What Are FTRs?

Fixed Transmission Rights are …

a financial contract that
entitles holder to a
stream of revenues (or
charges) based on the
hourly energy price
differences across the
path
Why Do We Need FTRs?

**Challenge:**
- LMP exposes PJM Market Participants to price uncertainty for congestion cost charges.
- During constrained conditions, PJM Market collects more from loads than it pays generators.

**Solution:**
- Provides ability to have price certainty.
- FTRs provide hedging mechanism that can be traded separately from transmission service.

Why Use FTRs?

- To create a financial hedge that provides price certainty to Market Participants when delivering energy across the PJM system.
- To provide firm transmission service without congestion cost.
- To provide methodology to allocate congestion charges to those who pay the fixed cost of the PJM transmission system.
Characteristics of FTRs

- Defined from source to sink
- MW level based on transmission reservation
- Financially binding
- Financial entitlement, *not* physical right
- Independent of energy delivery

What are FTRs Worth?

- Economic value determined by hourly LMPs
- Benefit (Credit)
  - same direction as congested flow
- Liability (Charge)
  - opposite direction as congested flow
Energy Delivery
Consistent with FTR

Bus A
Source (Sending End)
LMP = $15

Bus B
Sink (Receiving End)
LMP = $30

Energy Delivery = 100 MWh

FTR = 100 MW
Thermal Limit

Congestion Charge = 100 MWh * ($30 - $15) = $1500
FTR Credit = 100 MW * ($30 - $15) = $1500

Energy Delivery
Not Consistent with FTR (I)

Bus A
LMP = $10

Bus C
LMP = $15

Bus B
LMP = $30

Energy Delivery = 100 MWh

FTR = 100 MW

Congestion Charge = 100 MWh * ($30 - $15) = $1500
FTR Credit = 100 MW * ($30 - $10) = $2000
**Energy Delivery Not Consistent with FTR (II)**

Bus A
LMP = $20

FTR = 100 MW

Bus B
LMP = $30

Energy Delivery = 100 MWh

Congestion Charge = 100 MWh * ($30-$15) = $1500
FTR Credit = 100 MW * ($30-$20) = $1000

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**Obtaining FTRs**

- Network service
  - based on annual peak load
  - designated from resources to aggregate loads

- Firm point-to-point service
  - may be requested with transmission reservation
  - designated from source to sink

- Secondary market -- bilateral trading
  - FTRs that exist are bought or sold

- FTR Auction -- centralized market
  - purchase “left over” capability
**FTR Request Process - External Interfaces**

- **FTR Auction Screens**
- **FTR Secondary Market Trading Screens**
- **PJM OASIS**
  - Request
  - Quality
  - Auction Results
  - Post Approved FTRs
- **PJM eCapacity**
  - Request
  - Approval/Deny
  - Network Service FTRs
- **FTR Request Processing System**
- **PJM Grid Accounting**

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**FTR Feasibility Analysis**

- The number of FTRs that can be awarded is limited by the capability of the Transmission System.
- Each FTR request is subject to passing the Simultaneous Feasibility Test (SFT).
- The purpose of the SFT is to ensure that all subscribed FTRs are within the capability of the Transmission System.
- The SFT will ensure the PJM Energy Market is Revenue Adequate under normal system conditions.
**FTR Analysis Subsystems**

- Market User Interface
- PJM EMS
- Other PJM Systems (Oasis, eCapacity)
- FTR Database
- Pre-Processing Function
- Simultaneous Feasibility Testing Function
- Post-Processing Function
- Accounting & Billing

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**FTR Feasibility Analysis Data Inputs**

- Uncompensated Parallel Flow Injections
- Transmission Outages
- Existing FTRs
- Facility Ratings
- New FTR Requests
- PJM Network Model
- List of Contingencies
- Interface Ratings
FTR Auction Analysis Software

- Uncompensated Parallel Flow Injections
- Transmission Outage Schedules
- FTRs (Firm Transmission Service Reservations)
- Facility Ratings
- FTR Quotes (Buy or Sell)
- PJM Network Model
- List of Contingencies
- Aggregate Price Definitions

FTR Auction Software

- FTRs Awarded in Auction
- FTRs Sold in Auction
- Nodal Prices
- Aggregate Prices
- Binding Constraints


- Total Congestion Charges collected - $18 Million
- Total FTR Credits - $13.5 Million
- Excess Congestion Charges - $4.5 Million
- Average FTR Value - $50 per MW Month
- FTRs awarded (typical month) - 550
- FTR MW capability subscribed - 31,450
- Number of Participants holding FTRs - 20 to 30
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