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 received the low cost generation.

After the introduction of LMP markets, financial transmission rights (FTRs) were introduced to permit 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 congestion 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] Congestion is defined to be load payments in excess of generation revenues. Congestion 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, or an equivalent mechanism, to pay back to load the difference between the total load payments and the total generation revenues. 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 ensure that all congestion revenues are returned to load. Congestion revenues are defined to be equal to the sum of day ahead and balancing congestion. FTRs are one way to do that.

Effective April 1, 1999, FTRs were introduced with the LMP market, there was a real-time market but no day-ahead market, and FTRs returned real-time congestion revenue to load. Effective June 1, 2000, the day-ahead market was introduced and FTRs returned total congestion including day-ahead and balancing congestion to load. Effective June 1, 2003, PJM replaced the direct allocation of FTRs to load with an allocation of Auction Revenue Rights (ARRs). The load still owns the rights to congestion collected under this system, but the ARR construct allows load to either claim the FTRs directly (through a process called self scheduling), or to sell the rights in the FTR auction in exchange for a revenue stream based on the prices of the FTRs. Under the ARR construct, all of the FTR auction revenues should belong to the load and all of the congestion revenues should belong to those that purchase or self schedule the FTRs.

The current ARR/FTR design does not serve as an efficient way to ensure that load receives all the congestion revenues or has the ability to receive the auction revenues associated with all the potential congestion revenues. Total ARR and self scheduled FTR revenue offset only 86.5 percent of total congestion costs including congestion in the Day-Ahead Energy Market and the balancing energy market for the 2015/2016 planning period. One of the reasons for this inefficiency is the link, established by PJM member companies in their initial FTR filings prior to the opening of the PJM market, between congestion revenues and specific generation to load transmission paths. The original filings, made before PJM members had any experience with LMP markets, retained the view of congestion rooted in physical transmission rights. In an effort to protect themselves, the PJM utilities linked the payment of FTRs to specific, physical contract paths from specific generating units to specific load zones. That linkage was inconsistent with the appropriate functioning of FTRs in a nodal, network system with locational marginal pricing. The ARR allocation in 2015 continued to be based on those original physical generation to load paths, an illustration of the inadequacy of that approach and a source of the issues with the FTR model in 2015.

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

On September 15, 2016, FERC ordered PJM to address the allocation of congestion credits in the FTR market, portfolio netting within the FTR market and the use of historical resources for the Annual ARR allocation process.[3] PJM made a compliance filing on November 14, 2016, outlining their plans to address these issues.[4] Under the order, PJM will allocate the costs of balancing congestion and market-to-market payments to load and exports. PJM will allocate all excess congestion revenue from the day-ahead market to FTR holders. PJM will allocate excess auction revenue, which is what FTR holders were willing to pay for FTRs in excess of what is provided to ARR holders, to FTR holders. FERC ordered the continued use of portfolio netting with the corresponding cross subsidies among participants in the FTR market. FERC directed PJM to replace generation to load paths based on retired generation with generation to load paths based on existing generation resources.

If the original PJM FTR design had been designed to return congestion revenues to load without use of the generation to load paths, many of the subsequent issues with the FTR design would have been avoided. Now is a good time to address the issues of the FTR design and to return the design to its original purpose. This would eliminate much of the complexity associated with ARRs and FTRs and eliminate unnecessary controversy about the appropriate recipients of congestion revenues.

The *2017 Quarterly State of the Market Report for PJM: January through June* focuses on the 2016/2017 Monthly Balance of Planning Period FTR Auctions for the 2015/2016 and 2016/2017 planning periods, covering January 1, 2017, through June 30, 2017.

Table 13-1 The FTR Auction Markets results were competitive

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

3 See 156 FERC ¶ 61,180 (2016).
4 See Compliance Filing concerning Modifications to ARR and FTR Provisions, Docket No. EL16-6 (November 14, 2016).

- 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. But it is not clear, in a competitive market, why the ownership structure of Long Term FTRs is so highly concentrated.
- 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. But it is not clear, in a competitive market, why FTR purchases by financial entities remain persistently profitable.
- Market design was evaluated as flawed because there are significant flaws with the basic ARR/FTR design. The market design is not an efficient way to ensure that all congestion revenues are returned to load.

Overview

Auction Revenue Rights

Market Structure

- **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, are only effective for single, whole months and cannot be self scheduled. Residual ARR clearing prices are based on monthly FTR auction clearing prices. Residual ARRs with negative target allocations are not allocated to participants. Instead they are removed and the model is rerun until a minimum of negative target allocation residual ARRs are found.

  In the 2016/2017 planning period, PJM allocated a total of 35,034.9 MW of residual ARRs, up from 30,118.1 MW in the 2015/2016 planning period, with a total target allocation of $7.0 million for the 2016/2017 planning period, down from $7.7 million for the 2015/2016 planning period.

- **ARR Reassignment for Retail Load Switching.** There were 455,638 MW of ARRs associated with $659,000 of revenue that were reassigned in 2015/2016 planning period. There were 44,056 MW of ARRs associated with $492,500 of revenue that were reassigned for the 2016/2017 planning period.

Market Performance

- **Revenue Adequacy.** For the 2016/2017 planning period, the ARR target allocations, which are based on the nodal price differences from the Annual FTR Auction, were $914.2 million, while PJM collected $941.5 million from the combined Long Term, Annual and Monthly Balance of Planning Period FTR Auctions, making ARRs revenue adequate. For the 2015/2016 planning period, the ARR target allocations were $931.6 million while PJM collected $968.1 million from the combined Long Term, Annual and Monthly Balance of Planning Period FTR Auctions. The year over year decrease in ARR target allocations and auction revenue is a result of decreased prices from the previous planning period resulting from continued reduced allocation of Stage 1B and Stage 2 ARRs. ARR revenue adequacy is also affected by PJM's clearing of additional counter flow FTRs to alleviate infeasibilities from Stage 1A.

- **ARRs as an Offset to Congestion.** ARRs did not serve as an effective way to return congestion revenues to load. Total ARR and self scheduled FTR revenue offset only 63.8 percent of total congestion costs, which include congestion in the Day-Ahead Energy Market and the balancing energy market, for the 2014/2015 planning period. In the 2016/2017 planning period, total ARR and self scheduled FTR revenues offset 98.1 percent of total congestion costs. The total offset for the last six planning periods is 73.3 percent. The goal of the design should be to return 100 percent of the congestion revenues to the load.

Financial Transmission Rights

Market Structure

- **Supply.** The principal binding constraints limiting the supply of FTRs in the 2017/2020 Long Term FTR Auction include the St. John's Transformer in Dominion and the Elliott-Rosewood Line in AEP. The principal binding constraints limiting the supply of FTRs in the Annual FTR Auction for the 2017/2018 planning period include the Bunsonville Flowgate in MISO and the Silver Lake-Silver Lake Line in ComEd.

  Market participants can sell FTRs. In the 2017/2020 Long Term FTR Auction, total participant FTR sell offers were 208,405 MW, down from 327,980 in the 2016/2017 Long Term FTR Auction. In the 2017/2018 Annual FTR Auction, total participant sell offers were 276,844 MW, down from 378,431 MW in the 2016/2017 Annual FTR Auction. In the Monthly Balance of Planning Period FTR Auctions for the 2016/2017 planning period, total participant FTR sell offers were 4,342,320 MW, down from 4,891,443 MW for the same period during the 2015/2016 planning period.

- **Demand.** In the 2017/2020 Long Term FTR Auction, total FTR buy bids were 2,176,871 MW, down 11.5 percent from 2,459,946 MW the previous planning period. There were 2,306,063 MW of buy and self scheduled bids in the 2017/2018 Annual FTR Auction, down 11.0 percent from 2,592,183 MW the previous planning period. The total FTR buy bids from the Monthly Balance of Planning Period FTR Auctions for the 2016/2017 planning period decreased 21.6 percent from 25,686,865 MW for the same time period of the prior planning period, to 20,144,884 MW.

- **Patterns of Ownership.** For the 2017/2020 Long Term FTR Auction, financial entities purchased 77.5 percent of prevailing flow FTRs and 84.9 percent of counter flow FTRs. For the 2017/2018 Annual FTR Auction, financial participants purchased 60.1 percent of all prevailing flow FTRs and 76.7 percent of all counter flow FTRs. For the Monthly Balance of Planning Period Auctions, financial entities purchased 74.9 percent of prevailing flow and 82.6 percent of counter flow FTRs January through June of 2017. Financial entities owned 64.8 percent of all prevailing and counter flow FTRs, including 55.4 percent of all prevailing flow FTRs and

77.5 percent of all counter flow FTRs during the period from January through June 2017.

Market Behavior

- **FTR Forfeitures.** FTR forfeitures were not billed after January 19, 2017, pending retroactive implementation of a new FTR forfeiture rule.
- **Credit Issues.** There were no defaults in the first six months of 2017.

Market Performance

- **Volume.** The 2017/2020 Long Term FTR Auction cleared 297,083 MW (13.6 percent) of demand of FTR buy bids, up 7.1 percent from 277,397 MW (11.3 percent) in the 2016/2019 Long Term FTR Auction. The Long Term FTR Auction also cleared 36,782 MW (17.6 percent) of FTR sell offers, compared to 61,210 (18.7 percent), a 40.0 percent decrease.
- In the Annual FTR Auction for the 2017/2018 planning period 513,263 MW (22.3 percent) of buy and self-schedule bids cleared, up 22.1 percent from 420,198 MW (16.2 percent) for the previous planning period. In the 2016/2017 planning period Monthly Balance of Planning Period FTR Auctions cleared 2,311,996 MW (11.5 percent) of FTR buy bids and 1,004,662 MW (23.1 percent) of FTR sell offers cleared.
- **Price.** The weighted-average buy-bid FTR price in the 2017/2020 Long Term FTR Auction was $0.04 per MW, down from $0.05 per MW for the 2016/2019 planning period. The weighted-average buy-bid FTR price in the Annual FTR Auction for the 2017/2018 planning period was $0.51 per MW, up from $0.49 per MW in the 2016/2017 planning period. The weighted average buy bid cleared FTR price in the Monthly Balance of Planning Period FTR Auctions for 2016/2017 planning period was $0.12, unchanged from $0.21 per MW for the same period in the 2015/2016 planning period.
- **Revenue.** The 2017/2020 Long Term FTR Auction generated $26.7 million of net revenue for all FTRs, up from $23.2 million for the 2016/2019 Long Term FTR Auction. The 2017/2018 Annual FTR Auction generated $542.2 million in net revenue, down from $909.0 million for the 2016/2017 Annual FTR Auction. The Monthly Balance of Planning Period FTR Auctions generated $32.5 million in net revenue for all FTRs for the 2016/2017 planning period, up from $31.8 million for the same time period in the 2015/2016 planning period.
- **Revenue Adequacy.** FTRs were paid at 100 percent of the target allocation level for the 2016/2017 planning period. This high level of revenue adequacy was primarily a result of actions taken by PJM to reduce the level of available ARRs and FTRs. PJM’s actions included PJM’s decision to include more outages and PJM’s decision to include additional constraints (closed loop interfaces) in the model, both of which reduced system capability in the FTR auction model. PJM’s actions led to a significant reduction in the allocation of Stage 1B and Stage 2 ARRs.
- **Profitability.** FTR profitability is the difference between the revenue received for an FTR and the cost of the FTR. In the 2016/2017 planning period, physical entities made $39.7 million in profits, largely due to self scheduled FTRs, and financial entities lost $13.5 million. Revenues from self scheduled FTRs are more accurately described as a return of congestion rather than profits.

Markets Timeline

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

Table 13-2 shows the date of first availability and final closing date for all annual ARR and FTR products.

Table 13-2 Annual FTR product dates

Auction	Initial Open Date	Final Close Date
2017/2020 Long Term	6/2/2017	12/12/2017
2016/2017 ARR	2/27/2017	3/31/2017
2016/2017 Annual	4/4/2017	5/1/2017

Recommendations

- The MMU recommends that the ARR/FTR design be modified to ensure that the rights to all congestion revenues are assigned to load. (Priority: High. First reported 2015. Status: Not adopted.)
- The MMU recommends that all FTR auction revenue be distributed to ARR holders. (Priority: High. First reported 2015. Status: Not adopted.)
- The MMU recommends that FTR auction revenues not be used to buy counter flow FTRs for the purpose of improving FTR payout ratios.[5] (Priority: High. First reported 2015. Status: Not adopted.)
- The MMU recommends that all historical generation to load paths be eliminated as a basis for allocating ARRs. (Priority: High. First reported 2015. Status: Not adopted.)
- The MMU recommends that counter flow FTRs be eliminated. (Priority: High. First reported 2015. Status: Not adopted.)
- The MMU recommends that PJM eliminate portfolio netting to eliminate cross subsidies among FTR market participants. (Priority: High. First reported 2012. Status: Not adopted.)
- 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 2012. Status: Not adopted.)
- The MMU recommends that PJM eliminate geographic cross subsidies. (Priority: High. First reported 2013. Status: Not adopted.)
- 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 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: Adopted.)
- The MMU recommends that PJM examine the mechanism by which self scheduled FTRs are allocated when load switching among LSEs occurs throughout the planning period. (Priority: Low. First reported 2011. Status: Not adopted.)
- The MMU recommends that PJM improve transmission outage modeling in the FTR auction models. (Priority: Low. First reported 2013. Status: Not adopted, 2014/2015 planning period.)
- 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, 2014/2015 planning period.)
- The MMU recommends that PJM report correct monthly payout ratios to reduce understatement of payout ratios on a monthly basis. (Priority: Low. First reported 2012. Status: Adopted 2016.)
- The MMU recommends that Long Term FTRs be modified to include only a one year ahead FTR. (Priority: High. New recommendation. Status: Not adopted.)

Conclusion

The annual ARR allocation should be designed to ensure that the rights to all congestion revenues are assigned to firm transmission service customers, without requiring contract path physical transmission rights that are impossible to define and enforce in LMP markets. The fixed charges paid for firm transmission services result in the transmission system which provides physically firm transmission service which results in load paying congestion revenues.

After the introduction of LMP markets, financial transmission rights (FTRs) permitted the loads which pay for the transmission system to continue to receive the benefits of firm low cost generation delivered using the transmission system in the form of revenues which offset congestion. Financial transmission rights and the associated revenues were directly provided to loads in recognition of the fact that loads pay for the transmission system which permits low cost

5 See "PJM Manual 6: Financial Transmission Rights," Rev. 17 (June 1, 2016) at 55.

generation to be delivered to load and loads pay congestion. 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 congestion revenues 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, which equals total congestion revenues.

With the creation of ARRs, FTRs no longer serve their original function of providing firm transmission customers 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.

As a result of the creation of ARRs and other changes to the design, the current ARR/FTR design does not serve as an efficient way to ensure that load receives the rights to all the congestion revenues and has the ability to receive the auction revenues associated with all the potential congestion revenues. Total ARR and self scheduled FTR revenue offset only 63.8 percent of total congestion costs including congestion in the Day-Ahead Energy Market and the balancing energy market for the 2014/2015 planning period. For the 2015/2016 planning period, ARRs and self scheduled FTRs offset 86.5 percent of total congestion costs. For the 2016/2017 planning period, ARRs and self scheduled FTRs offset 98.1 percent of total congestion costs.

Load should never be required to subsidize payments to FTR holders, regardless of the reason. Such subsidies have been suggested repeatedly.[6] 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 and that congestion is defined, in an accounting sense, to equal the sum of 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 and result in profits to FTR holders.

The Commission's order will shift substantial revenue from load to the holders of FTRs and reduce the ability of load to offset congestion. If these rules had been in place for the 2016/2017 planning period, and ARR/FTR allocations had remained constant, ARR holders would have gone from an offset of 98.1 percent under the current rule, to 89.5 percent under the new rule, a loss of $81.4 million. FTR holders would have received a corresponding windfall and revenues to FTR holder would have exceeded target allocations by $179.0 million.

If these rules had been in place beginning with the 2011/2012 planning period, ARR holders would have received $1,034.2 million less in congestion offsets from the 2011/2012 through the 2016/2017 planning period. The total overpayment to FTR holders for the 2011/2012 through 2016/2017 planning period would have been $944.4 million. The underpayment to load and the overpayment to FTR holders is a result of several factors in the new rules all of which mean the transfer of revenues to FTR holders and the shifting of costs to load. Load is now required to pay for balancing congestion, which significantly increases costs to load and significantly increases revenues paid to FTR holders. PJM will continue to clear counter flow FTRs using excess auction revenues in order to make it possible to sell more prevailing flow FTRs. FTR holders will receive excess day-ahead congestion revenues in excess of target allocations. FTR holders will receive excess auction revenue, which is what FTR holders were willing to pay for FTRs in excess of what is provided to ARR holders.

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

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 even when defined correctly. Load does have those rights based on load's payment for the transmission system and load's payment of total congestion.

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 balancing congestion which is the other part of total congestion. FTR holders appropriately receive revenues based on actual congestion in both day-ahead and balancing markets. When day-ahead congestion differs significantly from balancing congestion, as has occurred only in recent years, 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 markets. Such differences are not an indication that FTR holders are under paid.

PJM used a more conservative approach to modeling the transmission capability for the 2014/2015 through 2016/2017 planning periods compared to the 2013/2014 planning period. PJM simply used higher outage levels and included additional constraints, both of which reduced system capability in the FTR auction model. 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. For the 2017/2018 planning period PJM assigned all balancing congestion and M2M payments to load and exports. As a result, PJM also reversed course and increased the availability of Stage 1B and Stage 2 FTRs. The market response to the increased supply of FTRs was lower bid prices and clearing prices.

Clearing prices fell and cleared quantities increased from the 2010/2011 planning period through the 2013/2014 planning period. The market response to lower revenue adequacy was to reduce bid prices and to increase bid volumes and offer volumes. In the 2014/2015, 2015/2016 and 2016/2017 planning periods, due to reduced ARR allocations, FTR volume decreased relative to the 2013/2014 planning period. The reduction in ARR allocations and resulting FTR volume caused, by definition, an improvement in revenue adequacy, and also resulted in an increase in the prices of FTRs. Increased FTR prices resulted in increased ARR target allocations, because ARR target allocations are based on the Annual FTR Auction nodal prices.

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 2013/2014 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 2013/2014 planning period from the reported 72.8 percent to 91.0 percent. For the 2014/2015, 2015/2016 and 2016/2017 planning periods the payout ratio was 100 percent. The MMU recommends that counter flow and prevailing flow FTRs 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. The origin and basis for the requirement to assign Stage 1A ARRs needs further investigation. The issues associated with over allocation are based on the use of out of date generation to load ARR paths and on whether PJM has appropriately built transmission to meet the requirement.

The MMU recommends that the basis for the Stage 1A assignments be reviewed and made explicit, that the role of out of date generation to load paths be reviewed and that the building of the transmission capability required to provide all defined Stage 1A allocations be reviewed. There is a reason that transmission is not built to address the Stage 1A overallocation issue. PJM's transmission planning process (RTEP) does not identify a need for new transmission because there is, in fact, no need for new transmission associated with Stage 1A ARRs. The Stage 1A overallocation issue is a fiction based on the use of outdated and irrelevant generation to load paths to assign Stage 1A rights that have nothing to do with actual power flows.

