

Financial Trading in Electricity Markets

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Overview

- Risk management products in electricity markets extend beyond short term RTO markets (e.g., tolling arrangements, heat rate call options, revenue puts, basis swaps)
- Organized electricity markets operated by RTOs are based on a centralized solution to a complex optimization problem with an increasingly complex set of rules
- There is a range of financial products in RTO markets – virtual or convergence bids, financial transmission rights (FTRs), spread bids etc.
- “Physical” bilateral power trades also rely on financial constructs and are decoupled from physical dispatch
- Several reforms and protections related to use of financial products in RTOs - FERC Order 741, CFTC RTO Exemption, FTR forfeiture rule (i.e., clawback of FTR revenues if impacted by virtual trades), assignment of uplift to virtual transactions etc.
- Good market design should align profit maximization with market efficiency but this may not always be true as real market design can be flawed
- Fixing market design problems can be a slow and challenging process – e.g., design of PJM FTRs

Internal Bilateral Transactions (IBTs)

- A mechanism for reporting physical bilateral transactions in LMP markets to the RTO
- Differing names in various RTOs (IBTs in PJM, ISO-NE and NYISO, ISTs in CAISO)
- Can be submitted after the fact as primarily a construct for settlement
- A financial construct for reporting physical bilateral transactions

PJM Guidance on IBTs

Section 1.7.10 of Schedule 1 of the Operating Agreement sets forth the requirements for reportable IBTs and provides that¹:

- Market Participants may enter into bilateral contracts for the purchase or sale of electric energy.”
- "Such bilateral contracts shall be for the physical transfer of energy to or from a Market Participant.
- Market Participants must use "all reasonable efforts" to "limit the megawatt hours of such reported transactions to amounts reflecting the expected load and other physical delivery obligations of the buyer.
- Bilateral contracts that do not contemplate the physical transfer of energy to or from a Market Participant . . . shall not be reported to and coordinated with the Office of the Interconnection.

1. Source: <https://www.pjm.com/~media/documents/reports/20120613-pjm-statement-regarding-ibts.ashx>

Virtual Bidding – Benefits, Concerns, Protections

Benefits

- Compensates for load or generation under-scheduling in Day-Ahead (DA) market relative to Real-Time (RT) market - can help address market power issues
- Can help DA prices better reflect RT market conditions
- *A risk hedging tool that can be used to manage price risk between DA and RT markets*

Concerns

- Can impact certain uplift charges (e.g., cost of reliability commitment) raising questions about whether the convergence benefit of virtual trades always outweighs the uplifts costs
- There are limits to the degree of convergence that may be achievable, e.g., due to modeling differences between DA and RT markets
- Virtual trades have been the subject of several FERC enforcement proceedings ¹
- High volume trades that may contribute to only minimal convergence between DA and RT

Protections

- FTR forfeiture rule, limitations as necessary, appropriate collateral, effective monitoring

1. A list of FERC civil penalty actions can be found here <http://www.ferc.gov/enforcement/civil-penalties/civil-penalty-action.asp>

Financial Transmission Rights (FTRs)

- FTRs are used to hedge basis risk resulting from congestion – an FTR provides the FTR holder a revenue stream that equals the quantity of the FTR multiplied by the hourly price difference (day-ahead) between the source and sink locations specified in the FTR
- An FTR can be used by a Load Serving Entity (LSE) to hedge congestion risk between a load zone and a supply location such as a generator or hub
- FTRs serve as a the financial equivalent of firm transmission service in LMP markets
- The aggregate volume of FTRs needs to be limited to the size of the transmission grid (*simultaneous feasibility*) to ensure that there are sufficient revenues to pay FTR holders
- Hedging of basis risk has received increased attention since the polar vortex – underfunded FTRs are an ineffective hedge
- Some markets (e.g., PJM) use a non-standard definition for FTRs that assigns congestion imbalance uplifts to FTRs
- FTRs are also traded for speculative purposes
- FTRs can be used as instruments for merchant and investor funded transmission projects/upgrades in organized markets (see Attachment S and Attachment EE of PJM Tariff)
- FTRs do not impact prices in physical markets

Observations on PJM FTRs

- Several years of significant “FTR underfunding” with recent improvements
- FTR funding in current planning year (2015-16) and the 2014-15 planning year has been hundred percent (including a net surplus of ~\$111 million for the 2014-2015 planning year)¹
- FTR funding in the prior four planning years (June 2010 – May 2014) had a shortfall of \$1.41 billion³
- Negative Balancing Congestion (allocated to FTRs) during this period constituted ~90 percent or ~\$1.28 of \$this shortfall³
- Separating balancing congestion from PJM FTRs has proven difficult causing PJM to explicitly account for it in ARR/FTR allocations
- The FTR funding improvement has occurred despite the persistence of significant balancing congestion
- Balancing congestion in 2014-15 was \$212.7 million – this implies that PJM collected a gross surplus of congestion revenues of ~\$323 million in 2014-15 through reduced ARR/FTR allocations

1 - PJM Markets Committee webinar, (Apr. 20, 2015) available at

<http://www.pjm.com/~media/committees-groups/committees/mc/20150420-webinar/20150420-item-09a-markets-report.ashx>

2 – Balancing Congestion, PJM FTRSTF Apr 29, 2015

<http://www.pjm.com/~media/committees-groups/task-forces/ftrstf/20150429/20150429-2014-2015-balancing-congestion.ashx>

3 - Source: PJM

4 - FTR/ARR Funding and Education, PJM FTRSTF, Aug 4, 2014

<http://www.pjm.com/~media/committees-groups/task-forces/ftrstf/20140804/20140804-updated-education-presentation.ashx>

Revisiting the Intent of FTRs

- A market design debate in PJM
 - should FTRs be a hedge for day-ahead congestion or should they distribute “total = day-ahead + balancing congestion” ?
 - it may not be possible to meet both objectives at the same time
- In a poll¹ conducted by PJM on whether FTRs should be defined as (1) a hedge against day-ahead congestion, or (2) as a mechanism for allocating “total congestion” that is defined as the sum of day-ahead and balancing congestion, 73.39 percent of the responses by PJM participants understood the definition to be (1)
- However, getting consensus on how to change the current definition of PJM FTRs has proven difficult
- FERC Order on Rehearing in EL13-47 (June 8, 2015) - *“we continue to view the associated underfunding of FTRs as affecting the value of FTRs, and as previously discussed, FTR holders are in the best position to reflect this valuation.”*

