



Residual Auction Revenue Rights Enhancement

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- Package A
 - Proposed by Exelon and Direct Energy
 - Can be supported by PJM
 - Requires PJM to run another SFT proration with all negatively valued bids removed
 - Can not be started until the monthly FTR auction is final
 - Results will be posted upon completion of the final SFT Run
 - May result in a delayed MSRS posting and settlement for residual ARR's only



#	Design Components	Priority	Status Quo	A
1	Allocation of Network Residual ARR revenues		Path level, shift with network load	Status Quo
2	Inclusion of Stage 1B paths		Currently all stage 1B prorated paths	PJM to remove all paths with economic value of \$0 or less
3	Timing of Residual ARR Markets		Monthly	Status Quo
4	Pricing methodology		Monthly FTR Auction 24H Obligation prices	Status Quo
5	Monthly Residual ARR clearing process		SFT based on annual model	SFT based on annual model run iteratively to exclude negative paths
6	Timing of posted results		Before the first day of the effective month	Upon completion of the final iteration of the SFT *

* May result in delayed residual ARR posting and settlement

- 7.9(f) The value of Residual Auction Revenue Rights awarded pursuant to this section, determined as specified in section 7.4.3(b) of Schedule 1 of this Agreement, shall be positive. Negatively valued Residual Auction Revenue Rights will not be awarded.

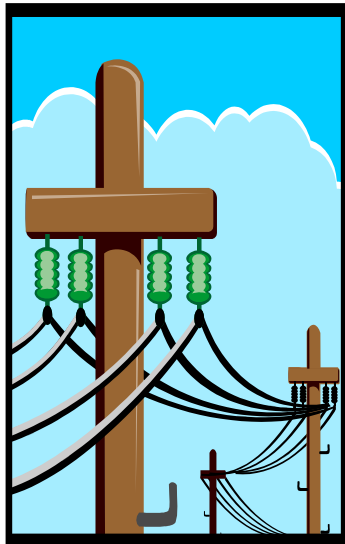
- 4.10 Prior to the effective month, PJM will remove all negatively valued Residual ARR's resulting from the corresponding Monthly FTR Auction and recalculate the Residual ARR's made available by the increased transmission capability for paths which were pro-rated in Stage 1 of the Annual ARR Allocation. PJM will allocate positively valued Residual ARR's only.

Appendix – Residual ARR Educational Material

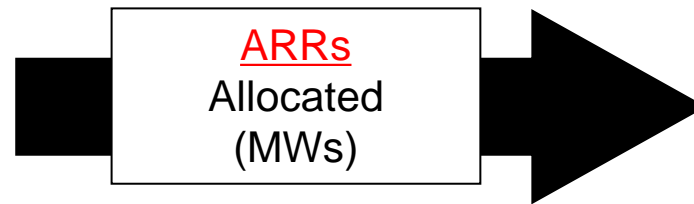
- Auction Revenue Rights (ARRs) prorated in Stage 1B of the annual ARR allocation maybe allocated residual ARRs on a monthly basis
 - New upgrades and monthly re-serviced outages
- Residual ARR paths could receive negative values based on monthly FTR clearing prices
- Stakeholders are interested in exploring enhancements to reduce customer exposures to negatively priced residual ARRs

Residual ARRs could be positively or negatively valued based on the monthly FTR Auction clearing prices. This is the only relationship between the two markets.

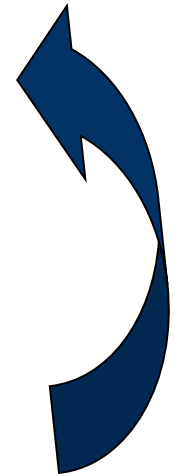
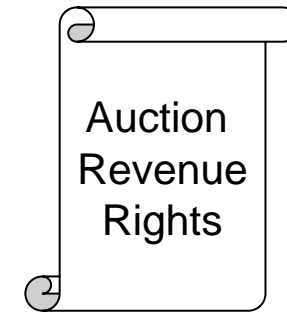
Incremental PJM System Capability



Residual Monthly Allocation



Monthly FTR Auction



- Residual ARR target credits are netted daily with Annual ARR target credits within a portfolio

- Net negative portfolios are a liability to the holder
 - Not reassigned if load shifts away from the LSE

- If sufficient FTR Auction revenues are collected for a day, ARR Credits equal ARR Targets for all ARR holders
 - Remaining Auction Revenues from each day get included in the End-of-Month allocation of Congestion Credits to FTR Holders