The result of removing portfolio netting, applying a payout ratio to counter flow FTRs and eliminating Stage 1A ARR overallocation in the 2013/2014 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 different line ratings, 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; the payment of congestion revenues to UTCs; 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.

It is not clear, in a competitive market, why FTR purchases by financial entities remain persistently profitable. In a competitive market, it would be expected that profits would be competed away. It is also not clear, in a competitive market, why the ownership structure of long term FTRs is so highly concentrated. The apparent lack of competition to purchase Long Term FTRs (three year product) results in low prices when compared to the resale prices in Annual FTR Auctions. In a competitive market the price of Long Term FTRs (three year product) would be expected to converge with the prices of Annual FTRs, but there has been a persistent, wide divergence that has made the purchase of Long Term FTRs very profitable.

For the 2014/2015, 2015/2016 and 2016/2017 planning periods FTRs have been revenue adequate. This is not because the underlying market design problems have been fixed. Revenue adequacy has been accomplished by limiting the amount of available ARRs and FTRs by arbitrarily decreasing the ARR allocations for Stage 1B and Stage 2 which also results in a redistribution of ARRs based on differences in allocations between Stage 1A and Stage 1B ARRs.

Load is significantly worse off as a result of the changes made to the FTR/ARR process by PJM based on the FERC order of September 15, 2016. ARR revenues were significantly reduced for the 2017/2018 FTR Auction, the first auction under the new rules. In addition, the certainty of the ARR offset to congestion, whatever the level, was eliminated by the assignment of 100 percent of balancing congestion to load. ARR holders will be worse off as a result of paying balancing congestion but will not know exactly how much worse off until the end of the planning year.

In addition, it has become increasingly clear that the three year FTR product sold in the Long Term FTR Auction should be eliminated. Ownership of the product is extremely highly concentrated. The buyers of the product resell the annual segments of the product for multiples of the purchase price. There is no reason for the very small number of purchasers to continue to be subsidized.

Auction Revenue Rights

ARRs are the financial instruments through which the proceeds from FTR Auctions are allocated to load based on load's payment for the transmission system and for load's payment of congestion. ARR values are based on nodal price differences between the ARR source and sink points.[7] 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 a 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.

7 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 goal of the ARR/FTR design should be to provide an efficient mechanism to ensure that load receives the rights to all the congestion revenues, and has the ability to receive the auction revenues associated with all the potential congestion revenues. The MMU recommends that all FTR auction revenues be allocated to ARR 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, 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.[8] 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 2003/2004 planning period. The initial allocation covered the Mid-Atlantic Region and the AP Control Zone. For the 2006/2007 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 2007/2008 and subsequent planning periods through the present, 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.

ARR Allocation

For the 2007/2008 planning period, the annual ARR allocation process was revised to include Long Term ARRs that would be in effect for 10 consecutive planning periods.[9] 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 ARRs, up to their share of zonal base load, based on generation to load paths that reflect generation resources that had served load prior to markets 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

8 "PJM Manual 6: Financial Transmission Rights," Rev. 17 (June 1, 2016) at 31; "IARRs for RTEP Upgrades Allocated for 2016/2017 Planning Period," <http://www.pjm.com/~/media/markets-ops/ftr/annual-arr-allocation/2016-2017/2016-2017-iarrs-for-rtep-upgrades-allocated.ashx>.

9 See *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.

feasibility.[10] While transmission upgrades are being implemented, Stage 1A ARRs, and therefore FTRs, are overallocated.

- **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 zonal peak load, based on generation to load paths that reflect generation resources that had served load prior to markets 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 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.[11] Participants may seek additional ARRs in the Stage 2 allocation.

Effective for the 2015/2016 planning period, when residual zone pricing was 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.[12]

10 See "PJM Manual 6: Financial Transmission Rights," Rev. 18 (June 1, 2017) at 22.
11 See "PJM Manual 6: Financial Transmission Rights," Rev. 18 (June 1, 2017) at 21.
12 *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>.

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.[13] PJM may also adjust the outages modeled, adjust line limits and account for potential closed loop interfaces to address expected revenue issues. 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).[14]

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.

13 "PJM Manual 6: Financial Transmission Rights," Rev. 18 (June 1, 2017) at 55–56.
14 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. <http://www.monitoringanalytics.com/reports/Technical_References/references.shtml>.

FERC Order on EL16-121: Stage 1A ARR Allocation

FERC ordered PJM to more accurately represent system usage when allocating Stage 1A ARRs by removing retired resources from their allocation methodology.[15] PJM made a compliance filing, accepted by FERC, stating that retired units would be replaced with qualified replacement resources (QRRs).[16] PJM proposed to categorize QRRs as built under a rate base approach or a non-rate base (market) approach. PJM proposed to give priority to load delivery from their own rate based units in deciding between competing ARR claims.

Under the new allocation methodology, PJM will replace retired units or units whose ICAP is less than their historical capacity with QRRs. A QRR will be a unit, or combination of units, whose ICAP value can meet the historically allocated MW quantity that was allocated based on the retired resource. QRRs will be classified as rate base or non-rate base units and ranked by rate base/non-rate base and by economics within each category. Participants will have to provide evidence that a unit is a rate-base unit to qualify for the designation in the Stage 1A ARR allocation. PJM will assign the historical MW to rate base QRRs within the zone, and then intra zonally to all generation units to replace retired resource capacity. These reassignments must all pass the simultaneous feasibility test.

The method PJM has implemented continues to rely on a contract path based approach. PJM is not applying this method to all Stage 1A units, so over allocations may persist. Existing, non-retired, Stage 1A resources will still be given their current allocations, while ARR allocations to QRRs that replace retired Stage 1A resources will be prorated based on the feasibility of these of ARRs after existing resources are allocated. As a result of this proration, the new ARRs will have lower priority than the non-retired Stage 1A resources, which could affect the value of the newly assigned ARRs.

15 156 FERC ¶ 61,180 (2016).
16 See FERC Docket No. EL16-6-003.

FTR Revenue Adequacy and Stage 1B/Stage 2 ARR Allocations

For the 2014/2015, 2015/2016 and 2016/2017 planning periods, FTR revenue adequacy was over 100 percent. Not every month was revenue adequate, but there was excess revenue from other months to ensure that the planning period was revenue adequate. The last time there were four months of consecutive funding of 100 percent or more was in the 2009/2010 planning period.

This high level of revenue adequacy was primarily due to actions taken by PJM to address prior low levels of revenue adequacy. PJM's actions included PJM's arbitrary use of higher outage levels and PJM's decision to include additional constraints (closed loop interfaces) both of which reduced system capability in the FTR auction model. PJM's actions led to a significant reduction in the allocation of Stage 1B and Stage 2 ARRs.

While PJM's 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 has 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 PJM's assumption of increased outages because they cannot be prorated.

For the 2014/2015 through 2016/2017 planning periods PJM reduced Stage 1B and Stage 2 ARRs to increase the payout ratio to FTR holders. For the 2017/2018 planning period PJM assigned all balancing congestion and M2M payments to load and exports. As a result, PJM also reversed course and increased the availability of Stage 1B and Stage 2 FTRs by reversing the conservative outage modeling. The market response to the increased supply of FTRs was lower bid prices and clearing prices.

Figure 13-1 shows the historic allocations for Stage 1B and Stage 2 ARRs from the 2011/2012 to 2017/2018 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 2013/2014 planning period to the 2014/2015 planning period. Total Stage 1B and Stage 2 ARR allocations increased slightly in the 2015/2016 planning year over the 2014/2015 planning year allocations, from 3,497.6 MW to 5,219.6 MW. But the ARR allocations for the 2015/2016 planning year were still 78.8 percent below 2013/2014 planning period volumes of 34,444.0 MW. For the 2016/2017 planning period there was another relatively small increase in available Stage 1B and Stage 2 capacity from 5,319.6 MW to 12,821.6 MW, but available ARRs were still 48.9 percent below 2013/2014 planning period volumes. For the 2017/2018 planning period, Stage 1B and Stage 2 ARRs returned to 2013/2014 volumes.

Figure 13-1 Historic Stage 1B and Stage 2 ARR Allocations from the 2011/2012 through 2017/2018 planning periods

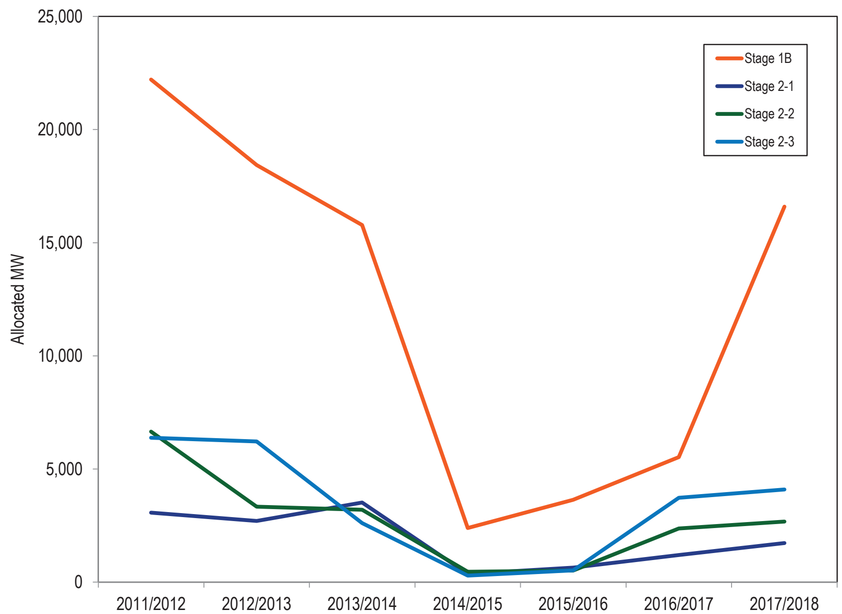


Table 13-3 shows the ARR allocations for the 2011/2012 through 2017/2018 planning periods. Stage 1A allocations cannot be prorated and have been slowly increasing. Stage 1B and Stage 2 allocations can be prorated. Stage 1B and Stage 2 allocations were steadily declining over the 2011/2012 through 2013/2014 planning periods, but were very significantly reduced in the 2014/2015 planning period as a result of PJM's arbitrary increase in modeled outages designed to increase revenue adequacy. PJM made available a small increase in Stage 1B and Stage 2 ARR volume from the 2014/2015 planning period to the 2015/2016 planning period and a small increase for the 2016/2017 planning period based on high payout ratios. In the 2017/2018 planning period, there was a large increase in ARR volume due to PJM's changes to Stage 1B and Stage 2 ARR allocations.

Table 13-3 Historic Stage 1B and Stage 2 ARR Allocations from the 2011/2012 through 2017/2018 planning periods

Stage	2011/2012	2012/2013	2013/2014	2014/2015	2015/2016	2016/2017	2017/2018
Stage 1A	64,159.9	67,299.6	67,861.4	68,837.7	71,874.0	69,089.1	70,874.7
Stage 1B	22,208.3	18,431.7	15,782.0	2,389.6	3,643.1	5,525.7	16,592.3
Stage 2-1	3,072.5	2,700.6	3,519.2	360.9	643.8	1,197.1	1,725.0
Stage 2-2	6,652.6	3,334.3	3,200.0	455.9	511.2	2,368.8	2,675.0
Stage 2-3	6,382.6	6,218.7	2,611.8	291.2	521.5	3,730.0	4,093.0
Total Stage 2	16,107.7	12,253.6	9,331.0	1,108.0	1,676.5	7,295.9	8,493.0
Total Allocations	102,475.9	97,984.9	92,974.4	72,335.3	77,193.6	81,910.7	95,960.0

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.[17] 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

17 See "PJM Manual 6: Financial Transmission Rights," Rev. 18 (June 1, 2017) at 28.

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 55,638 MW of ARRs associated with $659,000 of revenue that were reassigned in the 2015/2016 planning period. There were 44,056 MW of ARRs associated with $492,500 of revenue that were reassigned for the 2016/2017 planning period.

Table 13-4 summarizes ARR MW and associated revenue automatically reassigned for network load in each control zone where changes occurred between June 2015 and May 2017.

Table 13-4 ARRs and ARR revenue automatically reassigned for network load changes by control zone: June 1, 2015, through June 30, 2017

	ARRs Reassigned (MW-day)		ARR Revenue Reassigned [Dollars (Thousands) per MW-day]	
Control Zone	2015/2016 (12 months)	2016/2017 (12 months)	2015/2016 (12 months)	2016/2017 (12 months)
AECO	594	451	$4.5	$4.0
AEP	7,145	1,952	$72.0	$11.8
AP	2,171	1,617	$51.8	$33.4
ATSI	7,077	8,415	$66.7	$45.8
BGE	3,044	2,213	$95.7	$131.5
ComEd	5,433	3,468	$133.0	$113.9
DAY	624	822	$1.3	$2.4
DEOK	6,489	3,335	$31.5	$19.1
DLCO	6,179	5,464	$13.1	$12.9
DPL	1,628	1,538	$55.2	$31.3
Dominion	20	55	$0.3	$0.2
EKPC	0	0	$0.0	$0.0
JCPL	1,629	1,105	$12.4	$3.7
Met-Ed	1,081	824	$9.4	$6.8
PECO	4,189	3,468	$23.8	$8.8
PENELEC	1,277	1,150	$21.8	$17.3
PPL	3,341	4,055	$18.6	$5.0
PSEG	1,569	1,640	$37.5	$23.0
Pepco	2,098	2,419	$10.4	$21.3
RECO	52	65	$0.0	$0.1
Total	55,638	44,056	$659.0	$492.5

Incremental ARRs (IARRs) for RTEP Upgrades

Table 13-5 shows the IARR allocation MW for the 2008/2009 through 2017/2018 planning periods. This table includes IARRs from RTEP projects and IARRs from other projects.

Table 13-5 IARR allocation volume: Planning periods 2008/2009 through 2017/2018

Planning Period	Requested Count	Bid and Requested Volume (MW)	Cleared Volume (MW)	Cleared Volume	Uncleared Volume (MW)	Uncleared Volume
2008/2009	15	890.5	890.5	100%	0	0%
2009/2010	14	530.5	530.5	100%	0	0%
2010/2011	14	530.5	530.5	100%	0	0%
2011/2012	15	595.0	595.0	100%	0	0%
2012/2013	15	687.4	687.4	100%	0	0%
2013/2014	17	1,087.4	1,087.4	100%	0	0%
2014/2015	18	1,447.4	1,447.4	100%	0	0%
2015/2016	17	1,290.5	1,290.5	100%	0	0%
2016/2017	19	1,807.4	1,807.4	100%	0	0%
2017/2018	22	2,247.4	2,247.4	100%	0	0%

Table 13-6 lists the three RTEP upgrade projects that were allocated a total of 678.2 MW of IARRs for the 2017/2018 planning period.

Table 13-6 IARRs allocated for the 2017/2018 Annual ARR Allocation for RTEP upgrades

		IARR Parameters		
Project #	Project Description	Source	Sink	Total MW
B0287	Install 600 MVAR Dynamic Reactive Device at Elroy 500kV	RTEP B0287 Source	DPL	190.6
B0328	TrAIL Project: 502 JCT - Loudoun 500kV	RTEP B0328 Source	Pepco	391.2
B0329	Cason-Suffolk 500 kV	RTEP B0329 Source	Dominion	96.4

Residual ARRs

Residual ARRs are available if 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. Residual ARRs are a separate product from incremental ARRs.

Only ARR holders that had their Stage 1 ARRs prorated are eligible to receive Residual ARRs which cannot be declined, with positive or negative target allocations. Stage 1 ARR holders have a priority right to 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 13-7 shows the Residual ARRs automatically allocated to eligible participants, along with the target allocations from the effective month. In the 2016/2017 planning period planning period, PJM allocated a total of 35,034.9 MW of residual ARRs, up from 30,118.1 MW for the 2015/2016 planning period. Residual ARRs had a total target allocation of $7.0 million for the 2016/2017 planning period, down from $7.7 million for the 2015/2016 planning period. 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.

Beginning June 2017, Residual ARRs that would have cleared with a negative target allocation are not assigned to participants.

Table 13-7 Residual ARR allocation volume and target allocation: 2017

Month	Bid and Requested Volume (MW)	Cleared Volume (MW)	Cleared Volume	Target Allocation
Jan-17	3,253.4	2,186.7	67.2%	$1,148,805
Feb-17	5,885.1	2,273.7	38.6%	$905,697
Mar-17	9,304.9	2,391.6	25.7%	$286,710
Apr-17	8,334.5	3,313.8	39.8%	$347,694
May-17	6,312.2	3,268.7	51.8%	$55,180
Jun-17	4,241.0	3,666.1	86.4%	$805,206
Total	37,331.1	17,100.6	45.8%	$3,549,292

Market Performance

Volume

Table 13-8 shows the MW of ARR allocations for each round of the 2016/2017 and 2017/2018 planning periods. The percent cleared for the 2017/2018 planning period decreased by 9.5 percentage points, while the total cleared volume increased by 17.2 percent. This increased volume was due to PJM's decision to cease conservative outage modeling following the reallocation of balancing congestion and M2M payments to load and exports.

Table 13-8 Annual ARR Allocation volume: planning periods 2016/2017 and 2017/2018

Planning Period	Stage	Round	Requested Count	Requested Volume (MW)	Cleared Volume (MW)	Cleared Volume	Uncleared Volume (MW)	Uncleared Volume
2016/2017	1A	0	21,825	69,089	69,089	100.0%	0	0.0%
	1B	1	15,508	36,569	5,526	15.1%	31,043	84.9%
	2	2	5,784	27,942	1,197	4.3%	26,745	95.7%
		3	5,203	27,118	2,369	8.7%	24,749	91.3%
		4	5,070	27,080	3,730	13.8%	23,350	86.2%
		Total	16,057	82,140	7,296	8.9%	74,844	91.1%
	Total		53,390	187,798	81,911	43.6%	105,887	56.4%
2017/2018	1A	0	26,182	70,944	70,875	99.9%	69	0.1%
	1B	1	16,465	43,487	16,592	38.2%	26,895	61.8%
	2	2	6,394	22,473	1,725	7.7%	20,748	92.3%
		3	6,168	22,116	2,675	12.1%	19,441	87.9%
		4	5,279	21,668	4,093	18.9%	17,575	81.1%
		Total	17,841	66,257	8,493	12.8%	57,764	87.2%
	Total		60,488	180,688	95,960	53.1%	84,728	46.9%

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 to ensure 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.[18]

There is a reason that transmission is not actually built to address the Stage 1A overallocation issue. PJM's transmission planning process (RTEP) does not identify a need for new transmission because there is, in fact, no need for new transmission associated with Stage 1A ARRs. The Stage 1A overallocation issue is a fiction based on the use of outdated and irrelevant generation to load paths to assign Stage 1A rights that have nothing to do with actual power flows.

18 "PJM Manual 6: Financial Transmission Rights," Rev. 18 (June 1, 2017) at 22.

For the 2017/2018 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 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.

