Financial Transmission and Auction Revenue Rights

In an LMP market, the lowest cost generation is dispatched to meet the load, subject to the ability of the transmission system to deliver that energy. When the lowest cost generation is remote from load centers, the physical transmission system permits that lowest cost generation to be delivered to load. This was true prior to the introduction of LMP markets and continues to be true in LMP markets. Prior to the introduction of LMP markets, contracts based on the physical rights associated with the transmission system were the mechanism used to provide for the delivery of low cost generation to load. Firm transmission customers who paid for the transmission system through rates were the beneficiaries of the system.

After the introduction of LMP markets, financial transmission rights (FTRs) permitted the loads which pay for the transmission system to continue to receive those benefits in the form of revenues which offset congestion to the extent permitted by the transmission system.[1] Financial transmission rights and the associated revenues were directly provided to loads in recognition of the facts that loads pay for the transmission system which permits low cost generation to be delivered to load. Another way of describing the result is that FTRs and the associated revenues were directly provided to loads in recognition of the fact that load pays locational prices which result in load payments in excess of generation revenues which are the source of the funds available to offset congestion costs in an LMP market.[2] In other words, load payments in excess of generation revenues are the source of the funds to pay FTRs. In an LMP system, the only way to ensure that load receives the benefits associated with the use of the transmission system to deliver low cost energy is to use FTRs to pay back to load the difference between the total load payments and the total generation revenues associated with congestion.

The *2014 State of the Market Report for PJM* focuses on the Long Term, Annual and Monthly Balance of Planning Period FTR Auctions during the 2013 to 2014 planning period, covering January 1, 2014, through December 31, 2014.

1 *See* 81 FERC ¶ 61,257, at 62,241 (1997).
2 *See Id.* at 62, 259–62,260 & n. 123.

Table 13-1 The FTR Auction Markets results were competitive

Market Element	Evaluation	Market Design
Market Structure	Competitive	
Participant Behavior	Competitive	
Market Performance	Competitive	Mixed

- Market structure was evaluated as competitive because the FTR auction is voluntary and the ownership positions resulted from the distribution of ARRs and voluntary participation.
- Participant behavior was evaluated as competitive because there was no evidence of anti-competitive behavior.
- Market performance was evaluated as competitive because it reflected the interaction between participant demand behavior and FTR supply, limited by PJM's analysis of system feasibility.
- Market design was evaluated as mixed because while there are many positive features of the ARR/FTR design including a wide range of options for market participants to acquire FTRs and a competitive auction mechanism, there are several problematic features of the ARR/FTR design which need to be addressed. The market design incorporates widespread cross subsidies which are not consistent with an efficient market design and the market design as implemented results in overselling FTRs. FTR funding levels are reduced as a result of these factors.

Overview

Financial Transmission Rights

Market Structure

- **Supply.** Market participants can sell FTRs. In the Monthly Balance of Planning Period FTR Auctions for the first ten months of the 2014 to 2015 planning period, total participant FTR sell offers were 3,230,754 MW,

down from 4,990,310 MW for the same period during the 2013 to 2014 planning period.

- **Demand.** The total FTR buy bids from the Monthly Balance of Planning Period FTR Auctions for the first ten months of the 2014 to 2015 planning period increased 2.2 percent from 22,593,835 MW for the same time period of the prior planning period, to 23,099,689 MW.
- **Patterns of Ownership.** For the Monthly Balance of Planning Period Auctions, financial entities purchased 77.5 percent of prevailing flow and 87.2 percent of counter flow FTRs for January through March of 2015. Financial entities owned 70.0 percent of all prevailing and counter flow FTRs, including 61.3 percent of all prevailing flow FTRs and 83.8 percent of all counter flow FTRs during the period from January through March 2015.

Market Behavior

- **FTR Forfeitures.** Total forfeitures for the first ten months of the 2014 to 2015 planning period were $3.3 million for Increment Offers, Decrement Bids and UTC Transactions.
- **Credit Issues.** No defaults occurred in the first three months of 2015.

Market Performance

- **Volume.** For the first ten months of the 2014 to 2015 planning period Monthly Balance of Planning Period FTR Auctions 2,032,310 MW MW (8.8 percent) of FTR buy bids and 710,740 MW (22.0 percent) of FTR sell offers cleared.
- **Price.** The weighted-average buy-bid cleared FTR price in the Monthly Balance of Planning Period FTR Auctions for the 2014 to 2015 planning period was $0.18, up from $0.08 per MW in the 2013 to 2014 planning period.
- **Revenue.** The Monthly Balance of Planning Period FTR Auctions generated $17.3 million in net revenue for all FTRs for the first ten months of the 2014 to 2015 planning period, up from $8.3 million for the same time period in the 2013 to 2014 planning period.
- **Revenue Adequacy.** FTRs were paid at 100 percent of the target allocation level for the first ten months of the 2014 to 2015 planning period. This high level of revenue adequacy was primarily due to the significant reduction in the allocation of Stage 1B and Stage 2 ARRs as a result of PJM's implementation of more conservative outage assumptions and additional constraints (closed loop interfaces) in the FTR auction model.
- **ARR and FTR Offset.** ARRs and FTRs served as an effective, but not total, offset to congestion. ARR and FTR revenues offset 88.5 percent of the total congestion costs including the Day-Ahead Energy Market and the balancing energy market in PJM for the first ten months of the 2014 to 2015 planning period. In the 2013 to 2014 planning period, total ARR and FTR revenues offset 98.2 percent of the congestion costs.
- **Profitability.** FTR profitability is the difference between the revenue received for an FTR and the cost of the FTR. In 2015, FTRs were profitable overall, with $255.2 million in profits for physical entities, of which $160.3 million was from self-scheduled FTRs, and $171.2 million for financial entities.

Auction Revenue Rights

Market Structure

- **ARR Allocations.** Due to more conservative treatment of transmission outages in the FTR Auction model by PJM, designed to reduce revenue inadequacy, ARR allocation quantities were significantly reduced. For the 2014 to 2015 planning period, Stage 1B and Stage 2 ARR allocations were reduced 84.9 percent and 88.1 percent from the 2013 to 2014 planning period.
- **Residual ARRs.** If ARR allocations are reduced as the result of a modeled transmission outage and the transmission outage ends during the relevant planning year, the result is that residual ARRs may be available. These residual ARRs are automatically assigned to eligible participants the month before the effective date. Residual ARRs are only available on

paths prorated in Stage 1 of the annual ARR allocation, only effective for single, whole months and cannot be self scheduled. Residual ARR clearing prices are based on monthly FTR auction clearing prices.

In the first ten months of the 2014 to 2015 planning period planning period, PJM allocated a total of 19,928 MW of residual ARRs, up from 10,956.2 MW in the first ten months of the 2013 to 2014 planning period, with a total target allocation of $1.3 million for the first three months of 2015, down from $1.8 million for the first three months in 2014. This 81.9 percent increase in volume was primarily a result of the significant reductions in Annual ARR Stage 1B allocations.

- **ARR Reassignment for Retail Load Switching.** There were 64,086 MW of ARRs associated with $338,100 of revenue that were reassigned in the 2013 to 2014 planning period. There were 53,270 MW of ARRs associated with $456,100 of revenue that were reassigned for the first ten months of the 2014 to 2015 planning period.

Market Performance

- **Revenue Adequacy.** For the first ten months of the 2014 to 2015 planning period, the ARR target allocations, which are based on the nodal price differences from the Annual FTR Auction, were $735.0 million while PJM collected $765.9 million from the combined Long Term, Annual and Monthly Balance of Planning Period FTR Auctions, making ARRs revenue adequate. For the 2013 to 2014 planning period, the ARR target allocations were $506.2 million while PJM collected $568.8 million from the combined Long Term, Annual and Monthly Balance of Planning Period FTR Auctions, making ARRs revenue adequate.
- **ARRs as an Offset to Congestion.** ARRs served as an effective offset against congestion. The total revenues received by ARR holders, including self-scheduled FTRs, offset 100 percent of the total congestion costs experienced by ARR holders across the Day-Ahead Energy Market and balancing energy market for the first ten months of the 2014 to 2015 planning period and for the 2013 to 2014 planning period. Individual participants may not have a 100 percent offset.

Recommendations

- The MMU recommends that PJM report correct monthly payout ratios to reduce understatement of payout ratios on a monthly basis. (Priority: Low. First reported 2013. Status: Not adopted. Stakeholder process.)
- The MMU recommends that PJM eliminate portfolio netting to eliminate cross subsidies among FTR marketplace participants. (Priority: High. First reported 2013. Status: Not adopted. Stakeholder process.)
- The MMU recommends that PJM eliminate subsidies to counter flow FTRs by applying the payout ratio to counter flow FTRs in the same way the payout ratio is applied to prevailing flow FTRs. (Priority: High. First reported 2013. Status: Not adopted. Stakeholder process.)
- The MMU recommends that PJM eliminate geographic cross subsidies. (Priority: High. First reported 2013. Status: Not adopted. Stakeholder process.)
- The MMU recommends that PJM improve transmission outage modeling in the FTR auction models. (Priority: Low. First reported 2013. Status: Adopted partially, 14/15 planning period. Stakeholder process.)
- The MMU recommends that PJM reduce FTR sales on paths with persistent overallocation of FTRs including clear rules for what defines persistent overallocation and how the reduction will be applied. (Priority: High. First reported 2013. Status: Adopted partially, 14/15 planning period.)
- The MMU recommends that PJM implement a seasonal ARR and FTR allocation system to better represent outages. (Priority: Medium. First reported 2013. Status: Not adopted.)
- The MMU recommends that PJM eliminate overallocation requirement of ARRs in the Annual ARR Allocation process. (Priority: High. First reported 2013. Status: Not adopted. Stakeholder process.)
- The MMU recommends that PJM apply the FTR forfeiture rule to up to congestion transactions consistent with the application of the FTR forfeiture rule to increment offers and decrement bids. (Priority: High. First reported 2013. Status: Not adopted. Pending before FERC.)

- The MMU recommends that PJM not use the ATSI Interface or create similar closed loop interfaces to set zonal prices to accommodate the inadequacies of the demand side resource capacity product. Market prices should be a function of market fundamentals. The MMU recommends that, in general, the implementation of closed loop interface constraints be studied in advance and, if there is good reason to implement, implemented so as to include them in the FTR Auction model to minimize their impact on FTR funding. (Priority: Medium. First reported 2013. Status: Not adopted.)

Conclusion

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.

After the introduction of LMP markets, financial transmission rights (FTRs) permitted the loads which pay for the transmission system to continue to receive those benefits in the form of revenues which offset congestion to the extent permitted by the transmission system. Financial transmission rights and the associated revenues were directly provided to loads in recognition of the facts that loads pay for the transmission system which permits low cost generation to be delivered to load. Another way of describing the result is that FTRs and the associated revenues were directly provided to loads in recognition of the fact that load pays locational prices which result in load payments in excess of generation revenues which are the source of the funds available to offset congestion costs in an LMP market. In other words, load payments in excess of generation revenues are the source of the funds to pay FTRs. In an LMP system, the only way to ensure that load receives the benefits associated with the use of the transmission system to deliver low cost energy is to use FTRs to pay back to load the difference between the total load payments and the total generation revenues associated with congestion.

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.

For these reasons, load should never be required to subsidize payments to FTR holders, regardless of the reason. Such subsidies have been suggested repeatedly.[3] One form of recommended subsidies would ignore balancing congestion when calculating total congestion dollars available to fund FTRs. This approach would ignore the fact that loads must pay both day ahead and balancing congestion. To eliminate balancing congestion from the FTR revenue calculation would require load to pay twice for congestion. Load would have to continue paying for the physical transmission system, would have to continue paying in excess of generator revenues and not have balancing congestion included in the calculation of congestion in order to increase the payout to holders of FTRs who are not loads and who therefore did not receive an allocation of ARRs. In other words, load would have to continue providing all the funding of FTRs, while payments to FTR holders who did not receive ARRs exceed total congestion on their FTR paths.

Revenue adequacy has received a lot of attention in the PJM FTR Market. There are several factors that can affect the reporting, distribution of and quantity of funding in the FTR Market. Revenue adequacy is misunderstood. 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. ARR holders do have those rights based on their payment for the transmission system. FTR holders appropriately receive revenues based on actual congestion in both day-ahead and balancing 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 modeling differences between the day-ahead and real-time. Such differences are not an indication that FTR holders are being underallocated total congestion dollars.

3 See "FirstEnergy Solutions Corp. Allegheny Energy Supply Company, LLC v PJM Interconnection, LLC," Docket No. EL13-47-000 (February 15, 2013).

Reported FTR revenue adequacy uses target allocations as the relevant benchmark. But target allocations are not the relevant benchmark. Target allocations are based on day-ahead congestion only, ignoring the other part of total congestion which is balancing congestion. The difference between the congestion payout using total congestion and the congestion payout using only day-ahead congestion illustrates the issue. For 2014, total day-ahead congestion was $2,218.4 million while total day-ahead plus balancing congestion was $1,919.3 million, compared to target allocations of $2,419.4 million in the same time period.

Clearing prices fell and cleared quantities increased from the 2010 to 2011 planning period through the 2013 to 2014 planning period. The market response to lower revenue adequacy was to reduce bid prices and to increase bid volumes and offer volumes.

PJM used a more conservative approach to modeling the transmission capability for the 2014 to 2015 planning period. The result was a significant reduction in Stage 1B and Stage 2 ARR allocations and a corresponding reduction in the available quantity of FTRs, an increase in FTR prices and an increase in ARR target allocations. The market response to the reduced supply of FTRs was increased bid prices, increased clearing prices and reduced clearing quantities.

The monthly payout ratio reported by PJM is understated. The PJM reported monthly payout ratio does not appropriately consider negative target allocations as a source of revenue to fund FTRs on a monthly basis. PJM's reported monthly payout ratios are based on an estimate of the results for the entire year. The reported monthly payout ratio should be the actual monthly results including all revenue. The MMU recommends that the calculation of the monthly FTR payout ratio appropriately include negative target allocations as a source of revenue, consistent with actual settlement payout.

FTR target allocations are currently netted within each organization in each hour. This means that within an hour, positive and negative target allocations within an organization's portfolio are offset prior to the application of the payout ratio to the positive target allocation FTRs. The payout ratios are also calculated based on these net FTR positions. The current method requires those participants with fewer negative target allocation FTRs to subsidize those with more negative target allocation FTRs. The current method treats a positive target allocation FTR differently depending on the portfolio of which it is a part. The correct method would treat all FTRs with positive target allocations exactly the same, which would eliminate this form of cross subsidy. This should also be extended to include the end of planning period FTR uplift calculation. The net of a participant's portfolio should not determine their FTR uplift liability, rather their portion of total positive target allocations should be used to determine a participant's uplift charge. The FTR market cannot work efficiently if FTR buyers do not receive payments consistent with the performance of their FTRs. Eliminating the portfolio subsidy would be a good first step in that direction.

If netting within portfolios were eliminated and the payout ratio were calculated correctly, the payout ratio in the 2013 to 2014 planning period would have been 87.5 percent instead of the reported 72.8 percent. The MMU recommends that netting of positive and negative target allocations within portfolios be eliminated.

The current rules create an asymmetry between the treatment of counter flow and prevailing flow FTRs. Counter flow FTR holders make payments over the planning period, in the form of negative target allocations. These negative target allocations are paid at 100 percent regardless of whether positive target allocation FTRs are paid at less than 100 percent.

There is no reason to treat counter flow FTRs more favorably than prevailing flow FTRs. Counter flow FTRs should also be affected when the payout ratio is less than 100 percent. This would mean that counter flow FTRs would pay back an increased amount that mirrors the decreased payments to prevailing flow FTRs. The adjusted payout ratio would evenly divide the impact of lower payouts among counter flow FTR holders and prevailing flow FTR holders by increasing negative counter flow target allocations by the same amount it decreases positive target allocations. The FTR market cannot work efficiently

if FTR buyers do not receive payments consistent with the performance of their FTRs. Eliminating the counter flow subsidy would be another good step in that direction.

The result of removing portfolio netting and applying a payout ratio to counter flow FTRs would have increased the calculated payout ratio in the 2013 to 2014 planning period from the reported 72.8 percent to 91.0 percent. The MMU recommends that counter flow and prevailing flow FTRs should be treated symmetrically with respect to the application of a payout ratio.

The overallocation of Stage 1A ARRs results in FTR overallocations on the same facilities. Stage 1A ARR overallocation is a source of revenue inadequacy and cross subsidy. While prorating the Stage 1A ARR allocations based on actual system capability would address the issue, Stage 1A ARRs cannot be prorated under current market rules.

The MMU recommends that Stage 1A allocations be prorated to match actual system capability and that PJM commit to building the transmission capability required to provide all defined Stage 1A allocations. If Stage 1A overallocations are addressed, Stage 1B and Stage 2 allocations would not need to be reduced as they were for the 2014 to 2015 planning period.

The result of removing portfolio netting, applying a payout ratio to counter flow FTRs and eliminating Stage 1A ARR overallocation in the 2013 to 2014 planning period would have increased the payout ratio to 94.6 percent without reducing ARR allocations in Stage 1B and Stage 2.

In addition to addressing these issues, the approach to the question of FTR funding should also look at the fundamental reasons that there has been a significant and persistent difference between day-ahead and balancing congestion. These reasons include the inadequate transmission outage modeling in the FTR auction model which ignores all but long term outages known in advance; the different approach to transmission line ratings in the day-ahead and real–time markets, including reactive interfaces, which directly results in differences in congestion between day-ahead and real-time markets; differences in day-ahead and real–time modeling including the treatment of loop flows, the treatment of outages, the modeling of PARs and the nodal location of load, which directly results in differences in congestion between day–ahead and real-time markets; the overallocation of ARRs which directly results in a difference between congestion revenue and the payment obligation; the appropriateness of seasonal ARR allocations to better match actual market conditions with the FTR auction model; geographic subsidies from the holders of positively valued FTRs in some locations to the holders of consistently negatively valued FTRs in other locations; the contribution of up-to congestion transactions to the differences between day-ahead and balancing congestion and thus to FTR payout ratios; and the continued sale of FTR capability on pathways with a persistent difference between FTRs and total congestion revenue. The MMU recommends that these issues be reviewed and modifications implemented. Regardless of how these issues are addressed, funding issues that persist as a result of modeling differences and flaws in the design of the FTR market should be borne by FTR holders operating in the voluntary FTR market and not imposed on load through the mechanism of balancing congestion.

Financial Transmission Rights

FTRs are financial instruments that entitle their holders to receive revenue or require them to pay charges based on locational congestion price differences in the Day-Ahead Energy Market across specific FTR transmission paths, subject to revenue availability. This value, termed the FTR target allocation, defines the maximum, but not guaranteed, payout for FTRs. The value of an FTR reflects the difference in congestion prices rather than the difference in LMPs, which includes both congestion and marginal losses.

