



PJM Manual for
Financial Transmission Rights
Manual M-06

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PJM Manual for
Financial Transmission Rights

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Revision History

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Revision History

Revision 04 (03/15/03)

Revised to reflect the implementation of Auction Revenue Rights, FTR Options, and multi-period Annual FTR Auction.

Revision 03 (06/01/00)

Revised to reflect the Multi-Settlement Process implementation.

Revision 02 (10/18/99)

Section 3: FTR Auction

Revised subsection 'FTR Auction Overview' to reflect the change from PJM holidays to NERC Holidays:

- FTRs awarded in the Off-peak auction are valid for hours ending 2400 to 0700 on weekdays and for hours ending 0100 to 2400 on weekends and *NERC* holidays.

Revision 01 (05/01/99)

Revised to reflect the FTR auction implementation.

Introduction

Welcome to the PJM Manual for *Financial Transmission Rights*. In this Introduction, you will find the following information:

- What you can expect from the PJM Manuals in general (see “*About PJM Manuals*”).
- What you can expect from this PJM Manual (see “*About This Manual*”).
- How to use this manual (see “*Using This Manual*”).

About PJM Manuals

The PJM Manuals are the instructions, rules, procedures, and guidelines established by the PJM OI for the operation, planning, and accounting requirements of the PJM Control Area and the PJM Energy Market. Exhibit I.1 lists the PJM Manuals.

Transmission	M01 – Control Center Requirements	M02 – Transmission Service Requests	M03 – Transmission Operations
	M04 – PJM OASIS Operation	M05 – Data Management	M06 – Financial Transmission Rights
PJM Energy Market	M09 – PJM eSchedules	M10 – Pre-Scheduling Operations	M11 – Scheduling Operations
	M12 – Dispatching Operations	M13 – Emergency Operations	M15 – Cost Development Guidelines
Generation Interconnection	M14A – Generation and Transmission Interconnection Process Overview	M14B – Generation and Transmission Interconnection Planning	M14C – Generation and Transmission Interconnection Facility Construction
	M14D – Generator Operational Requirements	M14E – Merchant Transmission Specific Requirements	
Reserve	M17 – Capacity Obligations	M19 – Load Data Systems	M20 – PJM Reserve Requirements
	M21 – Rules & Procedures for Determination of Generating Capability	M22 – Generator Unavailability Subcommittee Reference Manual	M23 – PJM eGADS & eFuel
	M24 – PJM eCapacity		
Accounting & Billing	M27 – Open Access Transmission Tariff Accounting	M28 – Operating Agreement Accounting	M29 – Billing
PJM	M33 – Administrative Services for the PJM Interconnection Agreement	M35 – Definitions & Acronyms	

Exhibit I.1: List of PJM Manuals

About This Manual

The PJM Manual for *Financial Transmission Rights* is one of a series of manuals within the Transmission Owners set of manuals. This manual focuses on how Auction Revenue Rights (ARRs) are acquired, how Financial Transmission Rights (FTRs) are traded, in the FTR auctions or the secondary market, and on how the value of ARRs and FTRs are determined.

The PJM Manual for *Financial Transmission Rights* consists of nine sections. The sections are as follows:

- Section 1: Financial Transmission Rights Overview
- Section 2: Auction Revenue Rights Overview
- Section 3: Auction Revenue Rights Request & Approval Process
- Section 4: Annual ARR Allocation
- Section 5: FTR Auctions
- Section 6: FTR Secondary Market
- Section 7: Market Settlements
- Section 8: Simultaneous Feasibility Test
- Section 9: PJM eFTR

Target Users

The target users for the PJM Manual for *Financial Transmission Rights* are:

- *Transmission Customers* - Transmission Customers submit requests to PJM for ARRs, and buy/sell FTRs in the FTR auctions and secondary market.
- *PJM Members* - PJM Members buy and sell FTRs in the FTR auctions and secondary market.
- *PJM Market Settlement Department* - The PJM Market Settlement Department uses information from the FTR database to calculate transmission congestion credits for the monthly billing statements and to settle the FTR auctions including ARR Credits.
- *PJM Market Services Division* - The PJM Market Services Division processes requests for ARRs from Transmission Customers, facilitates the Annual ARR Allocation, runs Simultaneous Feasibility Tests to verify that the Transmission System can support the requested set of ARRs and FTRs, and conducts the FTR auctions.

References

The references to other documents that provide background or additional detail directly related to the PJM Manual for *Financial Transmission Rights* are:

- PJM Manual for *Transmission Service Request (M-02)*

- PJM Manual for *PJM OASIS Operation (M-04)*
- PJM Manual for *Operating Agreement Accounting (M-28)*
- PJM Manual for *Billing (M-29)*
- FTR Auction User's Guide
- eCapacity
- eFTR

Using This Manual

Because we believe that explaining concepts is just as important as presenting the procedures, we start each section with the “big picture”. Then, we present details and procedures. This philosophy is reflected in the way we organize the material in this manual. The following provides an orientation to this manual’s structure.

What You’ll Find In This Manual

- A table of contents
- An approval page that lists the required approvals and the revision history
- The Introduction
- Nine sections containing general concepts, as well as specific guidelines, requirements, or procedures. The sections describe both PJM OI actions and PJM Member actions.

Section 1: Financial Transmission Rights Overview

Welcome to the *Financial Transmission Rights Overview* section of the PJM Manual for *Financial Transmission Rights*. In this section, you will find the following information:

- A definition of Financial Transmission Rights (FTRs) and their purpose (see “*Definition and Purpose of FTRs*”).
- How the economic value of FTRs is calculated (see “*Valuation of FTRs*”).
- Requirements to participate in buying/selling of FTRs in the FTR auctions or in the secondary market (see “*Requirements to Participate*”).
- An overview of the FTR-related actions performed by Market Participants (see “*Participant Actions*”).
- An overview of the FTR-related actions performed by PJM (see “*PJM Actions*”).

Definition and Purpose of FTRs

A Financial Transmission Right (FTR) is a financial instrument that entitles the holder to receive compensation for Transmission Congestion Charges that arise when the transmission grid is congested in the Day-ahead Market and differences in Day-ahead Locational Marginal Prices (LMPs) result from the dispatch of generators out of merit order to relieve the congestion. Each FTR is defined from a point of receipt (where the power is injected onto the PJM grid) to a point of delivery (where the power is withdrawn from the PJM grid). In the Monthly FTR Auctions, FTRs can be designated to and from any single bus, Hub, Zone, Aggregate or Interface bus for which PJM calculates and post Day-ahead LMP values. In the Annual FTR Auction, valid sources and sinks are limited to hubs, zones, generator buses, aggregates and interface buses. For each hour in which congestion exists on the Transmission System between the receipt and delivery points specified in the FTR, the holder of the FTR is awarded a share of the Transmission Congestion Charges collected from the Market Participants.

One purpose of FTRs is to protect Firm Transmission Service Customers from increased cost due to Transmission Congestion when their energy deliveries are consistent with their firm reservations. Essentially, FTRs are financial instruments that entitle the holder to rebates of congestion charges paid by the Firm Transmission Service Customers. Market Participants are able to acquire financial transmission rights in the form of options or obligations. They do not represent a right for physical delivery of power.

The holder of the FTR is not required to deliver energy in order to receive a congestion credit. If a constraint exists on the Transmission System in the Day-ahead Market, the holders of FTRs receive a credit based on the FTR MW reservation and the LMP difference between point of delivery and point of receipt. This credit is paid to the holder regardless of who delivered energy or the amount delivered across the path designated in the FTR.