The result of this required increased 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 13-9 shows the MW quantity and count of overloaded facilities and the reasons for the modeled overload. In order to eliminate the infeasibilities for the requested Stage 1A ARR allocations, PJM was required to raise the modeled capacity limits on 117 facilities, 22 of which were internal to PJM and the rest were in MISO, a total of 7,170 MW.[19]

Table 13-9 Overloaded facility type and reason: 2017/2018 planning period

Reason	Type	MW	Count
Network Load	M2M Flowgate	5965	84
Network Load	Pseudo Tie Flowgate	216	11
Network Load	Internal PJM	82	2
Internal PJM	Transmission Outage	907	20

Figure 13-2 shows the predicted and estimated impact of Stage 1A infeasibilities on funding for the 2012/2013 through 2016/2017 planning periods, as well as the predicted impact on funding for the 2017/2018 planning period. The predicted funding is based on the infeasible ARR MW and the nodal price of the source and sink in the Annual FTR Auction. The estimated funding is calculated assuming every infeasible ARR MW is self scheduled, and uses the hourly congestion LMP values of the applicable day-ahead hours. In the 2016/2017 planning period, Stage 1A ARR infeasibilities accounted for $293.5 million in over allocation. Predicted funding is reduced in the 2017/2018 planning period from the previous two planning periods, but comparable to the planning periods prior to the 2015/2016 planning period. PJM's newly implemented Qualified Replacement Resource rules may reduce revenue inadequacy from Stage 1A ARRs, but do not eliminate the actual issues with historical Stage 1A resources.

Figure 13-2 Stage 1A Infeasibility Funding Impact

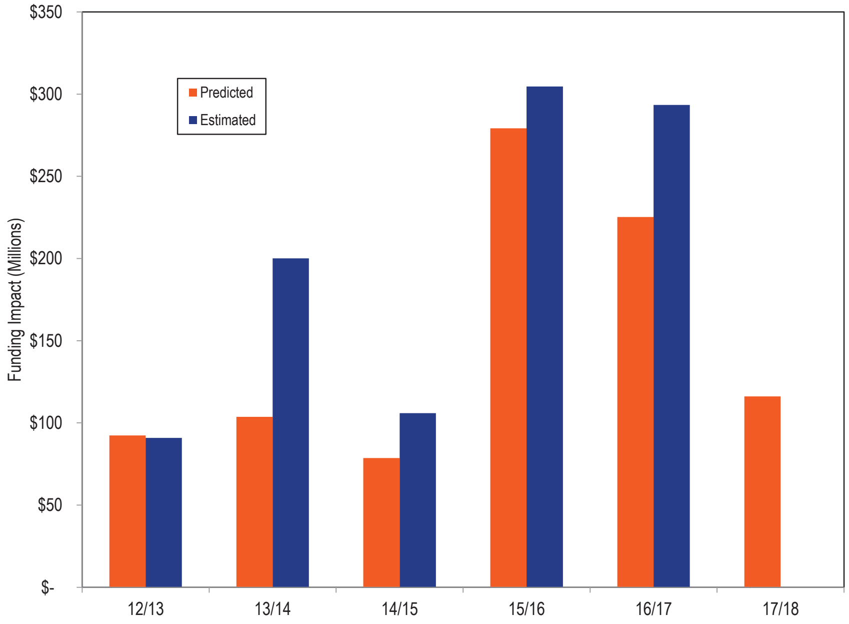


Table 13-10 shows the MW of retired generation sources for Stage 1A ARRs, the QRR MW assigned by PJM for all resources and the replacement MW that were considered rate-based.

19 *PJM 2017/2018 Stage 1A Over allocation notice*, PJM FTRs, <http://www.pjm.com/~/media/markets-ops/ftr/annual-arr-allocation/2016-2017/2016-2017-stage-1a-over-allocation-notice.ashx> (June 28, 2017).

Table 13-10 Qualified Replacement Resource results for the 2017/2018 planning period

Zone	Retired	Replacement (All)	Replacement (Rate-based)
AEP/DAY	6,930.1	6,095.6	809.8
ATSI	2,123.3	1,371.4	50.4
ComEd	5,646.8	4,451.2	4.5
DEOK	1,207.2	1,261.2	57.6
DOM	1,298.0	950.3	761.3
DUQ	834.0	211.7	0.0
EKPC	195.0	189.3	0.0
Midatlantic	15,076.8	12,432.5	375.9
Total	33,311.2	26,963.2	2,059.5

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.

Table 13-11 shows the value of 2016/2017 and 2017/2018 allocated ARRs at FTR prices from both planning periods. For example, in the 2017/2018 planning period, ARRs allocated in that planning period are expected to be worth a total of $1,147.1 million. The MMU calculates that the same allocated ARRs, but at 2016/2017 planning period prices, would have been worth $2,824.6 million. This substantial reduction in expected revenue from the same set of ARRs is a result of a significant reduction in FTR prices, and therefore ARR revenue, resulting from PJM's modeling decisions following the allocation of balancing congestion to load and exports. The predicted increased value to ARR holders from shifting balancing congestion out of FTR funding did not occur, and in fact ARR holders can expect to receive less total revenue while FTR holders experience increased profits and revenue stability.

Table 13-11 ARR Revenue at 2016/2017 and 2017/2018 planning period FTR prices

	2016/2017 ARRs	2017/2018 ARRs
2016/2017 Value	$1,676,721,685	$2,824,564,581
2017/2018 Value	$752,854,215	$1,147,082,005

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.

Total net FTR auction revenue for the 2015/2016 planning period, before accounting for self scheduling, load shifts or residual ARRs, was $968.1 million. The FTR auction revenue collected pays ARR holders' credits. During 2016/2017 planning period, total net FTR auction revenue was $941.5 million.

Table 13-12 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 2015/2016 planning period and the 2016/2017 planning periods.

Table 13-12 Projected ARR revenue adequacy (Dollars (Millions)): Planning periods 2015/2016 and 2016/2017

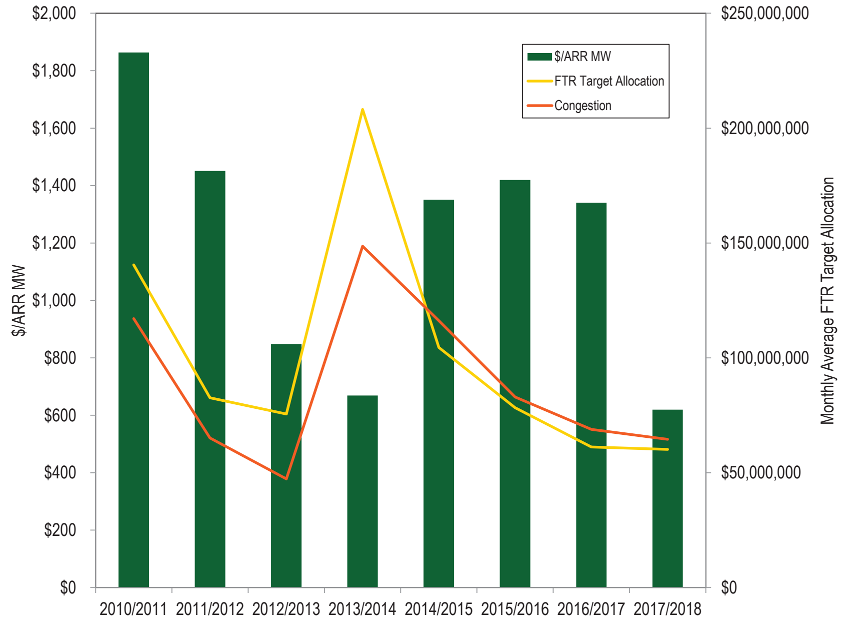
	2015/2016	2016/2017
Total FTR auction net revenue	$968.1	$941.5
Annual FTR Auction net revenue	$936.3	$909.0
Monthly Balance of Planning Period FTR Auction net revenue*	$31.8	$32.5
ARR target allocations	$931.6	$914.2
ARR credits	$931.6	$914.2
Surplus auction revenue	$36.5	$27.4
ARR payout ratio	100%	100%
FTR payout ratio*	100%	100%

* Shows twelve months for 2015/2016 and 2016/2017.

Figure 13-3 shows the dollars per ARR MW held for each month of the 2010/2011 planning period through the first month of the 2017/2018 planning periods. The ARR MW held do not include self scheduled FTRs but do include Residual ARRs starting in August 2012. FTR prices increased in the 2014/2015 Annual FTR Auction as a result of reduced supply caused by PJM's assumption of more outages in the model used to allocate Stage 1B and Stage 2 ARRs. The increased FTR prices resulted in an increase in dollars paid per ARR MW. For the 2014/2015 planning period, the total dollars per MW of ARR allocation was $11,279, while the previous planning period resulted in a dollars per MW of $6,692, a 68.5 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. For the 2015/2016 planning period, the dollars per MW of ARR allocation was $10,641.54. For the 2016/2017 planning period, the dollars per MW of ARR allocation were $10,411.

The dollar per MW value of ARRs in the first month of the 2017/2018 planning period decreased 39.4 percent from the previous planning period. ARR value was expected to increase in the 2017/2018 planning period from higher FTR prices paid in expectation of increased revenue with no balancing congestion offset, but this increased value did not materialize. FTRs buyers paid less. Figure 13-3 shows that the total congestion and FTR target allocations did not change significantly from the 2016/2017 to 2017/2018 planning period.

Figure 13-3 Dollars per ARR MW paid to ARR holders compared to congestion and FTR target allocations: 2010/2011 through 2017/2018



Excess Auction Revenue

Figure 13-4 shows the monthly excess auction revenue from the 2011/2012 through 2015/2016 planning periods. Excess auction revenue is the revenue collected each month from FTR auctions in excess of ARR target allocations.

Beginning with the 2014/2015 planning period, market rules allow PJM to decrease prevailing flow target allocations by clearing counter flow FTRs, without making the opposite prevailing flow FTR available, as long as ARRs remain revenue adequate.[20] This allows PJM to use the excess auction revenue to pay prevailing flow FTRs without increasing prevailing flow obligations. The result is to increase FTR funding. This action removes money from the ARR revenue stream and caused the decrease in excess ARR revenue beginning

20 *See* "PJM Manual 6: Financial Transmission Rights," Rev. 18 (June 1, 2017) at 55.

in June 2014. Excess auction revenue is allocated pro rata to FTR holders at the end of the planning period. All excess FTR auction revenue should be distributed to ARR holders.

Figure 13-4 Monthly excess ARR revenue: Planning periods 2011/2012 through 2017/2018

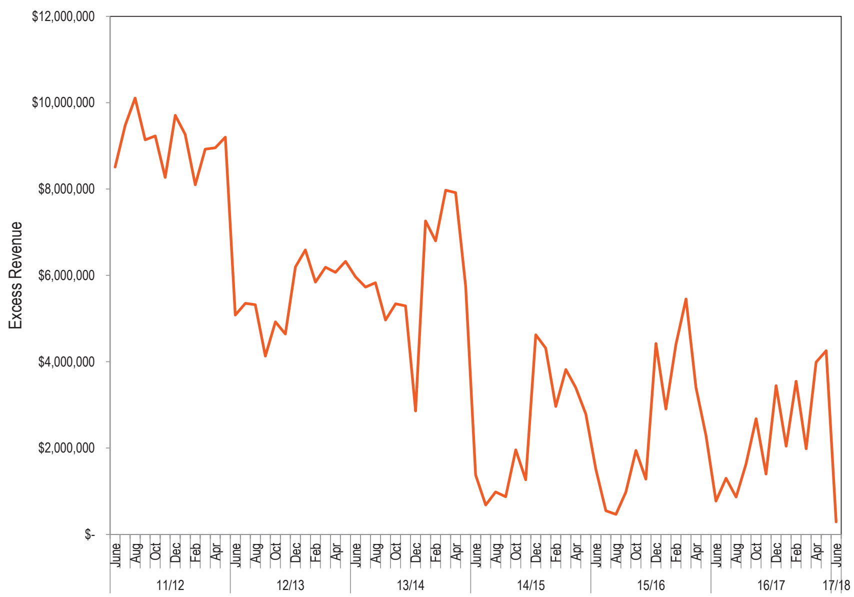


Table 13-13 shows the excess auction revenue, by planning period, for planning periods 2010/2011 through 2016/2017.

Table 13-13 Excess Auction Revenue: Planning periods 2010/2011 through 2017/2018

Planning Period	Excess Auction Revenue
2010/2011	$29,704,562
2011/2012	$108,874,342
2012/2013	$66,652,822
2013/2014	$71,687,937
2014/2015*	$29,045,590
2015/2016	$29,612,591
2016/2017	$27,917,175
2017/2018**	$290,764
Total	$363,785,783

*Start of counter flow "buy back"

**Through June 30, 2017

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 total congestion revenue including day-ahead and balancing congestion. The value of the day-ahead congestion price differences, termed the FTR target allocation, defines the maximum, but not guaranteed, payout for FTRs. The target allocation of an FTR reflects the difference in day-ahead 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. 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 target allocation 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. 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. 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 by ARR holders are available only as obligations and 24-hour product class, consistent with the associated ARRs, and only in the Annual FTR Auction.

Market Structure

Supply and Demand

PJM oversees the process of selling and buying FTRs through ARR Allocations and FTR Auctions. Market participants purchase FTRs by participating in Long Term, Annual and Monthly Balance of Planning Period FTR Auctions.[21] 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 Annual ARR Allocation. Stage 1A ARR requests must be granted, which artificially increases the transmission capacity in the model on the affected facilities. The capacity modeled in the Annual ARR Allocation is used as the capacity for the Annual FTR Auction to simultaneously accommodate the various combinations of requested FTRs. Depending on assumptions used in the 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 auction model to address expected revenue inadequacies. PJM can assume higher outage levels and PJM can decide to include additional constraints (closed loop interfaces) both of which reduce system capability in the auction model. These PJM actions 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 starting in the 2014/2015 planning year auction model.

For the Annual FTR Auction, known transmission outages that are expected to last for two months or more may be included in the model, while known outages of five days or more may be 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.[22] The full list of outages selected is publicly posted, but the process by which these outages are selected is not fully explained and PJM exercises significant discretion in selecting outages to accomplish FTR revenue adequacy goals.

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 and seasonal ARR/FTR markets to better align the supply of ARRs and FTRs with actual system capabilities.

Long Term FTR Auctions

In July 2006, FERC issued a Final Rule mandating the creation of long term firm transmission rights in transmission organizations with organized electricity markets (FERC Docket No. RM06-8-000; Order No. 681).[23] FERC's intention was that "load serving entities be able to request and obtain transmission rights up to a reasonable amount on a long-term firm basis, instead of being limited to obtaining exclusively annual rights." Despite that order, in PJM's Long Term FTR Auction market design, LSEs are not able to request ARRs nor are LSEs guaranteed rights to the revenue from Long Term FTR Auctions. LSEs in PJM are only able to obtain long term FTRs by participating in an auction.

21 See "PJM Manual 6: Financial Transmission Rights," Rev. 18 (June 1, 2017) at 38.

22 See "PJM Manual 6: Financial Transmission Rights," Rev. 18 (June 1, 2017) at 55.

23 116 FERC ¶ 61,077 (2006).

FERC's original intention for long term FTRs suggests an extension of the ARR process into Long Term FTR Auctions but this is not the case in PJM.[24]

PJM conducts a Long Term FTR Auction for the next three consecutive planning periods. The capacity offered for sale in Long Term FTR Auctions is the residual system capability assuming that all ARRs allocated in the prior annual ARR allocation process are self scheduled as FTRs. These ARRs are modeled as fixed injections and withdrawals in the Long Term FTR Auction. Future transmission upgrades are not included in the model. The 2009/2012 and 2010/2013 Long Term FTR Auctions consisted of two rounds.[25] Subsequent Long Term FTR Auctions consist of three rounds. FTRs purchased in prior rounds may be offered for sale in subsequent rounds. FTRs obtained in the Long Term Auctions may have terms of any one year or a single term of all three years. FTR products available in the Long Term Auction include 24-hour, on peak and off peak FTR obligations. FTR option products are not available in Long Term FTR Auctions.

- Round 1. The first round is conducted in the June prior to the start of the term covered by the Long Term FTR Auction. Market participants make offers for FTRs between any source and sink.
- Round 2. The second round is conducted approximately three months after the first round and follows the same rules as Round 1.
- Round 3. The third round is conducted approximately six months after the first round and follows the same rules as Round 1.

Table 13-15 shows the top 10 binding constraints for the 2017 to 2020 Long Term FTR Auction and the 2015 to 2016 Annual FTR Auction based on the marginal value of on peak hours. The severity ranking is based on the marginal value of the constraint in the simultaneous feasibility test.

PJM includes a three year FTR product in the Long Term FTR Auction design. The market for three year FTRs is highly concentrated. More than 99 percent of the three year FTRs awarded in the last five FTR Long Term FTR auctions were acquired by financial participants. Table 13-14 shows the HHI for three year FTRs sold in the last five long term FTR auctions, broken out by On Peak or Off Peak and Prevailing or counter flow.

Table 13-14 HHIs for Three-year FTRs

Class Type	Direction	2014/2017	2015/2018	2016/2019	2017/2020
On Peak	Prevailing	9489	9778	4646	8863
	Counter	10000	10000	4524	6760
Off Peak	Prevailing	9708	9816	5749	9324
	Counter	10000	10000	5671	9522

Table 13-15 Top 10 principal binding transmission constraints limiting the 2017/2020 Long Term FTR Auction

			Severity Ranking by Auction Round		
Constraint	Type	Control Zone	1	2	3
St. Johns	Transformer	Dominion	1	NA	5
Elliott - Rosewood	Line	AEP	NA	1	NA
Brown Jct. - Gates Hill	Line	AP	NA	NA	1
Mercer IP - Galesburg	Flowgate	MISO	2	NA	NA
Gore Jct. - Rolling Meadow	Line	Penelec	3	NA	6
Greenfield - Visteaon-Ford	Line	ATSI	NA	2	NA
Erie South - French Road	Line	Penelec	NA	3	NA
Worcester - Ocean Pines	Line	DPL	27	4	13
Gainesville	Transformer	Dominion	NA	5	NA

Annual FTR Auctions

After the Long Term FTR Auction, residual capability on the PJM transmission system is auctioned in the Annual FTR Auction. Annual FTRs are effective beginning June 1 of the planning period through May 31. Outages expected to last two or more months are included in the determination of the simultaneous feasibility for the Annual FTR Auction. ARR holders who wish to self schedule must inform PJM prior to round one of this auction. Any self scheduled ARR requests clear 25 percent of the requested volume in each round of the Annual FTR Auction as price takers. This auction consists of four rounds that allow any transmission service customers or PJM members to bid for any FTR or to offer for sale any FTR that they currently hold. FTRs in this auction can be obligations or options for peak, off peak or 24-hour periods. FTRs purchased

24 *Id.*

25 FERC approved, on December 7, 2009, the addition of a third round to the Long Term FTR Auction. FERC letter order accepting PJM Interconnection, L.L.C.'s revisions to Long-Term Financial Transmission Rights Auctions to its Amended and Restated Operating Agreement and Open Access Transmission Tariff, Docket No. ER10-82-000 (December 7, 2009).

in one round of the Annual FTR Auction can be sold in later rounds or in the Monthly Balance of Planning Period FTR Auctions.