1. FTR Polling Results, October 2014,

<http://www.pjm.com/~media/committees-groups/task-forces/ptrstf/20141002/20141002-ftr-expectation-polling-results.ashx>

IMM Statements on the Intent of FTRs

2010 SOM

An FTR provides holders revenues, or charges, equal to the difference in prices in the Day-Ahead Energy Market across the specific FTR transmission path¹

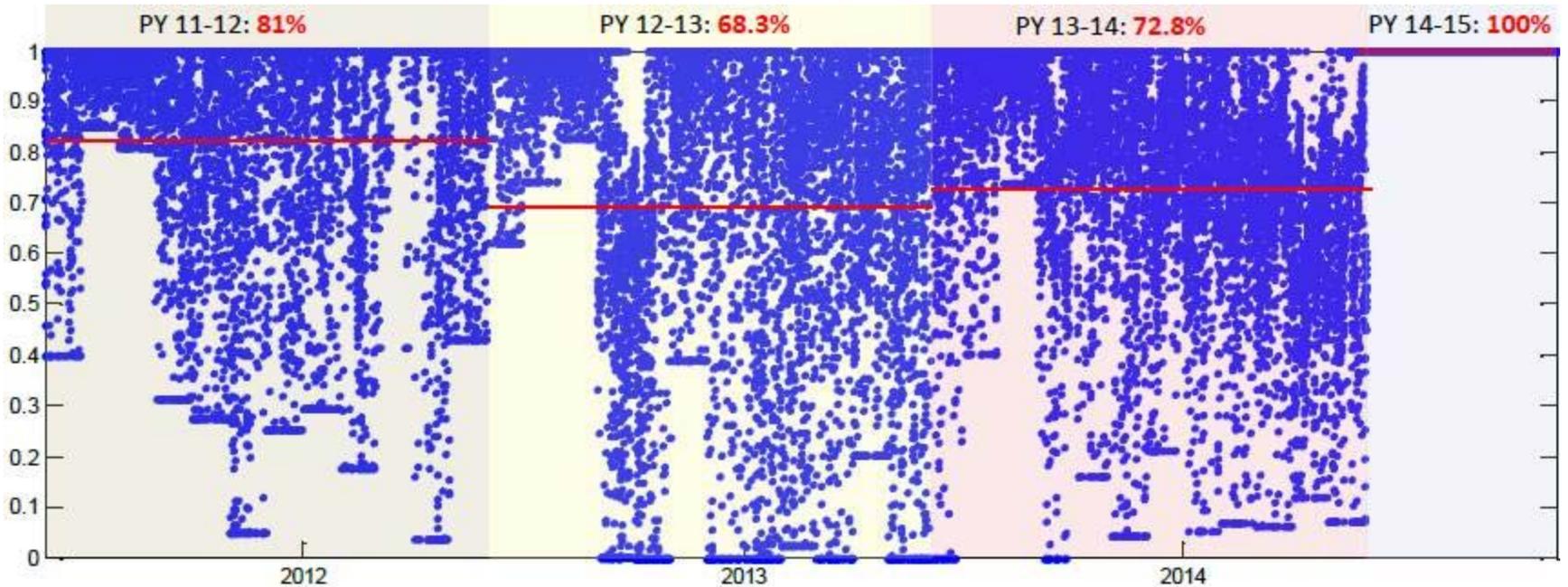
Aug 27, 2014 PJM FTRSTF

- FTR **designed** to allocate total congestion, not day ahead only congestion, not target allocation²
- Total Congestion = Total Day Ahead Congestion + Total Balancing Congestion

1. 2010 State of the Market – Section 8, March 10, 2011 Monitoring Analytics LLC, p 529
http://monitoringanalytics.com/reports/PJM_State_of_the_Market/2010/2010-som-pjm-volume2-sec8.pdf

2. FTRs and Congestion, Howard Haas, PJM FTRSTF Aug 27, 2014, Slide 2
<http://www.pjm.com/~media/committees-groups/task-forces/ptrstf/20140827/20140827-ma-ftr-and-congestion-discussion-response.ashx>
Also see, see Background on FTR Development, Scott Harvey, PJM FTRSTF Aug 27, 2014
<http://www.pjm.com/~media/committees-groups/task-forces/ptrstf/20140827/20140827-background-on-ftr-development-presentation.ashx>

PJM FTR Funding - An Hourly View

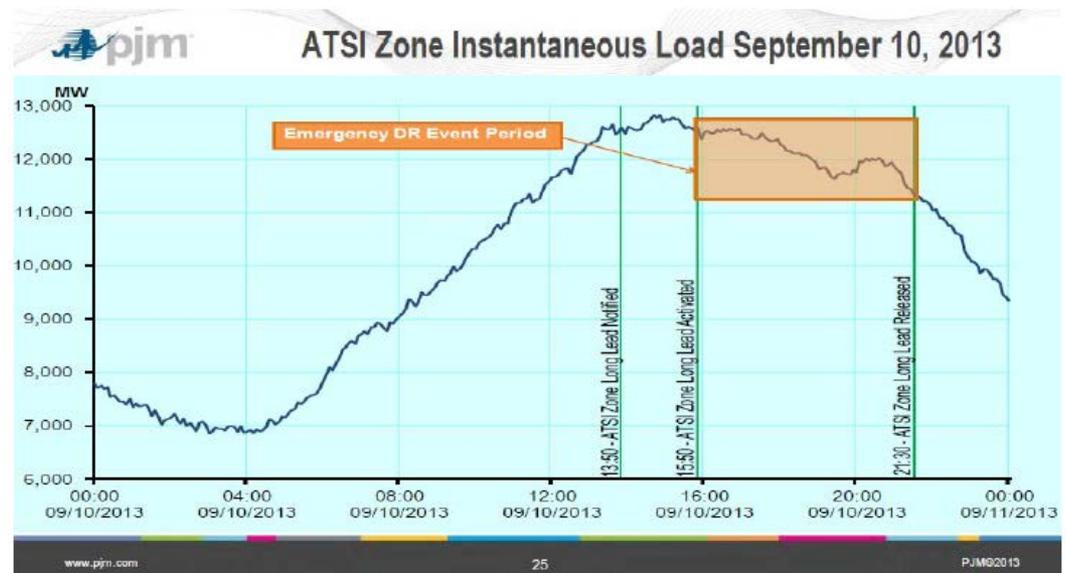


- Hourly FTR funding levels from June 1, 2011 – Nov 5, 2014
- Hourly funding level can vary significantly impacting ability to hedge exposure to congestion
- Significant improvement in FTR performance starting June 2014 due to a reduction in volume of FTRs issued by PJM (based on enforcement of Section 7.5 of the PJM Tariff)