Auction market participants are free to request FTRs between any eligible pricing nodes on the system. For the Long Term FTR Auction a list of available hubs, control zones, aggregates, generator buses and interface pricing points is available. For the Annual FTR Auction and FTRs bought for a quarterly period in the monthly auction the available FTR source and sink points include hubs, control zones, aggregates, generator buses, load buses and

interface pricing points. An FTR bought in the Monthly FTR Auction for the single calendar month following the auction may include any bus for which an LMP is calculated in the FTR model used. As one of the measures to address FTR funding, effective August 5, 2011, PJM does not allow FTR buy bids to clear with a price of zero unless there is at least one constraint in the auction which affects the FTR path. FTRs are available to the nearest 0.1 MW. The FTR target allocation is calculated hourly and is equal to the product of the FTR MW and the congestion price difference between sink and source that occurs in the Day-Ahead Energy Market. The value of an FTR can be positive or negative depending on the sink minus source congestion price difference, with a negative difference resulting in a liability for the holder. FTR holders with a negatively valued FTR are required to pay charges equal to their target allocations. The FTR target allocation is a cap on what FTR holders can receive. Revenues above that level on individual FTR paths are used to fund FTRs on paths which received less than their target allocations.

Available revenue to pay FTR holders is based on the amount of day-ahead and balancing congestion collected, payments by holders of negatively valued FTRs, Market to Market payments, excess ARR revenues available at the end of a month and any charges made to day-ahead operating reserves. Depending on the amount of revenues collected, FTR holders with a positively valued FTR may receive congestion credits between zero and their target allocations.

FTR funding is not on a path specific basis or on a time specific basis. There are widespread cross subsidies paid to equalize payments across paths and across time periods within a planning period. All paths receive the same proportional level of target revenue at the end of the planning period. FTR auction revenues and excess revenues are carried forward from prior months and distributed back from later months. At the end of a planning period, if some months remain not fully funded, an uplift charge is collected from any FTR market participants that hold FTRs for the planning period based on their pro rata share of total net positive FTR target allocations, excluding any charge to FTR holders with a net negative FTR position for the planning year.

FTRs can be bought, sold and self scheduled. Buy bids are bids to buy FTRs in the auctions; sell offers are offers to sell existing FTRs in the auctions; and self-scheduled bids are FTRs that have been directly converted from ARRs in the Annual FTR Auction.

There are two types of FTR products: obligations and options. An obligation provides a credit, positive or negative, equal to the product of the FTR MW and the congestion price difference between FTR sink (destination) and source (origin) that occurs in the Day-Ahead Energy Market. An option provides only positive credits and options are available for only a subset of the possible FTR transmission paths.

There are three classes of FTR products: 24-hour, on peak and off peak. The 24-hour products are effective 24 hours a day, seven days a week, while the on peak products are effective during on peak periods defined as the hours ending 0800 through 2300, Eastern Prevailing Time (EPT) Mondays through Fridays, excluding North American Electric Reliability Council (NERC) holidays. The off peak products are effective during hours ending 2400 through 0700, EPT, Mondays through Fridays, and during all hours on Saturdays, Sundays and NERC holidays.

PJM operates an Annual FTR Auction for all participants. In addition, PJM conducts Monthly Balance of Planning Period FTR Auctions for the remaining months of the planning period, which allows participants to buy and sell residual transmission capability. PJM also runs a Long Term FTR Auction for the following three consecutive planning years. FTR options are not available in the Long Term FTR Auction. A secondary bilateral market is also administered by PJM to allow participants to buy and sell existing FTRs. FTRs can also be exchanged bilaterally outside PJM markets.

The objective function of all FTR auctions is to maximize the bid-based value of FTRs awarded in each auction.

FTR buy bids and sell offers may be made as obligations or options and as any of the three classes. FTR self-scheduled bids are available only as

obligations and 24-hour class, consistent with the associated ARRs, and only in the Annual FTR Auction.

Market Structure

Any PJM member can participate in the Long Term FTR Auction, the Annual FTR Auction and the Monthly Balance of Planning Period FTR Auctions.

Supply and Demand

PJM oversees the process of selling and buying FTRs through FTR Auctions. Market participants purchase FTRs by participating in Long Term, Annual and Monthly Balance of Planning Period FTR Auctions.[4] FTRs can also be traded between market participants through bilateral transactions. ARRs may be self scheduled as FTRs for participation only in the Annual FTR Auction.

Total FTR supply is limited by the capability of the transmission system, as modeled in the FTR auction, to simultaneously accommodate the requested FTRs and the various combinations of requested FTRs. Depending on assumptions used in the FTR auction transmission model, the total FTR supply can be greater than or less than system capability in aggregate and/or on an element by element basis. When FTR supply is greater than system capability, FTR target allocations will be greater than congestion revenues, contributing to FTR revenue inadequacy. Where FTR supply is less than system capability, FTR target allocations will be less than congestion revenues, contributing to FTR revenue surplus.

PJM can also make further adjustments to the FTR auction model to account for anticipated revenue inadequacies by including more conservative outage assumptions and additional constraints (closed loop interfaces). These conservative measures reduce the supply of available Stage 1B and Stage 2 ARRs, which in turn reduce the number of FTRs available for purchase. PJM made such adjustments in the 2014 to 2015 planning year auction model.

For the Annual FTR Auction, known transmission outages that are expected to last for two months or more are included in the model, while known outages of five days or more are included in the model for the Monthly Balance of Planning Period FTR Auctions as well as any outages of a shorter duration that PJM determines would cause FTR revenue inadequacy if not modeled.[5]

But the auction process does not account for the fact that significant transmission outages, which have not been provided to PJM by transmission owners prior to the auction date, will occur during the periods covered by the auctions. Such transmission outages may or may not be planned in advance or may be emergency outages. In addition, it is difficult to model in an annual auction two outages of similar significance and similar duration in different areas which do not overlap in time. The choice of which to model may have significant distributional consequences. The fact that outages are modeled at significantly lower than historical levels results in selling too many FTRs which creates downward pressure on revenues paid to each FTR. To address this issue, the MMU has recommended that PJM use probabilistic outage modeling andr seasonal ARR/FTR markets to better align the supply of ARRs and FTRs with actual system capabilities.

Monthly Balance of Planning Period FTR Auctions

The residual capability of the PJM transmission system, after the Long Term and Annual FTR Auctions are concluded, is offered in the Monthly Balance of Planning Period FTR Auctions. Existing FTRs are modeled as fixed injections and withdrawals. Outages expected to last five or more days are included in the determination of the simultaneous feasibility test for the Monthly Balance of Planning Period FTR Auction. These are single-round monthly auctions that allow any transmission service customer or PJM member to bid for any FTR or to offer for sale any FTR that they currently hold. Market participants can bid for or offer monthly FTRs for any of the next three months remaining in the planning period, or quarterly FTRs for any of the quarters remaining in the planning period. FTRs in the auctions include obligations and options and 24-hour, on peak and off peak products.[6]

4 See PJM. "Manual 6: Financial Transmission Rights," Revision 15 (October 10, 2013), p. 38.

5 See PJM. "Manual 6: Financial Transmission Rights," Revision 15 (October 10, 2013), p. 55.

6 See PJM. "Manual 6: Financial Transmission Rights," Revision 15 (October 10, 2013), p. 39.

Secondary Bilateral Market

Market participants can buy and sell existing FTRs through the PJM administered, bilateral market, or market participants can trade FTRs among themselves without PJM involvement. Bilateral transactions that are not done through PJM can involve parties that are not PJM members. PJM has no knowledge of bilateral transactions that are done outside of PJM's bilateral market system.

For bilateral trades done through PJM, the FTR transmission path must remain the same, FTR obligations must remain obligations, and FTR options must remain options. However, an individual FTR may be split up into multiple, smaller FTRs, down to increments of 0.1 MW. FTRs can also be given different start and end times, but the start time cannot be earlier than the original FTR start time and the end time cannot be later than the original FTR end time.

Buy Bids

The total FTR buy bids in the 2014 to 2015 Annual FTR Auction were 3,270,311 MW. The total FTR buy bids in the Monthly Balance of Planning Period FTR Auctions for the 2013 to 2014 planning period were 25,088,665 MW.

Patterns of Ownership

The overall ownership structure of FTRs and the ownership of prevailing flow and counter flow FTRs is descriptive and is not necessarily a measure of actual or potential FTR market structure issues, as the ownership positions result from competitive auctions.

In order to evaluate the ownership of prevailing flow and counter flow FTRs, the MMU categorized all participants owning FTRs in PJM as either physical or financial. Physical entities include utilities and customers which primarily take physical positions in PJM markets. Financial entities include banks and hedge funds which primarily take financial positions in PJM markets. International market participants that primarily take financial positions in PJM markets are generally considered to be financial entities even if they are utilities in their own countries.

Table 13-2 presents the Monthly Balance of Planning Period FTR Auction cleared FTRs for 2015 by trade type, organization type and FTR direction. Financial entities purchased 77.5 percent of prevailing flow and 87.2 percent of counter flow FTRs for the year, with the result that financial entities purchased 81.6 percent of all prevailing and counter flow FTR buy bids in the Monthly Balance of Planning Period FTR Auction cleared FTRs for 2015.

Table 13-2 Monthly Balance of Planning Period FTR Auction patterns of ownership by FTR direction: 2015

		FTR Direction		
Trade Type	Organization Type	Prevailing Flow	Counter Flow	All
Buy Bids	Physical	22.5%	12.8%	18.4%
	Financial	77.5%	87.2%	81.6%
	Total	100.0%	100.0%	100.0%
Sell Offers	Physical	33.9%	34.2%	34.0%
	Financial	66.1%	65.8%	66.0%
	Total	100.0%	100.0%	100.0%

Table 13-3 presents the daily net position ownership for all FTRs for 2015, by FTR direction.

Table 13-3 Daily FTR net position ownership by FTR direction: 2015

	FTR Direction		
Organization Type	Prevailing Flow	Counter Flow	All
Physical	38.7%	16.2%	30.0%
Financial	61.3%	83.8%	70.0%
Total	100.0%	100.0%	100.0%

Market Behavior

FTR Forfeitures

An FTR holder may be subject to forfeiture of any profits from an FTR if it meets the criteria defined in Section 5.2.1 (b) of Schedule 1 of the PJM Operating Agreement. If a participant has a cleared increment offer or decrement bid for an applicable hour at or near the source or sink of any FTR they own and the day-ahead congestion LMP difference is greater than the real-time congestion LMP difference the profits from that FTR may be

subject to forfeiture for that hour. An increment offer or decrement bid is considered near the source or sink point if 75 percent or more of the energy injected or withdrawn, and which is withdrawn or injected at any other bus, is reflected on the constrained path between the FTR source or sink. This rule only applies to increment offers and decrement bids that would increase the price separation between the FTR source and sink points.

Figure 13-1 demonstrates the FTR forfeiture rule for INCs and DECs. The INC or DEC distribution factor (dfax) is compared to the largest impact withdrawal or injection dfax. If the absolute difference between the virtual bid and its counterpart is greater than or equal to 75 percent, the virtual bid is considered for forfeiture. This is the metric in the rule which defines the impact of the virtual bid on the constraint.

In the first part of the example in Figure 13-1, the INC has a dfax of 0.25 and the maximum withdrawal dfax on the constraint is -0.5. The difference between the two dfaxes is -0.75 (0.25 minus -0.5). The absolute value is 0.75. In the second part of the example in, the DEC has dfax of 0.5 and the maximum injection dfax on the constraint is -0.25. The difference between the two dfaxes is 0.75 (-0.25 minus 0.5). The absolute value is also 0.75.

Figure 13-1 Illustration of INC/DEC FTR forfeiture rule

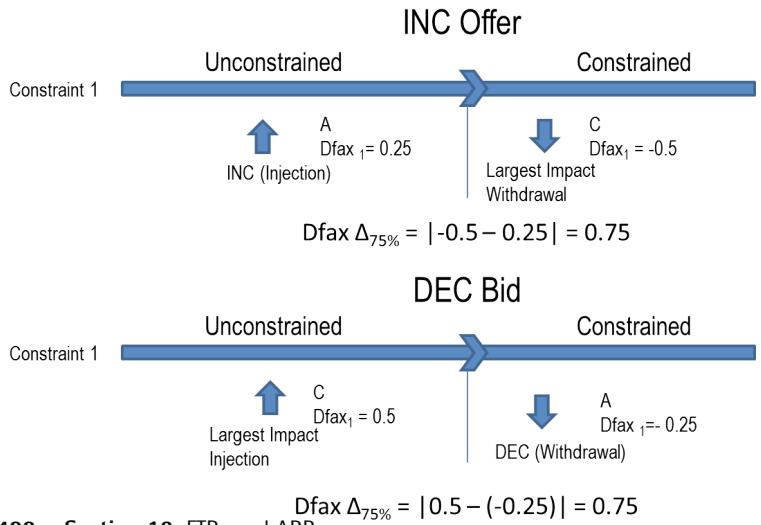


Figure 13-2 shows the FTR forfeiture values for both physical and financial participants for each month of June 2010 through March 2015. Currently, counter flow FTRs are not subject to forfeiture regardless of INC or DEC positions. Total forfeitures for the first ten months of the 2014 to 2015 planning period were $3.3 million (0.3 percent of total FTR target allocations).

Figure 13-2 Monthly FTR forfeitures for physical and financial participants: June 2010 through March 2015

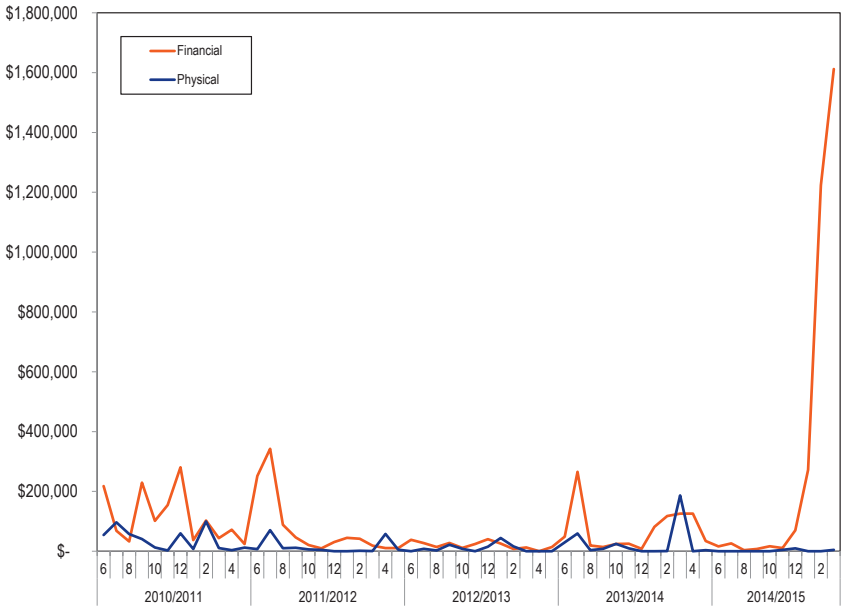
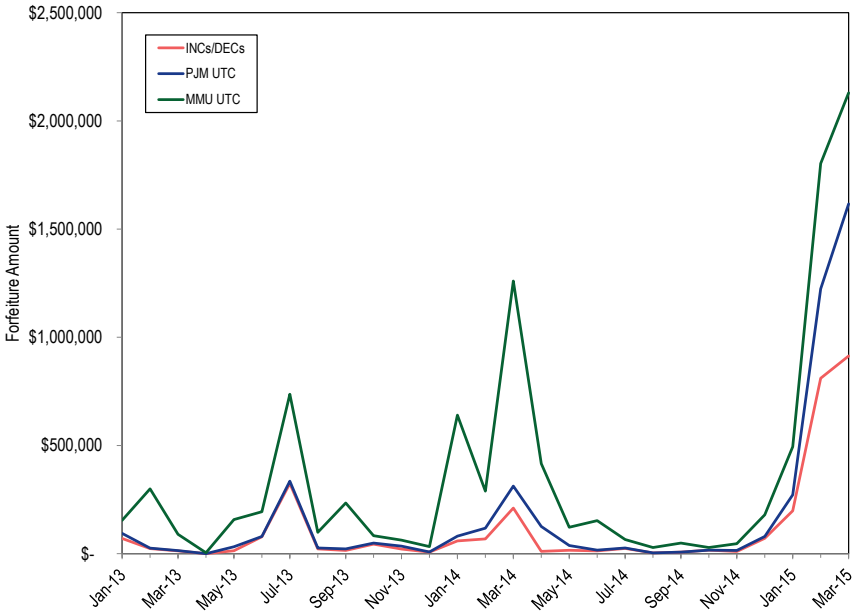


Figure 13-3 shows the FTR forfeitures on just INCs and DECs, FTR forfeitures on INCs, DECs and UTCs using the method proposed by PJM and FTR forfeitures on INCs, DECs and UTCs using the method proposed by the MMU from January 2013 through March 2015. The method proposed by PJM for calculating forfeitures associated with UTCs was implemented on September 1, 2013, and for each month thereafter. UTC forfeitures before September 2013 were not billed, but are included to illustrate the impact of the different

methods of calculating forfeitures. The UTC curves include all forfeitures for the month associated with INCs, DECs and UTCs.

Figure 13-3 FTR forfeitures for INCs/DECs and INCs/DECs/UTCs for both the PJM and MMU methods: January 2013 through March 2015



Up-to-Congestion Transaction FTR Forfeitures

The current implementation of the FTR forfeiture rule submitted by PJM is not consistent with the application of the forfeiture rule for INCs and DECs. Under PJM's method the simple net dfax of the UTC transaction is the only consideration for forfeiture, representing the contract path of the UTC transaction. Under this method, the net dfax is the sink dfax of the UTC minus the source dfax of the UTC. The net dfax alone cannot be used as an indication of helping or hurting a constraint, rather, the direction of the constraint must also be considered. In addition, the PJM method only considers UTC transactions whose net dfax is positive. This logic not only passes transactions that should fail the forfeiture test, but fails transactions that should pass the forfeiture test.

PJM's logic also does not hold when one of the points of the UTC is far from the constraint. In this case, one side of the UTC would have a dfax of zero, indicating no connection to the constraint being considered. If a point of the UTC transaction has no connection to the constraint, there can be no power flow directly between the two UTC points, so the simple net dfax, cannot logically be used in this case to indicate whether a UTC is eligible for forfeiture. Under the MMU method this UTC would be treated as an INC or DEC and follow the same rules as the current INC/DEC FTR forfeiture rule.