Table 13-16 shows the top 10 binding constraints for the 2017/2018 Annual FTR Auction based on the marginal value of on peak hours.

Table 13-16 Top 10 principal binding transmission constraints limiting the Annual FTR Auction: Planning period 2017/2018

			Severity Ranking by Auction Round			
Constraint	Type	Control Zone	1	2	3	4
Bunsonville	Flowgate	MISO	2	1	1	1
Silver Lake - Silver Lake	Line	ComEd	1	2	2	2
Reynolds - Magnetation	Flowgate	MISO	3	3	3	3
Cherry Valley	Transformer	ComEd	5	6	5	4
Harbor - University	Line	ComEd	4	4	4	6
Garden Plain	Flowgate	MISO	6	5	6	5
Sheperdstown - Sleepy Hollow	Line	AP	8	9	7	7
State Line	Transformer	ComEd	7	7	8	8
Roxbury - Shade Gap	Line	Penelec	18	8	14	20
Bush - Lafayette	Flowgate	MISO	9	14	23	29

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.[26]

26 See "PJM Manual 6: Financial Transmission Rights," Rev. 18 (June 1, 2017) at 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 Monthly Balance of Planning Period FTR Auctions for the entire 2015/2016 planning period and the 2016/2017 planning period were 25,686,865 MW and 20,144,884 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 13-17 presents the 2017/2020 Long Term FTR Auction market cleared FTRs by trade type, organization type and FTR direction. The results show that financial entities purchased 77.5 percent of prevailing flow buy bid FTRs and 84.9 percent of counter flow buy bid FTRs with the result that financial entities purchased 80.8 percent of all Long Term FTR Auction cleared buy bids for the 2017/2020 Long Term FTR Auction. Physical entities purchased only 19.2 percent of all available long term FTRs in the 2017/2020 Long Term FTR Auction.

Table 13-17 Long Term FTR Auction patterns of ownership by FTR direction: Planning periods 2017/2020

		FTR Direction		
Trade Type	Organization Type	Prevailing Flow	Counter Flow	All
Buy Bids	Physical	22.5%	15.1%	19.2%
	Financial	77.5%	84.9%	80.8%
	Total	100.0%	100.0%	100.0%
Sell Offers	Physical	36.9%	26.6%	33.3%
	Financial	63.1%	73.4%	66.7%
	Total	100.0%	100.0%	100.0%

Table 13-18 presents the Annual FTR Auction cleared FTRs for the 2017/2018 planning period by trade type, organization type and FTR direction. In the Annual FTR Auction for the 2017/2018 planning period, financial entities purchased 77.5 percent of prevailing flow FTRs, up 20.6 percentage points, and 79.7 percent of counter flow FTRs, down 5.2 percentage points, with the results that financial entities purchased 66.6 percent, up one percentage point, of all Annual FTR Auction cleared buy bids for the 2017/2018 planning period.

Table 13-18 Annual FTR Auction patterns of ownership by FTR direction: Planning period 2017/2018

			FTR Direction		
Trade Type	Organization Type	Self-Scheduled FTRs	Prevailing Flow	Counter Flow	All
Buy Bids	Physical	Yes	7.2%	1.0%	4.8%
		No	32.7%	22.3%	28.6%
		Total	39.9%	23.3%	33.4%
	Financial	No	60.1%	76.7%	66.6%
	Total		100.0%	100.0%	100.0%
Sell Offers	Physical		21.3%	17.6%	20.0%
	Financial		78.7%	82.4%	80.0%
	Total		100.0%	100.0%	100.0%

Table 13-19 presents the Monthly Balance of Planning Period FTR Auction cleared FTRs for 2017 by trade type, organization type and FTR direction. Financial entities purchased 74.9 percent of prevailing flow FTRs, up 0.9 percent, and 82.6 percent of counter flow FTRs, up 3.4 percent, for the year, with the result that financial entities purchased 78.5 percent, up 2.1 percent, of all prevailing and counter flow FTR buy bids in the Monthly Balance of Planning Period FTR Auction cleared FTRs for 2017.

Table 13-19 Monthly Balance of Planning Period FTR Auction patterns of ownership by FTR direction: 2017

		FTR Direction		
Trade Type	Organization Type	Prevailing Flow	Counter Flow	All
Buy Bids	Physical	25.1%	17.4%	21.5%
	Financial	74.9%	82.6%	78.5%
	Total	100.0%	100.0%	100.0%
Sell Offers	Physical	17.8%	15.9%	17.2%
	Financial	82.2%	84.1%	82.8%
	Total	100.0%	100.0%	100.0%

Table 13-20 presents the average daily net position ownership for all FTRs for 2017, by FTR direction.

Table 13-20 Daily FTR net position ownership by FTR direction: 2017

	FTR Direction		
Organization Type	Prevailing Flow	Counter Flow	All
Physical	44.6%	22.5%	35.2%
Financial	55.4%	77.5%	64.8%
Total	100.0%	100.0%	100.0%

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.[27]

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 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.[28]

In the 2017/2020 Long Term FTR Auction 133,153 MW (26.8 percent of demand; 44.8 percent of total FTR volume) of counter flow FTR buy bids cleared, an increase from 120,650 MW and 43.5 percent of total FTR volume. In the same auction, prevailing flow FTR buy bids cleared 163,931 MW (9.8 percent of demand; 55.2 percent of total FTR volume) an increase from 156,746 MW and 55.2 percent of total FTR volume. In the 2017/2020 Long Term FTR Auction, there were 12,853 MW (13.5 percent) of counter flow sell offers and 23,929 MW (21.1 percent) of prevailing flow sell offers cleared.

27 See "PJM Manual 6: Financial Transmission Rights," Rev. 18 (June 1, 2017) at 56.
28 See *id.*

Table 13-21 Long Term FTR Auction market volume: Planning period 2017/2020

Trade Type	FTR Direction	Period Type	Bid and Requested Count	Bid and Requested Volume (MW)	Cleared Volume (MW)	Cleared Volume	Uncleared Volume (MW)	Uncleared Volume
Buy bids	Counter Flow	Year 1	71,013	188,872	48,984	25.9%	139,887	74.1%
		Year 2	55,813	167,917	47,150	28.1%	120,767	71.9%
		Year 3	49,332	137,540	36,330	26.4%	101,210	73.6%
		Year All	266	1,627	688	42.3%	938	57.7%
		Total	176,424	495,955	133,153	26.8%	362,802	73.2%
	Prevailing Flow	Year 1	167,750	646,060	58,233	9.0%	587,826	91.0%
		Year 2	129,840	510,387	61,768	12.1%	448,618	87.9%
		Year 3	127,220	508,133	43,709	8.6%	464,425	91.4%
		Year All	2,760	16,336	220	1.3%	16,116	98.7%
		Total	427,570	1,680,916	163,931	9.8%	1,516,986	90.2%
	Total		603,994	2,176,871	297,083	13.6%	1,879,788	86.4%
Sell offers	Counter Flow	Year 1	26,109	59,201	8,744	14.8%	50,457	85.2%
		Year 2	12,347	28,722	3,582	12.5%	25,140	87.5%
		Year 3	3,192	7,167	527	7.3%	6,640	92.7%
		Year All	NA	NA	NA	NA	NA	NA
		Total	41,648	95,089	12,853	13.5%	82,237	86.5%
	Prevailing Flow	Year 1	29,991	62,737	14,093	22.5%	48,644	77.5%
		Year 2	17,866	40,390	8,575	21.2%	31,814	78.8%
		Year 3	4,555	10,189	1,261	12.4%	8,928	87.6%
		Year All	NA	NA	NA	NA	NA	NA
		Total	52,412	113,316	23,929	21.1%	89,386	78.9%
	Total		94,060	208,405	36,782	17.6%	171,623	82.4%

Table 13-22 provides the Annual FTR Auction market volume for the 2016/2017 planning period. Total FTR buy bids were 2,306,063 MW, down 11.0 percent from 2,592,183 MW for the previous planning period. For the 2016/2017 planning period 488,734 MW (21.4 percent) of buy bids cleared, up 6.1 percentage points from 393,509 MW for the previous planning period. There were 276,844 MW of sell offers with 37,990 MW (13.7 percent) clearing for the 2016/2017 planning period. The total volume of cleared buy and self scheduled bids was 513,263 MW, up 22.1 percent from 420,198 MW in the previous Annual FTR Auction.

Table 13-22 Annual FTR Auction market volume: 2017/2018 planning period

Trade Type	Type	FTR Direction	Bid and Requested Count	Bid and Requested Volume (MW)	Cleared Volume (MW)	Cleared Volume	Uncleared Volume (MW)	Uncleared Volume
Buy bids	Obligations	Counter Flow	200,749	638,840	198,853	31.1%	439,987	68.9%
		Prevailing Flow	366,221	1,446,952	270,302	18.7%	1,176,650	81.3%
		Total	566,970	2,085,792	469,154	22.5%	1,616,638	77.5%
	Options	Counter Flow	51	5,897	0	0.0%	5,897	100.0%
		Prevailing Flow	15,807	189,845	19,580	10.3%	170,265	89.7%
		Total	15,858	195,742	19,580	10.0%	176,162	90.0%
	Total	Counter Flow	200,800	644,737	198,853	30.8%	445,884	69.2%
		Prevailing Flow	382,028	1,636,797	289,882	17.7%	1,346,916	82.3%
		Total	582,828	2,281,534	488,734	21.4%	1,792,800	78.6%
Self-scheduled bids	Obligations	Counter Flow	127	1,941	1,941	100.0%	0	0.0%
		Prevailing Flow	2,401	22,588	22,588	100.0%	0	0.0%
		Total	2,528	24,529	24,529	100.0%	0	0.0%
Buy and self-scheduled bids	Obligations	Counter Flow	200,876	640,780	200,793	31.3%	439,987	68.7%
		Prevailing Flow	368,622	1,469,540	292,890	19.9%	1,176,650	80.1%
		Total	569,498	2,110,321	493,683	23.4%	1,616,638	76.6%
	Options	Counter Flow	51	5,897	0	0.0%	5,897	100.0%
		Prevailing Flow	15,807	189,845	19,580	10.3%	170,265	89.7%
		Total	15,858	195,742	19,580	10.0%	176,162	90.0%
	Total	Counter Flow	200,927	646,677	200,793	31.0%	445,884	69.0%
		Prevailing Flow	384,429	1,659,385	312,470	18.8%	1,346,916	81.2%
		Total	585,356	2,306,063	513,263	22.3%	1,792,800	77.7%
Sell offers	Obligations	Counter Flow	57,427	112,108	13,909	12.4%	98,200	87.6%
		Prevailing Flow	68,535	158,210	23,555	14.9%	134,655	85.1%
		Total	125,962	270,318	37,464	13.9%	232,854	86.1%
	Options	Counter Flow	2	100	0	0.0%	100	100.0%
		Prevailing Flow	1,226	6,426	527	8.2%	5,899	91.8%
		Total	1,228	6,526	527	8.1%	5,999	91.9%
	Total	Counter Flow	57,429	112,208	13,909	12.4%	98,300	87.6%
		Prevailing Flow	69,761	164,635	24,081	14.6%	140,554	85.4%
		Total	127,190	276,844	37,990	13.7%	238,853	86.3%

Table 13-23 provides a comparison of cleared FTR obligations (not options) acquired in the Long Term FTR Auctions versus the Annual FTR Auction, for FTRs in the 2014/2015 through 2017/2018 planning periods. A three year FTR is distributed to each individual planning period during its three year effective period. Long term FTRs that are effective in a single planning period comprise an average of 42.8 percent of total FTR volume in the 2014/2015 through 2017/2018 planning periods.

Table 13-23 Long Term and Annual Auction total cleared FTR MW

	Long Term FTR Product					
Planning Period	Year 3	Year 2	Year 1	Total Long Term	Annual (including self scheduled)	Long Term Percent of Total Cleared
2014/2015	81,666	86,754	131,911	300,330	356,522	45.7%
2015/2016	89,419	99,329	123,400	312,148	355,682	46.7%
2016/2017	97,837	95,637	107,182	300,656	397,258	43.1%
2017/2018	69,161	86,323	108,126	263,609	493,683	34.8%

Figure 13-5 shows the bid volumes of the Annual FTR Auctions from the 2009/2010 planning period through the 2017/2018 planning period and the associated planning period payout ratios, represented by the background bars. The payout ratio for the 2017/2018 planning period is shown as dotted background because it is not yet final. Bid volume has not changed significantly with the payout ratio. For on and off peak prevailing flow products, the bid volume in the 2012/2013 planning period decreased 24.3 percent from the 2011/2012 planning period, but then increased 30.5 percent for the 2013/2014 planning period despite an only slightly improved payout ratio. Bid volume for the 2016/2017 planning period was down 15.4 percent from the 2015/2016 planning period. Bid volume for the 2017/2018 planning period was only up 4.4 percent over the previous planning period, despite a less conservative FTR annual model.

Figure 13-5 Annual Bid FTR Auction volume: Planning period 2009/2010 through 2017/2018

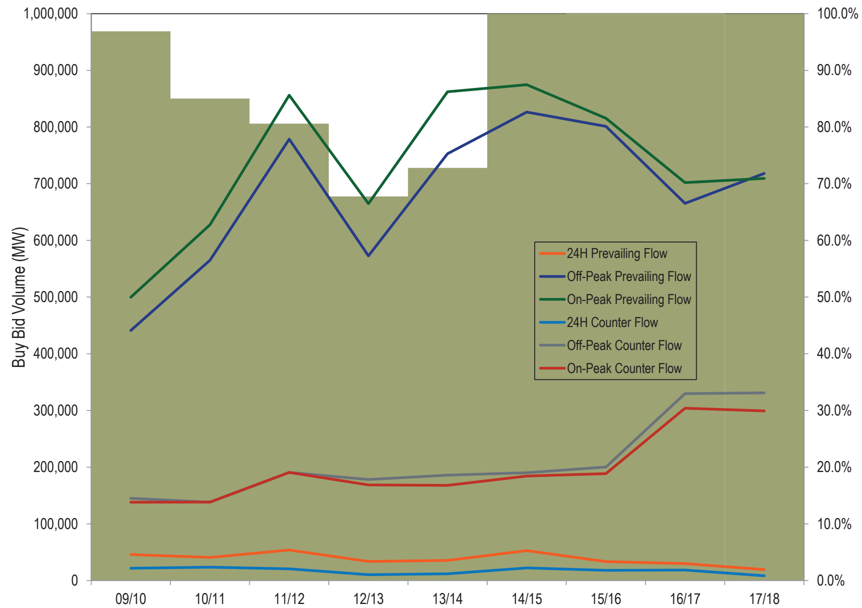


Figure 13-6 shows the cleared volumes of the Annual FTR Auctions from the 2009/2010 planning period through the 2017/2018 planning period and the associated planning period payout ratios, represented by the background bars. The payout ratio for the 2017/2018 planning period is shown as dotted background because it is not yet final. The cleared MW increased from the 2009/2010 planning period through the 2013/2014 planning period, as a market response to lower payout ratios. The 2014/2015, 2015/2016 and 2016/2017 planning period volumes were 19.1 percent, 16.3 percent and 7.0 percent lower than the 2013/2014 volume, as a result of PJM's more restrictive modeling of Stage 1B and Stage 2 ARRs starting in the 2014/2015 planning period which lead to fewer available FTRs in the Annual FTR Auction and higher prices. In the planning periods since 2014/2015, PJM has allowed more Stage 1B and Stage 2 ARRs to clear, resulting in higher slightly higher cleared volume and increasing prices in the Annual FTR Auction. In the 2017/2018 planning period, PJM ended their conservative outage modeling practices and assigned balancing congestion and M2M payments to load and exports. This created more FTR volume, and allowed for a 13.6 percent increase in cleared volume over the 2013/2014 planning period and a 40.3 percent increase in cleared volume over the 2014/2015 planning period.

Figure 13-6 Annual Cleared FTR Auction volume: Planning period 2009/2010 through 2017/2018

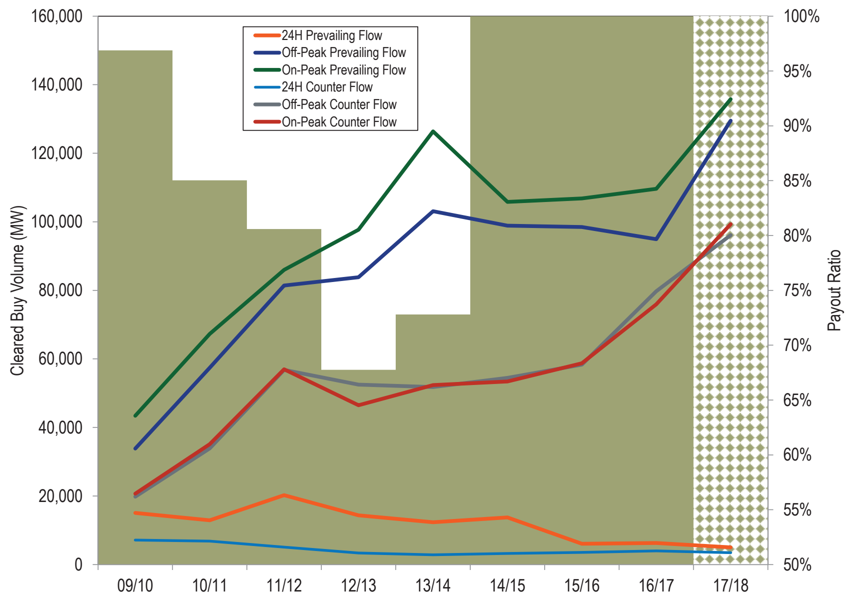


Table 13-24 shows the proportion of ARRs self scheduled as FTRs for the last seven planning periods. The maximum possible level of self scheduled FTRs includes all ARRs. Eligible participants self scheduled 24,529 MW (25.4 percent) of ARRs as FTRs for the 2017/2018 planning period, down from 26,689 MW (32.5 percent) in the previous planning period.

Table 13-24 Comparison of self scheduled FTRs: Planning periods 2009/2010 through 2017/2018

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%
2015/2016	23,699	77,872	30.4%
2016/2017	26,689	82,229	32.5%
2017/2018	24,529	96,638	25.4%

Table 13-25 provides the Monthly Balance of Planning Period FTR Auction market volume for the entire 2015/2016 and 2016/2017 planning. There were 16,452,696 MW of FTR obligation buy bids and 3,845,238 MW of FTR obligation sell offers for all bidding periods in the 2016/2017 planning period. The Monthly Balance of Planning Period FTR Auction cleared 2,250,750 MW (13.7 percent) of FTR obligation buy bids and 842,507 MW (221.9 percent) of FTR obligation sell offers.

There were 3,692,188 MW of FTR option buy bids and 497,083 MW of FTR option sell offers for all bidding periods in the Monthly Balance of Planning Period FTR Auctions for the 2016/2017 planning period. The monthly auctions cleared 61,247 MW (1.7 percent) of FTR option buy bids, and 161,155 MW (32.4 percent) of FTR option sell offers.