You can acquire FTRs in three market mechanisms: the Annual FTR Auction, the Monthly FTR Auction or the FTR Secondary market.

- (1) *Annual FTR Auction* – PJM conducts an annual process of selling and buying FTRs through a multi-round auction. The Annual FTR auction offers for sale the entire transmission entitlement that is available on the PJM system on a long-term basis. The clearing mechanism of the Annual FTR Auction will maximize the quote-based value of FTRs awarded in the auction. Auction Revenue Rights (ARRs) are the mechanism by which the proceeds from the Annual FTR Auction are allocated.
- (2) *Monthly FTR Auction* – PJM conducts a monthly process of selling and buying FTRs through an auction. The FTR auction offers for sale any residual transmission entitlement that is available after FTRs are awarded from the Annual FTR Auction. The auction also allows Market Participants an opportunity to sell FTRs that they are currently holding. Market Participants offer to sell or request to buy FTRs through an Internet computer application called *eFTR*.
- (3) *Secondary Market* - The FTR secondary market is a bilateral trading system that facilitates trading of existing FTRs between PJM Members through an Internet computer application called *eFTR*.

Valuation of FTRs

The hourly economic value of an FTR is based on the FTR MW reservation and the difference between Day-ahead LMPs at the sink point (point of delivery) and the source point (point of receipt) designated in the FTR. Therefore, it is important to note that an FTR can provide financial benefit, but it can also be a financial liability resulting in a charge to the holder.

FTR Obligations

- The hourly economic value of an FTR Obligation is based on the FTR MW reservation and the difference between Day-ahead LMPs at the sink point (point of delivery) and the source point (point of receipt) designated in the FTR.
- The hourly economic value of an FTR Obligation is positive (a benefit) when the path designated in the FTR is in the same direction as the congested flow. (The Day-ahead LMP at the sink point (point of delivery) is higher than the Day-ahead LMP at the source point (point of receipt).)
- The hourly economic value of an FTR Obligation is negative (a liability) when the designated path is in the direction opposite to the congested flow. (The Day-ahead LMP at the point of receipt is higher than the Day ahead LMP at the point of delivery.); however, if the holder were to actually deliver energy along the designated path, they would receive a congestion credit that would offset the FTR charge.

FTR Options

- The hourly economic value of an FTR Option is based on the FTR MW reservation and the difference between Day-ahead LMPs at the sink point (point of delivery) and the source point (point of receipt) designated in the FTR when that difference is positive.
- The hourly economic value of an FTR Option is positive (a benefit) when the path designated in the FTR is in the same direction as the congested flow. (The Day-ahead LMP at the sink point (point of delivery) is higher than the Day-ahead LMP at the source point (point of receipt).)
- The hourly economic value of an FTR Option is zero (neither a benefit nor a liability) when the designated path is in the direction opposite to the congested flow. (The Day-ahead LMP at the source point (point of receipt) is higher than the Day-ahead LMP at the sink point (point of delivery).)

Requirements to Participate

To be able to buy and sell FTRs in the PJM FTR Auctions, or in FTR secondary trading, you must be a PJM Member or a Transmission Customer. Anyone may buy and sell FTRs on the secondary market outside of eFTR; however, PJM Market Settlements makes the proper billing adjustments only for eFTR transactions.

Participant Actions

As a participant in the FTR process, you are required to perform the following actions:

- for those FTRs you wish to sell in any of the auctions through eFTR, enter the required information and submit offers for sale
- for those FTRs you wish to buy in any of the auctions through eFTR, enter the required information and submit the bids to purchase
- if you are an FTR trader in the secondary market, post, accept or reject quotes made through eFTR

PJM Actions

The PJM OI performs the following actions:

- conducts Simultaneous Feasibility Tests (SFTs) on FTRs
- notifies customers of SFT results and FTRs awarded in the FTR Auctions
- initiates, directs, and oversees the FTR Auctions
- incorporates FTRs into market settlements

Section 2: Auction Revenue Rights Overview

Welcome to the *Auction Revenue Rights Overview* section of the PJM Manual for **Financial Transmission Rights**. In this section, you will find the following information:

- A definition of Auction Revenue Rights (ARRs) and their purpose (see “*Definition and Purpose of ARRs*”).
- How the economic value of ARRs is calculated (see “*Valuation of ARRs*”).
- Requirements to participate in the acquisition and allocation of ARRs (see “*Requirements to Participate*”).
- An overview of the ARR-related actions performed by Market Participants (see “*Participant Actions*”).
- An overview of the ARR-related actions performed by PJM (see “*PJM Actions*”).

Definition and Purpose of ARRs

Auction Revenue Rights (ARRs) are the mechanism by which the proceeds from the Annual FTR Auction are allocated. Auction Revenue Rights are entitlements allocated annually to Firm Transmission Service Customers that entitle the holder to receive an allocation of the revenues from the Annual FTR Auction.

Auction Revenue Rights will be allocated to Network Transmission Service Customers and Firm Point-to-Point Transmission Customers. Market Participants will request ARRs, and PJM will approve all, part or none of the request based on the results of the Simultaneous Feasibility Test. At the beginning of each Annual Planning Period, ARRs are allocated to Network Transmission customers and to Firm Point to Point Transmission customers for the duration of the Annual Planning Period.

- *Network Integration Service* - Network Integration Service ARRs are designated along paths from specific generation resource(s) to the customer’s aggregated load. The Network Service Customer has the option to request ARRs for all or any portion of its generation resources. A Network Service Customer's total ARR designation to a zone cannot exceed the customer's total network load in that zone. Network Service Customers make ARR requests through PJM eTools.
- *Firm Point-to-Point Service* - PJM allocates ARRs to Firm Point-to-Point Service customers for approved service requests, subject to passing the Simultaneous Feasibility Test. The point of receipt is either a generation resource within the PJM Control Area or the interconnection point with the sending Control Area. The point of delivery is the set of load buses designated in OASIS or the point of interconnection with the receiving Control Area. The duration of the ARR is the same as for the associated Transmission

Service Request (TSR). The Point-to-Point Customer has the option to request ARRs consistent with the transmission reservation.

Valuation of ARRs

Auction Revenue Rights are defined from a source Price Node to a sink Price Node for a specific MW amount.

The economic value of each ARR is based on the MW amount and on the Locational Price differences between the source and sink node for FTR Obligations resulting from the Annual FTR Auction. The economic value of an Auction Revenue Right can either be positive (a benefit) or negative (a liability).

Annual FTR Auction revenue is distributed to Auction Revenue Rights holders in proportion to, but not to exceed, the economic value of the ARRs when compared to the clearing prices for FTR Obligations in each round of the Annual FTR Auction proportionally.

The settlements for Auction Revenue Rights will be based on the clearing prices from each round of the annual FTR auction. The amount of the credit that the ARR holder should receive for each round is equal to the MW amount of the ARR (divided by the number of rounds) times the price difference from the ARR sink point (delivery point) to the ARR source point as shown in the following formula:

$$ARR\ Target\ Allocation = (ARR/\#\ of\ rounds) * \left(LMP_{Delivery} - LMP_{Source} \right)$$

Note: The LMP values in the above equation are results for FTR Obligations from the appropriate round of the annual FTR auction.