Figure 13-4 shows an example of the two proposed FTR forfeiture rules for UTC transactions. In both cases, the net dfax of the UTC is taken. Under the PJM method the net dfax of the UTC is calculated by subtracting the dfax of the sink bus A (0.2) from the dfax of the source bus B (0.5) to get a net dfax of -0.3. If this net dfax value is greater than 0.75 the UTC is subject to forfeiture. Under the MMU method, the net dfax is calculated by subtracting the dfax of sink A (0.2) from the dfax of source bus B (0.5) to get a net dfax of 0.3. This net dfax is then compared to the withdrawal point with the largest impact on the constraint. The MMU method compares the net UTC dfax to a withdrawal because the UTC is a net injection on this constraint. In this example, the net dfax is 0.3 and it is compared to the largest withdrawal dfax at C (-0.5). The absolute value of the difference is calculated from these two points to determine if the UTC fails the FTR forfeiture rule. In this case, the absolute value of the difference is the dfax of bus C (-0.5) minus the net UTC dfax (0.3) for a total impact of 0.8, which is over the 0.75 threshold for the FTR forfeiture rule. The result is that this UTC fails the FTR forfeiture rule. The MMU proposes to apply the same rules to UTC transactions as is applied to INCs and DECs, treat the UTC as equivalent to an INC or a DEC depending on its net impact on a given constraint. A UTC transaction is essentially a paired INC/DEC, it has a net impact on the flow across a constraint, as an INC or DEC does. While total system power balance is maintained by a UTC, local flows may change based on the UTC's net impact on a constraint. The MMU method captures this impact.

Figure 13-4 Illustration of UTC FTR forfeiture rule

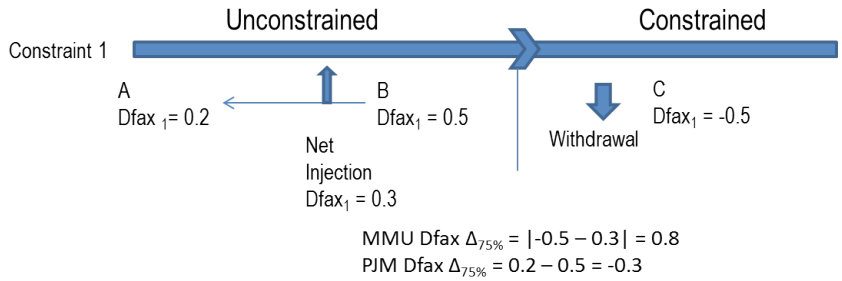
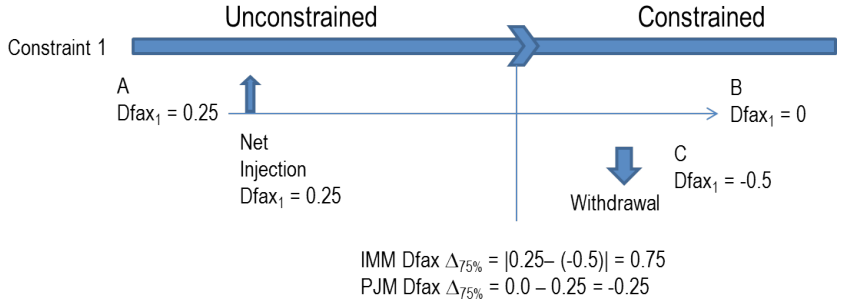


Figure 13-5 demonstrates where the assumption of contract path for UTCs in PJM's method does not hold with actual system conditions when either the source or sink of the UTC does not have any impact on the constraint being considered. In this case, the UTC is effectively an INC or a DEC relative to the constraint, as the other end of the UTC has no impact on the constraint. However, the PJM approach would not treat the UTC as an INC or DEC, despite the effective absence of the other end of the UTC. This is a flawed result.

As demonstrated in Figure 13-5, the UTC is no different than an INC on the constraint being considered. Using the PJM method this UTC would pass the FTR forfeiture rule. The net dfax would be calculated as the dfax of bus B (0) minus the dfax of bus A (0.25) for a net dfax of -0.25, with no comparison to any withdrawal bus. Since the dfax is negative, it would pass the PJM FTR forfeiture rule. Under the MMU's method, the net dfax is calculated as an injection with a dfax of 0.25, and then the absolute value of the difference is calculated between that injection and the dfax of the largest withdrawal on the constraint. In this example that is bus C, with a dfax of -0.5. The result is an absolute value of the dfax difference of 0.75, meaning that this UTC fails the FTR forfeiture test.

Figure 13-5 Illustration of UTC FTR Forfeiture rule with one point far from constraint



The MMU recommends that the FTR forfeiture rule be applied to UTCs in the same way it is applied to INCs and DECs.

Credit Issues

There were no defaults events for the first three months of 2015.

Market Performance

Volume

In an effort to address reduced FTR payout ratios, PJM may use normal transmission limits in the FTR auction model. These capability limits may be reduced if ARR funding is not impacted, all requested self-scheduled FTRs clear and net FTR Auction revenue is positive. If the normal capability limit cannot be reached due to infeasibilities then FTR Auction capability reductions are undertaken pro rata based on the MW of Stage 1A infeasibility and the availability of appropriate auction bids for counter flow FTRs.[7]

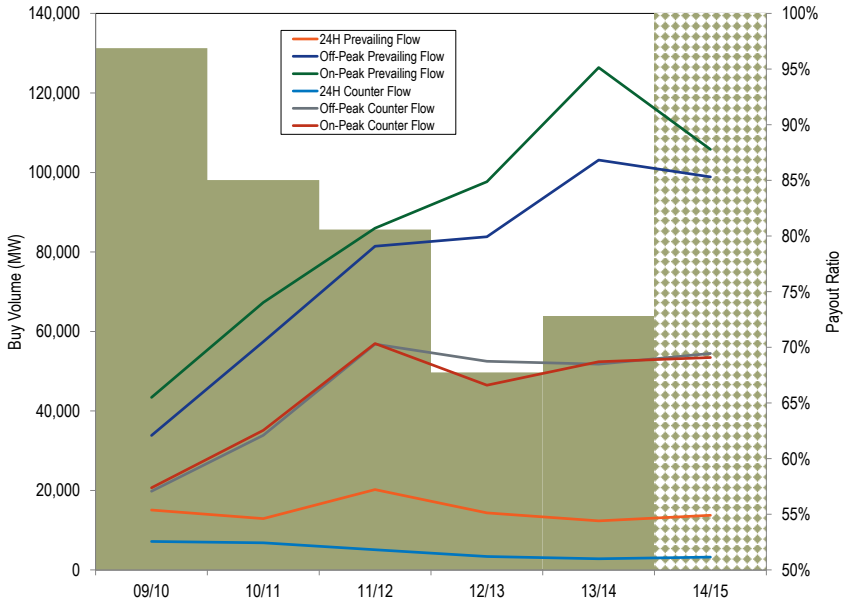
In another effort to reduce FTR funding issues, PJM implemented a new rule stating that PJM may model normal capability limits on facilities which are infeasible due to modeled transmission outages in Monthly Balance of Planning Period FTR Auctions. The capability of these facilities may be

7 See PJM. "Manual 6: Financial Transmission Rights," Revision 15 (October 10, 2013), p. 56.

reduced if ARR target allocations are fully funded and net auction revenues are greater than zero. This reduction may only take place when there are counter flow auction bids available to reduce the infeasibilities.[8]

Figure 13-6 shows the cleared volumes of the Annual FTR Auctions from planning period 2009 to 2010 through the 2014 to 2015 planning period and the associated planning period payout ratios, represented by the background bars. The payout ratio for the 2014 to 2015 planning period is shown as dotted background because it is not yet final. The cleared MW increased from the 2009 to 2010 planning period through the 2013 to the 2014 planning period, as a market response to lower payout ratios compared to target allocations. The 2014 to 2015 planning period volume was 19.1 percent lower as a result of PJM's more restrictive modeling of Stage 1B and Stage 2 ARRs, leading to fewer available FTRs in the Annual FTR Auction and higher prices.

Figure 13-6 Annual FTR Auction volume: Planning period 2009 to 2010 through 2014 to 2015



8 See PJM. "Manual 6: Financial Transmission Rights," Revision 15 (October 10, 2013), p. 56.

Table 13-4 shows the proportion of ARRs self-scheduled as FTRs for the last six planning periods. The maximum possible level of self-scheduled FTRs includes all ARRs, including RTEP ARRs. Eligible participants self-scheduled 26,964 MW (36.7 percent) of ARRs as FTRs for the 2014 to 2015 planning period, up from 31.1 percent in the previous planning period. This reduction was a market response to the relative values of ARRs and FTRs.

Table 13-4 Comparison of self-scheduled FTRs: Planning periods 2009 to 2010 through 2014 to 2015

Planning Period	Self-Scheduled FTRs (MW)	Maximum Possible Self-Scheduled FTRs (MW)	Percent of ARRs Self-Scheduled as FTRs
2009/2010	68,589	109,613	62.6%
2010/2011	55,669	102,046	54.6%
2011/2012	46,017	103,660	44.4%
2012/2013	41,351	99,115	41.7%
2013/2014	29,289	94,097	31.1%
2014/2015	26,964	73,504	36.7%

Table 13-5 provides the Monthly Balance of Planning Period FTR Auction market volume for the entire 2013 to 2014 planning period and the first ten months of the 2014 to 2015 planning period. There were 19,840,762 MW of FTR obligation buy bids and 3,041,355 MW of FTR obligation sell offers for all bidding periods in the first ten months of the 2014 to 2015 planning period. The monthly balance of planning period auctions cleared 1,985,497 MW (10.0 percent) of FTR obligation buy bids and 651,703 MW (21.4 percent) of FTR obligation sell offers.

There were 3,258,927 MW of FTR option buy bids and 189,399 MW of FTR option sell offers for all bidding periods in the Monthly Balance of Planning Period FTR Auctions for the first ten months of the 2014 to 2015 planning period. The monthly auctions cleared 46,813 (1.4 percent) of FTR option buy bids, and 59,037 MW (31.2 percent) of FTR option sell offers.

Table 13-5 Monthly Balance of Planning Period FTR Auction market volume: 2015

Monthly Auction	Type	Trade Type	Bid and Requested Count	Bid and Requested Volume (MW)	Cleared Volume (MW)	Cleared Volume	Uncleared Volume (MW)	Uncleared Volume
Jan-15	Obligations	Buy bids	252,024	1,586,427	144,179	9.1%	1,442,248	90.9%
		Sell offers	99,255	247,626	61,026	24.6%	186,600	75.4%
	Options	Buy bids	10,732	263,464	2,787	1.1%	260,678	98.9%
		Sell offers	2,886	15,735	4,571	29.1%	11,164	70.9%
Feb-15	Obligations	Buy bids	266,009	1,417,759	161,646	11.4%	1,256,112	88.6%
		Sell offers	96,236	237,844	51,752	21.8%	186,091	78.2%
	Options	Buy bids	12,280	284,062	6,106	2.1%	277,956	97.9%
		Sell offers	3,281	16,999	5,332	31.4%	11,667	68.6%
Mar-15	Obligations	Buy bids	254,361	1,467,192	151,571	10.3%	1,315,621	89.7%
		Sell offers	97,054	259,360	54,239	20.9%	205,121	79.1%
	Options	Buy bids	7,894	216,952	8,671	4.0%	208,281	96.0%
		Sell offers	4,158	28,822	8,783	30.5%	20,039	69.5%
2013/2014*	Obligations	Buy bids	2,981,219	20,739,786	3,284,056	15.8%	17,455,730	84.2%
		Sell offers	1,513,626	4,166,671	681,264	16.4%	3,485,407	83.6%
	Options	Buy bids	93,770	4,348,879	130,444	3.0%	4,218,435	97.0%
		Sell offers	188,618	1,314,005	472,571	36.0%	841,435	64.0%
2014/2015**	Obligations	Buy bids	3,046,382	19,840,762	1,985,497	10.0%	17,855,265	90.0%
		Sell offers	1,245,631	3,041,355	651,703	21.4%	2,389,652	78.6%
	Options	Buy bids	141,591	3,258,927	46,813	1.4%	3,212,114	98.6%
		Sell offers	31,475	189,399	59,037	31.2%	130,362	68.8%

* Shows Twelve Months for 2013/2014; ** Shows ten months ended 31-Mar-15 for 2014/2015

Table 13-6 presents the buy-bid, bid and cleared volume of the Monthly Balance of Planning Period FTR Auction, and the effective periods for the volume. The average monthly cleared volume for 2015 was 158,320.0 MW. The average monthly cleared volume for 2014 was 224,036.6 MW.

Table 13-6 Monthly Balance of Planning Period FTR Auction buy-bid, bid and cleared volume (MW per period): 2015

Monthly Auction	MW Type	Prompt Month	Second Month	Third Month	Q1	Q2	Q3	Q4	Total
Jan-15	Bid	971,818	380,246	165,248				332,579	1,849,891
	Cleared	90,259	25,220	7,982				23,505	146,966
Feb-15	Bid	930,310	230,137	204,195				337,179	1,701,821
	Cleared	103,322	16,683	14,472				33,276	167,753
Mar-15	Bid	926,146	248,594	275,292				234,112	1,684,143
	Cleared	105,252	23,524	20,266				11,200	160,242

Figure 13-7 shows cleared auction volumes as a percent of the total FTR cleared volume by calendar months for June 2004 through March 2015, by type of auction. FTR volumes are included in the calendar month they are effective, with Long Term and Annual FTR auction volume spread equally to each month in the relevant planning period. This figure shows the share of FTRs purchased in each auction type by month. Over the course of the planning period an increasing number of Monthly Balance of Planning Period FTRs are purchased, making them a greater portion of active FTRs. When the Annual FTR Auction occurs, FTRs purchased in any previous Monthly Balance of Planning Period Auction, other than the current June auction, are no longer in effect, so there is a reduction in their share of total FTRs with an accompanying rise in the share of Annual FTRs.

Figure 13-7 Cleared auction volume (MW) as a percent of total FTR cleared volume by calendar month: June 2004 through March 2015

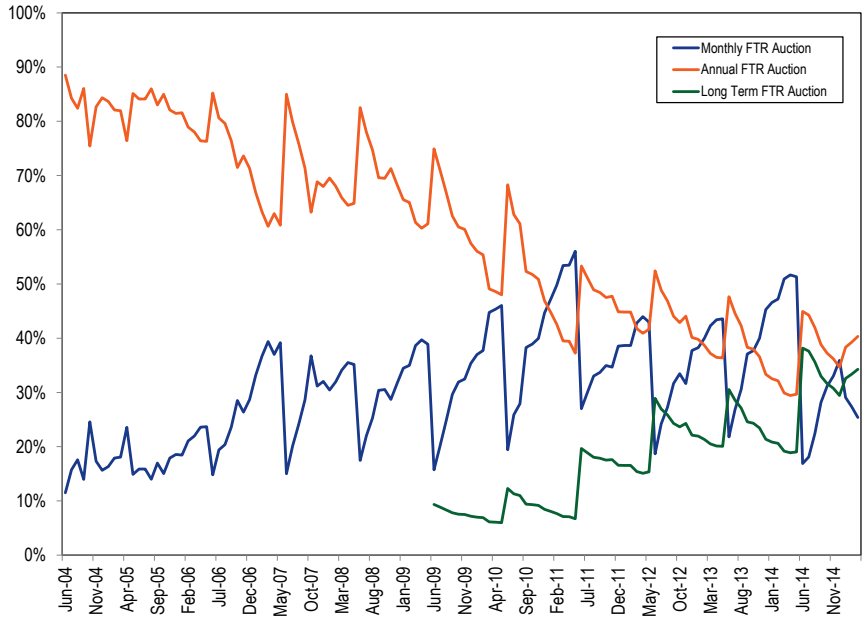


Table 13-7 provides the secondary bilateral FTR market volume for the entire 2013 to 2014 and 2014 to 2015 planning periods.

Table 13-7 Secondary bilateral FTR market volume: Planning periods 2013 to 2014 and 2014 to 2015[9]

Planning Period	Type	Class Type	Volume (MW)
2013/2014	Obligation	24-Hour	110
		On Peak	43,495
		Off Peak	36,012
		Total	79,617
	Option	24-Hour	0
		On Peak	9,724
		Off Peak	914
		Total	10,638
2014/2015	Obligation	24-Hour	203
		On Peak	1,535
		Off Peak	1,141
		Total	2,879
	Option	24-Hour	0
		On Peak	0
		Off Peak	0
		Total	0

Figure 13-8 shows the FTR bid, cleared and net bid volume from June 2003 through March 2015 for Long Term, Annual and Monthly Balance of Planning Period Auctions.[10] Cleared volume is the volume of FTR buy and sell offers that were accepted. The net bid volume includes the total buy, sell and self-scheduled offers, counting sell offers as a negative volume. The bid volume is the total of all bid and self-scheduled offers, excluding sell offers. Bid volumes and net bid volumes have increased since 2003. Cleared volume was relatively steady until 2010, with an increase in 2011 followed by a slight decrease in 2012. In 2013, cleared volume increased, and there was a larger increase in 2014. The demand for FTRs has increased despite historical revenues.

9 The 2013 to 2014 planning period covers bilateral FTRs that are effective for any time between June 1, 2013 through June 1, 2014, which originally had been purchased in a Long Term FTR Auction, Annual FTR Auction or Monthly Balance of Planning Period FTR Auction.
10 The data for this table are available in *2014 State of the Market Report for PJM*, Volume 2, Appendix H.