Table 13-25 Monthly Balance of Planning Period FTR Auction market volume: 2017

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-17	Obligations	Buy bids	241,099	1,077,550	123,675	11.5%	953,876	88.5%
		Sell offers	96,626	234,411	54,042	23.1%	180,370	76.9%
	Options	Buy bids	3,709	228,387	2,199	1.0%	226,187	99.0%
		Sell offers	7,276	28,852	11,745	40.7%	17,107	59.3%
Feb-17	Obligations	Buy bids	260,651	1,042,481	131,660	12.6%	910,821	87.4%
		Sell offers	94,844	208,036	48,565	23.3%	159,471	76.7%
	Options	Buy bids	2,826	190,661	2,187	1.1%	188,474	98.9%
		Sell offers	6,148	26,709	8,897	33.3%	17,812	66.7%
Mar-17	Obligations	Buy bids	259,179	1,004,570	166,466	16.6%	838,104	83.4%
		Sell offers	105,362	261,780	55,611	21.2%	206,168	78.8%
	Options	Buy bids	2,403	136,494	5,659	4.1%	130,835	95.9%
		Sell offers	6,941	32,989	10,691	32.4%	22,298	67.6%
Apr-17	Obligations	Buy bids	215,326	826,778	136,306	16.5%	690,472	83.5%
		Sell offers	111,753	219,164	58,063	26.5%	161,102	73.5%
	Options	Buy bids	1,734	71,002	2,431	3.4%	68,571	96.6%
		Sell offers	4,938	25,045	9,789	39.1%	15,255	60.9%
May-17	Obligations	Buy bids	144,990	554,023	96,709	17.5%	457,314	82.5%
		Sell offers	67,250	119,645	33,324	27.9%	86,320	72.1%
	Options	Buy bids	875	41,671	1,970	4.7%	39,701	95.3%
		Sell offers	2,325	12,564	6,287	50.0%	6,277	50.0%
Jun-17	Obligations	Buy bids	424,924	1,890,242	261,153	13.8%	1,629,089	86.2%
		Sell offers	245,103	441,623	103,552	23.4%	338,071	76.6%
	Options	Buy bids	2,850	95,975	3,466	3.6%	92,509	96.4%
		Sell offers	13,125	87,201	24,446	28.0%	62,754	72.0%
2015/2016*	Obligations	Buy bids	4,076,728	21,836,340	2,366,860	10.8%	19,469,480	89.2%
		Sell offers	1,582,528	4,385,972	1,088,967	24.8%	3,297,005	75.2%
	Options	Buy bids	157,638	3,850,526	92,957	2.4%	3,757,569	97.6%
		Sell offers	112,395	505,471	137,873	27.3%	367,598	72.7%
2016/2017**	Obligations	Buy bids	3,910,604	16,452,696	2,250,750	13.7%	14,201,947	86.3%
		Sell offers	1,888,130	3,845,238	843,507	21.9%	3,001,731	78.1%
	Options	Buy bids	83,045	3,692,188	61,247	1.7%	3,630,941	98.3%
		Sell offers	119,139	497,083	161,155	32.4%	335,928	67.6%

* Shows twelve months for 2015/2016; ** Shows twelve months ended May 31 for 2016/2017

Table 13-26 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 2017 was155,646.7 MW. The average monthly cleared volume for 2016 was 219,630.6 MW.

Table 13-26 Monthly Balance of Planning Period FTR Auction buy-bid, bid and cleared volume (MW per period): 2017

Monthly Auction	MW Type	Prompt Month	Second Month	Third Month	Q1	Q2	Q3	Q4	Total
Jan-17	Bid	614,939	263,340	198,667				228,991	1,305,937
	Cleared	72,086	25,184	10,841				17,763	125,874
Feb-17	Bid	617,074	230,889	201,187				183,993	1,233,142
	Cleared	82,727	24,497	13,321				13,302	133,847
Mar-17	Bid	582,068	237,341	219,040				102,614	1,141,063
	Cleared	100,495	34,460	27,873				9,297	172,125
Apr-17	Bid	641,003	256,777						897,780
	Cleared	100,962	37,775						138,737
May-17	Bid	595,694							595,694
	Cleared	98,679							98,679
Jun-17	Bid	694,826	242,835	225,724	140,632	249,241	220,255	212,703	1,986,217
	Cleared	115,341	32,654	26,230	15,601	28,384	24,559	21,850	264,619

Figure 13-7 shows cleared auction volumes as a percent of the total FTR cleared volume by calendar months for June 2004 through June 2017, 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 a corresponding increase 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 1, 2004 through June 30, 2017

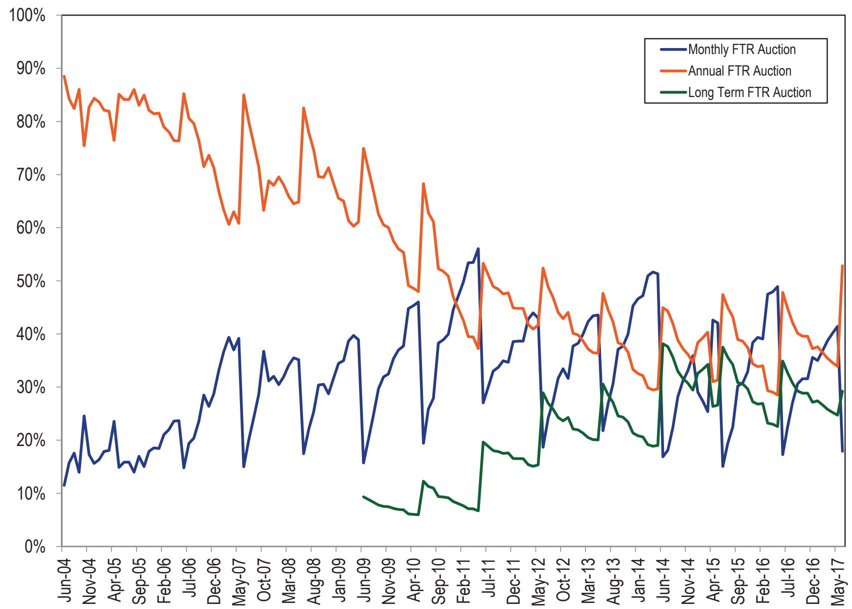


Table 13-27 provides the secondary bilateral FTR market volume for the entire 2015/2016 and 2016/2017 planning periods.

Table 13-27 Secondary bilateral FTR market volume: Planning periods 2015/2016 and 2016/2017[29]

Planning Period	Type	Class Type	Volume (MW)
2015/2016	Obligation	24-Hour	667.6
		On Peak	40,207.5
		Off Peak	27,652.4
		Total	68,527.5
	Option	24-Hour	0.0
		On Peak	8,765.5
		Off Peak	6,157.1
		Total	14,922.6
2016/2017	Obligation	24-Hour	538.5
		On Peak	13,955.7
		Off Peak	7,414.4
		Total	21,908.6
	Option	24-Hour	0.0
		On Peak	678.0
		Off Peak	104.5
		Total	782.5

Figure 13-8 shows the FTR bid, cleared and net bid volume from June 2003 through June 2017 for Long Term, Annual and Monthly Balance of Planning Period Auctions.[30] 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.

29 The 2015/2016 planning period covers bilateral FTRs that are effective for any time between June 1, 2015 through May 31, 2016, which originally had been purchased in a Long Term FTR Auction, Annual FTR Auction or Monthly Balance of Planning Period FTR Auction.
30 The data for this table are available in *2016 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 1, 2003 through June 30, 2017

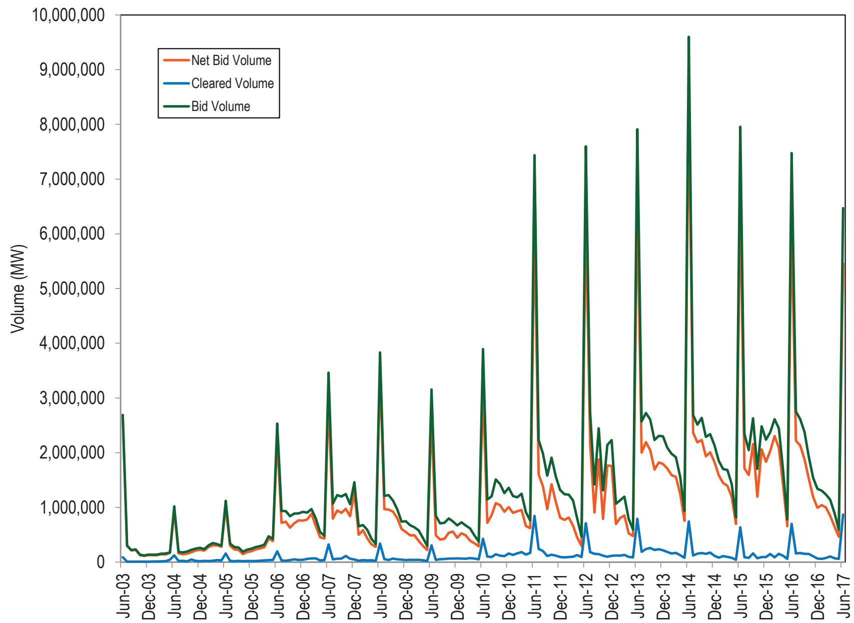


Table 13-28 Long Term FTR Auction weighted-average cleared prices (Dollars per MW): Planning periods 2017/2020

			Class Type			
Trade Type	FTR Direction	Period Type	24-Hour	On Peak	Off Peak	All
Buy bids	Counter Flow	Year 1	($1.55)	($0.33)	($0.55)	($0.47)
		Year 2	($1.19)	($0.31)	($0.52)	($0.42)
		Year 3	($0.71)	($0.27)	($0.44)	($0.36)
		Year All	NA	($0.03)	($0.09)	($0.05)
		Total	($1.18)	($0.30)	($0.50)	($0.42)
	Prevailing Flow	Year 1	$0.81	$0.35	$0.55	$0.46
		Year 2	$0.78	$0.32	$0.50	$0.41
		Year 3	$0.61	$0.27	$0.44	$0.35
		Year All	NA	$0.01	$0.01	$0.01
		Total	$0.75	$0.32	$0.50	$0.41
	Total		($0.26)	$0.03	$0.06	$0.04
Sell offers	Counter Flow	Year 1	($1.46)	($0.35)	($0.50)	($0.46)
		Year 2	NA	($0.32)	($0.45)	($0.40)
		Year 3	NA	($0.10)	($0.18)	($0.13)
		Year All	NA	NA	NA	NA
		Total	($1.17)	($0.33)	($0.48)	($0.43)
	Prevailing Flow	Year 1	$0.55	$0.27	$0.48	$0.38
		Year 2	$0.62	$0.47	$0.65	$0.55
		Year 3	NA	$0.26	$0.49	$0.36
		Year All	NA	NA	NA	NA
		Total	$0.57	$0.34	$0.54	$0.44
	Total		($0.26)	$0.11	$0.19	$0.13

Price

Table 13-28 shows the cleared, weighted-average prices by trade type, FTR direction, period type and class type for the 2017/2020 Long Term FTR Auction. Only FTR obligation products (no options) are available in the Long Term FTR Auctions. In this auction, weighted average buy bid counter flow and prevailing flow FTR prices were -$0.42 and $0.41, compared to -$0.47 and $0.45 from the 2016 to 2019 Long Term FTR Auction. Weighted average sell bid counter flow and prevailing flow FTR prices were -$0.43 and $0.44, compared to -$0.37 for counter flow FTRs and $0.43 for prevailing flow FTRs.

Figure 13-9 shows the volume-weighted average buy bid price for the Annual FTR Auctions from the 2009/2010 through the 2017/2018 planning periods and the associated planning period payout ratios, represented by the background bars. The payout ratio for the 2017/2018 planning period is shown as dotted background because it is not yet final. From the 2010/2011 planning period to the 2013/2014 planning period FTR prices decreased. The 2014/2015, 2015/2016 and 2016/2017 planning periods 24 hour obligation prices increased 142.5 percent, 210.8 and 260.8 percent from the 2013/2014 planning period. These large price increases were a result of the significant decrease in FTR supply volume during the Annual FTR Auctions which was a result of PJM's decisions to use a more constrained model and its impact on Stage 1B and Stage 2 ARR allocations. The increased prices led to an increase in ARR target allocations for the 2014/2015, 2015/2016 and 2016/2017 planning periods. Prices dropped for the 2017/2018 planning period as a result of PJM's change in FTR auction modeling which led to an increase in available capacity in the Annual FTR Auction. The reduced prices reflect in the ARR values.

Figure 13-9 Annual FTR Auction volume-weighted average buy bid price: Planning period 2009/2010 through 2017/2018

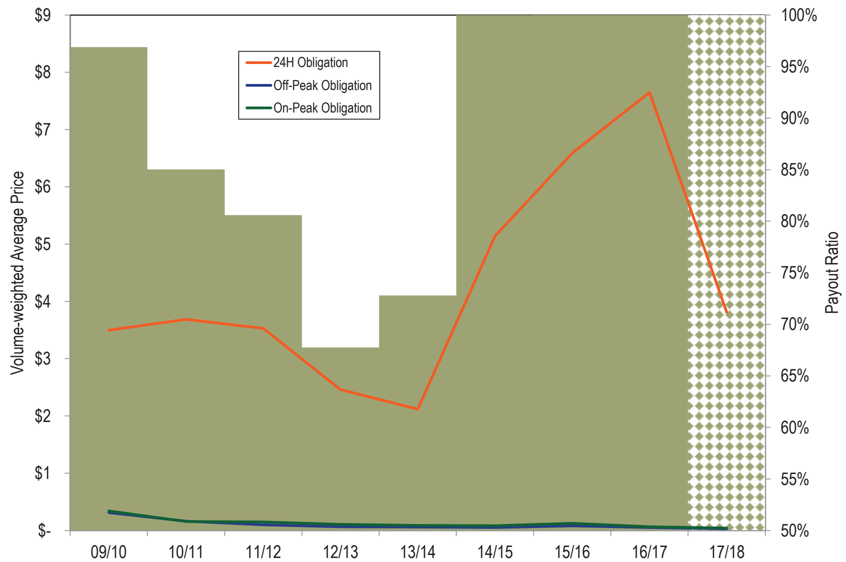


Table 13-29 shows the weighted-average cleared buy-bid prices by trade type, FTR product, FTR direction and class type for the Annual FTR Auction for the 2017/2017 planning period. The weighted-average cleared buy bid price in the 2017/2017 Annual FTR Auction was $0.24 per MW, down from $0.35 per MW in the 2016/2017 planning period.

Table 13-29 Annual FTR Auction weighted-average cleared prices (Dollars per MW): Planning period 2017/2018

			Class Type			
Trade Type	Type	FTR Direction	24-Hour	On Peak	Off Peak	All
Buy bids	Obligations	Counter Flow	($0.27)	($0.35)	($0.21)	($0.28)
		Prevailing Flow	$1.14	$0.62	$0.38	$0.52
		Total	$0.57	$0.21	$0.13	$0.18
	Options	Counter Flow	$0.00	$0.00	$0.00	$0.00
		Prevailing Flow	$0.71	$0.43	$0.25	$0.35
		Total	$0.71	$0.43	$0.25	$0.35
Self-scheduled bids	Obligations	Counter Flow	($0.04)	NA	NA	($0.04)
		Prevailing Flow	$0.76	NA	NA	$0.76
		Total	$0.69	NA	NA	$0.69
Buy and self-scheduled bids	Obligations	Counter Flow	($0.19)	($0.35)	($0.21)	($0.28)
		Prevailing Flow	$0.83	$0.62	$0.38	$0.55
		Total	$0.66	$0.21	$0.13	$0.23
	Options	Counter Flow	$0.00	$0.00	$0.00	$0.00
		Prevailing Flow	$0.71	$0.43	$0.25	$0.35
		Total	$0.71	$0.43	$0.25	$0.35
Sell offers	Obligations	Counter Flow	($0.59)	($0.52)	($0.33)	($0.43)
		Prevailing Flow	$1.36	$0.40	$0.27	$0.35
		Total	$0.26	$0.07	$0.06	$0.07
	Options	Counter Flow	NA	NA	NA	NA
		Prevailing Flow	$0.00	$0.47	$0.35	$0.41
		Total	$0.00	$0.47	$0.35	$0.41

Table 13-30 shows the weighted-average cleared buy-bid price in the Monthly Balance of Planning Period FTR Auctions by bidding period for January through June 2017. For example, for the January 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 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 June 2017 was $0.10 per MW, down from $0.13 per MW in the same time last year, a 23.1 percent decrease in FTR prices. The cleared weighted-average price for the current planning period was $0.12, down 7.7 percent from $0.13 for the same time period during the previous planning period.

Table 13-30 Monthly Balance of Planning Period FTR Auction cleared, weighted-average, buy-bid price per period (Dollars per MW): January through June, 2017

Monthly Auction	Prompt Month	Second Month	Third Month	Q1	Q2	Q3	Q4	Total
Jan-17	$0.14	$0.23	$0.05				$0.09	$0.13
Feb-17	$0.07	$0.09	$0.05				$0.06	$0.07
Mar-17	$0.09	$0.12	$0.13				$0.02	$0.09
Apr-17	$0.09	$0.10					$0.00	$0.10
May-17	$0.06						$0.00	$0.06
Jun-17	$0.07	$0.14	$0.11	$0.15	$0.11	$0.20	$0.11	$0.12

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.

The fact that FTRs have been consistently profitable for financial entities regardless of the payout ratio raises questions about the competitiveness of the market. It is not clear, in a competitive market, why FTR purchases by financial entities remain persistently profitable. In a competitive market, it would be expected that profits would be competed to zero or a de minimis level.

Table 13-31 lists FTR profits by organization type and FTR direction for the 2016/2017 planning period. Some participants classified as physical, such as a company that holds one generator, are not eligible for ARRs but do have a physical presence on the PJM system. Such entities would be under the Physical category, while any entity that holds an ARR will be under the Physical ARR Holder category. FTR profits are the sum of the daily FTR target allocations, including for self scheduled FTRs, adjusted by the payout ratio 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 FTR credits also do not include any excess congestion revenue distributions made at the end of the planning period. 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. FTR profitability is the difference between the revenue received for an FTR and the cost of the FTR. In the 2016/2017 planning period, companies made profits of $26.2 million, largely due to $152.9 million from self scheduled FTRs, which are zero cost, and $282.6 million from counter flow FTRs. In net only physical ARR holders were profitable for the 2016/2017 planning period due to self scheduled FTRs. Revenues from self scheduled FTRs are more accurately described as a return of congestion rather than profits.

Table 13-31 FTR profits by organization type and FTR direction for the 2016/2017 planning period

	FTR Direction				
Organization Type	Prevailing Flow	Self Scheduled Prevailing Flow	Counter Flow	Self Scheduled Counter Flow	All
Financial	($224,589,894)	NA	$211,070,070	NA	($13,519,824)
Physical	($51,761,952)	NA	$40,522,808	NA	($11,239,145)
Physical ARR Holder	($132,731,682)	$152,896,502	$31,015,348	($234,468)	$50,945,701
Total	($409,083,528)	$152,896,502	$282,608,226	($234,468)	$26,186,732

Table 13-32 lists the monthly FTR profits for the 2016/2017 and 2017/2018 planning periods by organization type.