Holders of Auction Revenue Rights may retain allocated ARRs, and receive associated allocations of revenues from the Annual FTR Auction. ARR holders may also convert ARRs into FTRs by “self scheduling” an FTR into the first round of the Annual FTR Auction. When “self-scheduled”, an FTR must have the same path as the associated ARR. Additionally, holders of ARRs may also reconfigure ARRs by bidding into the Annual FTR Auction to acquire an FTR on an alternative path or for an alternative product.

Requirements to Participate

In order to be granted an ARR by PJM, you must be a PJM Firm Transmission Service customer – that is, you are using either Network Integration Service or Firm Point-to-Point Transmission Service. Network Integration Service and Firm Point-to-Point Transmission Service is available to Market Participants who have fulfilled the requirements defined in the PJM Manual for *Transmission Service Request (M-02)*.

Participant Actions

As a participant in the ARR process, you are required to perform the following actions:

- submit requests for Network Integration Service ARRs
- submit Transmission Service Requests (TSRs) for Firm Point-to-Point Service
- after approval of ARRs by PJM, confirm acceptance

PJM Actions

The PJM OI performs the following actions:

- confirms receipt of all TSRs and Network Integration Service ARR requests
- conducts Simultaneous Feasibility Tests (SFTs) on ARRs
- notifies customers of SFT results and ARR approved/rejected/allocated

Section 3: Auction Revenue Rights Request & Approval Process

Welcome to the *Auction Revenue Rights Request & Approval Process* section of the PJM Manual for **Financial Transmission Rights**. In this section, you will find the following information:

- How participants request Network Integration Service ARR and how the PJM OI processes those requests for the 2003/2004 Planning Period (see “*Network Integration Service Auction Revenue Rights (ARRs) – 2003/2004 Planning Period*”).
- How participants request Network Integration Service FTRs for New Load in Zones Associated with Market Growth and how the PJM OI processes those requests (see “*Network Integration Service Financial Transmission Rights (FTRs) for New Load in Zones Associated with Market Growth*”).
- How ARRs for Firm Point-to-Point Service are awarded by the PJM OI (see “*Firm Point-to-Point Transmission Auction Revenue Rights (ARRs)*”).

Network Integration Service Auction Revenue Rights (ARRs)- 2003/2004 Planning Period

The following procedure is used in requesting and processing Network Integration Service ARRs for the 2003/2004 Planning Period only:

- The Network Service Customer submits requests to Network Integration Service ARRs using eCapacity.
- PJM enters accepted ARRs into the PJM FTR database.

Rules and Guidelines

The following is a list of business rules and guidelines to follow when requesting Network Integration Service ARRs for the 2003/2004 Planning Period only:

- All Network Integration Service ARR requests must pass a Simultaneous Feasibility Test before being given PJM approval.
- PJM can approve all, part, or none of the ARR request based on the results of the Simultaneous Feasibility Test.
- The path for each Network Integration Service ARR is defined from designated unit-specific Network Capacity Resource(s) to aggregate Network Customer Load or other designated Load Aggregation Zone.

- The total ARR for a designated network resource cannot be greater than the installed capacity Summer rating of the resource.
- A participant's total ARR amount to a transmission zone cannot exceed the participant's total network load in that zone.
- ARRs are specified to the nearest 0.1 MW.
- ARR requests are time-stamped and processed in the order in which they are received.

Network Integration Service Financial Transmission Rights (FTRs) for New Load in Zones Associated with Market Growth

A transitional FTR Allocation will be conducted for new zone load being added as a result of market growth. This transitional allocation of FTRs will cover the period of time between the implementation of the new zone added as a result of market growth and the next Annual ARR Allocation in which the new member elects to participate. The new member, at their election, will have until the second Annual FTR Auction after they join PJM to participate in the Annual FTR Auction.

During this transitional period, if load shifts within the transmission zone, FTRs will be reallocated. As load shifts from one LSE to another within a transmission zone, a proportionate share of the FTRs defined to sink into the zone are forfeited by the LSE that loses load. When an LSE loses load, the LSE selects a set of FTRs to be forfeited based on the ration of the load being lost to LSE's total load in the zone. The LSE gaining the load is then given the opportunity to request the forfeited set of FTRs. The FTRs are awarded to the LSE subject to simultaneous feasibility.

Transitional FTR requests associated with Network Integration Service for New Load associated with the new zone must satisfy the same requirements as mentioned above for Annual ARR requests except they may be requested anytime during the planning year.

Firm Point-to-Point Transmission Auction Revenue Rights (ARRs)

To qualify for an annual allocation of ARRs, firm point-to-point ARR requests must be associated with firm point-to-point service that spans the entire next planning period and is confirmed by the opening of the Annual ARR Allocation window.

The following procedure is used in processing Firm Point-to-Point ARRs outside of the Annual ARR Allocation window:

- The Firm Point-to-Point Transmission Customer submits Transmission Service Requests (TSRs) via OASIS, including the optional request for the associated ARR, according to the procedure outlined in the PJM Manual for *Transmission Service Request (M-02)* and the PJM Manual for *OASIS Operation (M-04)*.
- PJM conducts a Simultaneous Feasibility Study of the ARR request and notifies the Transmission Customer of TSR and ARR status via OASIS.
- Firm Point-to-Point Transmission Customers notify PJM of acceptance or rejection of TSRs and their associated ARRs via OASIS.

The timeline for the TSR/ARR request and approval process for Firm Point-to-Point Transmission Service are shown in the following table:

	Annual	Monthly	Weekly	Daily
Earliest Request , before start of service	No Limit	18 months	2 weeks	3 days
Latest Request , before start of service	2 months	14 days	7 days	2 days
OI Respond , after receipt of TSR	1 month	Per tariff	2 days	4 hours
Customer Confirm , after OI Response	15 days after PJM approves OR By 12:00 noon on day prior to service commencement			
Maximum Term	No Limit	1 month	2 weeks	2 days

Exhibit 3.1: Firm Point-to-Point Request and Approval Process

Rules and Guidelines

The following is a list of business rules and guidelines concerning Firm Point-to-Point ARRs:

- All Point-to-Point ARR requests must pass a Simultaneous Feasibility Test before being given PJM approval.
- PJM can approve all, part, or none of the ARR request based on the results of the Simultaneous Feasibility Test.

- The path for each Point-to-Point ARR is defined from the source to the sink, as specified in the TSR.
- The MW value of each Firm Point-to-Point ARR may be up to the megawatts of the Firm Transmission Service being provided.
- Firm Point-to-Point Transmission Service Customers must enter the amount of ARRs they desire in the "ARRs Requested" field on the OASIS Buy page. This value is considered an "up to" amount. Therefore, a Transmission Customer should enter the maximum amount of the ARRs that they desire, not to exceed the capacity value of the transaction.
- A Transmission Customer requesting Firm Point-to-Point Transmission Service that does not want ARRs should enter a "0" in the "ARRs Requested" field on the OASIS Buy page.
- Prior to placing the transaction in the Accepted status, PJM enters the amount of ARRs awarded in the "ARRs Award" field in OASIS.
- For Firm Point-to-Point Transmission Service out of or through the PJM Control Area, the Source is either the generation resource within the PJM Control Area or the interconnection with the sending Control Area; and the sink of delivery is the point of interconnection with the receiving Control Area.
- The duration of each Firm Point-to-Point ARR is the same as the associated Firm Transmission Service, which may be one year (starting at the beginning of any month), one month (starting the first day of the month), one week (Monday through Sunday), or one day (hours 1 through 24).
- If an approved ARR spans multiple planning periods, the ARR is technically only approved until the end of the first Planning Period. Prior to each new Planning Period, PJM re-evaluates all ARRs for feasibility. If ARR reductions are required due to infeasibility, then the ARRs are reduced in proportion to their MW value and level of impact on the binding constraint in the Simultaneous Feasibility Test.
- An ARR associated with long term (1 year or more) Firm Point-to-Point Transmission Service will be allocated on a first come first served basis if the request falls outside the Annual open enrollment window. If the request can be considered within the annual open enrollment window, then the request will be process on the same priority as Network Integration Service-based requests.