PJM FTR Performance During Hot Weather

- Sept 10-11, 2013 hot weather event with prices in PJM's ATSI zone set at 1,800 \$/MWh through application of a "closed loop interface" to align prices with operator actions
- Impact of closed loop interface was to create ~\$23 million of negative balancing congestion allocated to FTRs
- FTR funding levels at zero for several hours at precisely the time when FTRs would have been a useful hedging tool
- Problem would not occur if balancing congestion were separate from FTR settlement

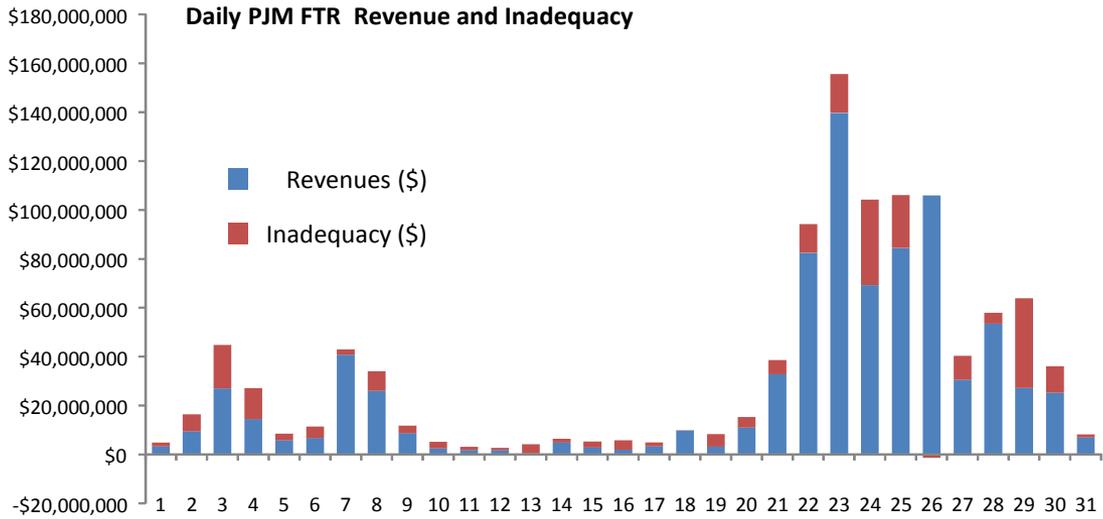
A "closed loop interface" involves limiting the flow on tie lines into a zone below a dynamically selected limit in order to help resources deployed within the zone to set price for the zone



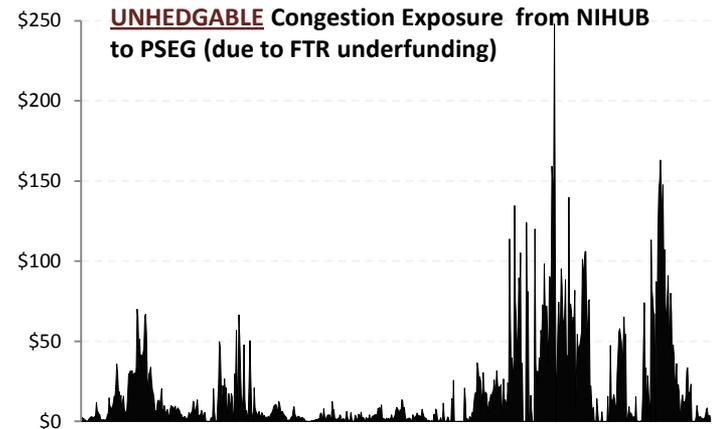
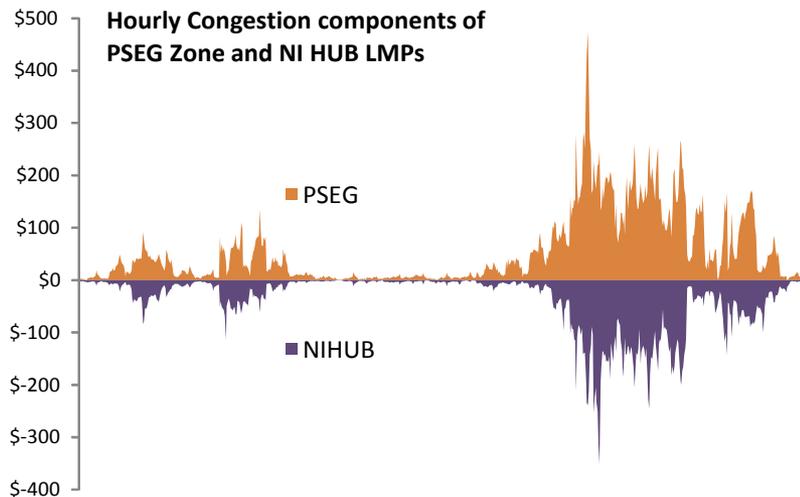
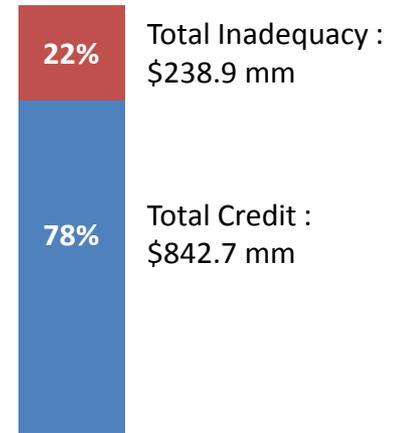
Source: PJM Markets Committee, Analysis of the September 9-11 Hot Weather Review (Sep. 23, 2013) ("PJM Analysis of the September 9-11 Hot Weather Review"), available at

<http://pjm.com/~media/committees-groups/committees/mc/20130923-webinar/20130923-item-01-september-2013-hot-weather-operations-review.ashx>

PJM FTR Performance During the Polar Vortex – Jan 2014



Total target :
\$1,081.6 mm



Source: PJM, J. Aron as of Sept 2014

Increased Focus on Basis Risk

- The magnitude of basis risk across locations during the polar vortex received attention from rating agencies and lenders in the context of financing new generation projects. Lenders to new merchant generation projects may require hedge contracts that allow for predictable cash flows to support payment obligations. Such hedge contracts typically settle at liquid pricing locations as opposed to the actual power output or gas delivery location for a project. This mismatch creates basis risk which can be significant during extreme weather events such as the polar vortex. If instruments such as FTRs designed to hedge basis risk underperform, it makes addressing such risks unhedgeable in the RTO market. The following is an excerpt from a Moody's report published after the polar vortex.