Figure 13-8 Long Term, Annual and Monthly FTR Auction bid and cleared volume: June 2003 through March 2015

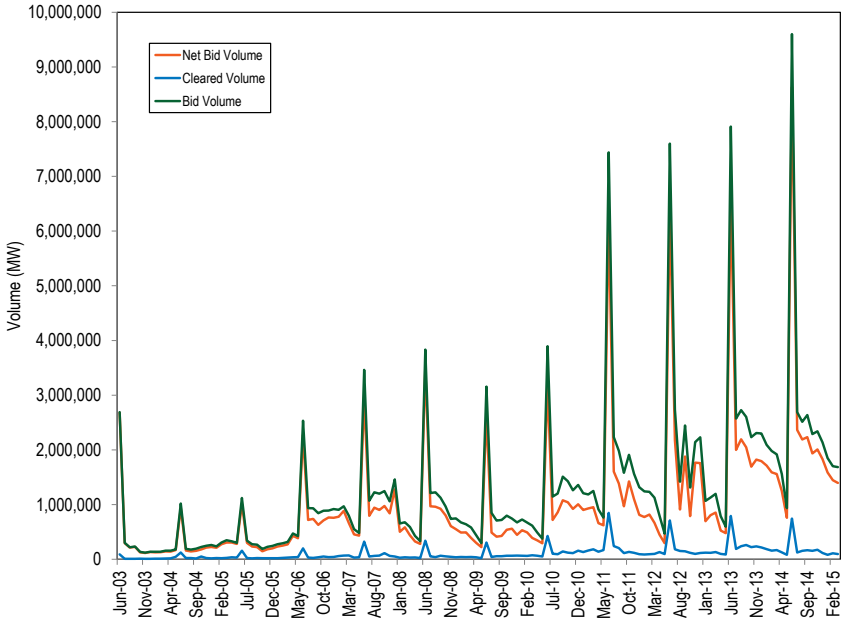
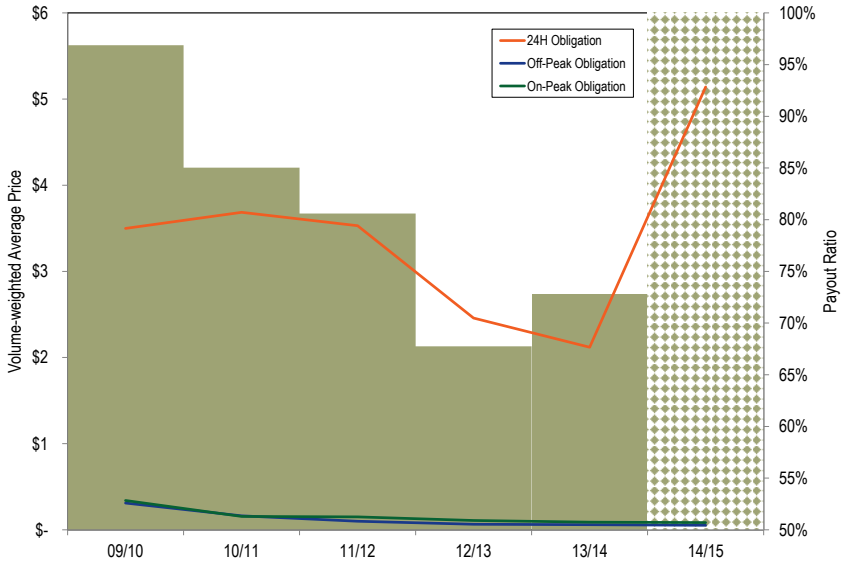


Figure 13-9 Annual FTR Auction volume-weighted average buy bid price: Planning period 2009 to 2010 through 2014 to 2015



Price

Figure 13-9 shows the volume-weighted average buy bid price for the Annual FTR Auctions from the 2009 to 2010 through the 2014 to 2015 planning periods and the associated planning period payout ratios, represented by the background bars. The payout ratio for the 2014 to 2015 planning period is shown as dotted background because it is not yet final. From the 2010 to 2011 planning period to the 2013 to 2014 planning period FTR prices decreased. The 2014 to 2015 planning period 24 hour obligation prices increased 142.5 percent. This large price increase was driven by the significant decrease in FTR supply volume during the Annual FTR Auction which was a result of PJM's more conservative transmission modeling and its impact on Stage 1B and Stage 2 ARR allocations. The increased price due to decreased volume has led to an increase in ARR target allocations for the planning period.

Table 13-8 shows the weighted-average cleared buy-bid price in the Monthly Balance of Planning Period FTR Auctions by bidding period for January 2015 through March 2015. For example, for the January 2015 Monthly Balance of Planning Period FTR Auction, the current month column is January, the second month column is February and the third month column is March. Quarters 1 through 4 are represented in the Q1, Q2, Q3 and Q4 columns. The total column represents all of the activity within the January 2015 Monthly Balance of Planning Period FTR Auction.

The cleared weighted-average price paid in the Monthly Balance of Planning Period FTR Auctions for January through March 2015 was $0.25 per MW, up from $0.10 per MW in the same time last year, a 150.0 percent increase in FTR prices.

Table 13-8 Monthly Balance of Planning Period FTR Auction cleared, weighted-average, buy-bid price per period (Dollars per MW): January through March 2015

Monthly Auction	Prompt Month	Second Month	Third Month	Q1	Q2	Q3	Q4	Total
Jan-15	$0.38	$0.57	$0.16				$0.19	$0.33
Feb-15	$0.21	$0.30	$0.21				$0.11	$0.17
Mar-15	$0.27	$0.27	$0.20				$0.13	$0.24

Profitability

FTR profitability is the difference between the revenue received for an FTR and the cost of the FTR. For a prevailing flow FTR, the FTR credits are the actual revenue that an FTR holder receives and the auction price is the cost. For a counter flow FTR, the auction price is the revenue that an FTR holder is paid and the FTR credits are the cost to the FTR holder, which the FTR holder must pay. The cost of self-scheduled FTRs is zero. ARR holders that self schedule FTRs purchase the FTRs in the Annual FTR Auction, but the ARR holders receive offsetting ARR credits that equal the purchase price of the FTRs.

Table 13-9 lists FTR profits by organization type and FTR direction for the period from January through March 2015. FTR profits are the sum of the daily FTR credits, including for self-scheduled FTRs, minus the daily FTR auction costs for each FTR held by an organization. The FTR target allocation is equal to the product of the FTR MW and congestion price differences between sink and source in the Day-Ahead Energy Market. The FTR credits do not include after the fact adjustments which are very small and do not occur in every month. The daily FTR auction costs are the product of the FTR MW and the auction price divided by the time period of the FTR in days. Self-scheduled FTRs have zero cost. FTRs were profitable overall, with $255.2 million in profits for physical entities, of which $160.3 million was from self-scheduled FTRs, and $171.2 million for financial entities. In the first three months of 2014, FTRs were more profitable, with an overall profit of $1,119.7 million. The large profit last year was mainly due to January 2014, which experienced unusually high congestion prices.

Table 13-9 FTR profits by organization type and FTR direction: 2015

	FTR Direction				
Organization Type	Prevailing Flow	Self Scheduled Prevailing Flow	Counter Flow	Self Scheduled Counter Flow	All
Physical	$125,450,380	$160,142,964	($30,566,923)	$192,605	$255,219,026
Financial	$199,381,438	NA	($28,177,056)	NA	$171,204,382
Total	$324,831,818	$160,142,964	($58,743,979)	$192,605	$426,423,407

Table 13-10 lists the monthly FTR profits in 2015 by organization type. Profits for January, February and March last year were $738.5 million, $146.3 million and $234.8 million. January profits were very large due to unusually high congestion values.

Table 13-10 Monthly FTR profits by organization type: 2015

	Organization Type			
Month	Physical	Self Scheduled Physical FTRs	Financial	Total
Jan	$11,958,919	$34,995,565	$31,679,970	$78,634,454
Feb	$78,051,647	$97,372,186	$103,883,296	$279,307,129
Mar	$4,872,891	$27,967,818	$35,641,115	$68,481,824
Total	$94,883,457	$160,335,569	$171,204,382	$426,423,407

Revenue

Monthly Balance of Planning Period FTR Auction Revenue

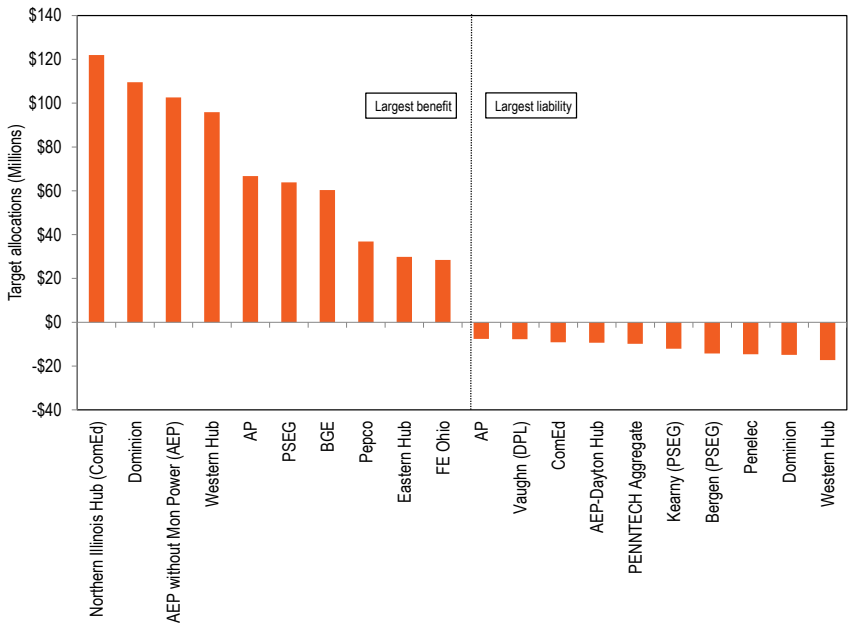
Table 13-11 shows Monthly Balance of Planning Period FTR Auction revenue by trade type, type and class type for January through March 2015. The Monthly Balance of Planning Period FTR Auction netted $17.3 million in revenue, with buyers paying $198.9 million and sellers receiving $181.7 million for the first ten months of the 2014 to 2015 planning period. For the entire 2013 to 2014 planning period, the Monthly Balance of Planning Period FTR Auctions netted $11.4 million in revenue with buyers paying $195.2 million and sellers receiving $183.8 million.

Table 13-11 Monthly Balance of Planning Period FTR Auction revenue: 2015

Monthly Auction	Type	Trade Type	Class Type 24-Hour	On Peak	Off Peak	All
Jan-15	Obligations	Buy bids	($618,302)	$13,581,853	$10,015,068	$22,978,619
		Sell offers	$635,745	$10,914,326	$7,928,853	$19,478,925
	Options	Buy bids	$0	$256,008	$168,789	$424,797
		Sell offers	$8,592	$1,047,368	$1,259,073	$2,315,033
Feb-15	Obligations	Buy bids	($147,453)	$7,611,995	$6,052,270	$13,516,812
		Sell offers	$114,483	$5,945,620	$4,885,777	$10,945,879
	Options	Buy bids	$5,211	$498,896	$432,335	$936,443
		Sell offers	$26	$1,332,728	$1,345,070	$2,677,824
Mar-15	Obligations	Buy bids	$47,778	$8,735,038	$6,313,585	$15,096,401
		Sell offers	$1,543	$6,293,269	$4,485,916	$10,780,728
	Options	Buy bids	$0	$408,180	$399,129	$807,309
		Sell offers	$23	$1,419,352	$1,351,464	$2,770,839
2013/2014*	Obligations	Buy bids	$9,826,767	$101,822,004	$64,728,872	$176,377,643
		Sell offers	$10,784,494	$59,962,481	$41,025,433	$111,772,408
	Options	Buy bids	$161,270	$10,651,046	$7,972,402	$18,784,718
		Sell offers	$20,765	$39,700,666	$32,300,116	$72,021,546
	Net Total		($817,223)	$12,809,904	($624,275)	$11,368,407
2014/2015**	Obligations	Buy bids	$16,510,411	$105,149,408	$67,448,845	$189,108,664
		Sell offers	$10,352,547	$90,043,379	$60,013,370	$160,409,296
	Options	Buy bids	$154,390	$5,483,333	$4,162,705	$9,800,428
		Sell offers	$39,932	$11,730,425	$9,472,173	$21,242,529
	Net Total		$6,272,322	$8,858,938	$2,126,008	$17,257,268

* Shows Twelve Months; ** Shows ten months ended 31-Mar-2015 for 2014/2015

Figure 13-10 Ten largest positive and negative FTR target allocations summed by sink: 2014 to 2015 planning period through March

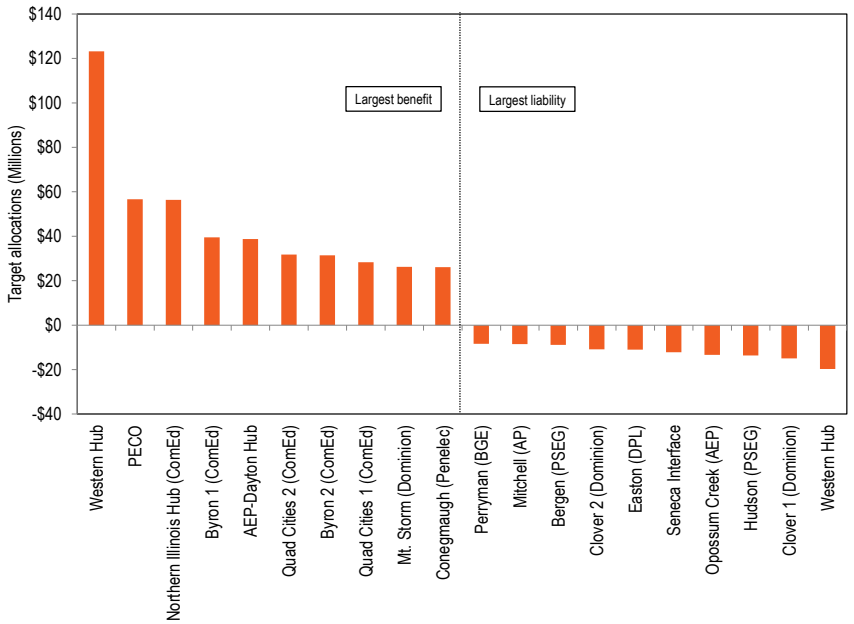


FTR Target Allocations

FTR target allocations were examined separately by source and sink contribution. Hourly FTR target allocations were divided into those that were benefits and liabilities and summed by sink and by source for the 2014 to 2015 planning period. Figure 13-10 shows the ten largest positive and negative FTR target allocations, summed by sink, for the 2014 to 2015 planning period. The top 10 sinks that produced financial benefit accounted for 37.7 percent of total positive target allocations during the 2014 to 2015 planning period with the Northern Illinois Hub accounting for 6.4 percent of all positive target allocations. The top 10 sinks that created liability accounted for 7.3 percent of total negative target allocations with the Western Hub accounting for 1.1 percent of all negative target allocations.

Figure 13-11 shows the ten largest positive and negative FTR target allocations, summed by source, for the 2014 to 2015 planning period. The top 10 sources with a positive target allocation accounted for 12.1 percent of total positive target allocations with the Western Hub accounting for 3.2 percent of total positive target allocations. The top 10 sources with a negative target allocation accounted for 7.6 percent of all negative target allocations, with the Western Hub accounting for 1.2 percent.

Figure 13-11 Ten largest positive and negative FTR target allocations summed by source: 2014 to 2015 planning period through March



Revenue Adequacy

Congestion revenue is created in an LMP system when all loads pay and all generators receive their respective LMPs. When load in a constrained area pays more than the amount that generators receive, excluding losses, positive congestion revenue exists and is available to cover the target allocations of FTR holders. The load MW exceed the generation MW in constrained areas because part of the load is served by imports using transmission capability into the constrained areas. That is why load, which pays for the transmission capability, receives ARRs to offset congestion in the constrained areas. Generating units that are the source of such imports are paid the price at their own bus, which does not reflect congestion in constrained areas. Generation in constrained areas receives the congestion price and all load in constrained areas pays the congestion price. As a result, load congestion payments are greater than the congestion-related payments to generation.[11] That is the source of the congestion revenue to pay holders of ARRs and FTRs. In general, FTR revenue adequacy exists when the sum of congestion credits is equal to or greater than the sum of congestion across the positively valued FTRs. If PJM allocated FTRs equal to the transmission capability into constrained areas, FTR payouts would equal the sum of congestion.

Revenue adequacy must be distinguished from the adequacy of FTRs as an offset against total congestion. Revenue adequacy is a narrower concept that compares total congestion revenues to the total target allocations across the specific paths for which FTRs were available and purchased. A path specific target allocation is not a guarantee of payment. The adequacy of FTRs as an offset against congestion compares ARR and FTR revenues to total congestion on the system as a measure of the extent to which ARRs and FTRs offset the actual, total congestion across all paths paid by market participants, regardless of the availability of ARRs or the availability or purchase of FTRs.

FTRs are paid each month from congestion revenues, both day-ahead and balancing. FTR auction revenues and excess revenues are carried forward from prior months and distributed back from later months. At the end of a planning period, if some months remain not fully funded, an uplift charge is collected from any FTR market participants that hold FTRs during the planning period based on their pro rata share of total net positive FTR target allocations, excluding any charge to FTR holders with a net negative FTR position for the planning year. Since the 2011 to 2012 planning period, FTRs were not fully funded and thus an uplift charge was collected. In June 2014, there was $2.9 million in excess congestion revenue, to be used to fund months later in the planning period that may have a revenue shortfall.

FTR revenues are primarily comprised of hourly congestion revenue, from the day-ahead and balancing markets.[12] FTR revenues also include ARR excess, which is the difference between ARR target allocations and FTR auction revenues, and negative FTR target allocations, which is an income for the FTR

11 For an illustration of how total congestion revenue is generated and how FTR target allocations and congestion receipts are determined, see Table G-1, "Congestion revenue, FTR target allocations and FTR congestion credits: Illustration," *MMU Technical Reference for PJM Markets*, at "Financial Transmission and Auction Revenue Rights."

12 When hourly congestion revenues are negative, it is defined as a net negative congestion hour.

market from FTRs with a negative target allocation. Competing use revenues are based on the Unscheduled Transmission Service Agreement between the New York Independent System Operator (NYISO) and PJM. This agreement sets forth the terms and conditions under which compensation is provided for transmission service in connection with transactions not scheduled directly or otherwise prearranged between NYISO and PJM. Congestion revenues appearing in Table 13-12 include both congestion charges associated with PJM facilities and those associated with reciprocal, coordinated flowgates (M2M flowgates) in MISO and NYISO whose operating limits are respected by PJM.[13]

In 2014, the market to market operations resulted in NYISO, MISO and PJM redispatching units to control congestion on flowgates located in the other's area and in the exchange of payments for this redispatch. The Firm Flow Entitlement (FFE) represents the amount of historic flow that each RTO had created on each reciprocally coordinated flowgate(RCF) used in the market to market settlement process. The FFE establishes the amount of market flow that each RTO is permitted to create on the RCF before incurring redispatch costs during the market to market process. If the non-monitoring RTO's real-time market flow is greater than their FFE plus the approved MW adjustment from day-ahead coordination, then the non-monitoring RTO will pay the monitoring RTO based on the difference between their market flow and their FFE. If the non-monitoring RTO's real-time market flow is less than their FFE plus the approved MW adjustment from day-ahead coordination, then the monitoring RTO will pay the non-monitoring RTO for congestion relief provided by the non-monitoring RTO based on the difference between the non-monitoring RTO's market flow and their FFE.

For the 2013 to 2014 planning period, PJM paid MISO and NYISO a combined $44.3 million for redispatch on the designated M2M flowgates, and for the first ten months of the 2014 to 2015 planning period PJM has paid MISO and NYISO a combined $25.1 million. The timing of the addition of new M2M flowgates may reduce FTR funding levels. MISO's ability to add flowgates dynamically throughout the planning period, which were not modeled in any previous PJM FTR auction, may result in oversold FTRs in PJM, and as a direct consequence, reduce FTR funding.

FTRs were paid at 100 percent of the target allocation level for the 2014 to 2015 planning period. Congestion revenues are allocated to FTR holders based on FTR target allocations. PJM collected $1,278.5 million of FTR revenues during the first ten months of the 2014 to 2015 planning period, and $1,819.5 million during the 2013 to 2014 planning period. Congestion in January 2014 was extremely high due to cold weather events, resulting in target allocations and congestion revenues that were unusually high for 2014. For the first ten months of the 2014 to 2015 planning period, the top sink and top source with the highest positive FTR target allocations were the Northern Illinois Hub and Western Hub. The top sink with the largest negative FTR target allocation was the Western Hub and the top source with the largest negative FTR target allocation was the Western Hub.