Section 4: Annual ARR Allocation

Welcome to the *Annual ARR Allocation* section of the PJM Manual for **Fixed Transmission Rights**. In this section, you will find the following information:

- A general overview of the PJM Annual ARR Allocation (see "*Annual ARR Allocation Overview*").
- How Auction Revenue Rights (ARRs) are allocated in Year 1 (see "*Annual Allocation of Auction Rights (ARRs) – 2003/2004 Planning Period*").
- How ARRs are reassigned for Shifts in Load Responsibility (see "*Reassignment of ARRs*")
- How Incremental Auction Revenue Rights (ARRs) associated with Transmission Expansion are allocated (see "*Allocation of Incremental Auction Revenue Rights (ARRs)*")

Annual ARR Allocation Overview

Auction Revenue Rights (ARRs) are the mechanism by which the proceeds from the Annual FTR Auction are allocated. ARRs are allocated to Network Service Customers and to Firm Point-to-Point Transmission Customers for the duration of the Annual Planning Period.

For the 2003/2004 Planning Period, Auction Revenue Rights will be distributed to Network Service Customers and Firm Point-to-Point Transmission Customers. Market Participants submit ARR requests for the planning period during the annual enrollment window. In the 2003/2004 Planning Period, all ARRs must be designated from network resources. PJM will allocate ARRs that pass a Simultaneous Feasibility Test to Firm Transmission Customers based on priority.

Annual Allocation of Auction Revenue Rights (ARRs) – 2003/2004 Planning Period

For the 2003/2004 Planning Period, Auction Revenue Rights (ARRs) are allocated annually to Network Service Customers and Firm Point-to-Point Transmission Service Customers. Prior to each Annual Planning Period, ARRs will be allocated to Network Service Customers and to Firm Point-to-Point Transmission Customers for the duration of the Annual Planning Period. Participants submit ARR requests for the planning period during annual enrollment window.

- All ARR requests must pass a Simultaneous Feasibility Test during allocation process.
- Participants specify designated resources (sources) and aggregate loads (sink) up to value of peak load.
- All ARRs are designated from network resources.
- All requests received during each annual enrollment window are deemed to have arrived simultaneously.
- Maximum amount of ARRs requested to zone limited to participant's share of peak load in that zone. All ARRs are designated from network resources.

Network Service customers specify priority (between 1 and 4) on their annual requests

- assign Priority 1 to most desirable ARRs
- assign Priority 4 to least desirable ARRs
- each priority level limited to 25% of peak load share

Firm point-to-point requests are separated into quarters and each quarter is assigned a priority (1 through 4). Requests for firm point-to-point ARRs must be associated with firm point-to-point service that spans the entire next planning period and is confirmed by the opening of the Annual ARR Nomination period. All requests within same priority analyzed and allocated at same time starting with Priority 1 requests. If all ARR requests within the same priority level are not simultaneously feasible then proration is required. If ARR proration is required due to infeasibility then ARRs are allocated in proportion to the MW value requested and in inverse proportion to the effect on the binding constraint.

Once allocated, ARRs may be traded but trades must be made prior to the first round of the annual FTR auction and can only be made between affiliates.

Within the planning period, as load changes from one LSE to another within a transmission zone, a proportionate share of the ARRs defined to sink into the zone are reassigned from the old LSE to the new LSE. The reassignment of ARRs must be initiated by a request made

by the LSE gaining load as described in the "Reassignment of ARRs for Shifts in Load Responsibility" section.

Reassignment of ARRs

ARRs allocated for the planning period will be reassigned on a proportional basis within a zone as load switches between within the planning period. As load shifts from one LSE to another within a transmission zone, a proportionate share of the ARRs defined to sink into the zone are reassigned from the old LSE to the new LSE. The reassignment of ARRs is an automatic process that is conducted on a daily basis.

ARRs are only reassigned from those LSEs that have lost load in a zone and have a net positive economic ARR position to that zone. An LSE that loses load will lose ARR MWs in proportion to the amount of load lost and this same proportion will reduce each individual ARR assigned to the LSE. ARRs are initially allocated to the 0.1 MW but reassigned to the nearest .001 MW. The total set of ARRs to be forfeited by LSEs losing load in a zone will be reallocated to LSEs gaining load in the zone in proportion to each LSE's MW load gain relative to the total load shifted in the zone.

On a daily basis, Auction Revenue Rights are reassigned using the following procedure:

- PJM compares each LSE's Network Service Peak Load in a zone to the Network Service Peak Load of the previous day.
- PJM analyzes each LSE's net economic ARR position. For each LSE losing load and having a net positive economic ARR position for that zone:
 - (a) The percentage of load lost for each LSE is determined,
 - (b) Each ARR owned by each LSE gaining load is reduced by this same percentage
- PJM assigns the total set of forfeited ARRs to LSEs gaining load in the zone:
 - (a) The percentage of ARRs to be assigned to each LSE gaining load is determined. The percentage will be equal to the MW load gain by the LSE divided by the total MWs of load shifting in the zone.
 - (b) Each LSE gaining load is assigned a percentage of each ARR in this set of forfeited ARRs.

Allocation of Incremental Auction Revenue Rights (ARRs)

Transmission expansion projects associated with new generation interconnection and Merchant Transmission Expansion projects will be allocated incremental ARRs in a three-round allocation process in which the customer requests incremental ARRs for three pairs of point-to-point combinations (one point-to-point combination is requested per round).

In each round, one-third of the Incremental ARRs made available by the expansion project will be assigned to the requester. After each of rounds one and two, the requester may accept the assigned Incremental ARRs or refuse them. Acceptance of the assignment will remove the assigned Incremental ARRs from availability in the next rounds. Refusal of the assignment will result in the Incremental ARR being available for the next round. The Incremental ARR assignment made in round three will be final and binding.

Incremental ARRs will be effective for thirty years or the life of the facility or upgrade, whichever is less.

At any time during this thirty-year period, in lieu of continuing this thirty-year ARR, the Interconnection Customer shall have a one-time choice to switch to an optional mechanism, whereby, on an annual basis, the customer has the choice to request an ARR during the Annual ARR Allocation process between the same source and sink, subject to simultaneous feasibility. Once this option is chosen, the Interconnection Customer must request the Incremental ARR during each annual ARR enrollment window for the upcoming planning period. If no request is made, the Incremental ARR is forfeited for that planning period.

At any time during this thirty-year period, an Interconnection Customer may return Incremental ARRs that it no longer desires at any time, provided that all remaining outstanding ARRs can be simultaneously accommodated following the return of such ARRs. In the event an Interconnection Customer returns Incremental ARRs, the Interconnection Customer shall have no further rights regarding such Incremental ARRs.