Table 13-32 Monthly FTR profits by organization type for the 2016/2017 and 2017/2018 planning periods

	Organization Type			
Month	Physical	Physical ARR Holders	Financial	Total
Jun-16	($2,861,362)	$11,479,035	($6,163,265)	$2,454,408
Jul-16	$289,899	$31,469,056	$570,363	$32,329,318
Aug-16	$3,152,454	$14,805,612	$9,898,169	$27,856,234
Sep-16	$5,595,192	$48,212,525	$12,909,228	$66,716,944
Oct-16	$4,111,015	$54,156,867	($3,486,077)	$54,781,805
Nov-16	($3,395,815)	($3,164,053)	($8,477,147)	($15,037,015)
Dec-16	($540,576)	($11,109,102)	($6,540,942)	($18,190,621)
Jan-17	($1,748,872)	($10,641,034)	$82,092	($12,307,814)
Feb-17	($2,264,649)	($1,608,316)	$3,282,949	($590,017)
Mar-17	($3,884,155)	($1,226,096)	($673,693)	($5,783,943)
Apr-17	($5,227,387)	($42,835,333)	($7,180,585)	($55,243,305)
May-17	($4,464,887)	($38,593,461)	($7,740,915)	($50,799,263)
Summary for Planning Period 2016/2017				
Total	($11,239,145)	$50,945,701	($13,519,824)	$26,186,732
Jun-17	$13,557,448	$1,226,459	$36,311,598	$51,095,505
Summary for Planning Period 2017/2018				
Total	$13,557,448	$1,226,459	$36,311,598	$51,095,505

Table 13-33 lists the historical profits by calendar year by organization type beginning in the 2012/2013 planning period. The profits include any end of planning period excess distribution or uplift that will impact total profitability.

Table 13-33 Planning period FTR profits by organization type: 2012/2013 through 2017/2018 planning periods

		2012/2013	2013/2014	2014/2015	2015/2016	2016/2017	2017/2018*
Financial	Profit	$63,457,511	$557,583,317	$236,692,290	$41,264,165	($13,519,824)	$13,557,448
	Excess	($80,450,357)	($256,820,253)	$44,410,625	$11,897,525	$20,968,663	
	Total	($16,992,846)	$300,763,064	$281,102,915	$53,161,690	$7,448,839	$13,557,448
Physical	Profit	($25,069,434)	$217,693,500	$65,085,246	($16,904,899)	($11,239,145)	$1,226,459
	Excess	($83,332,665)	($104,947,376)	$14,485,066	$5,072,985	$10,533,444	
	Total	($108,402,099)	$112,746,125	$79,570,312	($11,831,914)	($705,701)	$1,226,459
Physical ARR	Profit	$132,630,382	$594,766,545	$444,764,762	$250,258,035	$50,945,701	$36,311,598
	Excess	($128,497,763)	($316,929,138)	$80,692,482	$25,484,394	$44,883,161	
	Total	$4,132,619	$277,837,407	$525,457,245	$275,742,429	$95,828,862	$36,311,598
Total		($121,262,326)	$691,346,596	$886,130,472	$317,072,206	$102,572,000	$51,095,505

* One month of the 2017/2018 planning period

Revenue

Long Term FTR Auction Revenue

Table 13-34 shows the Long Term FTR Auction revenue data by trade type, FTR direction, period type and class type. The 2017/2020 Long Term FTR Auction netted $26.7 million in revenue, $3.5 million more than the previous Long Term FTR Auction. Buyers paid $48.4 million and sellers received $21.7 million, down $12.0 million and $15.4 million over the previous Long Term FTR Auction. In general, revenue increased $3.5 million over the previous Long Term FTR Auction, with counter flow buy bid revenue decreasing 3.9 percent and prevailing flow buy bid revenue decreasing 6.9 percent.

Table 13-34 Long Term FTR Auction Revenue: Planning periods 2017/2020

			Class Type			
Trade Type	FTR Direction	Period Type	24-Hour	On Peak	Off Peak	All
Buy bids	Counter Flow	Year 1	($13,865,196)	($52,361,573)	($37,364,286)	($103,591,055)
		Year 2	($7,761,389)	($43,553,743)	($37,548,472)	($88,863,605)
		Year 3	($5,005,407)	($28,000,602)	($25,397,031)	($58,403,039)
		Year All	$0	($319,141)	($176,332)	($495,473)
		Total	($26,631,992)	($124,235,058)	($100,486,121)	($251,353,171)
	Prevailing Flow	Year 1	$6,795,665	$67,652,677	$44,562,449	$119,010,791
		Year 2	$5,662,333	$57,741,990	$49,101,454	$112,505,777
		Year 3	$2,860,593	$35,206,352	$30,170,444	$68,237,390
		Year All	$6,961	$10,816	$15,524	$33,301
		Total	$15,325,553	$160,611,835	$123,849,872	$299,787,259
	Total		($11,306,439)	$36,376,777	$23,363,751	$48,434,088
Sell offers	Counter Flow	Year 1	($2,553,051)	($8,658,617)	($7,007,072)	($18,218,739)
		Year 2	($666,560)	($3,101,121)	($2,656,749)	($6,424,429)
		Year 3	0	($158,053)	($142,046)	($300,099)
		Year All	NA	NA	NA	NA
		Total	($3,219,610)	($11,917,790)	($9,805,868)	($24,943,268)
	Prevailing Flow	Year 1	$1,026,067	$14,286,980	$8,408,061	$23,721,107
		Year 2	$699,642	$10,531,252	$9,695,363	$20,926,257
		Year 3	11,648	$1,206,188	$792,342	$2,010,177
		Year All	NA	NA	NA	NA
		Total	$1,737,356	$26,024,420	$18,895,765	$46,657,541
	Total		($1,482,254)	$14,106,630	$9,089,897	$21,714,273
Total			($9,824,185)	$22,270,147	$14,273,853	$26,719,815

Annual FTR Auction Revenue

Table 13-35 shows the Annual FTR Auction revenue by trade type, type, FTR direction and class type. The Annual FTR Auction for the 2017/2018 planning period generated $542.2 million, down 40.4 percent from $909.0 million in the 2016/2017 planning period, and down 42.3 percent from $936.3 million in the 2015/2016 planning period. Counter flow FTR holders received $233.0 million, down 8.9 percent from the previous planning period and prevailing flow FTR holders paid $765.3 million, down 34.3 percent from the previous planning period.

Table 13-35 Annual FTR Auction revenue: Planning period 2017/2018

			Class Type			
Trade Type	Type	FTR Direction	24-Hour	On Peak	Off Peak	All
Buy bids	Obligations	Counter Flow	($8,029,201)	($145,788,774)	($94,420,672)	($248,238,646)
		Prevailing Flow	$50,055,711	$351,302,730	$223,789,478	$625,147,919
		Total	$42,026,509	$205,513,957	$129,368,807	$376,909,273
	Options	Counter Flow	$0	$0	$0	$0
		Prevailing Flow	$76,728	$19,194,704	$10,307,477	$29,578,910
		Total	$76,728	$19,194,704	$10,307,477	$29,578,910
	Total	Counter Flow	($8,029,201)	($145,788,774)	($94,420,672)	($248,238,646)
		Prevailing Flow	$50,132,439	$370,497,434	$234,096,956	$654,726,829
		Total	$42,103,238	$224,708,661	$139,676,284	$406,488,182
Self-scheduled bids	Obligations	Counter Flow	($750,762)	NA	NA	($750,762)
		Prevailing Flow	$149,488,947	NA	NA	$149,488,947
		Total	$148,738,185	NA	NA	$148,738,185
Buy and self-scheduled bids	Obligations	Counter Flow	($8,779,963)	($145,788,774)	($94,420,672)	($248,989,408)
		Prevailing Flow	$199,544,657	$351,302,730	$223,789,478	$774,636,866
		Total	$190,764,694	$205,513,957	$129,368,807	$525,647,458
	Options	Counter Flow	$0	$0	$0	$0
		Prevailing Flow	$76,728	$19,194,704	$10,307,477	$29,578,910
		Total	$76,728	$19,194,704	$10,307,477	$29,578,910
	Total	Counter Flow	($8,779,963)	($145,788,774)	($94,420,672)	($248,989,408)
		Prevailing Flow	$199,621,386	$370,497,434	$234,096,956	$804,215,776
		Total	$190,841,423	$224,708,661	$139,676,284	$555,226,367
Sell offers	Obligations	Counter Flow	($1,992,236)	($14,801,307)	($9,158,120)	($25,951,663)
		Prevailing Flow	$3,519,716	$20,025,225	$14,466,957	$38,011,899
		Total	$1,527,480	$5,223,918	$5,308,838	$12,060,235
	Options	Counter Flow	$0	$0	$0	$0
		Prevailing Flow	$0	$572,540	$373,021	$945,560
		Total	$0	$572,540	$373,021	$945,560
	Total	Counter Flow	($1,992,236)	($14,801,307)	($9,158,120)	($25,951,663)
		Prevailing Flow	$3,519,716	$20,597,765	$14,839,978	$38,957,459
		Total	$1,527,480	$5,796,458	$5,681,858	$13,005,796
Total			$189,313,943	$218,912,203	$133,994,426	$542,220,572

The total net of all buy and sell offers, not including self scheduled FTRs, was $606.8 million for the 2016/2017 planning period and $393.5 million for the 2017/2018 planning period, a 35.2 percent reduction in revenue. The total buy bids were 393,509.0 MW for the 2016/2017 planning period and 488,734.1 MW for the 2017/2018 planning period. The value of FTRs per MW decreased from $1,564.83 for the 2016/2017 planning period to $831.72 for the 2017/2018 planning period, a 46.8 percent decrease. The expected return to load from the redefinition of balancing congestion did not occur. Load receives lower ARR revenues in addition to the fact that load has to bear 100 percent of the costs of balancing congestion.

Table 13-36 provides a comparison of FTR auction net revenue raised by PJM in Long Term FTR Auctions versus the Annual FTR Auction for the 2014/2015 through 2017/2018 planning periods. Despite the fact that the volume of FTRs traded in Long Term FTR Auctions is similar to the volume in Annual FTR Auctions, for these planning periods, average buy bid Long Term FTR Auction revenue was only 3.0 percent of the buy bid Annual FTR Auction revenue. In properly functioning market, the Long Term FTR Auction revenue should be comparable to the Annual FTR Auction revenue, especially since the long term FTR volume is close to annual FTR volume.

Table 13-36 FTR Auction net revenue: Long Term FTR Auction compared to Annual FTR Auction

	Long Term FTR Product					
Planning Period	Year 3	Year 2	Year 1	Total Long Term	Annual (including self scheduled)	Long Term Percent of Total Net Revenue
2014/2015	$13,016,512	$7,176,209	$6,863,135	$27,055,856	$735,998,448	3.5%
2015/2016	$12,479,874	$7,378,550	$5,156,206	$25,014,630	$893,043,415	2.7%
2016/2017	$7,624,149	$2,105,984	$11,087,250	$20,817,382	$861,031,182	2.4%
2017/2018	$1,670,521	$7,210,445	$9,763,312	$18,644,279	$513,587,222	3.5%

FTRs sold in Long Term FTR Auctions are sold at a substantial discount to the same FTR sold in an Annual FTR Auction. Table 13-37 shows the increase in total auction revenue that would have resulted for the 2014/2015 through 2017/2018 planning periods if long term FTRs were sold at annual auction clearing prices. This $337 million represents a loss in revenue which should go to ARR holders. This also raises questions, together with the high degree of concentration in the three year FTR product, about whether PJM should continue to sell Long Term FTRs.

Table 13-37 Estimated additional Long Term FTR Auction revenue at Annual FTR Auction prices

	Long Term FTR Product				
Planning Period	Year 3	Year 2	Year 1	Three-year	Total Difference
2014/2015	$59,598,642	$30,284,173	$52,030,909	$926,989	$142,840,713
2015/2016	$67,896,588	$40,975,278	$9,936,078	$303,082	$119,111,026
2016/2017	$42,378,048	$3,854,373	$11,055,824	$1,079,901	$58,368,147
2017/2018	$6,134,076	($1,841,715)	$12,396,817	$227,524	$16,916,702
Total	$176,007,354	$73,272,109	$85,419,628	$2,537,496	$337,236,587

Monthly Balance of Planning Period FTR Auction Revenue

Table 13-38 shows Monthly Balance of Planning Period FTR Auction revenue by trade type, type and class type for January through June 2017. The Monthly Balance of Planning Period FTR Auctions for the 2016/2017 planning period netted $32.5 million in revenue, the difference between buyers paying $158.3 million and sellers receiving $125.7 million for the 2016/2017 planning period. For the entire 2015/2016 planning period, the Monthly Balance of Planning Period FTR Auctions netted $31.8 million in revenue with buyers paying $263.5 million and sellers receiving $231.7 million.

Table 13-38 Monthly Balance of Planning Period FTR Auction revenue: 2017

			Class Type			
Monthly Auction	Type	Trade Type	24-Hour	On Peak	Off Peak	All
Jan-17	Obligations	Buy bids	$2,064,395	$3,326,398	$1,880,556	$7,271,349
		Sell offers	($1,166,330)	$2,100,570	$568,999	$1,503,239
	Options	Buy bids	$0	$436,831	$124,595	$561,427
		Sell offers	$14,107	$2,241,105	$1,851,251	$4,106,463
Feb-17	Obligations	Buy bids	$19,605	$2,333,806	$1,386,196	$3,739,608
		Sell offers	($73,596)	($379,460)	($408,832)	($861,888)
	Options	Buy bids	$0	$112,477	$48,121	$160,598
		Sell offers	$10,443	$1,587,969	$1,091,908	$2,690,320
Mar-17	Obligations	Buy bids	($931,344)	$4,194,358	$2,656,930	$5,919,943
		Sell offers	($28,037)	$3,554,009	$632,253	$4,158,225
	Options	Buy bids	$0	$281,337	$130,792	$412,129
		Sell offers	$5,795	$1,219,568	$675,806	$1,901,170
Apr-17	Obligations	Buy bids	$56,196	$2,794,792	$1,942,194	$4,793,183
		Sell offers	($424,330)	$1,893,838	$1,219,145	$2,688,653
	Options	Buy bids	$1	$170,667	$70,317	$240,985
		Sell offers	$5,510	$837,677	$642,171	$1,485,359
May-17	Obligations	Buy bids	($148,725)	$1,298,130	$954,626	$2,104,031
		Sell offers	($18,257)	$596,555	$356,062	$934,361
	Options	Buy bids	$0	$10,894	$10,626	$21,520
		Sell offers	$1,172	$470,594	$320,693	$792,459
Jun-17	Obligations	Buy bids	$1,449,554	$12,156,206	$5,881,196	$19,486,956
		Sell offers	$263,150	$6,840,938	$3,132,765	$10,236,854
	Options	Buy bids	$189	$308,906	$167,990	$477,085
		Sell offers	$20,477	$3,257,891	$1,572,561	$4,850,929
2015/2016*	Obligations	Buy bids	$19,822,319	$132,789,349	$90,651,090	$243,262,758
		Sell offers	($3,279,132)	$105,708,110	$76,816,631	$179,245,609
	Options	Buy bids	$34,213	$12,353,013	$7,822,858	$20,210,083
		Sell offers	$237,496	$30,375,844	$21,799,523	$52,412,863
	Net Total		$22,898,168	$9,058,407	($142,207)	$31,814,368
2016/2017**	Obligations	Buy bids	$33,300,850	$74,471,786	$35,210,649	$142,983,284
		Sell offers	$1,054,010	$54,037,503	$22,053,221	$77,144,734
	Options	Buy bids	$370,193	$9,383,661	$5,521,874	$15,275,728
		Sell offers	$587,564	$29,503,924	$18,494,976	$48,586,464
	Net Total		$32,029,469	$314,020	$184,325	$32,527,815

* Shows Twelve Months; ** Shows Twelve Months

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 2016/2017 planning period. Figure 13-10 shows the 10 largest positive and negative FTR target allocations, summed by sink, for the 2016/2017 planning period. The top 10 sinks that produced financial benefit accounted for 47.9 percent of total positive target allocations during the 2016/2017 planning period with the Northern Illinois Hub accounting for 14.6 percent of all positive target allocations. The top 10 sinks that created liability accounted for 17.4 percent of total negative target allocations with the PSEG Zone accounting for 2.9 percent of all negative target allocations.

Figure 13-10 Ten largest positive and negative FTR target allocations summed by sink: 2016/2017 planning period

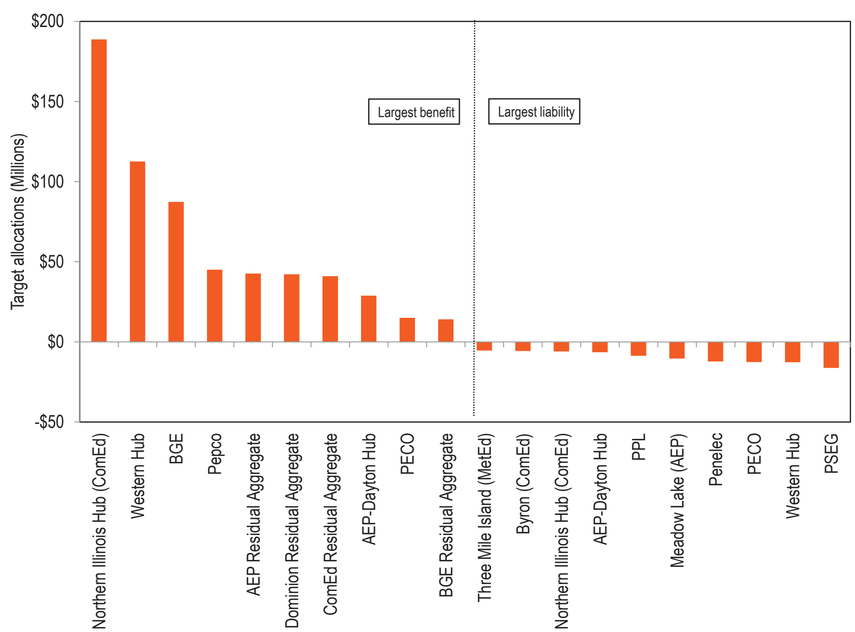
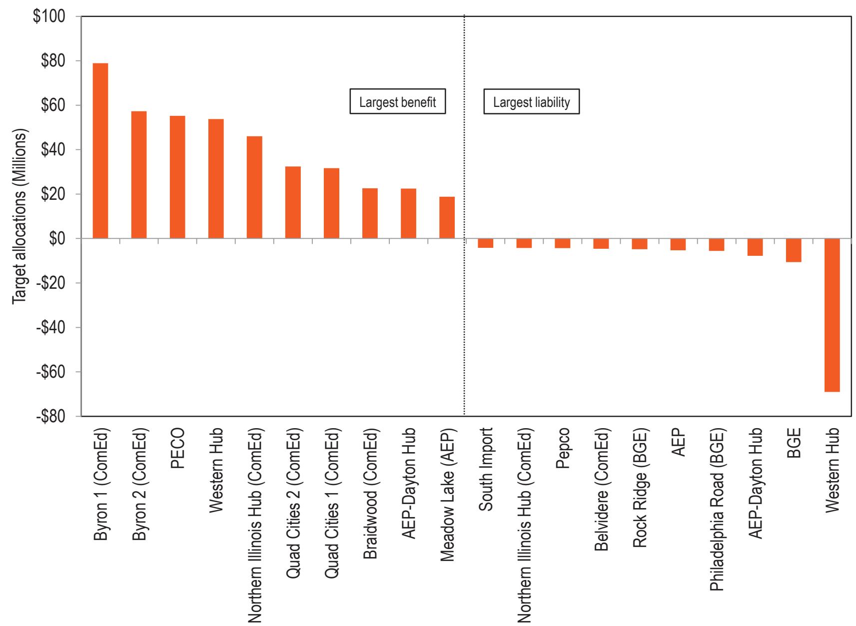


Figure 13-11 shows the 10 largest positive and negative FTR target allocations, summed by source, for the 2016/2017 planning period. The top 10 sources with a positive target allocation accounted for 32.5 percent of total positive target allocations with Byron accounting for 6.1 percent of total positive target allocations. The top 10 sources with a negative target allocation accounted for 21.7 percent of all negative target allocations, with the Western Hub accounting for 12.5 percent.