One of the main causes of the 2014 to 2015 planning period revenue adequacy was PJM's more conservative treatment of constrained facilities in the FTR Auction model, including outages and closed loop interfaces, designed to reduce revenue inadequacy, which resulted in a reduction of ARR allocation quantities. For the 2014 to 2015 planning period, Stage 1B and Stage 2 ARR allocations were reduced 84.9 percent and 88.1 percent from the 2013 to 2014 planning period. The result of this change in modeling is that available FTR capacity decreased for the planning period. This decrease resulted in an increase in FTR nodal prices for the Annual FTR Auction. Allocated ARR target allocations are based on the average of the four round Annual FTR Auction prices, so ARR target allocations increased due to the conservative modeling. The result of this is fewer available ARRs to allocate, but an increased dollar per MW value to held ARRs, as seen by the total ARR target allocations in Table 13-12 and the dollars per MW increase in Figure 13-16.

Table 13-12 presents the PJM FTR revenue detail for the 2013 to 2014 planning period and the 2014 to 2015 planning period.

13 See "Joint Operating Agreement between the Midwest Independent System Operator, Inc. and PJM Interconnection, L.L.C." (December 11, 2008), Section 6.1 <http://www.pjm.com/~/Media/documents/agreements/joa-complete.ashx>. (Accessed March 13, 2012)

Table 13-12 Total annual PJM FTR revenue detail (Dollars (Millions)): Planning periods 2013 to 2014 and 2014 to 2015

Accounting Element	2013/2014	2014/2015
ARR information		
ARR target allocations	$520.0	$639.0
FTR auction revenue	$593.9	$661.9
ARR excess	$71.7	$22.9
FTR targets		
Positive target allocations	$2,625.8	$1,333.6
Negative target allocations	($126.4)	($235.3)
FTR target allocations	$2,499.4	$1,098.3
Adjustments:		
Adjustments to FTR target allocations	($1.2)	$3.3
Total FTR targets	$2,498.2	$1,095.1
FTR revenues		
ARR excess	$71.7	$22.9
Competing uses	$0.0	$0.0
Congestion		
Net Negative Congestion (enter as negative)	($55.0)	($62.4)
Hourly congestion revenue	$1,837.9	$1,276.1
Midwest ISO M2M (credit to PJM minus credit to Midwest ISO)	($44.3)	($25.1)
Consolidated Edison Company of New York and Public Service Electric and Gas Company Wheel (CEPSW) congestion credit to Con Edison (enter as negative)	$0.0	$0.0
Adjustments:		
Excess revenues carried forward into future months	$0.0	$63.7
Excess revenues distributed back to previous months	$0.0	$0.0
Other adjustments to FTR revenues	$0.0	$0.0
Total FTR revenues		
Excess revenues distributed to other months	$0.0	$0.0
Net Negative Congestion charged to DA Operating Reserves	$9.2	$0.0
Excess revenues distributed to CEPSW for end-of-year distribution	$0.0	$0.0
Excess revenues distributed to FTR holders	$0.0	$0.0
Total FTR congestion credits	$1,819.5	$1,278.5
Total congestion credits on bill (includes CEPSW and end-of-year distribution)	$1,819.5	$1,278.5
Remaining deficiency	$678.7	($95.8)

Unallocated Congestion Charges

When total congestion revenue (day ahead plus balancing) at the end of an hour is negative, target allocations in that hour (based on day ahead CLMP values) are set to zero, and there is a congestion liability for that hour. At the end of the month, if excess ARR revenue and excess congestion from other hours and months are not adequate to offset the sum of these hourly differences, the unallocated congestion charges are included in day-ahead operating reserve charges so that the total congestion for the month is not less than zero. This charge is applied retroactively at the end of the month as additional day-ahead operating reserves charges and is never credited back to day-ahead operating reserves in the case of excess congestion. This means that within an hour, the congestion dollars collected from load were less than the congestion dollars paid to generation and there was not enough excess during the month to pay the difference. From 2010 through May 31, 2012, these charges were only made in three months, for a total of $7.3 million. However, in the 2012 to 2013 planning period these charges were made in five months for a total of $12.1 million in just one planning period.

Table 13-13 shows the monthly unallocated congestion charges made to day-ahead operating reserves for the 2012 to 2013 planning period through the 2014 to 2015 planning period. Months with no unallocated congestion are excluded from the table.[14]

Table 13-13 Unallocated congestion charges: Planning period 2012 to 2013 through 2014 to 2015

Period	Charge
Oct-12	$794,752
Dec-12	$193,429
Jan-13	$5,233,445
Mar-13	$701,303
May-13	$5,210,739
Jun-13	$2,828,660
Sep-13	$6,411,602
2012/2013	$12,133,668
2013/2014	$9,240,262

FTR target allocations are based on hourly prices in the Day-Ahead Energy Market for the respective FTR paths and are defined to be the revenue required to compensate FTR holders for congestion on those specific paths. FTR credits are paid to FTR holders and, depending on market conditions, can be less than the target allocations. Table 13-14 lists the FTR revenues, target allocations, credits, payout ratios, congestion credit deficiencies and excess

14 See *State of the Market Report for PJM*: Volume II, Section 4: Energy Uplift at "Energy Uplift Charges," for the impact of Unallocated Congestion Charges on Operating Reserve rates.

congestion charges by month. At the end of the 12-month planning period, excess congestion charges are used to offset any monthly congestion credit deficiencies.

The total row in Table 13-14 is not the sum of each of the monthly rows because the monthly rows may include excess revenues carried forward from prior months and excess revenues distributed back from later months. October 2014, November 2014 and March 2015 had revenue shortfalls of $6.5 million, $17.7 million and $38.7, but were fully funded using excess revenue from previous months.

Table 13-14 Monthly FTR accounting summary (Dollars (Millions)): Planning period 2013 to 2014 and 2014 to 2015

Period	FTR Revenues (with adjustments)	FTR Target Allocations	FTR Payout Ratio (original)	FTR Credits (with adjustments)	FTR Payout Ratio (with adjustments)	Monthly Credits Excess/Deficiency (with adjustments)
Jun-13	$61.3	$81.9	74.7%	$64.1	78.2%	($17.8)
Jul-13	$113.5	$128.3	88.3%	$113.5	88.5%	($14.7)
Aug-13	$43.1	$45.8	94.0%	$43.1	94.0%	($2.7)
Sep-13	$60.3	$116.0	52.0%	$66.7	57.5%	($49.3)
Oct-13	$47.4	$63.9	74.0%	$47.4	74.1%	($16.6)
Nov-13	$44.7	$66.9	66.9%	$44.7	66.9%	($22.1)
Dec-13	$85.0	$115.9	73.3%	$85.0	73.3%	($31.0)
Jan-14	$815.8	$1,044.0	78.1%	$815.8	78.1%	($228.2)
Feb-14	$167.7	$243.2	68.9%	$167.7	68.9%	($75.5)
Mar-14	$245.5	$367.0	66.8%	$245.5	66.8%	($121.8)
Apr-14	$60.9	$112.2	54.2%	$60.9	54.3%	($51.3)
May-14	$65.2	$113.2	57.6%	$65.2	57.6%	($48.0)
Summary for Planning Period 2013 to 2014						
Total	$1,810.3	$2,498.3		$1,819.5	72.8%	($678.8)
Jun-14	$89.0	$86.1	100.0%	$89.0	100.0%	$2.9
Jul-14	$104.0	$84.4	100.0%	$104.0	100.0%	$19.5
Aug-14	$69.5	$49.2	100.0%	$69.5	100.0%	$20.3
Sep-14	$88.7	$75.0	100.0%	$88.7	100.0%	$13.7
Oct-14	$80.5	$80.5	91.9%	$80.5	100.0%	$0.0
Nov-14	$106.4	$106.4	83.3%	$106.4	100.0%	$0.0
Dec-14	$65.4	$58.2	100.0%	$58.2	100.0%	$7.2
Jan-15	$132.0	$123.5	100.0%	$123.5	100.0%	$8.5
Feb-15	$425.8	$316.8	100.0%	$316.8	100.0%	$109.1
Mar-15	$112.3	$112.3	64.58	$112.3	100.0%	$0.0
Summary for Planning Period 2014 to 2015						
Total	$1,273.6	$1,092.3		$1,148.9	100.0%	$181.2

Figure 13-12 shows the original PJM reported FTR payout ratio by month, excluding excess revenue distribution, for January 2004 through March 2015. The months with payout ratios above 100 percent have excess congestion revenue and the months with payout ratios under 100 percent are revenue inadequate. Figure 13-12 also shows the payout ratio after distributing excess revenue across months within the planning period. If there are excess revenues in a given month, the excess is distributed to other months within the planning period that were revenue deficient. The payout ratios for months in the 2014 to 2015 planning period may change if excess revenue is collected in the remainder of the planning period. March 2015 had high levels of negative balancing congestion that resulted in a payout ratio of 64.6 percent. However, there was enough excess from previous months to bring the payout ratio to 100 percent.

Figure 13-12 FTR payout ratio by month, excluding and including excess revenue distribution: January 2004 through March 2014

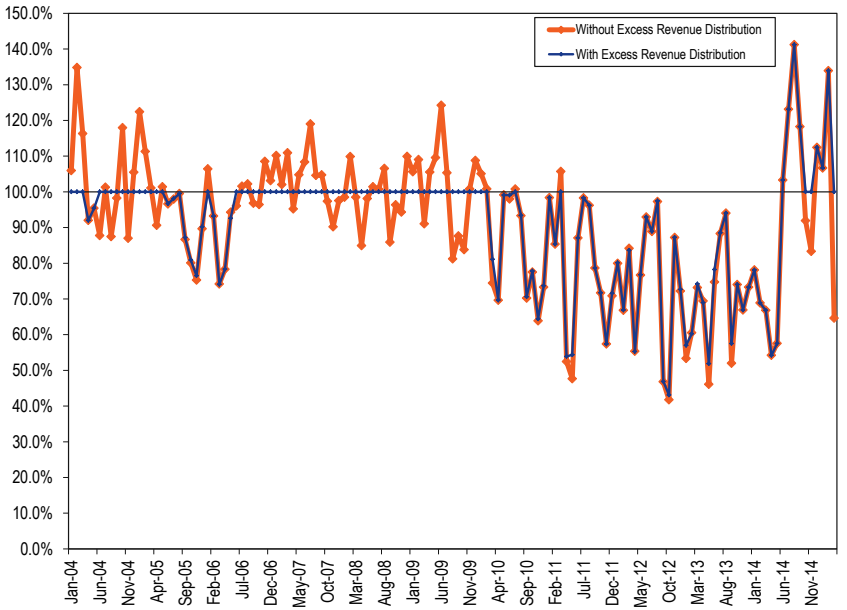


Table 13-15 shows the FTR payout ratio by planning period from the 2003 to 2004 planning period forward. Planning period 2013 to 2014 includes the additional revenue from unallocated congestion charges from Balancing Operating Reserves. For June through March 2015, there was excess congestion revenue to pay target allocations resulting in a reported payout ratio of 112.9 percent for the planning period.

Table 13-15 PJM reported FTR payout ratio by planning period

Planning Period	FTR Payout Ratio
2003/2004	97.7%
2004/2005	100.0%
2005/2006	90.7%
2006/2007	100.0%
2007/2008	100.0%
2008/2009	100.0%
2009/2010	96.9%
2010/2011	85.0%
2011/2012	80.6%
2012/2013	67.8%
2013/2014	72.8%
2014/2015	100.0%

FTR Uplift Charge

At the end of the planning period, an uplift charge is applied to FTR holders. This charge is to cover the net of the monthly deficiencies in the target allocations calculated for individual participants. An individual participant's uplift charge is a pro rata charge, to cover this deficiency, based on their net target allocation with respect to the total net target allocation of all participants with net positive target allocations for the planning period. Participants pay an uplift charge that is a ratio of their share of net positive target allocations to the total net positive target allocations.

The uplift charge is only applied to, and calculated from, members with a net positive target allocation at the end of the planning period. Members with a net negative target allocation have their year-end target allocation set to zero for all uplift calculations. Since participants in the FTR market with net positive target allocations are paying the uplift charge to fully fund FTRs, their payout ratio cannot be 100 percent. The end of planning period payout ratio is calculated as the participant's target allocations minus the uplift charge applied to them divided by their target allocations. The calculations of uplift are structured so that, at the end of the planning period, every participant in the FTR market with a positive net target allocation receives payments based on the same payout ratio. At the end of the planning period and the end of a given month no payout ratio is actually applied to a participant's target allocations. The payout ratio is simply used as a reporting mechanism to demonstrate the amount of revenue available to pay target allocations and represent the percentage of target allocations a participant with a net positive portfolio has been paid for the planning period. However, this same calculation is not accurate when calculating a single month's payout ratio as currently reported, where the calculation of available revenue is not the same.

The total planning period target allocation deficiency is the sum of the monthly deficiencies throughout the planning period. The monthly deficiency is the difference in the net target allocation of all participants and the total revenue collected for that month. The total revenue paid to FTR holders is based on the hourly congestion revenue collected, which includes hourly M2M, wheel payments and unallocated congestion credits.

Table 13-16 provides a demonstration of how the FTR uplift charge is calculated. In this example it is important to note that the sum of the net positive target allocations is $32 and the total monthly deficiency is $10. The uplift charge is structured so that those with higher target allocations pay more of the deficit, which ultimately impacts their net payout. Also, in this example, and in the PJM settlement process, the monthly payout ratio varies for all participants, but the uplift charge is structured so that once the uplift charge is applied the end of planning period payout ratio is the same for all participants.

For the 2012 to 2013 planning period, the total deficiency was $291.8 million. The top ten participants with the highest target allocations paid 53.6 percent of the total deficiency for the planning period. All of the uplift money is collected from individual participants, and distributed so that every participant

experiences the same payout ratio. This means that some participants subsidize others and receive less payout from their FTRs after the uplift is applied, while others receive a subsidy and get a higher payout after the uplift is applied. In this example, participants 1 and 5 are paid less after the uplift charge is applied, while participants 3 and 4 are paid more.

Table 13-16 End of planning period FTR uplift charge example

Participant	Net Target Allocation	Total Monthly Payment	Monthly Deficiency	Uplift Charge	Net Payout	Payout Change	Monthly Payout Ratio	EOPP Payout Ratio
1	$10.00	$8.00	$2.00	$3.13	$6.88	$(1.13)	80.0%	68.8%
2	($4.00)	$0.00	$0.00	$0.00	($4.00)	$-	100.0%	100.0%
3	$15.00	$10.00	$5.00	$4.69	$10.31	$0.31	66.7%	68.8%
4	$3.00	$1.00	$2.00	$0.94	$2.06	$1.06	33.3%	68.8%
5	$4.00	$3.00	$1.00	$1.25	$2.75	$(0.25)	75.0%	68.8%
Total	$28.00	$22.00	$10.00	$10.00	$18.00	$0.00		

Revenue Adequacy Issues and Solutions

PJM Reported Payout Ratio

The payout ratios shown in Table 13-17 reflect the PJM reported payout ratios for each month of the planning period. These reported payout ratios equal congestion revenue divided by the sum of the net positive and net negative target allocations for each hour of the month. This does not correctly measure the payout ratio actually received by positive target allocation FTR holders in the month, but provides an estimate of the ratio based on the approach to end of planning period calculations, including cross subsidies.

The payout ratio is intended to measure the proportion of the target allocation received by the holders of FTRs with positive target allocations in a month. In fact, the actual monthly payout ratio includes the net negative target allocations as a source of funding for FTRs with net positive target allocations in an hour. Revenue from FTRs with net negative target allocations in an hour is included with congestion revenue when funding FTRs with net positive target allocations.[15] Also included in this revenue is any M2M charge or credit for the month and any excess ARR revenues for the month. The revenue and net target allocations are then summed over the month to calculate the monthly payout ratio. There is no payout ratio applied on a monthly basis, each participant receives a different share of the available revenue based on availability, it is simply used as a reporting mechanism. At the end of a given month, a participant's FTR payments are a proportion of the congestion credits collected, based on the participant's share of the total monthly target allocation. The payout ratio is only used and calculated at the end of the planning period after uplift is applied to each participant. The actual monthly payout ratio received by FTR holders equals congestion revenue plus the net negative target allocations divided by the net positive target allocations for each hour. The actual payout ratio received by the holders of positive target allocation FTRs, reported on a monthly basis, is greater than reported by PJM.

Table 13-17 shows the PJM reported and actual monthly payout ratios for 2014. On a month to month basis, the payout ratio currently reported by PJM does not take into account all sources of revenue available to pay FTR holders. On a monthly basis, this provides a slightly understated payout ratio. In June 2014, there was an excess of FTR revenues, so total funding was actually over 100 percent. Additional revenue will be distributed to future months of the planning period to cover any shortfall.

Table 13-17 PJM Reported and Actual Monthly Payout Ratios: Planning period 2014 to 2015

	Reported Monthly Payout Ratio	Actual Monthly Payout Ratio
Jun-14	100.0%	100.0%
Jul-14	100.0%	100.0%
Aug-14	100.0%	100.0%
Sep-14	100.0%	100.0%
Oct-14	100.0%	100.0%
Nov-14	100.0%	100.0%
Dec-14	100.0%	100.0%
Jan-15	100.0%	100.0%
Feb-15	100.0%	100.0%
Mar-15	100.0%	100.0%

15 See PJM. "Manual 28: Operating Agreement Accounting," Revision 63 (December 19, 2013), p. 50.

Netting Target Allocations within Portfolios

Currently, FTR target allocations are netted within each organization in each hour. This means that within an hour, positive and negative target allocations within an organization's portfolio are offset prior to the application of the payout ratio to the positive target allocation FTRs. The payout ratios are also calculated based on these net FTR positions.

The current method requires those with fewer negative target allocation FTRs to subsidize those with more negative target allocation FTRs. The current method treats a positive target allocation FTR differently depending on the portfolio of which it is a part. But all FTRs with positive target allocations should be treated in exactly the same way, which would eliminate this form of cross subsidy.

For example, a participant has $200 of positive target allocation FTRs and $100 of negative target allocation FTRs and the payout ratio is 80 percent. Under the current method, the positive and negative positions are first netted to $100 and then the payout ratio is applied. In this example, the holder of the portfolio would receive 80 percent of $100, or $80.

The correct method would first apply the payout ratio to FTRs with positive target allocations and then net FTRs with negative target allocations. In the example, the 80 percent payout ratio would first be applied to the positive target allocation FTRs, 80 percent of $200 is $160. Then the negative target allocation FTRs would be netted against the positive target allocation FTRs, $160 minus $100, so that the holder of the portfolio would receive $60.

If done correctly, the payout ratio would also change, although the total net payments made to or from participants would not change. The sum of all positive and negative target allocations is the same in both methods. The net result of this change would be that holders of portfolios with smaller shares of negative target allocation FTRs would no longer subsidize holders of portfolios with larger shares of negative target allocation FTRs.