Section 5: FTR Auctions

Welcome to the *FTR Auctions* section of the PJM Manual for *Fixed Transmission Rights*. In this section, you will find the following information:

- A general overview of the PJM FTR Auctions (see "*FTR Auctions Overview*").
- How the winning quotes are determined (see "*Determining the Winning Quotes*").
- A description of the Annual FTR Auction time line (see "*Annual FTR Auction Time Line*").
- A description of the Monthly FTR Auction time line (see "*Monthly FTR Auction Time Line*").
- A description of the FTR Auctions business rules (see "*FTR Auctions Business Rules*").
- A description of the credit requirements for PJM's FTR Auctions (see "*FTR Auctions Credit Business Rules*").

FTR Auctions Overview

Throughout the year, PJM oversees the process of selling and buying FTRs through FTR Auctions. Market Participants purchase FTRs by participating in Annual and Monthly FTR Auctions.

- *Annual FTR Auction* - The Annual FTR Auction offers for sale the entire transmission entitlement that is available on the PJM system on a long-term basis. The Annual FTR Auction is a multi-round auction consisting of four rounds. In each of the four rounds, 25% of the feasible FTR capability of the entire PJM system is awarded. FTRs that are purchased in one round may be offered for sale in subsequent rounds. An auction participant must own any FTR purchased in the first round that is offered for sale in subsequent rounds.
- *Monthly FTR Auctions* - In each calendar month, Monthly FTR Auctions provide a method of auctioning the residual FTR capability that remains on the PJM Transmission System after the Annual FTR Auction is conducted. The Monthly FTR Auctions are single-round auctions, where the residual FTR capability is awarded. The Monthly FTR Auctions also allow Market Participants an opportunity to offer for sale any FTRs that they currently hold. An auction participant must own any FTR that is offered for sale.

The clearing mechanism of the FTR Auctions will maximize the quote-based value of FTRs awarded in each auction. Auction Revenue Rights (ARRs) are the mechanism by which the proceeds from the FTR Auctions are allocated. The proceeds from the Annual FTR Auction are distributed to ARR holders. All monthly auction revenues are first allocated among ARR holders in proportion to the holder's deficiencies from the Annual FTR Auction. Any

monthly auction revenues remaining after this allocation are treated as excess congestion charges and are distributed starting with Stage Two as described in the “Market Settlements” section.

FTRs are awarded in FTR Auctions for the following products:

- FTRs can be either options or obligations.
- An on-peak FTR product valid for hours ending 0800 to 2300 weekdays, except NERC holidays.
- An off-peak FTR product valid for hours ending 2400 to 0700 on weekdays and for hours ending 0100 to 2400 on weekends and NERC holidays.
- A 24-hour FTR product valid for hours ending 0100 to 2400 on all days.

FTRs that are awarded in FTR Auctions have the following characteristics:

- FTRs hedge the FTR holder against congestion payments to PJM when energy delivery is consistent with the FTR’s definition.
- FTRs do not hedge the FTR owner against payment for losses.
- FTRs acquired in the Annual FTR Auction have a term of one year.
- FTRs acquired in the Annual FTR Auction entitle the holder to credits for transmission congestion charges for one calendar year.
- FTRs acquired in the Monthly FTR Auctions have a term of one month.
- FTRs acquired in the Monthly FTR Auctions entitle the holder to credits for transmission congestion charges for one calendar month.
- Valid FTR sources and sinks in the Annual FTR Auction are limited to hubs, zones, aggregates, generators, and interface buses (subject to simultaneous feasibility).
- Valid FTR sources and sinks in the Monthly FTR Auctions are any single bus or combination of buses for which an LMP is calculated and posted in the Day-ahead Market. (subject to simultaneous feasibility). The list of buses includes hubs, zones, aggregates, and single buses.
- Only a subset of paths will be eligible for FTR Option bids in all FTR Auctions in order to prevent potential auction clearing performance issues.
- FTRs in all FTR Auctions may be designated from injection buses outside PJM and withdrawal locations outside PJM **OR** buses with injections and withdrawals within PJM.

- In the Annual FTR Auction, an ARR holder may self-schedule an FTR Obligation (up to the ARR MW reservation amount) into the Annual FTR auction as a “price-taker” auction buy bid. The self-scheduled FTR must have exactly the same source and sink points as the ARR. This feature can only be used in Round 1 and must be for a 24-hour FTR Obligation product. 25% of the MW amount self-scheduled in Round 1 will clear in each round.
- In all FTR Auctions, FTRs can be reconfigured, meaning that the FTR auction not only allows Market Participants to purchase the FTRs offered into the auction by sellers, but also enables buyers to purchase FTRs that are different from any of the FTRs offered into the auction by sellers.
- PJM determines and posts the expected non-simultaneous estimates of available FTR capability for each interface, via the MUI.

Determining the Winning Quotes

The winning quotes are determined by the set of simultaneously feasible FTRs with the highest total auction value, as determined by the bids of the buyers and taking into account the reservation prices of the sellers.

- The valuation of the awarded FTRs during the auction is based on the quotes submitted into each FTR Auction. Therefore, the set of quotes that maximizes the quote-based value of the awarded FTRs to the Market Participants that would receive them is the winning set.
- This ensures that PJM awards the set of FTRs and allocates them among auction participants in such a way that the value-based transmission utilization is maximized.

The FTR Auctions will calculate the clearing prices for all FTR Obligations at all buses, regardless of whether they are bought or sold in the auction. The FTR Auctions will calculate the clearing prices of FTR Options for all valid FTR Option paths, regardless of whether they are bought or sold in the auction.

- The clearing price of any FTR Obligation can be computed directly from the nodal prices.
- The clearing price of an A-to-B FTR Obligation is equal to the negative of the clearing price of a B-to-A FTR Obligation. This is not true for the FTR Options since the clearing prices of FTR Options are never negative.
- The clearing price of an FTR Option Buy Bid will never be less than zero.
- The clearing price of an FTR Option will always be greater than or equal to the clearing price of an FTR Obligation for the same path.
- The clearing price of an FTR Option is a function of the shadow price of each binding constraint and cannot be computed directly from the nodal prices.
- To ensure feasibility, each constraint is monitored for limit violation by the worst case combination of awarded FTR Options. Counterflow created by an FTR Option is ignored.

The major steps performed to determine the winning quotes include:

- (1) Downloading data for the FTR market user database.
- (2) Solving the linear program problem.
- (3) Checking the simultaneous feasibility of the FTR auction solution.
- (4) Repeating Steps 2 and 3.

(5) Uploading the results to the FTR MUI.

After determining the winning quotes, settlements occur. Winning bidders pay market price for FTRs acquired in the auction; FTR sellers are paid market price for the FTRs they surrender to PJM. This settlement is separate from the transmission congestion settlements.

Annual FTR Auction Time Line

PJM initiates, directs, and oversees the following process for the Annual FTR Auction. The Annual FTR Auction must be conducted prior to the June Monthly FTR Auction. Annually, PJM conducts a multi-round auction that consists of four (4) rounds:

- PJM opens the Bidding Period for each round and Market Participants may submit bids to purchase and offers to sell FTRs.
- The Bidding Period for each round of the Annual FTR Auction will be open for three business days, closing at 1700 on the last day.
- PJM performs the FTR auction clearing analysis.
- Within two business days after the close of the Bidding Period for each round PJM posts FTR auction results on the MUI.