“A driver for sponsors to enter into HRCOs (Heat Rate Call Options) is the assumed predictable cash flows, thus enabling the project's capital structure to carry more leverage. In light of some of the unexpected consequences witnessed with HRCOs in recent times, we expect sponsors to take a more cautious approach towards basis risk when considering a HRCO, particularly in the PJM and ISO-New England regions. Moreover, we anticipate that these developments will cause unregulated power projects to operate with a more open position over the next several years particularly given the recent pullback that has occurred among global banking institutions towards the commodity business, many of whom are the largest HRCO Counterparties.”¹

CFTC Requirements for FTRs

An "FTR" was proposed to be defined as "a transaction, however named, that entitles one party to receive, and obligates another party to pay, an amount based solely on the difference between the price for electricity, established on an electricity market administered by a Requesting Party at a specified source (i.e., where electricity is deemed injected into the grid of a Requesting Party) and a specified sink (i.e., where electricity is deemed withdrawn from the grid of a Requesting Party)." As set forth in the Proposed Order, FTRs would be exempt only where each FTR is linked to, and the aggregate volume of FTRs for any period of time is limited by, the physical capability (after accounting for counterflow) of the electric energy transmission system operated by the Requesting Party offering the contract for such period; a Requesting Party serves as the market administrator for the market on which the FTR is transacted; each party to the FTR is a member of a particular Requesting Party (or is the Requesting Party itself); the FTR is executed on a market administered by that Requesting Party; and the FTR does not require any party to make or take physical delivery of electric energy.

The Commission's Final Order does not impose position limits on the Covered Transactions. The Commission accepts the Requesting Parties' representations that the physical capability of their transmission grids limits the size of positions that any single market participant can take at a given time. Moreover, based upon the representations made in the Petition, the Proposed Order provided that each category of exempted transaction, including FTRs, would be limited by the physical capability of the electric energy transmission system. Accordingly, as the Final Order continues to limit each Covered Transaction category to the physical capability of the transmission grid, the Commission believes that imposing position limits on the Covered Transactions is not necessary at this time in order to make the requisite public interest and purposes of the CEA determinations.

Final Order in Response to a Petition to Exempt Specified Transactions Authorized by a Tariff or Protocol, 19 Fed. Reg. 19,880, 19,913 (Apr. 2, 2013)
<http://www.cftc.gov/LawRegulation/FederalRegister/FinalRules/2013-07634>

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CFTC Requirements for FTRs (continued)

Two Specific Requirements for the Exempted Product

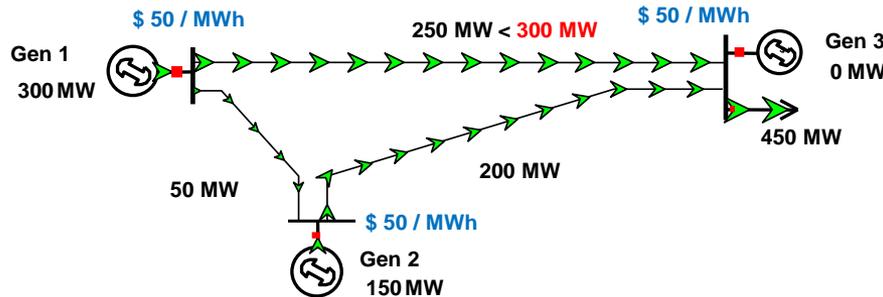
- Requirement 1 – The definition of the exempted product requires that payments are solely based on the price difference between source and sink
- Requirement 2 – Aggregate volume of FTRs must be limited to physical capability of the transmission grid

Congestion Accounting in Multi-Settlement Markets

Day-Ahead + Balancing Congestion \neq Real-Time Congestion

DAY-AHEAD

No Constraint is binding



Day-Ahead Settlement

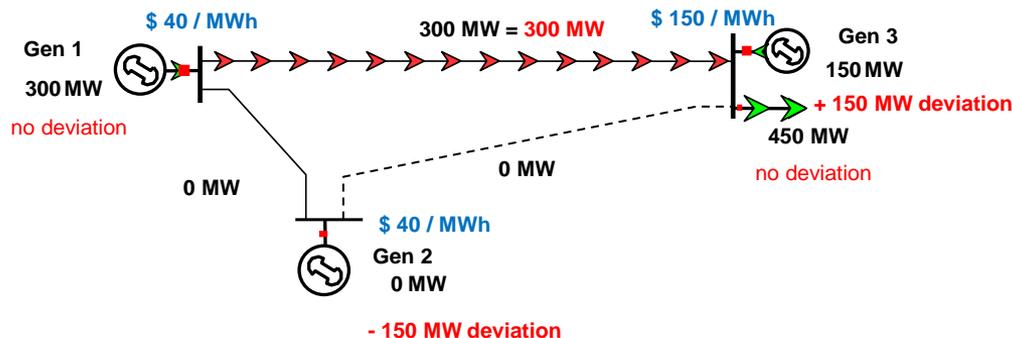
Payment	Demand	\$	22,500
Credit	Gen 1	\$	15,000
	Gen 2	\$	7,500
	Gen 3	\$	-

Balancing Market Settlement

Payment	Demand	\$	-
Credit	Gen 1	\$	-
	Gen 2	\$	(6,000)
	Gen 3	\$	22,500

REAL-TIME

Line is forced out and causes real-time congestion addressed by generation redispatch



Two-Settlement Market

Day-Ahead Congestion = 0

Balancing Congestion = -\$16,500

Single Settlement Market

Real-Time Congestion = \$33,000

Single Real-Time Settlement

Payment	Demand	\$	67,500
Credit	Gen 1	\$	12,000
	Gen 2	\$	-
	Gen 3	\$	22,500

- No Day-Ahead congestion and negative Balancing congestion
- Under a single settlement, a congested system
- Both "total congestion" and day-ahead congestion understate actual congestion in this example

What is the Appropriate Metric for Congestion in Two Settlement Markets?