Figure 13-11 Ten largest positive and negative FTR target allocations summed by source: 2016/2017 planning period



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. 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, is assigned 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.[31] That is the source of the congestion revenue to pay holders of ARRs and 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 ARRs/FTRs as an offset against total congestion. Revenue adequacy is a narrower concept that compares total congestion revenues, including day-ahead and balancing congestion, to the total target allocations, based only on day-ahead congestion, 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 ARRs/FTRs as an offset for load against congestion compares ARR and self scheduled FTR revenues to total congestion on the system.

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. For example, 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. 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. For example, the 2013 to 2014 planning period was not revenue adequate, and thus this uplift charge was collected from FTR participants. There was excess congestion revenue at the end of the 2014 to 2015 planning period, which was distributed to FTR participants in the same manner that the FTR uplift is applied.

FTR revenues are primarily comprised of hourly congestion revenue, from the day-ahead and balancing markets.[32] FTR revenues also include ARR excess revenues, which equal the difference between ARR target allocations and FTR auction revenues, and negative FTR target allocations, which are a source of revenue 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 13-39 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.[33]

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 nonmonitoring RTO's real-time market flow is greater than their FFE plus the approved MW adjustment from day-ahead coordination, then the nonmonitoring RTO will pay the monitoring

31 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."

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

33 See "Joint Operating Agreement between the Midwest Independent System Operator, Inc. and PJM Interconnection, L.L.C." (December 11, 2008), Section 6.1 <http://pjm.com/media/documents/merged-tariffs/miso-joa.pdf>. (Accessed February 23, 2016)

RTO based on the difference between their market flow and their FFE. If the nonmonitoring 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 nonmonitoring RTO for congestion relief provided by the non-monitoring RTO based on the difference between the nonmonitoring RTO's market flow and their FFE.

For the 2014/2015, 2015/2016 and the 2016/2017 planning periods, PJM paid MISO and NYISO a combined $33.2 million, $41.5 million and $43.5 million for redispatch on the designated M2M flowgates. 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 2014/2015 and 2015/2016 planning periods. Congestion revenues are allocated to FTR holders based on FTR target allocations. PJM collected $1,457.1 million, $1,003.3 million and $828.7 million of FTR revenues during the 2014/2015, 2015/2016 and the 2016/2017 planning periods. 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 2015/2016 planning period, the top sink and top source with the highest positive FTR target allocations were the Northern Illinois Hub and Byron. The top sink and top source with the largest negative FTR target allocation was PSEG and the Western Hub.

This high level of revenue adequacy was primarily due to actions taken by PJM to address prior low levels of revenue adequacy. PJM's actions included PJM's assumption of higher outage levels and PJM's decision to include additional constraints (closed loop interfaces) both of which reduced system capability in the FTR auction model. PJM's actions led to a significant reduction in the allocation of Stage 1B and Stage 2 ARRs. For the 2014/2015 planning period, Stage 1B and Stage 2 ARR allocations were reduced by 84.9 percent and 88.1 percent from the 2013/2014 planning period. For the 2015/2016 planning period, Stage 1B and Stage 2 ARR allocations were reduced by 76.9 percent and 82.0 percent from the 2013/2014 planning period. The result of this change in modeling was also that available FTR capacity decreased for the planning period. This decrease resulted in an increase in FTR nodal prices for the Annual FTR Auction. The result was fewer available ARRs, but an increased dollar per MW value for those ARRs.

Table 13-39 presents the PJM FTR revenue detail for the 2015/2016 planning period and the 2016/2017 planning period.

Table 13-39 Total annual PJM FTR revenue detail (Dollars (Millions)): Planning periods 2015/2016 and 2016/2017

Accounting Element	2015/2016	2016/2017
ARR information		
ARR target allocations	$963.5	$934.3
FTR auction revenue	$993.1	$962.2
ARR excess	$29.6	$27.9
FTR targets		
Positive target allocations	$1,148.8	$929.1
Negative target allocations	($209.1)	($194.1)
FTR target allocations	$939.7	$735.0
Adjustments:		
Adjustments to FTR target allocations	($0.3)	($0.4)
Total FTR targets	$939.4	$734.6
FTR revenues		
ARR excess	$29.6	$27.9
Congestion		
Net Negative Congestion (enter as negative)	($25.2)	($16.9)
Hourly congestion revenue	$1,021.0	$843.6
Midwest ISO M2M (credit to PJM minus credit to Midwest ISO)	($41.5)	($43.5)
Adjustments:		
Excess revenues carried forward into future months	$21.5	$20.4
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	$21.5	$20.4
Net Negative Congestion charged to DA Operating Reserves	$0.0	$0.0
Total FTR congestion credits	$1,003.3	$828.7
Total congestion credits on bill (includes CEPSW and end-of-year distribution)	$1,003.3	$828.7
Remaining deficiency	($39.2)	($67.7)

FTR target allocations are based on hourly prices in the Day-Ahead Energy Market for FTR paths and are defined to be the revenue required to compensate FTR holders for day-ahead congestion on those paths. FTR credits are paid to FTR holders and, depending on market conditions, can be less than the target allocations. Table 13-40 lists the FTR revenues, target allocations, credits, payout ratios, congestion credit deficiencies and excess 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 13-40 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. September 2016 and October 2016 had revenue shortfalls totaling $2.6 million and $6.1 million, but were fully funded using excess revenue from previous months.

Table 13-40 Monthly FTR accounting summary (Dollars (Millions)): Planning period 2015/2016 and 2016/201

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-16	$60.5	$55.1	100.0%	$60.5	100.0%	($5.4)
Jul-16	$112.1	$87.1	100.0%	$112.1	100.0%	($24.9)
Aug-16	$110.9	$82.2	100.0%	$110.9	100.0%	($28.7)
Sep-16	$117.7	$120.4	97.7%	$120.4	100.0%	$2.6
Oct-16	$104.9	$110.9	94.5%	$110.9	100.0%	$6.1
Nov-16	$45.7	$38.2	100.0%	$45.7	100.0%	($7.4)
Dec-16	$52.9	$42.3	100.0%	$52.9	100.0%	($10.7)
Jan-17	$61.1	$44.0	100.0%	$61.1	100.0%	($17.1)
Feb-17	$47.5	$51.8	91.7%	$51.8	100.0%	$0.0
Mar-17	$44.4	$48.9	90.8%	$48.9	100.0%	$0.0
Apr-17	$28.0	$25.3	100.0%	$28.0	100.0%	($2.6)
May-17	$25.6	$28.4	90.3%	$28.4	100.0%	
Summary for Planning Period 2016/2017						
Total	$811.3	$734.5		$831.5		($88.1)
Jun-17	$64.1	$60.1	100.0%	$64.1	100.0%	($4.0)
Summary for Planning Period 2017/2018						
Total	$64.1	$60.1		$64.1		($4.0)

Figure 13-12 shows the original PJM reported FTR payout ratio by month, excluding excess revenue distribution, for January 2004 through June 2017. 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 ratio for revenue inadequate months in the current 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 1, 2004 through June 30, 2017

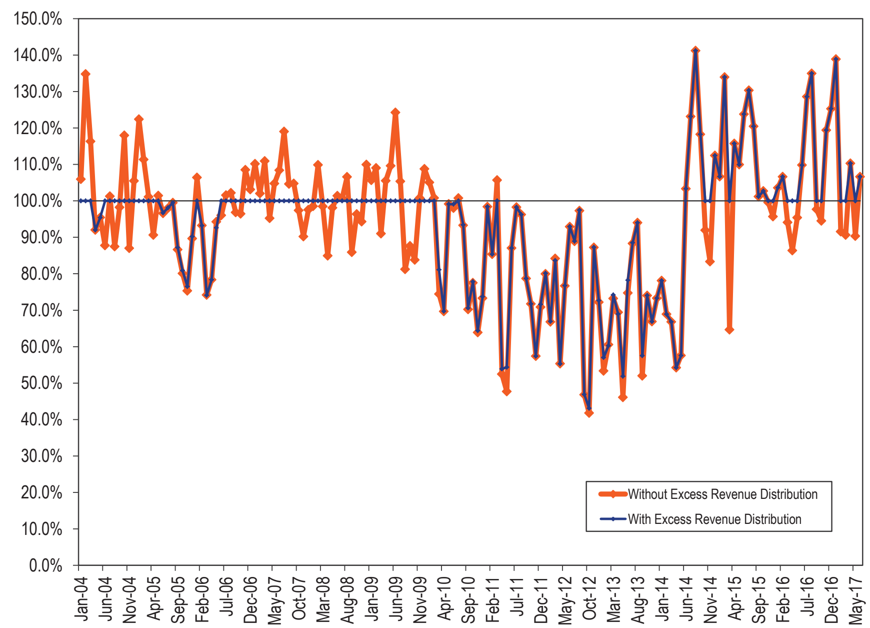


Table 13-41 shows the FTR payout ratio by planning period from the 2003/2004 planning period forward. Planning period 2013/2014 includes the additional revenue from unallocated congestion charges from Balancing Operating Reserves. For the 2014/2015, 2015/2016 and 2016/2017 planning periods, there was excess congestion revenue to pay target allocations resulting in a payout ratio of 116.2 percent, 106.8 and 113.1 percent for the planning periods. This excess will be distributed to all FTR participants, pro rata, based on their net positive target allocations.

Table 13-41 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%
2015/2016	100.0%
2016/2017	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 13-42 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 10 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 13-42 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)	$0.00	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

The current ARR/FTR design does not serve as an efficient way to ensure that load receives all the congestion revenues or has the ability to receive the auction revenues associated with all the potential congestion revenues. There are several reasons for the disconnect between congestion revenues and ARR/FTR revenues. The reasons include unavoidable modeling differences, avoidable modeling differences, such as outage modeling decisions, cross subsidies among and between FTR participants ARR holders and the construction of the Stage 1A ARR system which is based on historical, rather than physical, pathways.

The issuance of the September 15, 2016, FERC order increases the gap between congestion revenue and ARR/FTR revenue collected. Allocating balancing congestion and M2M payments, along with allocating excess congestion revenue to FTR holders solely, increases revenue adequacy for FTRs, but reduces payments to load and increases costs to load, undermining the ability of load to offset their congestion costs. Supporting FTR portfolio netting leads to cross subsidies among FTR participants. Restructuring Stage 1A allocations using QRRs for retired resources is an attempt to fix a flawed system, but retains the core problem which is reliance on contract path congestion revenue rights. The accepted rule change does not address the problem with using contract paths, does not address the deficiencies for active units and gives priority to units based on financial, not physical, determinations. The purpose of the FTR/ARR system is to return congestion revenue to load. The current and newly accepted rules do not meet this goal.

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. Elimination of portfolio netting would correctly account for negative target allocations as a source of revenue to pay positive target allocations. It would also apply the payout ratio directly to a participant's positive target allocations before subtracting negative target allocations, rather than applying the payout ratio to a participant's net portfolio. Applying the payout ratio to a participant's net portfolio, results in unequal payout ratios depending on a participant's portfolio construction.

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 13-43 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. In this example, there was $45 in congestion revenue collected, which results in a payout ratio of 39.1 percent for positive target allocations when ignoring any contribution by negative or net negative target allocations. With portfolio netting, the total revenue available to pay positive target allocations is $50, which is the $45 in congestion collected plus the $5 generated by the net negative target allocation of Participant 4, which results in a payout ratio of 41.7 percent for net positive target allocations. Without portfolio netting there is $110 in total revenue available, which is the $45 in congestion collected plus the $65 in negative target allocations from all participants, which results in a payout ratio of 61.1 percent for positive target allocations.

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 13-43 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 13-44 Monthly positive and negative target allocations and payout ratios with and without hourly netting: Planning period 2015/2016 and 2016/2017

	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-16	$66,890,503	($11,761,810)	$145,725,072	($90,578,663)	$60,547,574	100.0%	100.0%
Jul-16	$103,067,704	($15,947,225)	$234,908,328	($147,750,891)	$112,060,353	100.0%	100.0%
Aug-16	$106,463,071	($24,309,023)	$270,738,798	($188,528,046)	$110,872,528	100.0%	100.0%
Sep-16	$143,711,526	($23,349,848)	$334,869,805	($214,320,300)	$120,361,723	100.0%	100.0%
Oct-16	$140,704,976	($29,766,159)	$322,466,349	($211,484,113)	$110,938,816	100.0%	100.0%
Nov-16	$50,418,317	($12,156,919)	$124,242,433	($85,964,032)	$45,658,421	100.0%	100.0%
Dec-16	$58,101,556	($15,818,469)	$164,917,652	($122,634,566)	$52,937,720	100.0%	100.0%
Jan-17	$57,634,209	($13,628,839)	$155,454,345	($111,435,198)	$61,102,571	100.0%	100.0%
Feb-17	$62,493,872	($10,637,939)	$164,114,064	($112,258,132)	$51,847,372	100.0%	100.0%
Mar-17	$61,368,268	($12,419,714)	$176,027,074	($128,158,531)	$48,948,554	100.0%	100.0%
Apr-17	$35,192,270	($9,847,881)	$120,235,928	($94,891,539)	$27,953,520	100.0%	100.0%
May-17	$43,648,904	($14,920,644)	$145,660,505	($116,932,244)	$28,356,564	100.0%	100.0%
2015/2016 Total	$1,148,845,079	($206,167,602)	$2,970,405,028	($2,030,832,071)	$1,003,307,668	100.0%	100.0%
2016/2017 Total	$929,695,176	($194,564,470)	$2,359,360,352	($1,624,936,255)	$831,585,716	100.0%	100.0%

Table 13-44 shows the total value for the 2015/2016 and 2016/2017 planning periods 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 2013/2014 planning period would have been 87.5 percent instead of the reported 72.8. For the 2014/2015, 2015/2016 and 2016/2017 planning periods there was no revenue inadequacy, so eliminating portfolio netting would have no effect. September 2016 experienced revenue inadequacy, but excess revenue was distributed from previous months to ensure full funding. For months with no revenue inadequacies there is no change in payout ratio.

Portfolio Dependent Payout Ratio

Under the current portfolio netting rules, negative target allocations are first netted against positive, and then the payout ratio is applied. This results in two significant problems with the current method. First is that a participant can shield itself from both monthly revenue inadequacy and the end of planning period uplift charge by shrinking the size of their positive target allocations. This is advantageous because the participant can still be profiting from their negative target allocations if they are paid to take counter flow positions and pay back less than they received. Additionally, it results in positive target allocations receiving different payout ratios depending on the composition of the portfolio they are in. All positive target allocation FTR should be treated equally, regardless of the portfolio they are in, and this can only be accomplished by eliminating portfolio netting. Not treating all FTRs equally results in participants with more negative target allocations receiving a subsidy by reducing the effective payout ratio to participants with fewer negative target allocations. The reduced payouts to participants with fewer negative target allocations subsidize increased payout ratios to participants with larger negative target allocations, and is an unbalanced distribution of available congestion revenue collected.

Table 13-45 Change in positive target allocation payout ratio given portfolio construction

	Congestion = $4,750 Net TA = $9,500				With Netting			Without Netting		
Participant	Positive Target Allocations	Negative Target Allocations	Net Target Allocations	Reported Payout Ratio	Congestion Revenue Received	Revenue to Positive TA	Calculated Positive TA Payout Ratio	Congestion Revenue Received	Revenue to Positive TA	Calculated Positive TA Payout Ratio
1	$1,000.00	($750.00)	$250.00	50.0%	$125.00	$875.00	87.5%	($204.55)	$545.45	54.5%
2	$750.00	($200.00)	$550.00	50.0%	$275.00	$475.00	63.3%	$209.09	$409.09	54.5%
3	$8,700.00	$0.00	$8,700.00	50.0%	$4,350.00	$4,350.00	50.0%	$4,745.45	$4,745.45	54.5%
Total	$10,450.00	($950.00)	$9,500.00	-	$4,750.00	$5,700.00	-	$4,750.00	$5,700.00	-

Table 13-45 demonstrates the impact on the payout ratio to positive target allocation FTRs with and without portfolio netting. In the example the total congestion collected is $4,750 and the total net target allocation is $9,500, resulting in a reported payout ratio of 50.0 percent. With portfolio netting, the net target allocation is simply multiplied by the payout ratio to calculate the congestion revenue a participant receives. For Participant 1, this is $250 multiplied by 0.5 for a total revenue received of $125. The revenue to positive TA column is an indication of how much revenue the positive target allocations, which are the only part of a portfolio receiving available revenue, of a participant need to be paid in order to reach the congestion revenue received. For participant 1, they are effectively being paid $875 of their $1,000 so that the congestion revenue received can be $125. Another way to state this is the participant is effectively paying themselves their negative target allocations first, and then receiving revenue based on their net target allocation. The result of this is that Participant 1's positive target allocations are effectively granted a payout ratio of 87.5 percent simply because they hold negative target allocations, while Participant 3, who holds no negative target allocations, is only paid at a 50.0 percent payout ratio.

Without portfolio netting all participants are paid at the same effective payout ratio for their positive target allocations. Counting negative target allocations as a source of revenue raises the payout ratio to 54.5 percent. Without portfolio netting, the payout ratio is first applied to positive target allocations, then the participant's negative target allocations are added. The result of this calculation is that each participant is paid an equal 54.5 percent regardless of their portfolio's negative target allocations. In this example Participant 1 pays ends up paying $204.55 into the congestion pot, in net, while Participant 3 is paid 54.5 percent of the positive target allocations, resulting in a payment of $4,745.45. Eliminating portfolio netting is the only way to treat positive target allocations equally across all portfolios, and eliminates the subsidy positive target allocations holders are paying to negative target allocation holders.