Monthly FTR Auction Time Line

PJM initiates, directs, and oversees the Monthly FTR Auctions. In each calendar month, PJM conducts a single round auction. The following timeline defines open, close and clearing dates for all Monthly FTR Auctions.

- Thirteen business days prior to the start of the auction month, PJM opens the Bidding Period and Market Participants may submit bids to purchase and offers to sell FTRs. PJM determines and posts the expected non-simultaneous estimates of available FTR capability for each interface, via the MUI.
- Ten business days prior to the start of the auction month, the auction closes at 1700 of the last day.
- PJM performs the FTR auction clearing analysis.
- Within two business days of the Bidding Period closing, PJM posts FTR auction results on the MUI.

FTR Auctions Business Rules

The following information summarizes the business rules for PJM's FTR Auctions:

- Market Participants must be a PJM Member or a PJM Transmission Customer to be eligible to submit bids or offers into FTR Auctions.
- Market Participants cannot submit offers to sell FTRs that they do not own at the time of the submittal.
- Invalid quotes into the auction are rejected. These quotes may be resubmitted and if time stamped as received by PJM before the close of the Bidding Period are included in the auction.

FTR Auctions Credit Business Rules

The following information summarizes the business rules for credit requirements for PJM's FTR Auctions:

- **Market Participants must have established an Auction Credit Limit prior to bidding in any FTR Auction.** Auction Credit Limits may be established by utilizing the unused portion, if any, of a Market Participant's currently established Unsecured Credit Limit at PJM, or may be established by providing additional Financial Security, of a type that is acceptable under PJM's Credit Policy. Credit requests should be made to PJM's Treasury Department at least two weeks prior to opening of the first round of bidding. Previously established credit with PJM will not be available for the FTR Auction unless the Market Participant specifically makes such a request to the PJM Treasury Department and confirms it with the FTR Markets group.
- **The Credit Requirement for a Market Participant's bids may not exceed its Auction Credit Limit.** Positive bids for which the bidder holds matching ARR's will not be counted in the bid total. If, during any auction round, the total Credit Requirement for a Market Participant's previously accepted and currently submitted aggregate bids exceeds the Market Participant's Auction Credit Limit, all currently submitted bids will be rejected. PJM will attempt to work with bidders to increase credit during the auction process, if desired, but cannot guaranty doing so in a particular timeframe. It is highly unlikely that any increase in credit can be accomplished in the final day of a bidding round.
- **Market Participants with successful bids must maintain credit (the Credit Requirement) for those successful bids after the auction.** After the auction, PJM will release, if applicable, and if requested by the Market Participant, any credit provided for the auction that is not needed to satisfy the remaining Credit Requirement for the Market Participant's winning bids.
- **A Total Credit Requirement will be calculated for every Market Participant.** The Credit Requirement will be calculated as the sum of the individual credit exposures for all FTR's the Market Participant is currently bidding for, or has already won. Calculations for individual FTR's that result in a value of zero or less will be set to zero.

- (a) The Credit Requirement for individual FTRs that are self-scheduled using an ARR will be calculated as:

Price of the bid for that FTR

Less : Value of ARR credits for that FTR

Less : Revenue Offset for that FTR

- (b) The Credit Requirement for individual FTRs that are not self-scheduled using an ARR will be calculated as:

Price of the bid for that FTR

Less : Revenue Offset for that FTR

Note: The sum of the Credit Requirement for all of a Market Participant's non-self-scheduled FTRs will be offset by the total value of the Market Participant's ARRs that were not used to self-schedule an FTR in the auction.

The Revenue Offset will be calculated as the difference between the expected LMP values at the source and sink nodes adjusted to account for the volatility at the nodes.

- **Credit Requirements may be reviewed and changed as needed.** Credit exposure for all participants may be reviewed as needed by PJM to determine if the Credit Requirement for the Market Participant has increased. If the Credit Requirement exceeds credit currently in place, the party must increase its credit for its FTR obligations. PJM will review the Annual FTR Auction after six months of operation to determine if any reduction in credit requirement is warranted at that time.
- **Credit provided for the FTR auction must be non-cancelable for the entire auction period.** Any credit enhancement provided for FTR purposes that has a termination date (e.g. corporate guaranty or letter of credit) must be non-cancelable until at least 10 days after payment is due for the last month of the auction (e.g. June 30, 2004 for the 2003 auction).
- **Credit responsibility for an FTR that is traded within PJM's eFTR system remains with the original party unless/until the receiving party ("3rd party") establishes sufficient acceptable credit with PJM.** If a Market Participant owns an FTR and later trades that FTR to a 3rd party (using eFTR), then
 - (a) PJM will include the traded FTR payments and revenue credits on the 3rd party's bill each month, but the original party retains the obligation to pay for the FTR (offset by associated revenue credits) if the 3rd party defaults on its payment obligation to PJM prior to credit responsibility being transferred to the 3rd party.
 - (b) Once the 3rd party establishes sufficient credit acceptable to PJM for its new FTR obligation, then PJM will notify both parties that the 3rd party has assumed credit responsibility for the FTR, and the original party is released from its credit responsibility for the FTR. PJM cannot guaranty that a 3rd party will establish sufficient credit acceptable to PJM. Market Participants trading FTR's to 3rd parties may retain credit responsibility for those FTR's up to the duration of the Annual FTR Auction period. Parties may work with PJM to establish credit prior to a trade.
 - (c) If a 3rd party defaults, and has not yet assumed credit responsibility for one or more of its FTR's, then the original party will be responsible to pay a portion of the default, prorated based its FTR's contribution to the defaulted invoice.

- (d) FTR's may be traded multiple times, but the original party retains credit responsibility until it is assumed by a 3rd party.
- (e) FTR's that are traded for less than the remaining duration of the Annual FTR Auction period will remain the credit responsibility of the original party.

Section 6: FTR Secondary Market

Welcome to the *FTR Secondary Market* section of the PJM Manual for *Financial Transmission Rights*. In this section, you will find the following information:

- An overview of the secondary markets for FTRs (see "*FTR Secondary Markets Overview*").
- A description of PJM's computer application for trading FTRs (see "*The PJM eFTR's Secondary Trading Center*").
- A description of the secondary trading business rules (see "*FTR Secondary Trading Business Rules*").

FTR Secondary Markets Overview

The PJM FTR secondary trading market is a bilateral trading system that facilitates the trading existing FTRs between PJM Members, using a bulletin board system in PJM eFTR. The FTR secondary market allows trading of existing FTRs only. FTRs cannot be reconfigured in the secondary market.

- For FTR trades made through eFTR, PJM automatically transfers ownership and adjusts the PJM Members' monthly billing statements accordingly.
- You can also trade FTRs independently of eFTR. However, PJM has no knowledge of such trades and, therefore, is not able to adjust PJM Members' monthly billing statements appropriately. In fact, it is possible that parties involved in such trades might not be PJM Members.

The PJM eFTR's Secondary Trading Center

Using PJM's eFTR, Market Participants can buy and sell FTRs directly with other Market Participants. Market Participants specify trades by transmission paths. An FTR can be split into multiple FTRs on the same path with different MW amounts and different start and ends dates.

The eFTR allows you to:

- *View FTR Postings* - You view FTRs that are posted using the Secondary Trading Center web page.
- *Post FTRs For Resale* - When FTRs are initially awarded by PJM, PJM enters the data into the FTR database and posts the FTRs on eFTR. Subsequently, the owner of the FTR is able to post the FTR for resale via eFTR.
- *Buy and Sell FTRs* - eFTR provides a web page called the Secondary Trading Center that allows traders to post a secondary trade and confirm or deny the quotes.