- PJM Day-Ahead Congestion in 2013 was \$1,011.3 million
 - Q1 2014 Day-Ahead Congestion was \$1,433.3 million
- PJM Balancing Congestion in 2013 was -\$334.4 million
 - Q1 2014 Balancing Congestion was -\$197.2 million (this is an uplift rather than a rent and arises only when real-time transmission capacity < day-ahead transmission capacity)
- The PJM State of the Market (SOM) Report defines Total Congestion for 2013 as the sum of Day-Ahead and Balancing Congestion equal to \$676.9 million¹
- Does the “total congestion” metric understate the level of congestion that LSEs are actually exposed to and need to hedge against? Is it inconsistent with the metric used by PJM to evaluate transmission upgrades?

Source - 2013 PJM State of the Market Report, Section 11

http://monitoringanalytics.com/reports/PJM_State_of_the_Market/2013/2013-som-pjm-volume2-sec11.pdf

and Q1 2014 State of the Market Report, Section 11

http://monitoringanalytics.com/reports/PJM_State_of_the_Market/2014/2014q1-som-pjm-sec11.pdf

Metrics for transmission expansion are discussed in section 2.6 of Manual 14B and Schedule 6, section 1.5.7 of the PJM Operating Agreement

Auction Revenue Rights (ARRs)

- A mechanism introduced in 2003 where LSEs were awarded ARRs instead of FTRs with the choice of converting the ARR into an FTR or selling the FTR in an annual auction and receiving the corresponding auction revenues

Excerpts from 2003 FERC Order approving ARRs

- “Specifically, under PJM's FTR revisions, there is no change in the allocation of FTRs to existing entities. Those entities entitled to an allocation of FTRs under PJM's existing procedures will be allocated the same rights, in the form of ARRs. These entities can then self-schedule FTRs to hedge against congestion costs. Thus, the existing congestion rights to which these parties are entitled (and the overall quantity of these rights as they exist system wide) will neither expand nor contract as a consequence of PJM's proposed revisions.”
- “The only change made in this filing is that PJM has instituted a once-a-year auction procedure by which FTRs can be sold. Such an auction will benefit the market by enabling both potential buyers and sellers of FTRs to obtain better information about the value of FTRs. But, as discussed above, transmission customers are not required to sell their FTRs in the auction, but can retain them under the right-of-first refusal procedure.”

Source: *PJM Interconnection, L.L.C.*, 102 FERC ¶ 61,276, at PP 18-19 (2003)

IMM Statements on Role of ARR/FTRs

2004 SOM

- Effective June 1, 2003, PJM replaced the allocation of FTRs with an allocation of Auction Revenue Rights (ARRs) and an associated Annual FTR Auction. The process for allocating ARRs is identical to the previous process for allocating FTRs, but the revenues received for the allocated ARRs are based on the results of the Annual FTR Auction. Firm transmission customers have the option either to take ARRs or to take the underlying FTRs through a process called self-scheduling.
- ARR and FTRs are both financial instruments that entitle the holder to receive revenues or to pay charges based on nodal price differences. ARRs provide holders with revenues or charges based on the locational price difference between ARR sources (origins) and sinks (destinations) determined in the Annual FTR Auction. In other words, ARR revenues are a function of FTR auction participants' expectations of locational price differences in the Day-Ahead Energy Market. FTRs provide holders with revenues or charges based on the locational price differences actually experienced in the Day-Ahead Energy Market
- ARR and FTR holders do not need to deliver energy to receive ARR or FTR credits, and neither instrument represents a right to the physical delivery of power. Both can, however, help protect load-serving entities (LSEs) and other market participants from congestion costs in the PJM Day- Ahead Energy Market. Market participants can also hedge against real-time congestion by matching real-time energy schedules with day-ahead energy schedules.

2012 SOM

- The annual ARR allocation provides firm transmission service customers with the financial equivalent of physically firm transmission service, without requiring physical transmission rights that are difficult to define and enforce. The fixed charges paid for firm transmission services result in the transmission system which provides physically firm transmission service. With the creation of ARRs, FTRs no longer serve their original function of providing firm transmission customers with the financial equivalent of physically firm transmission service. FTR holders, with the creation of ARRs, do not have the right to financially firm transmission service and FTR holders do not have the right to revenue adequacy.
- FTR holders, with the creation of ARRs, do not have the right to financially firm transmission service and FTR holders do not have the right to revenue adequacy. FTR holders appropriately receive revenues based on actual congestion in both day ahead and real time markets. When day ahead congestion differs significantly from real time congestion, as has occurred only recently, this is evidence that there are reporting issues, cross subsidization issues, issues with the level of FTRs sold, and issues with the differences between modeling in the day ahead and real time. Such differences are not an indication that FTR holders are being under allocated total congestion dollars.

Infeasible ARR Allocations (Stage 1A)

- One factor for underfunding of FTRs has been the allocation of infeasible ARRs
- Under the PJM Tariff, Stage 1A ARRs are required to be allocated even if infeasible

2013-14

Source	Sink	MW
6BYRON25KVBY-1	COMED	1,070
6BYRON25KVBY-2	COMED	1,041
4QUADC18KVQC-1	COMED	576
4QUADC18KVQC-2	COMED	576
MISO	AEPW.O.MONPOWER	535
MISO	APS	420
952ROCK16KVRO11	COMED	133
952ROCK16KVRO12	COMED	133
NILLINOISHUB	COOK	78
HOPECREE25KVUNIT1	PSEG	76
937LEE13.5KVLEE33-1	COMED	71
937LEE13.5KVLEE33-2	COMED	71
937LEE13.5KVLEE31-1	COMED	71
937LEE13.5KVLEE31-2	COMED	71
MISO	DAY	70
EDGEMOOR23KVUNIT05	DPL_ODEC	68
21KINCA20KVKN-1	COMED	55
21KINCA20KVKN-2	COMED	55
194SABR138KVTR7112	COMED	54
MISO	DUKEXP	54