Mathematically Equivalent FTRs

A single FTR can be broken into multiple FTRs. The newly formed set of multiple FTRs can have the same net target allocation as long as the start and end points of the constituent end points are, in net, the same as the original. Opponents of the elimination of FTR netting have claimed that without netting this would no longer be true. However, this assertion does not account for revenues from negative target allocation FTR paths in the mathematically equivalent set of FTRs. Appropriately including these revenues results in mathematical equivalence between the single FTR and that same FTR broken into a constituent set of FTRs with the same start and end point.

Table 13-47 shows the effects on a participant with and without portfolio netting under three distinct scenarios. Table 13-46 provides the day-ahead CLMP values for each node used in the example. In this example, a participant can either buy an FTR position directly from A to B or can break it into individual pieces with the net effect of an FTR from A to B with a net target allocation of $5. In this example, there was $3.60 in congestion collected, due to a payout ratio of 72.0 percent and a total payout in each of the three scenarios of $3.60. This payout amount is simply the payout ratio of 72.0 percent multiplied by the net target allocations of $5 in each scenario.

With the elimination of netting, if the additional revenue created by considering positive and negative target allocations separately is disregarded, it appears as if the payout for the same net FTR is drastically different depending on the composition of the FTR. The results of this mistake are payouts of $3.60, -$0.60 and -$25.80 for the same net FTR in each distinct scenario. However, if the negative target allocations are properly accounted for as a source of revenue when considering congestion collected, the total revenue available increases thereby increasing the payout ratio for each scenario's positive target allocations. The total revenue available is the $3.60 in congestion collected plus the negative target allocations, resulting in revenue available to pay positive target allocations of $3.60, $18.60 and $108.60 with payout ratios to positive target allocations of 72.0 percent (unchanged due to no negative target allocations), 93.0 percent and 98.7 percent. Multiplying these correct payout ratios by the scenario's positive target allocations, and then adding the scenario's negative target allocations results in a net payout of $3.60 for each scenario.

The results of this example demonstrate the mathematical fact that no matter how an FTR path is constructed, as a single FTR or a mathematically equivalent set of FTRs, the total payment the FTR path will be the same. Attempts to disprove this ignore the revenues from the constituent FTR counter flow positions and the resulting change in payout ratio that is experienced by positive target allocations. A net FTR may be constructed in any manner and the resultant total payout will be equivalent with and without portfolio netting.

Table 13-46 Nodal day-ahead CL

Node	DA CLMP
A	$20
B	$25
C	$40
D	$100
E	$10

Table 13-47 Mathematically equivalent FTR payments with and without portfolio netting

FTR Path(s)	Positive TA	Negative TA	Net TA	Available Revenue Netting	Netting Revenue Received	No Netting Revenue Received (Incorrect)	Available Revenue No Netting	Payout Ratio No Netting	Correct No Netting Revenue Received
A-B	$5.00	$0.00	$5.00	$3.60	$3.60	$3.60	$3.60	72.0%	$3.60
A-C, C-B	$20.00	($15.00)	$5.00	$3.60	$3.60	($0.60)	$18.60	93.0%	$3.60
A-C, C-E, E-D, D-B	$110.00	($105.00)	$5.00	$3.60	$3.60	($25.80)	$108.60	98.7%	$3.60

FERC Order on FTRs: Portfolio Netting

On September 15, 2016, FERC decided that PJM's current practice of portfolio netting was just and reasonable.[34] FERC did not agree that portfolio netting led to subsidization of portfolios with counterflow positions. The Market Monitor and PJM demonstrated that eliminating portfolio netting would eliminate a cross subsidy among FTR portfolios without changing the amount of total revenue available revenue to pay to portfolios. Table 13-43, Table 13-44 and Table 13-45 examples demonstrate that portfolio netting in PJM leads to incorrect payments based on participant FTR portfolios. Including portfolio netting in FTR accounting treats FTRs differently depending on the composition of a participant's FTR portfolio.

34 See 156 FERC ¶ 61,180 (2016).

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 13-48 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 13-48 Example implementation of counter flow adjustment metho

	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 revenue inadequacy	($10.00)	$10.00
Profit after revenue inadequacy	($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 13-49 shows the monthly positive, negative and total target allocations.[35] Table 13-49 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 2014/2015, 2015/2016 or 2016/2017 planning periods. 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 as a slight difference in the total revenue and adjusted counter flow total revenue columns for February and March 2017 that were not revenue adequate. The result of this would be $4.3 million in additional revenue generated for the 2015/2016 planning period and an increase of $3.8 million for the 2016/2017 planning period.

35 Reported payout ratio may differ between Table 13-23 and Table 13-28 due to rounding differences when netting target allocations and considering each FTR individually.

The result of removing portfolio netting and applying a payout ratio to counter flow FTRs would increase the calculated payout ratio for the 2013/2014 planning period from the reported 72.8 percent to 91.0 percent. For months with no revenue inadequacies there is no change in payout ratio.

Table 13-49 Counter flow FTR payout ratio adjustment impacts: Planning period 2015/2016 and 2016/2017

	Positive Target Allocations	Negative Target Allocations	Total Target Allocations	Total Congestion Revenue	Reported Payout Ratio*	Total Revenue Available	Adjusted Prevailing Flow Payout Ratio	Adjusted Counter Flow Payout Ratio	Adjusted Counter Flow Revenue Available	Additional Revenue Generated
Jan-17	$155,454,345	($111,435,198)	$44,019,146	$61,102,571	100.0%	$172,537,769	100.0%	100.0%	$172,537,769	$0
Feb-17	$164,114,064	($112,258,132)	$51,855,933	$47,485,194	91.6%	$159,743,326	100.0%	100.0%	$161,202,653	$1,459,327
Mar-17	$176,027,074	($128,158,531)	$47,868,543	$44,355,740	92.7%	$172,514,271	100.0%	100.0%	$173,686,238	$1,171,967
Apr-17	$120,235,925	($94,891,539)	$25,344,386	$27,953,520	100.0%	$122,845,060	100.0%	100.0%	$122,845,060	$0
May-17	$145,660,505	($116,932,244)	$28,728,260	$25,612,240	89.2%	$142,544,484	100.0%	100.0%	$143,609,312	$1,064,828
Jun-17	$166,308,515	($106,169,103)	$60,139,412	$64,123,168	100.0%	$170,292,272	100.0%	100.0%	$170,292,272	$0
Total 2015/2016	$2,970,404,365	($2,030,831,660)	$939,572,706	$1,002,235,633	100.0%	$3,033,067,292	100.0%	100.0%	$3,037,387,376	$4,320,084
Total 2016/2017	$2,359,360,349	($1,624,936,255)	$734,424,094	$819,886,355	100.0%	$2,444,822,610	100.0%	100.0%	$2,351,900,338	$3,770,798

* 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 June 2017. May 2016 had positive total balancing congestion of $7.5 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 1, 2005 through June 30, 2017

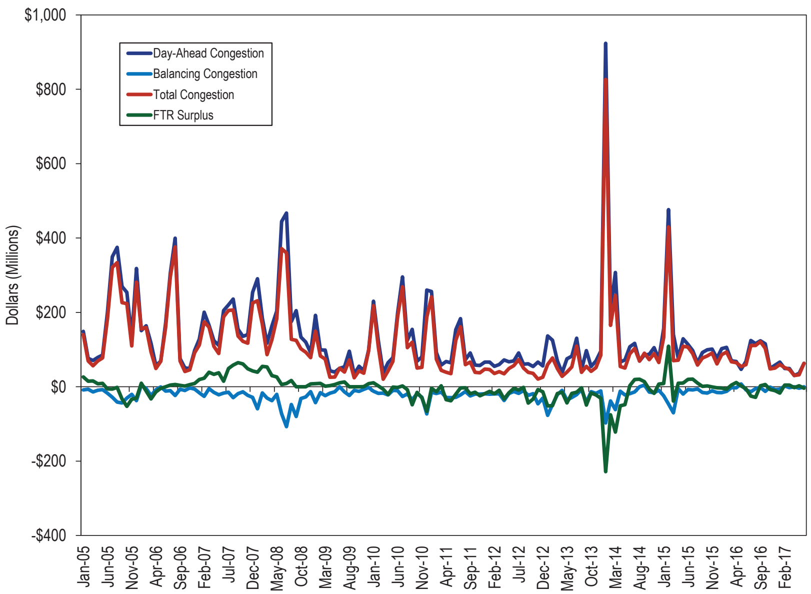
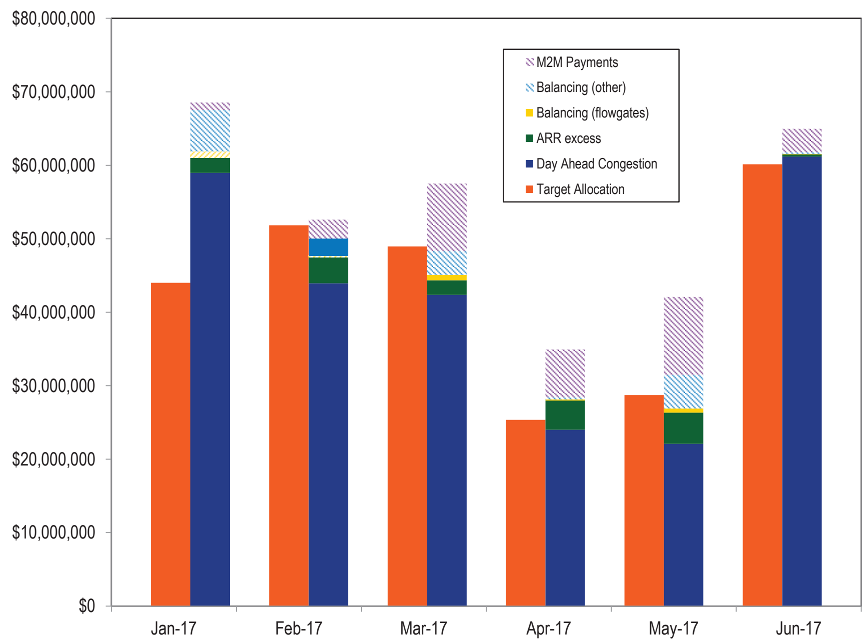


Figure 13-14 shows the relationship among monthly target allocations, balancing congestion, M2M payments and day-ahead congestion. The left column is the target allocations for all FTRs for the month. The total height of the right column is day-ahead congestion revenues and the stripes are reductions 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, February 2017 was revenue adequate by $4.4 million. March was revenue inadequate by $4.6 million, but there was enough excess revenue in other months in the planning period to fully fund both months.

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



ARRs as an Offset to Congestion for Load

Load pays for the transmission system and contributes congestion revenues. FTRs and later ARRs were intended to return congestion revenues to load. With the implementation of the current FTR/ARR design, other participants are allowed to receive a portion of the congestion revenues.

Table 13-50 compares the revenue received by ARR holders and total congestion for the 2011 to 2012 through the first four months of the 2016/2017 planning period. This compares the total offset provided to all ARR holders including all ARRs converted to self scheduled FTRs to the total congestion revenues. 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 represent the total self scheduled FTR target allocations for FTRs held by ARR holders, adjusted by the FTR payout ratio. ARR holders that elect to self schedule FTRs are paid the daily ARR credits for the ARR, and then pay the daily auction price of the self scheduled FTRs, netting the cost of the FTRs to zero. This is accounted for in the ARR credits column by subtracting the cost of the FTR from the ARR credits.

The total ARR/FTR offset is the sum of the ARR and self scheduled FTR credits. The congestion column shows the total amount of congestion collected in the Day-Ahead Energy Market and the balancing energy market. The percent offset is the percent of total, system wide, congestion offset by ARR and self scheduled FTR credits that ARR holders receive.

Table 13-50 shows the offset provided by ARRs and self scheduled FTRs for the entire 2011/2012 through the 2016/2017 planning period. This offset reflects the share of congestion revenues returned to loads. ARR and FTR revenues offset 44.7 percent of Day-Ahead Energy Market and the balancing energy market for the 2013/2014 planning period and 63.8 percent for the 2014/2015 planning period. For the 2015/2016 planning period ARRs and self scheduled FTRs offset 86.5 percent of total congestion costs. For the 2016/2017 planning period ARRs and self scheduled FTRs offset 98.1 percent of total congestion costs.

This demonstrates the inadequacies of the current ARR/FTR design. The goal of the design should be to return 100 percent of the congestion revenues to the load. But the actual results fall well short of that goal. The current allocation of congestion revenue resulted in a total of $1,689.4 million in unreturned congestion revenue to ARR holders, and a 73.3 percent congestion offset, over the last six planning periods.

Table 13-50 ARR and FTR total congestion offset (in millions) for ARR holders: Planning periods 2011/2012 through 2016/2017

Planning Period	ARR Credits	FTR Credits	Total Congestion	Total ARR/FTR Offset	Percent Offset	Unreturned Revenue
2011/2012	$512.2	$249.8	$770.6	$762.0	98.9%	$8.5
2012/2013	$349.5	$181.9	$575.8	$531.4	92.3%	$44.4
2013/2014	$337.7	$456.4	$1,777.1	$794.0	44.7%	$983.1
2014/2015	$482.4	$404.4	$1,390.9	$886.8	63.8%	$504.1
2015/2016	$635.3	$223.4	$992.6	$858.8	86.5%	$133.8
2016/2017	$640.0	$169.1	$824.6	$809.1	98.1%	$15.5
Total	$2,957.1	$1,684.9	$6,331.5	$4,642.1	73.3%	$1,689.4

FERC Order on FTRs: Balancing Congestion and M2M Payment Allocation

On September 15, 2016, FERC issued an order removing balancing congestion and market to market (M2M) payments from the FTR funding equation and assigned them, on a load ratio basis, to load and exports.[36] The MMU has petitioned the U.S. Court of Appeals for the District of Columbia Circuit to reverse the order and restore the longstanding approach to calculating congestion revenues.[37] This has been consolidated with appeals filed by others and is now pending.

The new rule for calculating congestion revenues went into effect on June 1, 2017, for the 2017/2018 planning period.

In its compliance filing PJM redefined balancing congestion as balancing congestion plus market to market (M2M) payments between MISO and NYISO. Under the order, load and exports will pay balancing congestion and M2M payments proportionally. On average from the 2011/2012 planning period on, load comprises 94.8 percent of all demand. From the 2011/2012 planning period onward, total balancing congestion and M2M payments were $1,537.8 million, so load would have been responsible for an additional $1,034.2 million in charges to subsidize FTR holders.

In addition, FERC ordered that all excess congestion revenue, which includes day-ahead congestion in excess of FTR target allocations and excess FTR auction revenue, belongs to FTR holders. PJM initially proposed returning excess day-ahead congestion and excess FTR auction revenue to ARR holders, but that proposal was rejected by FERC. Under this new rule, from the 2011/2012 onward FTR holders would have receive an additional $944.4 million over their target allocations.

The Market Monitor continues to propose that excess FTR auction revenue should be allocated to ARR holders and all congestion rents, including balancing congestion, should be allocated to FTRs.

The reallocation of balancing congestion and M2M payments from FTR holders to load, and the allocation of excess auction revenues to FTR holders subsidizes FTR holders at the expense of ARR holders. It is inconsistent with the logic that FTRs are a day-ahead only product because excess auction revenues are not day-ahead revenues.

Table 13-51 shows the share of total congestion that is offset by ARRs and FTRs for load for the 2011/2012 through 2016/2017 planning periods. Table 13-51 shows the congestion offset available to load under the current rules. Table 13-51 also shows what the congestion offset available to load would be under the new rules, the change in the congestion offset available to load and the overpayment to FTRs under the new rules. The new congestion offset is calculated as the ARR credits and the FTR credits excluding balancing congestion and M2M payments, divided by the total congestion and the load share of balancing and M2M payments. The proposed new revenue is the sum of the ARR credits, adjusted FTR credits and the load share of balancing congestion and M2M payments. The FTR over payment is the excess day-

36 See 156 FERC ¶ 61,180 (2016), *reh'g denied*, 156 FERC ¶ 61,093 (2017).
37 Case No. 17-1106.

ahead congestion revenue and excess auction revenue FTR holders received over their FTR target allocations.

If these rules had been in place beginning with the 2011/2012 planning period, ARR holders would have received $1,034.2 million less in congestion offsets from the 2011/2012 through the 2016/2017 planning period. The total overpayment to FTR holders for the 2011/2012 through 2016/2017 planning period would have been $944.4 million. The underpayment to load and the overpayment to FTR holders is a result of several factors in the new rules all of which mean the transfer of revenues to FTR holders and the shifting of costs to load. Load is now required to pay for balancing congestion, which significantly increases costs to load and significantly increases revenues paid to FTR holders. PJM will continue to clear counter flow FTRs using excess auction revenues in order to make it possible to sell more prevailing flow FTRs. FTR holders will receive excess day-ahead congestion revenues in excess of target allocations. FTR holders will receive excess auction revenue, which is what FTR holders were willing to pay for FTRs in excess of what is provided to ARR holders.

Table 13-51 ARR and FTR total congestion offset (in millions) for ARR holders under PJM's proposed FTR funding: Planning periods 2011/2012 through 2016/2017

Old						Proposed				
Planning Period	ARR Credits	FTR Credits	Total Congestion	Total ARR/FTR Offset	Percent Offset	New Offset	Old Revenue Received	New Revenue Received	ARR Holder Change	FTR Over Payment
2011/2012	$512.2	$249.8	$770.6	$762.0	98.9%	83.3%	$762.0	$598.6	($163.4)	$113.9
2012/2013	$349.5	$181.9	$575.8	$531.4	92.3%	68.0%	$531.4	$275.9	($255.5)	$62.1
2013/2014	$337.7	$456.4	$1,777.1	$794.0	44.7%	43.2%	$794.0	$574.1	($219.9)	$0.0
2014/2015	$482.4	$404.4	$1,390.9	$886.8	63.8%	57.2%	$886.8	$686.6	($200.2)	$400.6
2015/2016	$635.3	$223.4	$992.6	$858.8	86.5%	78.2%	$858.8	$744.8	($113.9)	$188.9
2016/2017	$640.0	$169.1	$824.6	$809.1	98.1%	89.5%	$809.1	$727.7	($81.4)	$179.0
Total	$2,957.1	$1,684.9	$6,331.6	$4,642.1	73.3%	65.0%	$4,642.1	$3,607.8	($1,034.2)	$944.4

Credit Issues

There were no defaults in the first six months of 2017.

FTR Forfeitures

FERC Order on FTR Forfeitures

On January 19, 2017, FERC determined that the application of the current FTR forfeiture rule to INCs, DECs and UTCs was unjust and unreasonable.[38] In their determination, FERC ordered that a method should be developed to consider the net impact of a participant's entire portfolio of virtual bids on a constraint related to an FTR position. The new rule will be more transparent and will depend on an individual participant's net impact on a constraint. FERC also explicitly ordered counter flow FTRs to be considered for FTR forfeiture.

In response to this, PJM determined that no FTR forfeitures will be billed to participants after January 19, 2017, under the prior rules. Instead, participants will be retroactively billed their FTR forfeiture amounts based on the new FTR forfeiture rule once it is in place.

38 See 158 FERC ¶ 61,038 (2017).

Until January 19, 2017, 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.