You can find detailed instructions for participating in the secondary market in the FTR Auction User's Guide (available on the PJM Web Site).

FTR Secondary Trading Business Rules

The following is a list of business rules and guidelines to follow when using *eFTR* for secondary trades:

- To buy and sell FTRs through *eFTR*, you must be a PJM Member or a PJM Transmission Customer. To register, use the *eFTR* User Registration Page, which is available on the PJM Web Site.
- When an FTR is traded, the associated firm transmission capacity is not reassigned, just the financial entitlements.
- On the secondary market, an FTR can be split into multiple FTRs with different MW amounts and different start and end times than the original FTR. However, an FTR cannot be reconfigured into FTRs with a larger total MW value, earlier start time, later end time, or different path.
- On the FTR secondary market, an FTR Obligation can only be traded as an FTR Obligation and an FTR Option can only be traded as an FTR Option. An FTR Obligation cannot be reconfigured as an FTR Option and an FTR Option cannot be reconfigured as an FTR Obligation.
- FTR MW values can be split in 0.1 MW increments.
- All FTR trades for a given day are locked out at midnight of the current day.
- Once per day, *eFTR* database sends updated FTR information reflecting the previous day's trades to the PJM Market Settlements system for use in preparing reports and monthly billing statements.

Section 7: Market Settlements

Welcome to the *Market Settlements* section of the PJM Manual for *Financial Transmission Rights*. In this section, you will find the following information:

- How the proceeds from the Annual FTR Auction are distributed to Auction Revenue Rights holders (see “*Distribution of Annual FTR Auction Revenues*”).
- How PJM calculates the settlement of Auction Revenue Rights (see “*Auction Revenue Rights (ARR) Settlement*”).
- How PJM calculates Transmission Congestion Credit target allocations for FTR holders (see “*FTR Settlement - Calculating Transmission Congestion Credit Target Allocations*”).
- How PJM calculates Transmission Congestion Credits (see “*FTR Settlement - Calculating Transmission Congestion Credits*”).
- How excess Transmission Congestion Charges are distributed to FTR holders at the end of each month (see “*Distributing Excess Transmission Congestion Charges*”).

Distribution of Annual FTR Auction Revenues

Annual and Monthly FTR Auction revenues are distributed to Auction Revenue Rights holders in proportion to (but not to exceed) the economic value of the ARRs when compared to the Annual FTR Auction clearing prices for FTR Obligations from each round proportionately.

Excess revenues after distribution to ARR holders will be used to fund any shortfall in FTR Target Allocations over the calendar year.

These funds are accounted for on a monthly basis as Excess Congestion Charges and they are distributed with other Excess Congestion Charges as described in the Section entitled “*Distributing Excess Transmission Congestion Charges*”.

For additional information, refer to the PJM Manual for *Billing (M-29)* and the PJM Manual for *Operating Agreement Accounting (M-28)*.

Auction Revenue Rights (ARR) Settlement

The settlements for Auction Revenue Rights will be based on the clearing prices from each round of the annual FTR auction. The amount of the credit that the ARR holder should receive for each round is equal to the MW amount of the ARR (divided by the number of rounds) times the price difference from the ARR delivery point to the ARR source point as shown in the following formula:

$$ARR\ Target\ Allocation = (ARR/\#\ of\ rounds) * \left(LMP_{Delivery} - LMP_{Source} \right)$$

Note: The LMP values in the above equation are results for FTR Obligations from the appropriate round of the annual FTR auction.

The ARR Target Allocation can be positive or negative. An ARR can be either a benefit or liability to the holder depending on the direction of transmission congestion in the annual auction analysis.

- If sufficient funds are collected in the Annual and Monthly FTR Auctions to satisfy all ARR Target Allocations then the ARR Credits = ARR Target Allocations for all ARR holders.
- The ARR Credits may be prorated proportionately if there are insufficient Annual and Monthly FTR auction revenues collected to cover all of the ARR credits.
- If the ARR Credits are prorated, the difference between ARR Target Allocations and ARR Credits are called ARR Deficiencies. The ARR Deficiencies may be funded by Annual Excess Congestion Charges as explained in the "FTR Settlements" Section.

The settlements for the Annual FTR Auction and the corresponding ARR settlements will be performed on a monthly basis.

For additional information, refer to the PJM Manual for **Billing (M-29)** and the PJM Manual for **Operating Agreement Accounting (M-28)**.

FTR Settlement – Calculating Transmission Congestion Credit Target Allocations

The Transmission Congestion Credit Target Allocation is the amount of credit the FTR holder should receive in each constrained hour due to the value of an FTR.

The PJM OI determines a target allocation of Transmission Congestion Credits for each hour for each FTR by using the following formula:

$$\text{Target Allocation} = \text{FTR} * \left(\text{DALMP}_{\text{Delivery}} - \text{DALMP}_{\text{Receipt}} \right)$$

where:

- *FTR* - Financial Transmission Rights between the designated load bus and the designated generation bus, in megawatts
- $\text{DALMP}_{\text{Delivery}}$ - The Day-ahead LMP during the hour at the Point of Delivery designated in the FTR
- $\text{DALMP}_{\text{Receipt}}$ - The Day-ahead LMP during the hour at the Point of Receipt designated in the FTR

The total target allocation for a Market Participant for each hour is then the sum of the target allocations for all of the Market Participant's FTRs.

Note, if the $\text{DALMP}_{\text{Delivery}}$ or the $\text{DALMP}_{\text{Receipt}}$ is an aggregate zone, the following formula is used:

$$\text{Target} = \text{FTR} * \sum \text{Load Percentage}_i * \left(\text{DALMP}_{\text{Delivery}-i} - \text{DALMP}_{\text{Receipt}} \right)$$

where:

- *FTR* - Financial Transmission Rights between the designated Load Aggregation Zone and the designated bus, in megawatts
- Load Percentage_i - The percentage of the load at time of annual peak associated with each individual load bus in the Load Aggregation Zone designated in the FTR

For additional information, refer to the PJM Manual for **Billing (M-29)** and the PJM Manual for **Operating Agreement Accounting (M-28)**.

FTR Settlement - Calculating Transmission Congestion Credits

The PJM OI compares the total of all Transmission Congestion Credit target allocations to the total Transmission Congestion Charges for the PJM Control Area in each hour resulting from the Day-Ahead Market and from the Real-time Market.

- If the total of the target allocations is less than the total of the Transmission Congestion Charges, the Transmission Congestion Credit for each FTR is equal to its target allocation. All excess Transmission Congestion Charges are distributed at the end of the month as described later in this section.
- If the total of the target allocations is equal to the total of the Transmission Congestion Charges, the Transmission Congestion Credit for each FTR is equal to its target allocation.
- If the total of the target allocations is greater than the total of the Transmission Congestion Charges, the Transmission Congestion Credit for each FTR is equal to a share of the total Transmission Congestion Charges in proportion to its target allocation. The shortfalls in hourly Transmission Congestion Charges may be offset by excess charges from other hours in the end of the month accounting, as described in the next section.

For additional information, refer to the PJM Manual for ***Billing (M-29)*** and the PJM Manual for ***Operating Agreement Accounting (M-28)***.