- It is possible PJM does not collect enough FTR Auction revenue to fulfill all ARR Targets for a day, although this has never happened
 - Example: If Annual ARR Allocation did not model a Major Long Term Emergency outage that was included in Annual FTR (i.e. outage started after Annual ARR but before Annual FTR)
- If this were to happen, negative valued ARRs would be collected first to increase the proration to positive ARR Targets
- Unfulfilled ARR Targets would get uplifted at the end of the planning period as part of the existing uplift process

- Revenue collected to fund FTR Target credits:
 - Day-ahead congestion revenue
 - Balancing congestion revenue (*subject to change*)
 - Market-to-market payments (*subject to change*)
 - FTR Auction revenue surplus
 - After all ARR Targets are fulfilled

- FTR Auction revenue and surplus values should not significantly change with the removal of counter flow ARR
- SFT will clear less prevailing flow MWs to offset the removal of counter flow MWs
- ARR portfolio values could be different for each member, although impact to total FTR Auction surplus bucket should be minimal
 - Possible +/- change due to ARR paths not being equal and opposite

Potential Impacts:

- Prevailing Flow Residual ARR
- Less will clear since counter flows are removed from the SFT
- ARR Portfolio values could change, although total for PJM should be minimal

Less Possible Impacts:

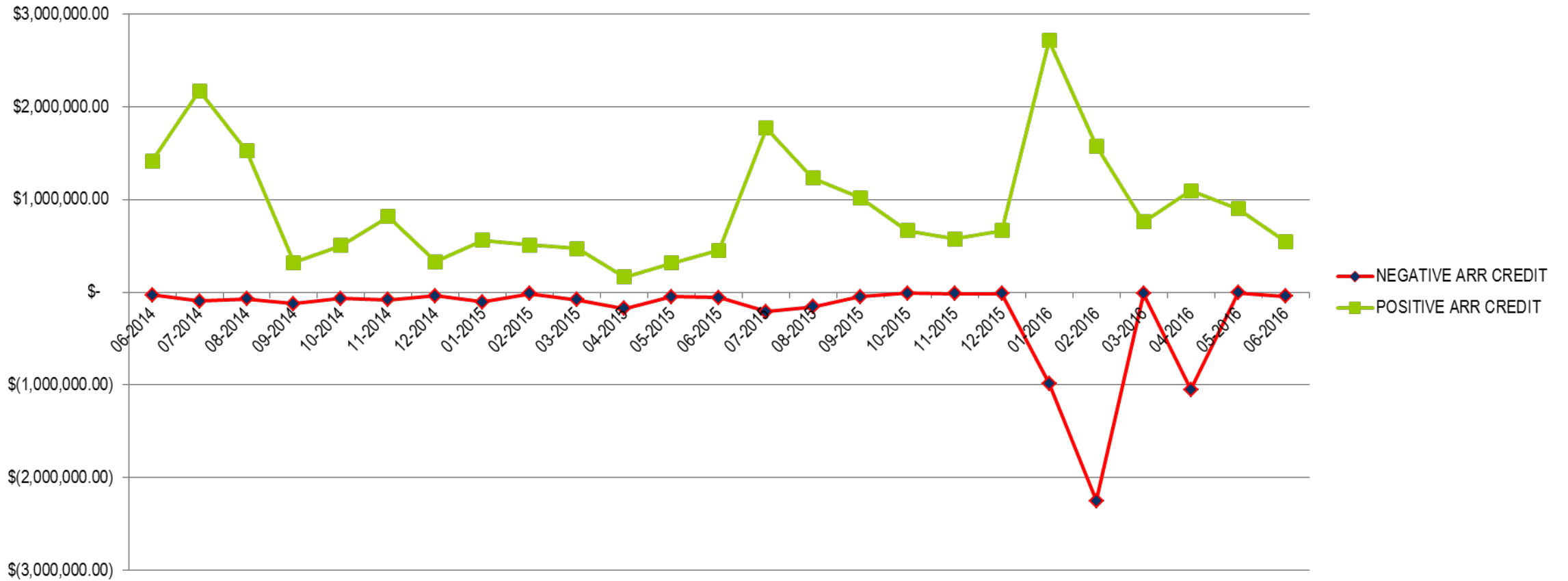
- Full Funding of ARR Target credits
- ARR Target credits have always been 100% funded

No Impacts:

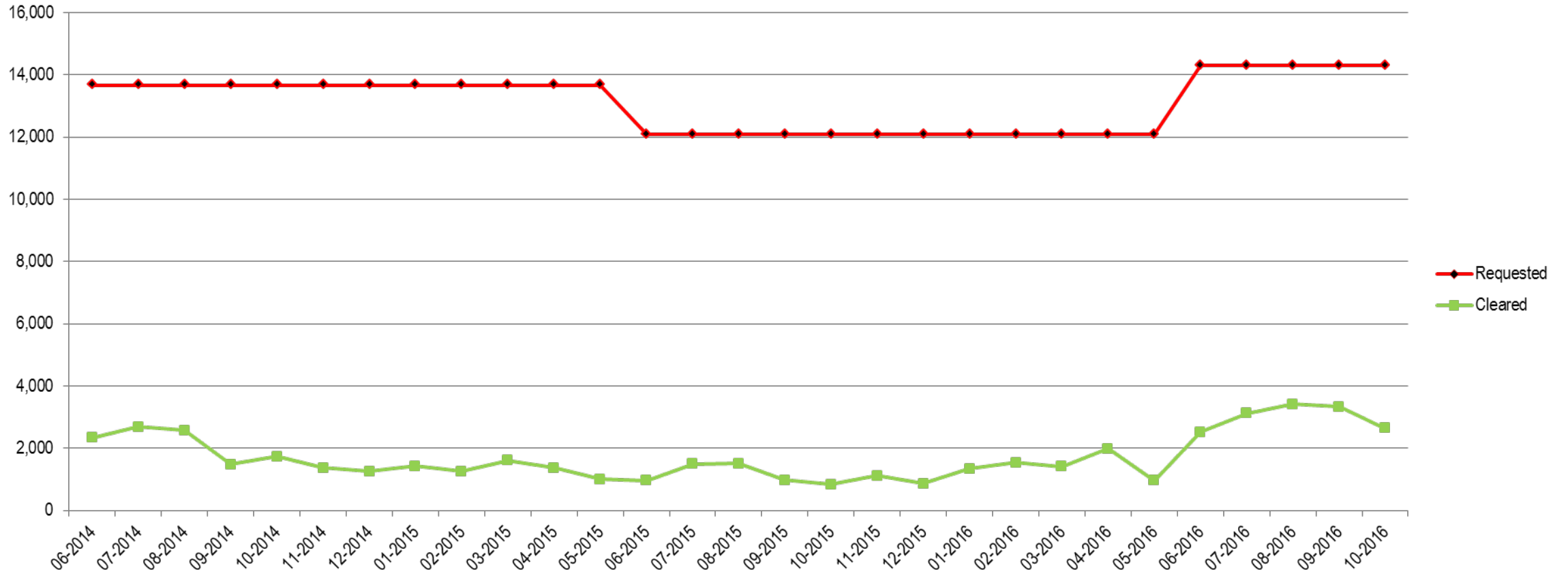
- FTR Auction clearing prices
- Total PJM FTR funding

- Compared outages to annual model vs. February 2016
- Smaller outage set allowed for increased transmission capability and ARRAs
- Several zonal pnodes cleared less than the historical generator pnodes in that zone for the FEB 2016 FTR Auction
- (Sink – Source) calculation for residual ARR resulted in a negative value
- All outages modeled and auction results are publically posted on PJM.com