2014-15

Source	Sink	MW
ROCKPOR226KVRP1	AEPW.O.MONPOWER	347.5
ROCKPOR226KVRP2	AEPW.O.MONPOWER	347.5
WALDWICKJK	HUDSON-LINDENABC	238.9
NILLINOISHUB	COOK	200
MISO	APS	139.1
MISO	AEPW.O.MONPOWER	117.6
6BYRON25KVBY-1	COMED	104.7
6BYRON25KVBY-2	COMED	101.9
HARRAPS20KVGEN3	APS	89.5
HARRAPS20KVGEN2	APS	88.2
HARRAPS20KVGEN1	APS	88
21KINCA20KVKN-1	COMED	82.2
21KINCA20KVKN-1	COMED	82.2
4QUADC18KVQC-1	COMED	77.4
4QUADC18KVQC-1	COMED	77.4
FTMARTIN22KVGEN2	APS	70.2
FTMARTIN22KVGEN1	APS	69.6
HATFIELD18KVGEN1	APS	68.2
HOMERCIT24KVUNIT3	PENELEC	64.2
HOMERCIT20KVUNIT1	PENELEC	63.2

Source: PJM 2013/14 and 2014/15 Stage 1A Over allocation notices

<http://www.pjm.com/~media/markets-ops/ftr/annual-arr-allocation/2013-2014/2013-2014-annual-arr-stage-1a-over-allocation-notice.ashx>

<http://www.pjm.com/~media/markets-ops/ftr/annual-arr-allocation/2014-2015/2014-2015-annual-arr-stage-1a-over-allocation-notice.ashx>

See Stage 1A 10 year ARR analysis, Aug 13, 2015 for discussion of approved transmission upgrades to address infeasibilities

<http://www.pjm.com/~media/committees-groups/committees/teac/20150813/20150813-stage-1a-10-year-arr-analysis-for-2015-2016.ashx>

See PJM State of the Market Report, Q2, 2015, Section 13, p 467 for Stage 1A infeasibility impacts on FTR funding

http://monitoringanalytics.com/reports/PJM_State_of_the_Market/2015/2015q2-som-pjm-sec13.pdf

Generation Retirements and Stage 1A ARR

- Some historical generation designated as the source for Stage 1A ARRs has retired causing PJM to ask whether there is now a mismatch between the physical use of transmission system and Stage 1A ARRs

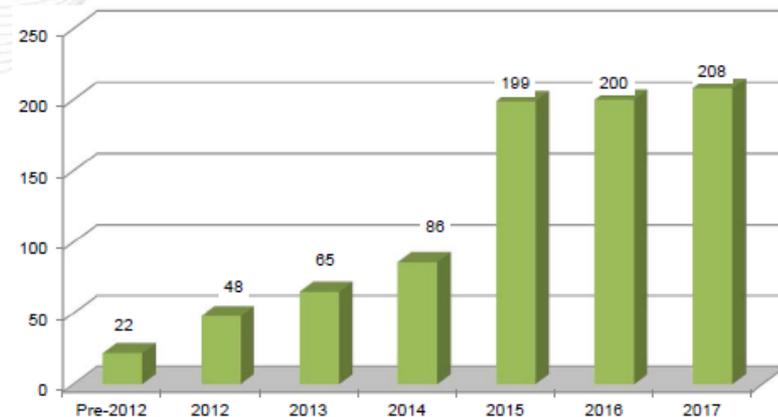


Stage 1 Allocation – Historical Resources

Generation Retirements

- Requires remapping historical resources to an equivalent generator or creating a dummy generator for ARR/pricing purposes only
 - Idea was to preserve the historical transmission system rights
 - May create mismatch between transmission system and Stage 1A entitlements
- Substantial amount of retirements not expected when Stage 1A process originally designed.

Historical Generation Retirements

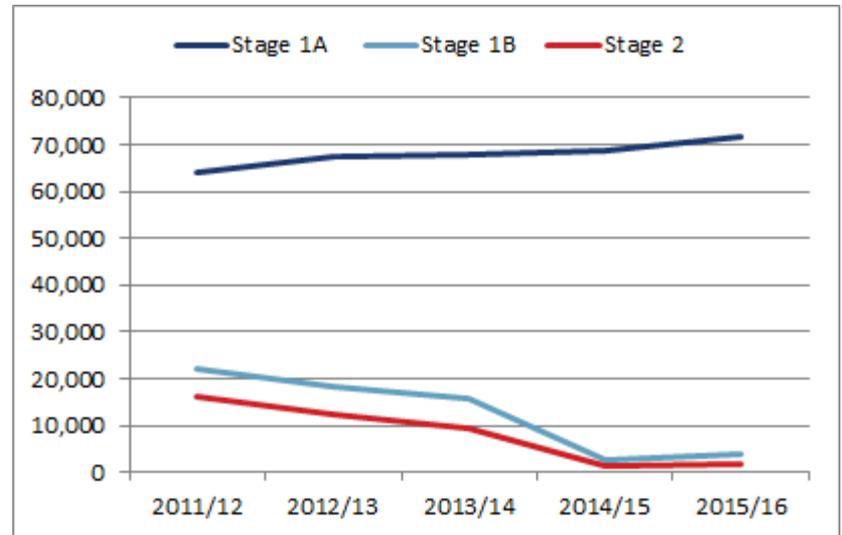


15.4% of Stage 1 historical generation has retired or submitted deactivation notices representing 25,543.7 MWs

PJM's Efforts to Address ARR Over Allocation

- If aggregate simultaneous feasibility is to be applied (as required by PJM Tariff and the CFTC exemption conditions) and infeasible Stage 1A ARRs must be allocated, other ARR allocations (e.g. Stage 1B) may be reduced disproportionately

Stage	2011/12	2012/13	2013/14	2014/15	2015/16
Stage 1A	64,159.9	67,299.6	67,861.4	68,837.7	71,874.0
Stage 1B	22,208.3	18,431.7	15,782.0	2,389.6	3,653.1
Stage 2-1	3,072.5	2,700.6	3,519.2	360.9	643.8
Stage 2-2	6,652.6	3,334.3	3,200.0	455.9	511.2
Stage 2-3	6,382.6	6,218.7	2,611.8	291.2	521.5
Total	102,475.9	97,984.9	92,974.4	72,335.3	77,203.6



Source: Historical ARR Allocations, PJM FTRSTF, Sept 17, 2014

<http://www.pjm.com/~media/committees-groups/task-forces/ftrstf/20140917/20140917-historic-arr-allocations.ashx>