Distributing Excess Transmission Congestion Charges

The objective of the monthly excess Transmission Congestion Charge distribution is to cover any deficiency in the share of Transmission Congestion Credits received by each FTR holder during the month as compared to their target allocations for the month.

- *Stage One* - The PJM OI distributes excess Transmission Congestion Charges accumulated during the month to each holder of FTRs in proportion to, but not greater than, any deficiency in the share of Transmission Congestion Charges received by the holder during that month as compared to its total target allocations for the month.
- *Stage Two* - Any remaining excess after the stage one distribution will be used to satisfy any FTR deficiency from previous months within the calendar year on a pro-rata basis up to the full FTR Target Allocation value.
- *Stage Three* – Any remaining excess after the stage Two distribution will be carried forward to the next month as excess congestion charges.
- *Stage Four* - At the end of the calendar year, any remaining Excess Congestion Charges will first be used to satisfy any ARR deficiency that may exist. If insufficient funds exist to honor all ARR revenue shortfalls then the funds would be distributed by ratio of the ARR deficiency.
- *Stage Five* - The PJM OI distributes any excess Transmission Congestion Charges remaining after the Stage Four distribution to Network Service Customers and Firm Point-to-Point Transmission Customers in proportion to their Demand Charges for Network Integration Service and their charges for Reserved Capacity for Firm Point-to-Point Transmission Service, regardless of whether these customers hold FTRs for their Transmission Service.

For additional information, refer to the PJM Manual for **Billing (M-29)** and the PJM Manual for **Operating Agreement Accounting (M-28)**.

Section 8: Simultaneous Feasibility Test

Welcome to the *Simultaneous Feasibility Test* section of the PJM Manual for *Financial Transmission Rights*. In this section, you will find the following information:

- A description of the Simultaneous Feasibility Test (SFT) and how it is performed by the PJM OI (see “*Simultaneous Feasibility Test Overview*”).

Simultaneous Feasibility Test Overview

The Simultaneous Feasibility Test (SFT) is a market feasibility test run by PJM that provides revenue adequacy by ensuring that the Transmission System can support the subscribed set of FTRs or ARR during normal system conditions. If the FTRs or ARRs can be supported under normal system conditions and congestion occurs, PJM will be collecting enough congestion charges to cover the FTRs or ARR credits, thus becoming revenue adequate. The purpose of the SFT is to preserve the economic value of FTRs or ARRs to the holders by ensuring that all FTRs or ARRs awarded can be honored. An SFT is run for each or ARR or FTR requested.

The SFT uses a DC power flow model that models the requested firm transmission reservations and expected network topology during the period being analyzed. It is not a system reliability test and is not intended to model actual system operating conditions. FTRs and ARRs for Firm Point-to-Point Service are modeled as generation at the receipt (source) point(s) and load at the delivery (sink) point(s). FTRs and ARRs for Network Integration Service are modeled as a set of generators at the receipt (source) point and a network load at the delivery (sink) point. SFTs are run for yearly, monthly, and weekly analysis periods, when network resource changes are submitted and during the determination of the winning quotes for the Annual FTR Auction and the Monthly FTR auction.

Inputs to the SFT model include:

- all newly-requested FTRs and ARRs for the study period,
- all existing FTRs and ARRs for the study period,
- transmission line outage schedules, thermal operating limits for transmission lines,
- PJM reactive interface limits that are valid for the study period, and
- estimates of uncompensated power flow circulation through the PJM Control Area from other Control Areas.

Consistent with PJM Operating and Planning criteria, the SFT evaluates the ability of all system facilities to remain within normal ratings during normal, extended-period operation, while maintaining an acceptable bulk system voltage profile. The system must also be able to sustain any single contingency event with all system facilities remaining within applicable

short-term, emergency ratings while maintaining an acceptable bulk system voltage profile and a maximum bulk system voltage drop of five percent. To ensure feasibility, each constraint is monitored for limit violation by the worse-case scenario combination of awarded FTR options and obligations. Counterflow created by an FTR option is ignored.

Section 9: PJM eFTR

Welcome to the *PJM eFTR* section of the PJM Manual for *Financial Transmission Rights*. In this section, you will find the following information:

- A description of the PJM FTR Auction system (see "*PJM eFTR Overview*").

PJM eFTR Overview

PJM eFTR is an Internet application that allows Market Participants to participate in PJM's FTR Auctions and secondary market. Figure 9.1 presents a conceptual view of the FTR auction subsystems.

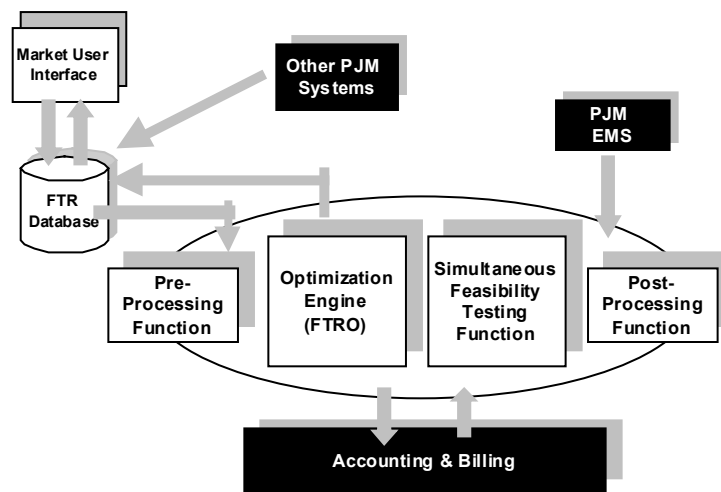


Exhibit 9.1: FTR Auction Subsystems

Offers to sell or bids to purchase FTRs are submitted by Market Participants through the Market User Interface (MUI). All entered quotes are validated and entered into the FTR auction database by the MUI.

In addition to the quotes, other data that is required by the FTR Auctions is provided by other PJM systems. These items include external grid/flow modeling, outage schedules, and facility ratings.

The FTR auction subsystem consists of the following four components:

- *Pre-processing Function* - performs all activities necessary to setup a base case for the evaluation process, including evaluating the quotes and preparing a set of FTRs to be tested for simultaneous feasibility.
- *Optimization Engine (FTRO)*- formulates the Linear Programming (LP) problem including transmission facility limits constraints, generic constraints, and contingencies and solve the LP problem. The objective is to determine the highest valued combination of FTRs to be awarded in the auction that is simultaneously feasible while respecting pre-and post-contingency transmission limits in conjunction with the previously awarded FTRs. FTR offers and bids are cleared based on their comprehensive prices determined by both their bid/offer prices and their relevant impacts on all the binding constraints. This optimization is based on a DC transmission network model.
- *Simultaneous Feasibility Testing Function* - checks the feasibility of the FTR auction solution generated by the optimization module under network contingency conditions. This module performs DC power flow based contingency analysis and identifies those contingencies that cause violations of facility limits. To ensure feasibility, each constraint is monitored for limit violation by the worse-case scenario combination of awarded FTR Options and Obligations. Impacts of counterflows from FTRs Options are taken into account, and counterflow created by an FTR option is ignored. Once identified, constraints corresponding to these contingencies are constructed and the optimization module is called again to solve the FTR auction with the newly identified contingencies included.
- *Post-processing Function* - ensures that the appropriate data items are transferred to the FTR auction database for posting on the MUI and ensures the results are transferred to the accounting and billing subsystems.