Under the current method all participants with a net positive target allocation in a month are paid a payout ratio based on each participant's net portfolio position. The correct approach would calculate payouts to FTRs with positive target allocations, without netting in an hour. This would treat all FTRs the same, regardless of a participant's portfolio. This approach would also eliminate the requirement that participants with larger shares of positive target allocation FTRs subsidize participants with larger shares of negative target allocation FTRs.

Elimination of portfolio netting should also be applied to the end of planning period FTR uplift calculation. With this approach, negative target allocations would not offset positive target allocations at the end of the planning period when allocating uplift. The FTR uplift charge would be based on participants' share of the total positive target allocations paid for the planning period.

Table 13-18 shows an example of the effects of calculating FTR payouts on a per FTR basis rather than the current method of portfolio netting for four hypothetical organizations for an example hour. The positive and negative TA columns show the total positive and negative target allocations, calculated separately, for each organization. The percent negative target allocations is the share of the portfolio which is negative target allocation FTRs. The net target allocation is the net of the positive and negative target allocations for the given hour. The FTR netting payout column shows what a participant would see on their bill, including payout ratio adjustments, under the current method. The per FTR payout column shows what a participant would see on their bill, including payout ratio adjustments, if FTR target allocations were done correctly. In this example, the actual monthly payout ratio is 41.7 percent. If portfolio netting were eliminated, the actual monthly payout ratio would rise to 61.1 percent.

This table shows the effects of a per FTR target allocation calculation on individual participants. The total payout does not change, but the allocation across individual participants does.

The largest change in payout is for participants 1 and 2. Participant 1, who has a large proportion of FTRs with negative target allocations, receives less payment. Participant 2, who has no negative target allocations, receives more payment.

Table 13-18 Example of FTR payouts from portfolio netting and without portfolio netting

Participant	Positive Target Allocation	Negative Target Allocation	Percent Negative Target Allocation	Net TA	FTR Netting Payout (Current)	No Netting Payout (Proposed)	Percent Change
1	$60.00	($40.00)	66.7%	$20.00	$8.33	($3.33)	(140.0%)
2	$30.00	$0.00	0.0%	$30.00	$12.50	$18.33	46.7%
3	$90.00	($20.00)	22.2%	$70.00	$29.17	$35.00	20.0%
4	$0.00	($5.00)	100.0%	($5.00)	($5.00)	($5.00)	0.0%
Total	$180.00	($65.00)	-	$115.00	$45.00	$45.00	-

Table 13-19 Monthly positive and negative target allocations and payout ratios with and without hourly netting: Planning period 2013 to 2014 and 2014 to 2015

	Net Positive Target Allocations	Net Negative Target Allocations	Per FTR Positive Target Allocations	Per FTR Negative Target Allocations	Total Congestion Revenue	Reported Payout Ratio (Current)	No Netting Payout Ratio (Proposed)
Jun-14	$100,523,323	($14,425,640)	$218,239,158	($132,125,293)	$88,974,913	100.0%	100.0%
Jul-14	$97,073,106	($12,614,842)	$215,524,070	($131,065,807)	$103,981,118	100.0%	100.0%
Aug-14	$62,474,287	($13,237,305)	$158,672,445	($109,435,464)	$69,520,938	100.0%	100.0%
Sep-14	$93,351,901	($18,360,141)	$230,425,062	($155,432,941)	$88,683,326	100.0%	100.0%
Oct-14	$115,053,632	($34,510,582)	$315,119,620	($234,573,734)	$80,529,041	100.0%	100.0%
Nov-14	$130,497,679	($24,118,185)	$318,604,763	($212,209,995)	$106,379,493	100.0%	100.0%
Dec-14	$80,517,779	($19,395,531)	$224,363,165	($163,240,917)	$65,392,809	100.0%	100.0%
Jan-15	$146,311,151	($22,842,202)	$410,273,039	($283,654,558)	$131,999,162	100.0%	100.0%
Feb-15	$374,621,111	($57,865,312)	$1,037,653,444	($719,673,940)	$425,826,022	100.0%	100.0%
Mar-15	$132,420,713	($18,509,912)	$414,369,580	($300,458,779)	$73,630,078	100.0%	100.0%
2013/2014 Total	$2,625,369,880	($126,385,125)	$5,442,171,151	($2,942,754,444)	$1,819,508,754	72.8%	87.5%
2014/2015 Total	$1,332,844,681	($235,879,652)	$3,543,244,346	($2,441,871,428)	$1,234,916,900	100.0%	100.0%

Table 13-19 shows the total value for the 2013 to 2014 planning period of FTRs with positive and negative target allocations. The Net Positive Target Allocation column shows the value of all portfolios with an hourly net positive value after negative target allocation FTRs are netted against positive target allocation FTRs. The Net Negative Target Allocation column shows the value of all portfolios with an hourly net negative value after negative target allocation FTRs are netted against positive target allocation FTRs. The Per FTR Positive Allocation column shows the total value of the hourly positive target allocation FTRs without netting. The Per Negative Allocation column shows the total value of the hourly negative target allocation FTRs without netting.

The Reported Payout Ratio column is the monthly payout ratio as currently reported by PJM, calculated as total revenue divided by the sum of the net positive and net negative target allocations. The No Netting FTR Payout Ratio column is the payout ratio that participants with positive target allocations would receive if FTR payouts were calculated without portfolio netting, calculated by dividing the total revenue minus the per FTR negative target allocation by the per FTR positive target allocations. The total revenue available to fund the holders of positive target allocation FTRs is calculated by adding any negative target allocations to the congestion credits for that month.

If netting within portfolios were eliminated and the payout ratio were calculated correctly, the payout ratio for the 2013 to 2014 planning period would have been 87.5 percent instead of the reported 72.8. October and November 2014 and March 2015 experienced revenue inadequacy, but excess revenue was distributed to them from previous months to ensure full funding.

Counter Flow FTRs and Revenues

The current rules create an asymmetry between the treatment of counter flow and prevailing flow FTRs. The payout to the holders of counter flow FTRs is not affected when the payout ratio is less than 100 percent. There is no reason for that asymmetric treatment.

For a prevailing flow FTR, the target allocation would be subject to a reduced payout ratio, while a counter flow FTR holder would not be subject to the reduced payout ratio. The profitability of the prevailing flow FTRs is affected

by the payout ratio while the profitability of the counter flow FTRs is not affected by the payout ratio.

Counter flow FTR holders make payments over the planning period, in the form of negative target allocations. These negative target allocation FTRs are paid at 100 percent regardless of whether positive target allocation FTRs are paid at less than 100 percent.

A counter flow FTR is profitable if the hourly negative target allocation is smaller than the hourly auction payment they received. A prevailing flow FTR is profitable if the hourly positive target allocation is larger than the auction payment they made.

There is no reason to treat counter flow FTRs more favorably than prevailing flow FTRs. Counter flow FTRs should also be affected when the payout ratio is less than 100 percent. This would mean that counter flow FTRs would pay back an increased amount, parallel to the decreased payments to prevailing flow FTRs. The adjusted payout ratio would evenly divide funding between counter flow FTR holders and prevailing flow FTR holders by increasing negative counter flow target allocations by the same amount it decreases positive target allocations.

Table 13-20 provides an example of how the counter flow adjustment method would impact a two FTR system. In this example there is $15 of total congestion revenue available, corresponding to a reported payout ratio of 75 percent and an actual payout ratio of 87.5 percent. In the example, the profit is shown with and without the counter flow adjustment. As the example shows, the profit of a counter flow FTR does not change when there is a payout ratio less than 100 percent, while the profit of a prevailing flow FTR is reduced. Applying the payout ratio to counter flow FTRs distributes the funding penalty evenly to both prevailing and counter flow FTR holders.

Table 13-20 Example implementation of counter flow adjustment method

	Prevailing A-B 10MW	Counter C-D 10MW
Auction Cost	$50.00	($30.00)
Target Allocation	$40.00	($20.00)
Payout	$30.00	($20.00)
Profit without underfunding	($10.00)	$10.00
Profit after underfunding	($20.00)	$10.00
Payout for Positive TA	$35.00	($20.00)
Profit for Positive TA	($15.00)	$10.00
Payout after CF Adjustment	$36.67	($21.67)
Profit after CF Adjustment	($13.33)	$8.33
Profit Difference	$1.67	($1.67)

Table 13-21 shows the monthly positive, negative and total target allocations.[16] Table 13-21 also shows the total congestion revenue available to fund FTRs, as well as the total revenue available to fund positive target allocation FTR holders on a per FTR basis and on a per FTR basis with counter flow payout adjustments. Implementing this change to the payout ratio for counter flow FTRs would result in an additional $188.4 million (27.8 percent of difference between revenues and total target allocations) in revenue available to fund positive target allocations for the 2013 to 2014 planning period. If this change were implemented after excess planning period revenue was distributed, it would not result in additional revenue for the first ten months of the 2014 to 2015 planning period. However, if this change were implemented before excess planning period revenues were distributed, there would be an increase in the revenue available each month to pay prevailing flow FTRs, resulting in a decrease in the amount of excess from previous months that needs to be used to achieve revenue adequacy. This can be seen by a slight difference in the total revenue and adjusted counter flow total revenue columns for the three months, October, November and March, in the 2014 to 2015 planning period that were not revenue adequate. The result of this would be more excess available for distribution pro-rata at the end of the planning period.

The result of removing portfolio netting and applying a payout ratio to counter flow FTRs would increase the calculated payout ratio for the 2013 to 2014 planning period from the reported 72.8 percent to 91.0 percent.

16 Reported payout ratio may differ between Table 13-29 and Table 13-31 due to rounding differences when netting target allocations and considering each FTR individually.

Table 13-21 Counter flow FTR payout ratio adjustment impacts: Planning period 2013 to 2014 and 2014 to 2015

	Positive Target Allocations	Negative Target Allocations	Total Target Allocations	Total Congestion Revenue	Reported Payout Ratio*	Total Revenue Available	Adjusted Counterflow Payout Ratio	Adjusted Counter Flow Revenue Available
Jun-14	218,239,158	(132,125,293)	$86,113,864	$88,974,913	100.0%	$221,100,206	100.0%	$221,100,206
Jul-14	215,524,070	(131,065,807)	$84,458,264	$103,981,118	100.0%	$235,046,924	100.0%	$235,046,924
Aug-14	158,672,445	(109,435,464)	$49,236,982	$69,520,938	100.0%	$178,956,402	100.0%	$178,956,402
Sep-14	230,425,062	(155,432,941)	$74,992,120	$88,683,326	100.0%	$244,116,267	100.0%	$244,116,267
Oct-14	315,119,620	(234,573,734)	$80,545,886	$80,529,041	100.0%	$315,102,775	100.0%	$315,107,797
Nov-14	318,604,763	(212,209,995)	$106,394,768	$106,379,493	100.0%	$318,589,489	100.0%	$318,594,398
Dec-14	234,209,679	(170,750,190)	$63,459,490	$65,392,809	100.0%	$236,142,998	100.0%	$236,142,998
Jan-15	410,273,039	(283,654,558)	$126,618,482	$131,999,162	100.0%	$415,653,720	100.0%	$415,653,720
Feb-15	1,037,653,444	(719,673,940)	$317,979,504	$425,826,022	100.0%	$1,145,499,962	100.0%	$1,145,499,962
Mar-15	414,369,580	(300,458,779)	$113,910,801	$112,294,395	100.0%	$412,753,174	100.0%	$413,256,180
Total 2013/2014	5,442,171,151	(2,942,754,444)	$2,499,416,707	$1,819,508,754	72.8%	$4,762,263,198	91.0%	$4,950,708,852
Total 2014/2015	3,553,090,861	(2,449,380,701)	$1,103,710,160	$1,273,581,216	100.0%	$3,722,961,917	100.0%	$3,723,474,855

* Reported payout ratios may vary due to rounding differences when netting

Figure 13-13 shows the FTR surplus, collected day-ahead, balancing and total congestion payments from January 2005 through March 2015. August and December 2014 had positive total balancing congestion of $0.03 million and $4.4 million. March 2015 had balancing congestion of $70.0 million.

Figure 13-13 FTR surplus and the collected Day-Ahead, Balancing and Total congestion: January 2005 through March 2015

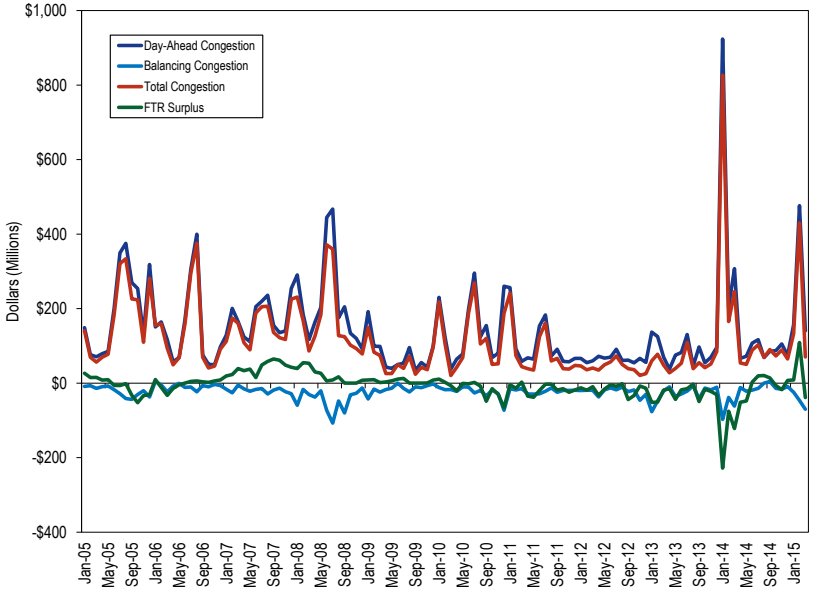
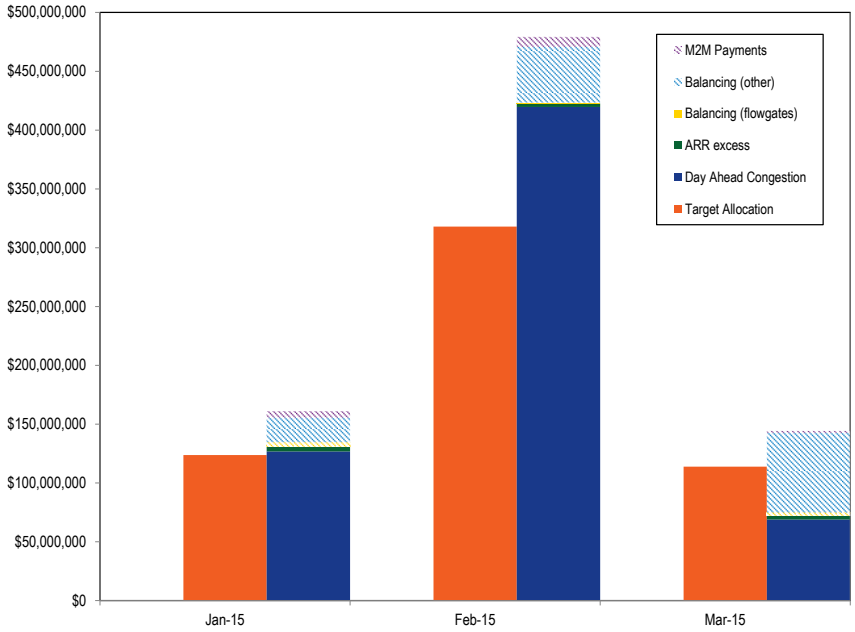


Figure 13-14 shows the relationship among monthly target allocations, balancing congestion, M2M payments and day-ahead congestion. The left column is the target allocations for all FTRs for the month. The total height of the right column is day ahead congestion revenues and the stripes are reductions to total congestion revenues. When the total height of the solid segments in the right column exceeds the height of the left column, the month is revenue adequate. For example, January was revenue adequate. In the first ten months of the 2014 to 2015 planning period, day-ahead congestion exceeded target allocations and offsets were small, resulting in payout ratios over 100 percent. March was revenue inadequate due to a large negative balancing congestion charge, but there was enough excess revenue in other months in the planning period to fully fund the month.

Figure 13-14 FTR target allocation compared to sources of positive and negative congestion revenue



Auction Revenue Rights

ARRs are financial instruments that entitle the holder to receive revenues or to pay charges based on nodal price differences determined in the Annual FTR Auction.[17] These price differences are based on the bid prices of participants in the Annual FTR Auction. The auction clears the set of feasible FTR bids which produce the highest net revenue. ARR revenues are a function of FTR auction participants' expectations of locational congestion price differences and the associated level of revenue adequacy.

ARRs are available only as obligations (not options) and only as the 24-hour product. ARRs are available to the nearest 0.1 MW. The ARR target allocation is equal to the product of the ARR MW and the price difference between sink and source from the Annual FTR Auction. An ARR value can be positive or negative depending on the price difference between sink and source, with a negative difference resulting in a liability for the holder. The ARR target allocation represents the revenue that an ARR holder should receive. ARR credits can be positive or negative and can range from zero to the ARR target allocation. If the combined net revenues from the Long Term, Annual and Monthly Balance of Planning Period FTR Auctions are greater than the sum of all ARR target allocations, ARRs are fully funded. If these revenues are less than the sum of all ARR target allocations, available revenue is proportionally allocated among all ARR holders. If there are excess ARR revenues, the excess revenue is given pro rata to FTR holders.

When a new control zone is integrated into PJM, firm transmission customers in that control zone may choose to receive either an FTR allocation or an ARR allocation before the start of the Annual FTR Auction for two consecutive planning periods following their integration date. After the transition period, such participants receive ARRs from the annual allocation process and are not eligible for directly allocated FTRs. Network Service Users and Firm Transmission Customers cannot choose to receive both an FTR allocation and an ARR allocation. This selection applies to the participant's entire portfolio of ARRs that sink into the new control zone. During this transitional period,

17 These nodal prices are a function of the market participants' annual FTR bids and binding transmission constraints. An optimization algorithm selects the set of feasible FTR bids that produces the most net revenue.

the directly allocated FTRs are reallocated, as load shifts between LSEs within the transmission zone.

Incremental ARRs (IARRs) are allocated to customers that have been assigned cost responsibility for certain upgrades included in the PJM's Regional Transmission Expansion Plan (RTEP). These customers as defined in Schedule 12 of the Tariff are network service customers and/or merchant transmission facility owners that are assigned the cost responsibility for upgrades included in the PJM RTEP. PJM calculates IARRs for each Regionally Assigned Facility and allocates the IARRs, if any are created by the upgrade, to eligible customers based on their percentage of cost responsibility. The customers may choose to decline the IARR allocation during the annual ARR allocation process.[18] Each network service customer within a zone is allocated a share of the IARRs in the zone based on their share of the network service peak load of the zone.