PJM State of the Markets Report, Q2, 2015, Section 13, p463-464

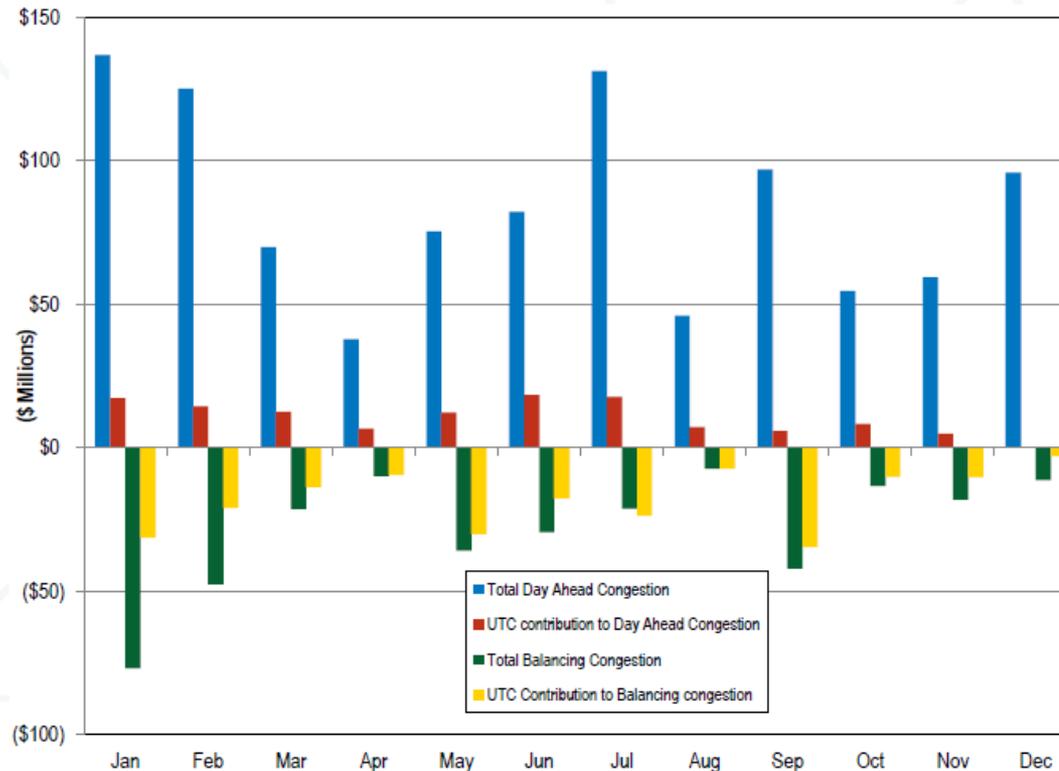
http://monitoringanalytics.com/reports/PJM_State_of_the_Market/2015/2015q2-som-pjm-sec13.pdf

Load, ARR and FTRs

- PJM Auctions the entire capacity of its transmission system in Annual FTR Auction
- LSEs are allocated Auction Revenue Rights (ARRs) that can be directly converted to FTRs
- Annual FTR auction revenues are paid to LSEs through ARR Credits
- Any excess auction revenue (after fully funding ARRs) is used to improve FTR funding
- Close to 90 percent of annual auction revenue currently flows to ARR holders
- Total ARR revenue has steadily declined in recent years (prior to polar vortex)
- While congestion expectations are a driver of FTR valuation, increased FTR underfunding would be expected to result in lower FTR auction revenues and consequently lower ARR payments to load – conversely reductions in ARR allocations and improved funding can have a positive impact on ARR payments

	ARR Credits (\$ millions)	Auction Surplus (\$ millions)	
2009/10	\$ 1,273	\$ 92	93%
2010/11	\$ 1,029	\$ 67	94%
2011/12	\$ 947	\$ 109	90%
2012/13	\$ 565	\$ 67	89%
2013/14	\$ 502	\$ 76	87%

Virtual Transactions and Negative Balancing Congestion



- Negative balancing congestion only occurs when real-time transmission capacity < day-ahead transmission capacity
- A significant percentage of negative balancing congestion in PJM has corresponded to virtual transactions when the above condition is satisfied

Source: FTRSTF Education, Monitoring Analytics, June 25, 2014 Slide 8

<http://www.pjm.com/~media/committees-groups/task-forces/ftrstf/20140625/20140625-ma-education-session.ashx>

The PJM Tariff and Simultaneous Feasibility of FTRs

7.5 Simultaneous Feasibility

(a) The Office of the Interconnection shall make the simultaneous feasibility determinations specified herein using appropriate powerflow models of contingency-constrained dispatch. Such determinations shall take into account outages of both individual generation units and transmission facilities and shall be based on reasonable assumptions about the configuration and availability of transmission capability during the period covered by the auction that are not inconsistent with the determination of the deliverability of Generation Capacity Resources under the Reliability Assurance Agreement. **The goal of the simultaneous feasibility determination shall be to ensure that there are sufficient revenues from Transmission Congestion Charges to satisfy all Financial Transmission Rights Obligations for the auction period under expected conditions and to ensure that there are sufficient revenues from the annual Financial Transmission Right auction to satisfy all Auction Revenue Rights Obligations.**

- A more rigorous application of the above Tariff provision, recognizing the inclusion of balancing congestion in PJM FTRs, has been a major contributor to FTR funding improvement
- Once balancing congestion is factored into ARR allocations, LSEs are effectively paying for balancing congestion - however, a direct allocation can be more efficient and equitable

PJM Statements on Tariff Provisions on FTR Funding

- While it is true that PJM is not under a legal obligation to fully fund FTRs and Auction Revenue Rights (“ARRs”), the Tariff states in relevant part:
 - The goal of the simultaneous feasibility determination *shall be to ensure that there are sufficient revenues* from Transmission Congestion Charges to satisfy all Financial Transmission Rights Obligations for the auction period under expected conditions and to ensure that there are sufficient revenues from the annual Financial Transmission Right auction to satisfy all Auction Revenue Rights Obligations.⁵

- Thus, while PJM does not always meet the goal of fully funding FTRs and ARR, the goal of fully funding FTRs and ARR is not optional for PJM. The italicized language in section 7.5(a) of Attachment K-Appendix of the Tariff makes clear that PJM is required to endeavor to meet this goal to the best of its ability.