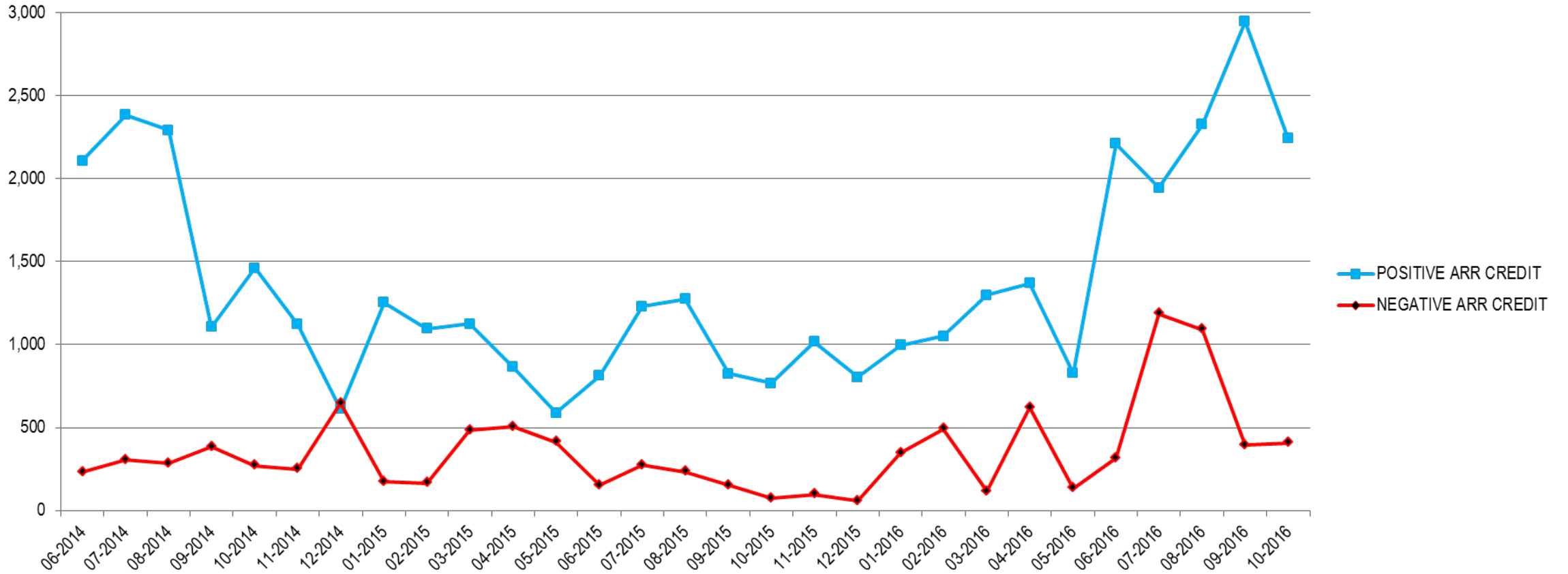
Residual ARR Credit by Month



Residual ARR Count by Month



Residual ARR Cleared Count by Month



- Based on the current monthly FTR schedule, performing a second iteration of the monthly Residual ARR market will require significant administrative work in only a few days
- Adjusting the monthly FTR schedule will have multiple effects including:
 - Base case set-up time for PJM
 - Availability of FTR auction user data postings
 - Credit timeline impacts and potential for locking credit longer than normal
 - Potential member impacts
- PJM would prefer to give members option to include bid rather than zero out

- Provide flexibility for ARR holders to remove bids prior to the simultaneous feasibility test (SFT) run each month
 - Gives ARR holders option each month whether or not to include ARR bids for evaluation
 - Does not require significant additional administrative work
 - Will not require adjusting FTR/ARR monthly market timelines

- ARR are allocated to Network & Firm Transmission Service Customers
- ARR entitle the holder to receive an allocation of FTR Auction revenues
- ARR are reassigned on a proportional basis within a zone as load switches between LSEs within the planning period
- ARR must be simultaneously feasible
- Residual ARR may be available within a planning period for increased transmission capability

- ARRs prorated in Stage 1B of the Annual Allocation may be allocated Residual ARRs for the following:
 - Increased transmission capability made available by certain transmission upgrades made during the planning year that were not modeled in the Annual ARR Allocation
 - Increased transmission capability made available for periods when Annual ARR modeled transmission outages are not out of service

- Residual ARR MWs plus previously awarded Stage 1 and Stage 2 MWs cannot exceed the Network Service Peak Load value for a particular participant
- Residual ARRs are effective the first month the increased transmission capability is modeled in the Monthly FTR Auction
- Economic value of Residual ARRs are based on the MW amount and the nodal clearing price difference between the source and sink nodes for the FTR Obligations resulting from each monthly FTR Auction the Residual ARR is effective

- Market is created with prorated stage 1B requests from Annual Allocation
 - All ARR requests from stage 1B that did not fully clear
- Proration is done manually by operator until violated facilities are minimized as much as possible
 - Constraint basis – residual requests that impact violated constraints are prorated

- Residual ARRs are valued based on the nodal clearing prices from the corresponding monthly FTR Auction
- Results are posted in eFTR roughly same time as monthly FTR Auction
- Residual ARRs will shift with load within a zone
- Settlements calculates a daily rate – billed weekly evenly throughout month

Market	Residual MW Total	Total Value (Annual)*	Total Value (Monthly)
2014/2015 ARR	22,532.90	\$ 4,894,781.83	\$ 8,160,918.27
2015/2016 ARR	37,043.80	\$ 8,138,975.75	\$ 8,620,612.69

**Represents the total cleared Residual ARR MWs priced at the average 4-round annual clearing prices divided by 12.*