Market Structure

ARRs have been available to network service and firm, point-to-point transmission service customers since June 1, 2003, when the annual ARR allocation was first implemented for the 2003 to 2004 planning period. The initial allocation covered the Mid-Atlantic Region and the AP Control Zone. For the 2006 to 2007 planning period, the choice of ARRs or direct allocation FTRs was available to eligible market participants in the AEP, DAY, DLCO and Dominion control zones. For the 2007 to 2008 and subsequent planning periods through the 2014 to 2015 planning period, all eligible market participants were allocated ARRs.

Supply and Demand

ARR supply is limited by the capability of the transmission system to simultaneously accommodate the set of requested ARRs and the numerous combinations of ARRs that are feasible. The top ten binding transmission constraints for the 2014 to 2015 planning period are shown in Table 13-23.

ARR Allocation

For the 2007 to 2008 planning period, the annual ARR allocation process was revised to include Long Term ARRs that would be in effect for 10 consecutive planning periods.[19] Long Term ARRs can give LSEs the ability to offset their congestion costs on a long-term basis. Long Term ARR holders can self schedule their Long Term ARRs as FTRs for any planning period during the 10 planning period timeline.

Each March, PJM allocates ARRs to eligible customers in a three-stage process:

- **Stage 1A.** In the first stage of the allocation, network transmission service customers can obtain Long Term ARRs, up to their share of the zonal base load, after taking into account generation resources that historically have served load in each control zone and up to 50 percent of their historical nonzone network load. Nonzone network load is load that is located outside of the PJM footprint. Firm, point-to-point transmission service customers can obtain Long Term ARRs, based on up to 50 percent of the MW of long-term, firm, point-to-point transmission service provided between the receipt and delivery points for the historical reference year. Stage 1A ARRs cannot be prorated. If Stage 1A ARRs are found to be infeasible, transmission system upgrades must be undertaken to maintain feasibility.[20] While transmission upgrades are being implemented, Stage 1A ARRs, and therefore FTRs, are overallocated which can lead to revenue inadequacy.
- **Stage 1B.** ARRs unallocated in Stage 1A are available in the Stage 1B allocation for the following planning period. Network transmission service customers can obtain ARRs, up to their share of the zonal peak load, based on generation resources that historically have served load in each control zone and up to 100 percent of their transmission responsibility for nonzone network load. Firm, point-to-point transmission service customers can obtain ARRs based on the MW of long-term, firm, point-to-point service provided between the receipt and delivery points for the historical reference year. These long-term point-to-point service

18 PJM. "Manual 6: Financial Transmission Rights," Revision 15 (October 10, 2013), pp. 31 and "IARRs for RTEP Upgrades Allocated for 2011/2012 Planning Period," <http://www.pjm.com/~/media/markets-ops/ftr/annual-arr-allocation/2011-2012/iarrs-rtep-upgrades-allocated-for-2011-12-planning-period.ashx>.

19 See the *2006 State of the Market Report* (March 8, 2007) for the rules of the annual ARR allocation process for the 2006 to 2007 and prior planning periods.

20 See PJM. "Manual 6: Financial Transmission Rights" Revision 15 (October 10, 2013), p. 22.

agreements must also remain in effect for the planning period covered by the allocation.

- **Stage 2.** Stage 2 of the annual ARR allocation is a three-step procedure, with one-third of the remaining system capability allocated in each step of the process. Network transmission service customers can obtain ARRs from any hub, control zone, generator bus or interface pricing point to any part of their aggregate load in the control zone or load aggregation zone for which an ARR was not allocated in Stage 1A or Stage 1B. Firm, point-to-point transmission service customers can obtain ARRs consistent with their transmission service as in Stage 1A and Stage 1B.

Prior to the start of the Stage 2 annual ARR allocation process, ARR holders can relinquish any portion of their ARRs resulting from the Stage 1A or Stage 1B allocation process, provided that all remaining outstanding ARRs are simultaneously feasible following the return of such ARRs.[21] Participants may seek additional ARRs in the Stage 2 allocation.

Effective for the 2015 to 2016 planning period, when residual zone pricing will be introduced, an ARR will default to sinking at the load settlement point, but the ARR holder may elect to sink their ARR at the physical zone instead.[22]

ARRs can also be traded between LSEs, but these trades must be made before the first round of the Annual FTR Auction. Traded ARRs are effective for the full 12-month planning period.

When ARRs are allocated, all ARRs must be simultaneously feasible to ensure that the physical transmission system can support the approved set of ARRs. In making simultaneous feasibility determinations, PJM utilizes a power flow model of security-constrained dispatch that takes into account generation and transmission facility outages and is based on assumptions about the configuration and availability of transmission capability during the planning period.[23] PJM may also adjust the outages modeled, adjust line limits and account for potential closed loop interfaces to address expected revenue inadequacies. The simultaneous feasibility requirement is necessary to ensure that there are adequate revenues from congestion charges to satisfy all resulting ARR obligations. If the requested set of ARRs is not simultaneously feasible, customers are allocated prorated shares in direct proportion to their requested MW and in inverse proportion to their impact on binding constraints, except Stage 1A ARRs:

Equation 13-1 Calculation of prorated ARRs

Individual prorated MW = (Constraint capability) X (Individual requested MW / Total requested MW) X (1 / MW effect on line).[24]

The effect of an ARR request on a binding constraint is measured using the ARR's power flow distribution factor. An ARR's distribution factor is the percent of each requested MW of ARR that would have a power flow on the binding constraint. The PJM methodology prorates ARR requests in proportion to their MW value and the impact on the binding constraint. PJM's method results in the prorating only of ARRs that cause the greatest flows on the binding constraint. Were all ARR requests prorated equally, regardless of their proportional impact on the binding constraints, the result would be a significant reduction in market participants' ARRs.

Revenue Adequacy and Stage 1B ARR Allocations

For the first ten months of the 2014 to 2015 planning period, revenue adequacy was over 100 percent. The last time there were four months of consecutive funding of 100 percent or more was in the 2009 to 2010 planning period.

One of the main causes of the 2014 to 2015 planning period revenue adequacy was PJM's more conservative treatment of transmission outages in the FTR Auction model, designed to reduce revenue inadequacy, which resulted in a reduction of ARR allocation quantities. For the 2014 to 2015 planning period, Stage 1B and Stage 2 ARR allocations were reduced 84.9 percent and 88.1 percent from the 2013 to 2014 planning period.

21 See PJM. "Manual 6: Financial Transmission Rights," Revision 15 (October 10, 2013), pp. 21.

22 See "Residual Zone Pricing," PJM Presentation to the Members Committee (February 23, 2012) <http://www.pjm.com/~/media/committees-groups/committees/mc/20120223/20120223-item-03-residual-zone-pricing-presentation.ashx> The introduction of residual zone pricing, while approved by PJM members, depends on a FERC order.

23 PJM. "Manual 6: Financial Transmission Rights," Revision 15 (October 10, 2013), pp. 55-56.

24 See the *MMU Technical Reference for PJM Markets*, at "Financial Transmission Rights and Auction Revenue Rights," for an illustration explaining this calculation in greater detail.

PJM's more conservative approach is reflected in the increase in the outages and the inclusion of closed loop interfaces as thermal limits in the ARR and FTR auction model. While the more conservative approach to outages in the Annual FTR Auction reduces revenue inadequacy, which was caused in part by Stage 1A ARR overallocations, it does not address the Stage 1A ARR overallocation issue directly and it resulted in decreased Stage 1B ARR allocations through proration, decreased Stage 2 ARR allocations through proration and decreased FTR capability. Stage 1A ARRs were not affected by the more conservative treatment of outages because they may not be prorated.

Figure 13-15 shows the historic allocations for Stage 1B and Stage 2 ARRs from the 2011 to 2012 to 2014 to 2015 planning periods. There was an 84.9 percent decrease in Stage 1B ARRs allocated and an 88.1 percent decrease in total Stage 2 ARR allocations from the 2013 to 2014 planning period to the 2014 to 2015 planning period.

Figure 13-15 Historic Stage 1B and Stage 2 ARR Allocations from the 2011 to 2012 through 2014 to 2015 planning periods

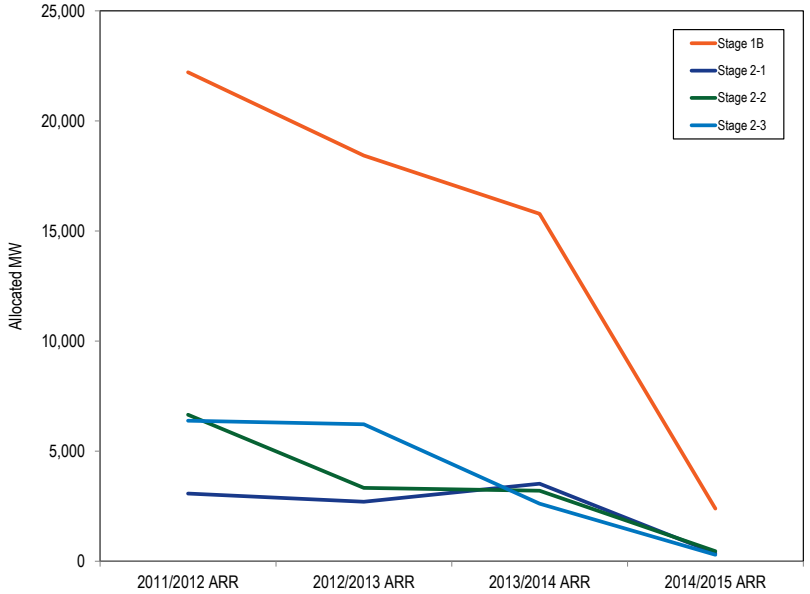


Table 13-22 shows the ARR allocations for the 2011 to 2012 through 2014 to 2015 planning periods. Stage 1A allocations cannot be prorated and have been slowly increasing. Stage 1B and Stage 2 allocations can be prorated. Stage 1B and Stage 2 allocations were steadily declining over the 2011 to 2012 through 2013 to 2014 planning periods, but were very significantly reduced in the 2014 to 2015 planning period as a result of PJM's modified approach to outage modeling designed to increase revenue adequacy.

Table 13-22 Historic Stage 1B and Stage 2 ARR Allocations from the 2011 to 2012 through 2014 to 2015 planning periods

Stage	2011/2012 ARR	2012/2013 ARR	2013/2014 ARR	2014/2015 ARR
Stage 1A	64,159.9	67,299.6	67,861.4	68,837.7
Stage 1B	22,208.3	18,431.7	15,782.0	2,389.6
Stage 2-1	3,072.5	2,700.6	3,519.2	360.9
Stage 2-2	6,652.6	3,334.3	3,200.0	455.9
Stage 2-3	6,382.6	6,218.7	2,611.8	291.2
Total Stage 2	16,107.7	12,253.6	9,331.0	1,108.0

Table 13-23 shows the top 10 principal binding transmission constraints that limited the 2014 to 2015 ARR Stage 1A allocation. PJM was required to increase capability limits for several facilities in order to make the ARR allocation feasible.[25]

Table 13-23 Top 10 principal binding transmission constraints limiting the Annual ARR Allocation: Planning period 2014 to 2015

Constraint	Type	Control Zone
Waterford - Muskingum	Flowgate	MISO
Breed - Wheatland	Flowgate	MISO
Monroe - Bayshore	Flowgate	MISO
Western Interface	Interface	PJM
Loretto - Wilton Center	Flowgate	MISO
Dickerson - Quince Orchard	Line	Pepco
Cedar Grove - Clifton	Line	PSEG
Nelson - Electric Junction	Flowgate	MISO
Marlton - New Freedom	Line	PSEG
Roseland - Whippany	Line	PSEG

25 It is a requirement of Section 7.4.2 (i) in the OATT that any ARR request made in Stage 1A must be feasible and transmission capability must be raised if an ARR request is found to be infeasible.

ARR Reassignment for Retail Load Switching

PJM rules provide that when load switches between LSEs during the planning period, a proportional share of associated ARRs that sink into a given control or load aggregation zone is automatically reassigned to follow that load.[26] ARR reassignment occurs daily only if the LSE losing load has ARRs with a net positive economic value to that control zone. An LSE gaining load in the same control zone is allocated a proportional share of positively valued ARRs within the control zone based on the shifted load. ARRs are reassigned to the nearest 0.001 MW and any MW of load may be reassigned multiple times over a planning period. Residual ARRs are also subject to the rules of ARR reassignment. This practice supports competition by ensuring that the offset to congestion follows load, thereby removing a barrier to competition among LSEs and, by ensuring that only ARRs with a positive value are reassigned, preventing an LSE from assigning poor ARR choices to other LSEs. However, when ARRs are self scheduled as FTRs, these underlying self-scheduled FTRs do not follow load that shifts while the ARRs do follow load that shifts, and this may result in lower value of the ARRs for the receiving LSE compared to the total value held by the original ARR holder.

There were 64,086 MW of ARRs associated with approximately $338,100 of revenue that were reassigned in the 2013 to 2014 planning period. There were 53,270 MW of ARRs associated with approximately $456,100 of revenue that were reassigned for the first ten months of the 2014 to 2015 planning period.

Table 13-24 summarizes ARR MW and associated revenue automatically reassigned for network load in each control zone where changes occurred between June 2013 and March 2015.

Table 13-24 ARRs and ARR revenue automatically reassigned for network load changes by control zone: June 1, 2013, through March 31, 2014

	ARRs Reassigned (MW-day)		ARR Revenue Reassigned [Dollars (Thousands) per MW-day]	
Control Zone	2013/2014 (12 months)	2014/2015 (7 months)*	2013/2014 (12 months)	2014/2015 (7 months)*
AECO	971	515	$2.5	$2.4
AEP	8,006	2,371	$28.8	$34.1
AP	2,618	2,270	$51.7	$48.2
ATSI	6,792	7,853	$8.7	$63.1
BGE	3,672	3,134	$41.9	$49.9
ComEd	9,664	7,967	$69.9	$84.2
DAY	1,100	728	$2.1	$1.0
DEOK	7,568	6,146	$9.5	$11.9
DLCO	5,248	5,730	$11.1	$10.5
DPL	2,740	2,346	$24.6	$28.2
Dominion	5	20	$0.1	$0.3
EKPC	NA	0	NA	$0.0
JCPL	1,519	1,167	$4.5	$8.0
Met-Ed	1,043	957	$6.8	$10.2
PECO	2,883	2,822	$17.3	$25.4
PENELEC	1,265	937	$10.0	$13.6
PPL	3,197	3,759	$12.9	$19.1
PSEG	2,441	1,557	$24.2	$30.5
Pepco	3,134	2,947	$11.6	$15.6
RECO	222	44	$0.0	$0.0
Total	64,086	53,270	$338.1	$456.1

* Through 31-March-2015

Residual ARRs

Only ARR holders that had their Stage 1A or Stage 1B ARRs prorated are eligible to receive residual ARRs. Residual ARRs are available if additional transmission system capability is added during the planning period after the annual ARR allocation. This additional transmission system capability would not have been accounted for in the initial annual ARR allocation, but it enables the creation of residual ARRs. Residual ARRs are effective on the first day of the month in which the additional transmission system capability is included in FTR auctions and exist until the end of the planning period. For the following planning period, any residual ARRs are available as ARRs in the annual ARR allocation. Stage 1 ARR holders have a priority right to

26 See PJM. "Manual 6: Financial Transmission Rights," Revision 15 (October 10, 2013), p. 28.

ARRs. Residual ARRs are a separate product from incremental ARRs. Effective August 1, 2012, residual ARRs are also available for eligible participants when a transmission outage was modeled in the Annual ARR Allocation, but the transmission facility becomes available during the modeled year. Residual ARRs awarded due to outages are effective for single, whole months and cannot be self scheduled. ARR target allocations are based on the clearing prices from FTR obligations in the effective monthly auction, may not exceed zonal network services peak load or firm transmission reservation levels and are only available up to the prorated ARR MW capacity as allocated in the Annual ARR Allocation.

Table 13-25 shows the residual ARRs automatically allocated to eligible participants, along with the target allocations from the effective month. In the first ten months of the 2014 to 2015 planning period planning period, PJM allocated a total of 19,928.0 MW of residual ARRs, up from 10,956.2 MW for the first ten months of the 2013 to 2014 planning period with a total target allocation of $1.3 million for the first three months in 2015, down from $1.8 million for the first three months in 2014. This 81.9 percent increase in volume was a result of the significant reduction in the Annual ARR Stage 1B allocations. Some ARRs that were previously allocated in Stage 1B are now being allocated as Residual ARRs on a month to month basis without the option to self-schedule.

Table 13-25 Residual ARR allocation volume and target allocation: January through March 2015

Month	Bid and Requested Volume (MW)	Cleared Volume (MW)	Cleared Volume	Target Allocation
Jan-15	4,068.7	1,559.2	38.3%	$454,212
Feb-15	3,685.7	1,536.9	41.7%	$492,060
Mar-15	7,930.9	1,735.0	21.9%	$387,576
Total	15,685.3	4,831.1	30.8%	$1,333,847

Market Performance

Volume

Table 13-26 shows the volume of ARR allocations for each round of the 2013 to 2014 and 2014 to 2015 planning periods. The percentage of cleared decreased significantly in the 2014 to 2015 planning period from the prior planning period.

Table 13-26 Annual ARR Allocation volume: planning periods 2013 to 2014 and 2014 to 2015

Planning Period	Stage	Round	Requested Count	Requested Volume (MW)	Cleared Volume (MW)	Cleared Volume	Uncleared Volume (MW)	Uncleared Volume
2013/2014	1A	0	18,022	67,861	67,861	100.0%	0	0.0%
	1B	1	14,227	32,679	15,782	48.3%	16,897	51.7%
	2	2	5,476	22,096	3,519	15.9%	18,577	84.1%
		3	4,128	22,480	3,200	14.2%	19,280	85.8%
		4	3,335	22,348	2,612	11.7%	19,736	88.3%
		Total	12,939	66,924	9,331	13.9%	57,593	86.1%
	Total		45,188	167,464	92,974	55.5%	74,490	44.5%
2014/2015	1A	0	19,287	68,843	68,838	100.0%	5	0.0%
	1B	1	14,235	35,104	2,390	6.8%	32,714	93.2%
	2	2	5,517	27,708	361	1.3%	27,347	98.7%
		3	5,817	27,914	456	1.6%	27,458	98.4%
		4	5,381	27,953	291	1.0%	27,662	99.0%
		Total	16,715	83,575	1,108	1.3%	82,467	98.7%
	Total		50,237	187,522	72,336	38.6%	115,186	61.4%

Stage 1A Infeasibility

Stage 1A ARRs are allocated for a 10 year period, with the ability for a participant to opt out of any planning period. PJM conducts a simultaneous feasibility analysis to determine the transmission upgrades required so that the long term ARRs can remain feasible. If a simultaneous feasibility test violation occurs in any year, PJM will identify or accelerate any transmission upgrades to resolve the violation and these upgrades will be recommended for inclusion in the PJM RTEP process.[27]

27 PJM. "Manual 6: Financial Transmission Rights," Revision 15 (October 10, 2013), p22.

For the 2014 to 2015 planning period, Stage 1A of the Annual ARR Allocation was infeasible. As a result modeled system capability, in excess of actual system capability, was provided to the Stage 1A ARRs and added to the FTR auction. According to Section 7.4.2 (i) of the PJM OATT, the capability limits of the binding constraints rendering these ARRs infeasible must be increased in the model and these increased limits must be used in subsequent ARR and FTR allocations and auctions for the entire planning period, except in the case of extraordinary circumstances. These infeasibilities are due to newly monitored facilities where upgrades could not be planned in advance, facilities not owned by PJM and an overall reduced system capability due to loop flows.