PJM Statements on Current Approach

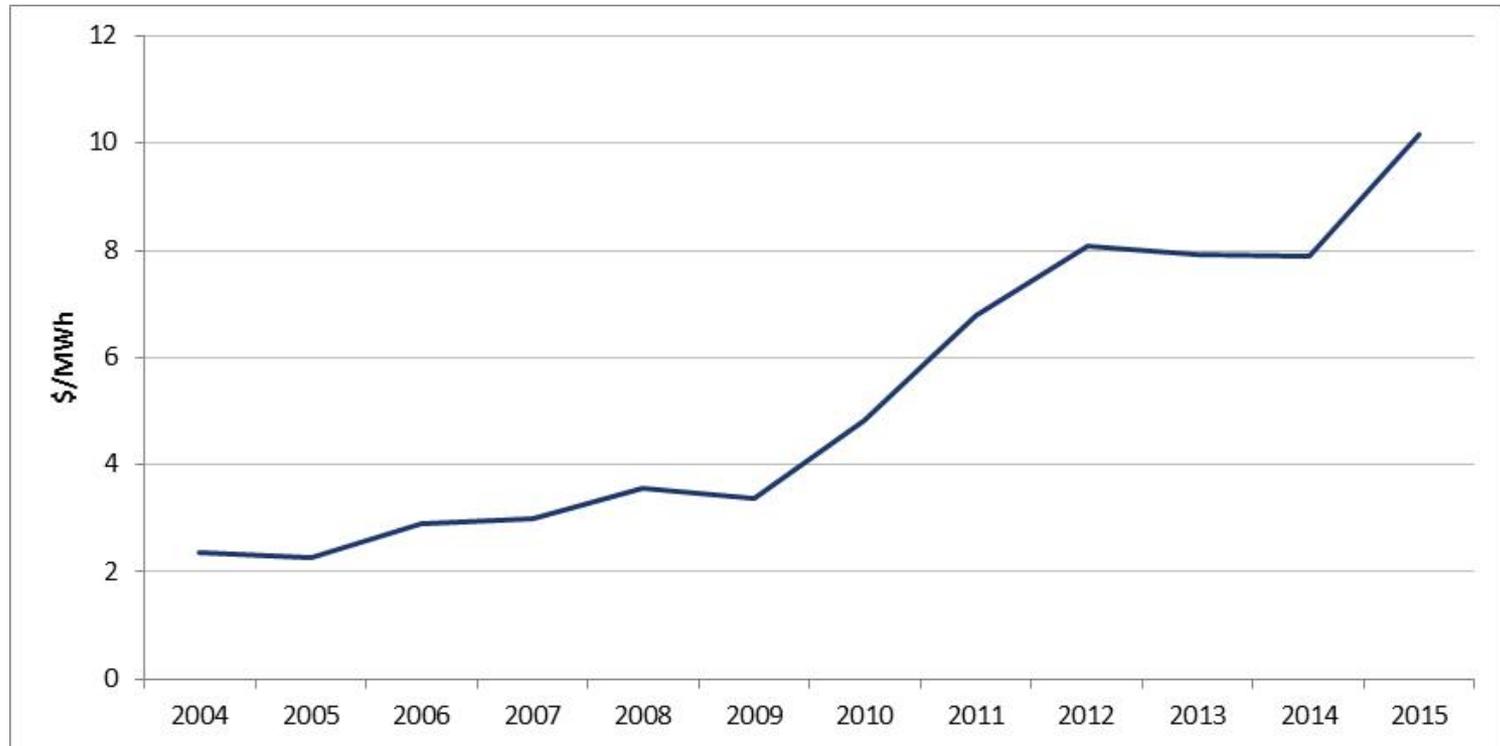
- FTRs are not only currently fully funded, but there is a net surplus in FTR funding for the 2014/2015 Planning Year. The improvement in FTR funding has taken place notwithstanding the continued occurrence of significant negative balancing congestion revenue, which is a key component of FTR underfunding.
- While PJM has resolved FTR funding issues for the time being, such resolution has come at a price. Specifically, PJM has taken into account more transmission outages, market-to-market flowgates, and conservative loop flow into its annual model that predicts the condition of the transmission system serving PJM's footprint. This has resulted in a reduction of ARRs allocated to Load Serving Entities ("LSEs") during Stage 1B of the ARR allocation process, which in turn has generated greater excess transmission congestion revenue because of the corresponding reduction in FTRs. This increased amount of excess transmission congestion revenue has been used to offset negative balancing congestion revenue, and in turn has resulted in a surplus in FTR funding for the 2014/2015 Planning Year.
- While the reduction in ARRs allocated during Stage 1B of the ARR allocation process has improved FTR funding, PJM believes that the resulting status quo is less equitable and desirable than it would prefer, and does not represent the best design for PJM's FTR products.
- More specifically, PJM agrees with J. Aron that as long as PJM needs to make assumptions based on factors for which it has imperfect information, such as real time (balancing) congestion, when initially allocating ARRs to LSEs, PJM will likely either under-allocate ARRs to LSEs (resulting in overfunding of FTRs) or underfund FTRs.

FTRs and Merchant Transmission Projects/Upgrades

- Merchant transmission projects
 - Investor funds a new project or upgrade – does not add to RTO transmission access charge
 - Incremental Transmission capacity/rights created by merchant project are awarded to investor
- Projects within an RTO market
 - Entity funding merchant project or upgrade is awarded long-term FTRs or Incremental Auction Revenue Rights (IARRs) for 30 years or life of facility
 - Required under FERC Order 681
 - Examples include projects/upgrades under Attachment S and Attachment EE of the PJM Tariff
- Projects across RTOs or outside of RTOs
 - Evolution of FERC policy to allow more flexibility on awarding up to 100 percent of capacity to anchor shippers including affiliates¹
 - Do not involve FTRs
 - Examples include HVDC links across RTOs (e.g. Neptune), projects for integrating renewables (e.g., Zephyr, MATL)

1. Allocation of capacity on new merchant transmission projects – Final Policy Statement, Docket AD12-9
<http://www.ferc.gov/whats-new/comm-meet/2013/011713/E-2.pdf>

CAISO Transmission Access Charge



Source: CAISO <https://www.caiso.com/market/Pages/TransmissionOperations/Default.aspx>

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