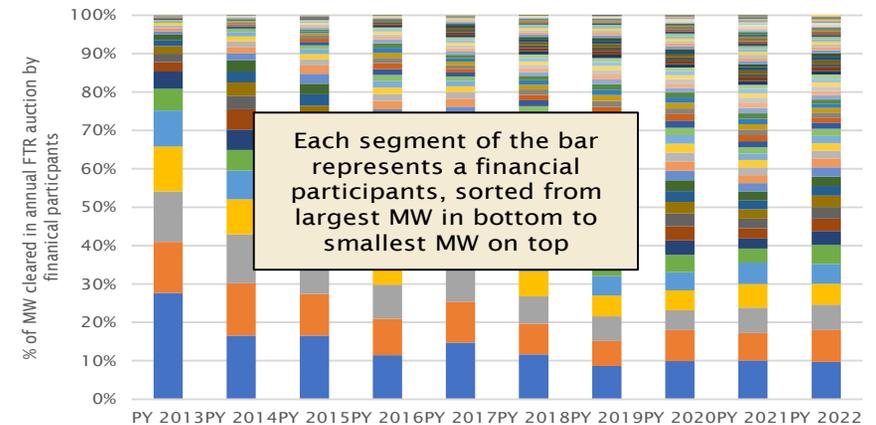
- ▶ In aggregate, load received on average over 80% of the annual congestion payments from 2011-2020
- ▶ Rules have evolved to improve the amount of payout to load, but there will always be weather-related forecast risk that interacts with load's strategy around ARR / FTR use

### LEI's Recommendations

1. Path-based construct supports commercial arrangements and price discovery for forward market
2. Dual system property rights benefits load and should be retained
3. ARR allocation process needs to evolve
4. ARR holders should have more flexibility in self-scheduling
5. FTR auctions should be retained, including the long-term FTR auction
6. FTR auction clearing engine should be enhanced to prevent underpriced FTR options
7. Study whether forfeiture rule can be relaxed
8. PJM should enhance its network model transparency

## MISO

### Percentage of MW cleared in annual FTR auctions by financial participants



Source: LEI .Independent Evaluation of MISO's Auction Revenue Rights and Financial Transmission Rights, p. 66

### LEI's Recommendations

1. Consider changing the entitlement process to focus on current network use
2. Provide transmission customers with an expanded set of paths for ARR nomination
3. Allocate multi-period monthly auction revenues to transmission customers
4. Bifurcate current peak and off-peak products into more granular ones aligned with generation patterns and load profiles
5. Design a mechanism for use with the FTR network model that incentivizes the transmission owners to submit timely and accurate outage reporting
6. Grant entitlement access to additional network capacity to transmission customers/LSEs
7. Develop supplementary metrics alongside the TCM