The result of this required increased of capability in the models is an overallocation of both ARRs and FTRs for the entire planning period and an associated reduction in ARR and FTR funding.

Table 13-27 lists the constraints for which ARR requests were found to be infeasible for the 2014 to 2015 ARR Stage 1A Allocation and the MW increase in modeled facility ratings required to make them feasible. In addition, the reason for infeasibility is provided, whether it is an increase in network load or transmission outages in the simultaneous feasibility test.

Table 13-27 Constraints with capacity increases due to Stage 1A infeasibility for the 2014 to 2015 ARR Allocation

Constraint	Contingency	Type	Zone	MW Increase	Reason
Breed - Wheatland	Rockport-Jefferson	Flowgate	MISO	329	Load
Loretto - Wilton Center	Pontiac-Dresden	Flowgate	MISO	230	Load
Nelson - Electric Junction	Cherry Valley-Silver Lake	Flowgate	MISO	204	Load
Marengo Tap - Pleasant Valley	Cherry Valley-Silver Lake	Flowgate	MISO	159	Load
Babcock - Stillwell	Wilton Center-Dumont	Flowgate	MISO	148	Load
Pleasant Prairie - Zion	Pleasant Prairie-Zion	Flowgate	MISO	121	Load
Cordova - Nelson	Nelson	Flowgate	MISO	120	Load
Byron - Cherry Valley	Byron - Cherry Valley	Line	ComEd	83	Outages
Woodstock	Cherry Valley-Silver Lake	Flowgate	MISO	75	Load
Oakgrove - Galesburg	Nelson-Electric Junction	Flowgate	MISO	69	Load
Galesburg	Electric Junction-Nelson	Flowgate	MISO	68	Load
Nelson	Nelson-Electric Junction	Flowgate	MISO	61	Load
Butler - Karns City	BASE	Line	AP	59	Outages
Burr Oak - Plymouth	Burr Oak-Lessburg	Flowgate	MISO	56	Load
Oakgrove - Galesburg	Cordova-Nelson	Flowgate	MISO	56	Load
Athenia - Bellville	BASE	Line	PSEG	55	Outages
East Akron - Knox	BASE	Line	ATSI	52	Outages
Belvidere	Cherry Valley-Silver Lake	Flowgate	MISO	52	Load
Oakgrove - Galesburg	Sterling-Nelson	Flowgate	MISO	52	Load
Kewanee - Edwards	Duck Creek-Tazewell	Flowgate	MISO	44	Load
Kewanee - Edwards	Nelson-Electric Junction	Flowgate	MISO	38	Load
Paddock - Townline	Paddock-Blackhawk	Flowgate	MISO	33	Load
Cedar Grove - Clifton	Cedar Grove-Clifton-Athenia	Line	PSEG	32	Load
Bremo - Buckingham	Carson-Clover	Line	Dominion	31	Outages
Athenia - Clifton	Cedar Grove-Clifton-Athenia	Line	PSEG	31	Load
Butler - Karns City	Handsome Lake-Homer City	Line	AP	30	Outages
Church - Townsend	Cedar Creek-Red Lion	Line	DPL	25	Outages
Babb - Evans	Hanna-Juniper	Line	ATSI	22	Outages
Monticello-East Winamac	Schahfer-Burr Oak	Flowgate	MISO	21	Load
Athenia - Bellville	Hillsdale-Waldwick	Line	PSEG	19	Outages
Beaver Channel - Albany	Rock Creek-Salem	Flowgate	MISO	19	Load
Belleville - Penhorn Tap	Hillsdale-Waldwick	Line	PSEG	18	Outages
Mazon - La Salle	Braidwood - E. Frankfort	Line	ComEd	16	Outages
Mazon - Dresden	Braidwood - E. Frankfort	Line	ComEd	15	Outages
Church - New Meredith	Cedar Creek-Red Lion	Line	DPL	14	Outages
Lakeview	Carson-Clover	Transformer	ATSI	14	Outages
East Akron - Knox	Sammis-Star	Line	ATSI	12	Outages
Athenia - East Rutherford	Hudson-Penhorn-Belville	Line	PSEG	11	Outages
Kammer	Muskingham River-Kammer	Transformer	AEP	10	Outages
Rantoul - Rantoul Junction	N. Champaign-Mahomet-Rising	Flowgate	MISO	10	Load
Otter - Alta Vista	Cloverdale	Line	Dominion	8	Outages
Middletown Junction	Middletown Junction #5	Transformer	MetEd	7	Outages
Dixon - Stillman Valley	Nelson - Electric Junction	Line	ComEd	7	Load
Babb - Evans	BASE	Line	ATSI	6	Outages
Michigan City - Laporte	Wilton Center	Flowgate	MISO	6	Load
Alta Vista	Altavista	Transformer	Dominion	4	Outages
Mazon	Pontiac-Brokaw	Flowgate	MISO	3	Outages
Hudson - Penhorn	BASE	Line	PSEG	2	Outages

Revenue

ARRs are allocated to qualifying customers rather than sold, so there is no ARR revenue comparable to the revenue that results from the FTR auctions.

Revenue Adequacy

As with FTRs, revenue adequacy for ARRs must be distinguished from the adequacy of ARRs as an offset to total congestion. Revenue adequacy is a narrower concept that compares the revenues available to ARR holders to the value of ARRs as determined in the Annual FTR Auction. ARRs have been revenue adequate for every auction to date. Customers that self schedule ARRs as FTRs have the same revenue adequacy characteristics as all other FTRs.

The adequacy of ARRs as an offset to total congestion compares ARR revenues to total congestion sinking in the participant's load zone as a measure of the extent to which ARRs offset market participants' actual, total congestion into their zone. Customers that self schedule ARRs as FTRs provide the same offset to congestion as all other FTRs.

ARR holders received a projected $765.9 million in credits from the FTR auctions during the first ten months of the 2014 to 2015 planning period. The FTR auction revenue collected pays ARR holders' credits. During the first ten months of the 2014 to 2015 planning period, ARR holders received $735.0 million in ARR credits.

Table 13-28 lists projected ARR target allocations from the Annual ARR Allocation, and net revenue sources from the Annual and Monthly Balance of Planning Period FTR Auctions for the 2013 to 2014 planning period and the 2014 to 2015 planning periods. As seen here, due to decreased FTR volume leading to increased FTR nodal prices, auction revenue increased 34.7 percent while projected ARR target allocations increased 45.0 percent from the previous planning period.

Table 13-28 Projected ARR revenue adequacy (Dollars (Millions)): Planning periods 2013 to 2014 and 2014 to 2015

	2013/2014	2014/2015
Total FTR auction net revenue	$568.8	$765.9
Annual FTR Auction net revenue	$558.4	$748.6
Monthly Balance of Planning Period FTR Auction net revenue*	$10.4	$17.3
ARR target allocations	$506.2	$735.0
ARR credits	$506.2	$735.0
Surplus auction revenue	$62.6	$30.9
ARR payout ratio	100%	100%
FTR payout ratio*	72.8%	100.0%

* Shows twelve months for 2013/2014 and ten months for 2014/2015.

Figure 13-16 shows the dollars per ARR MW held for each month of the 2010 to 2011 through 2014 to 2015 planning periods. The ARR MW held do not include self scheduled FTRs and do include Residual ARRs starting in August 2012. FTR prices in the 2014 to 2015 Annual FTR Auction as a result of reduced supply caused by a more conservative model used to allocate Stage 1B and Stage 2 ARRs. The increased FTR prices result in an increase in dollars paid per ARR MW. For the first ten months of the 2014 to 2015 planning period, the total dollars per MW of ARR allocation was $9,786, while the first ten months of the previous planning period resulted in a dollars per MW of $5,569, a 75.7 percent increase in payment per allocated ARR MW. Some of the ARR MW lost from proration were provided in the Residual ARR process, but the residual allocations are not comparable to the ARRs awarded in the annual process because residual ARR allocations change each month and cannot be self scheduled as FTRs.

Figure 13-16 Dollars per ARR MW paid to ARR holders: Planning periods 2010 to 2011 through 2014 to 2015

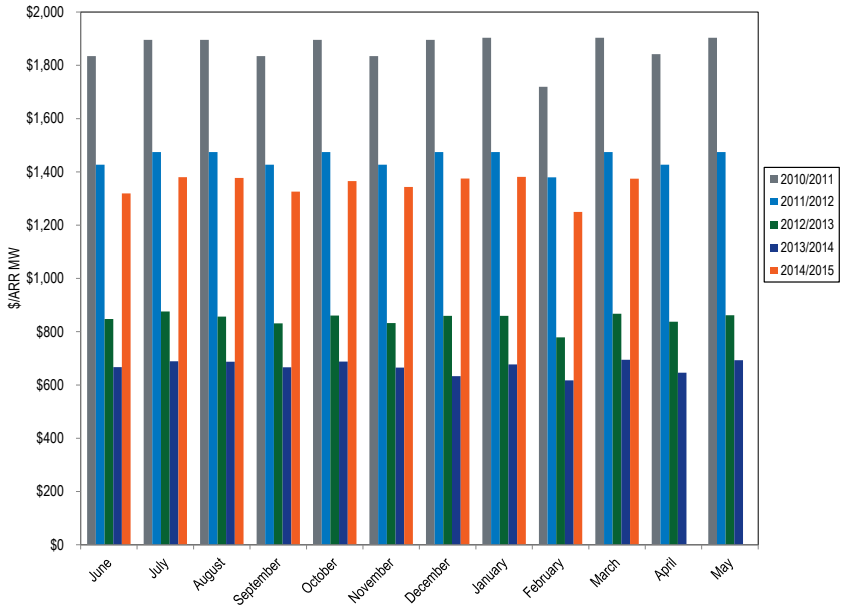
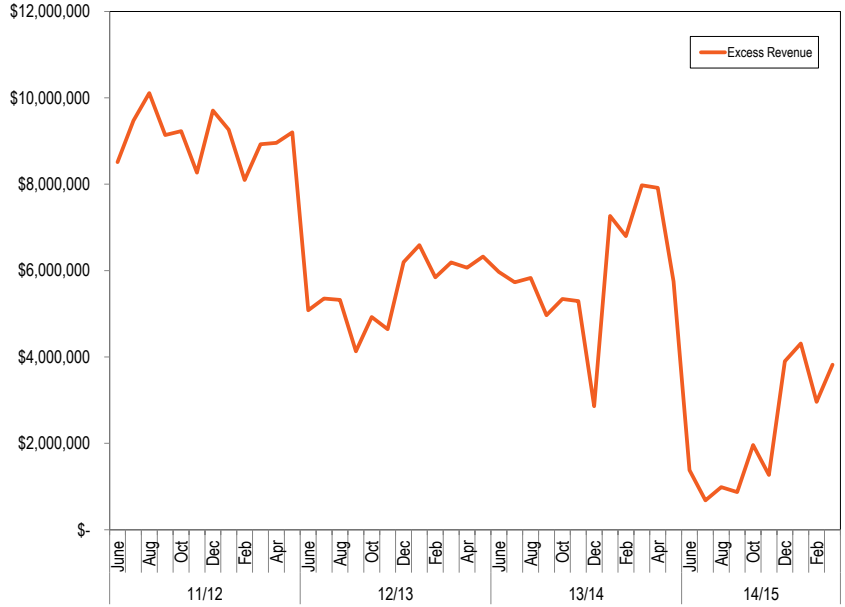


Figure 13-17 Excess ARR revenue: Planning periods 2011 to 2012 through 2014 to 2015



Excess ARR Revenue

Excess ARR revenue is the revenue collected each month from FTR auctions in excess of ARR target allocations after PJM's implemented counter flow FTR clearing process (Figure 13-17). Beginning with the 2014 to 2015 planning period, market rules allow PJM to lower facility limits by clearing counter flow FTRs, without making the opposite prevailing flow FTR available, as long as ARRs remain revenue adequate. This allows PJM to use the excess ARR revenue to pay prevailing flow FTRs without increasing prevailing flow obligations. This action removes money from the excess ARR revenue stream and caused the large decrease in excess ARR revenue beginning in June 2014. Currently excess ARR revenue is allocated pro rata to FTR holders.

ARR and FTR Revenue and Congestion

Effectiveness of ARRs as an Offset to Congestion

One measure of the effectiveness of ARRs as an offset to congestion is a comparison of the revenue received by the holders of ARRs and the congestion paid by the holders of ARRs in both the Day-Ahead Energy Market and the balancing energy market. The revenue which serves as an offset for ARR holders comes from the FTR auctions while the revenue for FTR holders is provided by the congestion payments from the Day-Ahead Energy Market and the balancing energy market. During the first ten months of the 2014 to 2015 planning period, the total revenues received by the holders of all ARRs and FTRs offset 88.5 percent of the total congestion costs within PJM.

The comparison between the revenue received by ARR holders and the actual congestion experienced by these ARR holders in the Day-Ahead Energy Market and the balancing energy market is presented in Table 13-29. Total revenue equals the ARR credits and the FTR credits from ARRs which are self scheduled as FTRs. The ARR credits do not include the ARR credits for the portion of any ARR that was self scheduled as an FTR since ARR holders purchase self-scheduled FTRs in the Annual FTR Auction and that revenue is then paid back to the ARR holders, netting the transaction to zero. ARR credits are calculated as the product of the ARR MW (excludes any self-scheduled FTR MW) and the cleared price for the ARR path from the Annual FTR Auction.

FTR credits equal FTR target allocations adjusted by the FTR payout ratio. The FTR target allocation is equal to the product of the FTR MW and the congestion price differences between sink and source that occur in the Day-Ahead Energy Market. FTR credits are paid to FTR holders and may be less than the target allocation. The FTR payout ratio was 100 percent of the target allocation for the first ten months of the 2014 to 2015 planning period. The target allocation is not a guarantee of payment nor does it reflect congestion incurred on a particular FTR path. The target allocation is used to set a cap on path specific FTR payouts.

ARRs served as an effective offset against congestion. The total revenues received by ARR holders, including self-scheduled FTRs, offset 100 percent of the total congestion costs experienced by these ARR holders in the Day-Ahead Energy Market and the balancing energy market for the first ten months of the 2014 to 2015 planning period and for the 2013 to 2014 planning period.

The Congestion column shows the amount of congestion from the Day-Ahead Energy Market and the balancing energy market and includes only the congestion costs incurred by the organizations that hold ARRs or self-scheduled FTRs. The last column shows the difference between the total revenue and congestion collected.

Table 13-29 shows the total offset due to ARRs and self-scheduled FTRs for the entire 2013 to 2014 and the first ten months of the 2014 to 2015 planning periods. ARRs and self-scheduled FTRs served as an effective offset against congestion. ARR and self-scheduled FTR revenues offset greater than 100 percent of the total congestion costs incurred by ARR holders for both the 2013 to 2014 and first ten months of the 2014 to 2015 planning periods.

Table 13-29 ARR and self-scheduled FTR congestion offset (in millions): Planning periods 2013 to 2014 and 2014 to 2015

Planning Period	ARR Credits	Self-Scheduled FTR Credits	Total Revenue	Congestion	Total Revenue - Congestion Difference	Percent Offset
2013/2014	$336.2	$88.7	$424.9	$22.1	$432.2	>100%
2014/2015*	$480.1	$278.9	$759.0	$171.0	$588.0	>100%

* Shows first ten months through March 31, 2015

Effectiveness of ARRs and FTRs as an Offset to Congestion

Table 13-30 compares the revenue for ARR and FTR holders and the congestion in both the Day-Ahead Energy Market and the balancing energy market for the first ten months of the 2014 to 2015 planning period. This compares the total offset provided by all ARRs and all FTRs to the total congestion costs. ARR credits are calculated as the product of the ARR MW and the cleared price of the ARR path from the Annual FTR Auction. The "FTR Credits" column represents the total FTR target allocation for FTRs from the Long Term FTR Auction, Annual FTR Auction, the Monthly Balance of Planning Period FTR Auctions, and any FTRs that were self scheduled from ARRs, adjusted by the FTR payout ratio. The FTR target allocation is equal to the product of the FTR MW and congestion price differences between sink and source that occur in the Day-Ahead Energy Market. FTR credits are the product of the FTR target allocations and the FTR payout ratio. The FTR payout ratio was 100 percent of the target allocation for the first ten months of the 2014 to 2015 planning period. The "FTR Auction Revenue" column shows the amount paid for FTRs from the Long Term FTR Auction, the Annual FTR Auction, the Monthly Balance of Planning Period FTR Auctions and any ARRs that were self scheduled as FTRs. ARR holders that self schedule FTRs purchased the FTRs in the Annual FTR Auction and that revenue was then paid back to those ARR holders through ARR credits on a monthly basis throughout the planning period, ultimately netting the transaction to zero. The total ARR

and FTR offset is the sum of the ARR credits and the FTR credits minus the FTR auction revenue. The "Congestion" column shows the total amount of congestion in the Day-Ahead Energy Market and the balancing energy market.The last column shows the difference between the total ARR and FTR offset and the congestion cost.

Table 13-30 shows the total offset due to ARRs and FTRs for the entire 2013 to 2014 and the first ten months of the 2014 to 2015 planning periods. ARRs and FTRs served as an effective, but not total, offset against congestion. ARR and FTR revenues offset 88.5 percent of the total congestion costs in the Day-Ahead Energy Market and the balancing energy market within PJM for the first ten months of the 2014 to 2015 planning period. In the 2013 to 2014 planning period, total ARR and FTR revenues offset 98.2 percent of the congestion costs.

Table 13-30 ARR and FTR congestion offset (in millions): Planning periods 2013 to 2014 and 2014 to 2015[28]

Planning Period	ARR Credits	FTR Credits	FTR Auction Revenue	Total ARR and FTR Offset	Congestion	Total Offset - Congestion Difference	Percent Offset
2013/2014	$522.3	$1,814.9	$598.8	$1,738.3	$1,771.0	($32.7)	98.2%
2014/2015*	$761.1	$1,103.9	$792.9	$1,072.1	$1,211.2	($139.1)	88.5%

* Shows first ten months through March 31, 2015

28 The FTR credits do not include after-the-fact adjustments. For the 2013 to 2014 planning period, the ARR credits were the total credits allocated to all ARR of this planning period, and the FTR Auction Revenue includes the net revenue in the Monthly Balance of Planning Period FTR Auctions for the planning period and the portion of Annual FTR Auction revenue distributed to the entire planning period.