



# FTR Task Force

August 11, 2011

## FTR Task Force

- Mission: The FTRTF will investigate the causes of the FTR Revenue Inadequacy that has occurred in the 2010/2011 Planning Period and identify potential improvements including modeling that could be made to minimize the Revenue Inadequacy going forward
- PJM cannot guarantee that FTR Revenue Inadequacy will be eliminated or reduced regardless of any changes associated with the FTR Task Force.
- FTR Revenue Adequacy can never be guaranteed because ARR/FTR and Day-Ahead modeling are only simulating actual system conditions.
- The FTR Task force changes and/or process improvements are being developed to help reduce the risk associated with changing system conditions.

- General Comments:
  - Significant changes to modeling might not be appropriate for one possible unique year.
  - Markets needs to maximize FTR Revenue Adequacy while also maximizing ARR capability.
  - FTR Revenue Adequacy that is much larger than 100% is not optimal
    - Optimal to be as close to 100% without being too low or high
  
- Annual model
  - Several updates to 2011/2012 Annual modeling are anticipated to reduce the risk of FTR Revenue Adequacy while not at the expense of being too conservative for ARR allocation.
  - Wait and see how FTR Revenue Adequacy changes throughout 2011/2012 planning period?

## Agenda:

1. FTR Task Force Status
2. Development Matrix
3. Package development

## FTR Task Force Status

- ✓ Education
- ✓ Investigation
- ✓ Proposal Development
- Package Development
- Consensus Resolution

## Five Major Design Criteria Areas

- ✓ Process Improvements
- General Auction Rule Changes
- Annual Modeling
- Outages
- Funding

Design Criteria		Consensus Importance Level	A	B	C	D	E	F
1	Process Improvements	Minor	Operating/Switching Procedure process enhancements	eDART Tickets - List all facilities associated with circuit breaker status changes.	Consider Short Duration (< 5 days) outages in Monthly Auction if could be a revenue risk			
2	General Auction Rule Changes	Medium	Do not allow bids to clear in which the clearing price equals zero and there are no binding constraints in the auction period on which the FTR path sensitivity is non-zero.	Remove availability of Load nodes in prompt month for Monthly Auctions	Reduce Monthly Auction capability	Reduce Long Term Auction Capability		
3	Annual	High	No Change	Full Seasonal - Model four seasons in Annual ARR and FTR. Clearing for all four seasons done during one clearing process before start of planning period.	Hybrid 1 - Allocate percentage of prorated stage 1 ARR based on amount of time that modeled outages not scheduled.	Hybrid 2 - Allocate Residual ARRs for prorated stage 1 ARRs associated with outages for period when outage not scheduled.		
4	Annual Outages	High	No Change	Model sliding window of worst case outages using 60 days length criteria	Model Outages if 5 days or more (Seasonal only)	Model Outages if 10 days or more (Seasonal only)	Model Outages if 15 days or more (Seasonal Only)	DC Energy Proposal: Provide incentive to Transmission owners to maintain outage schedules following auctions.
5	Monthly Outages	High	No Change	Model sliding window of worst case outages using 5 days length criteria	Model all outages 2 days or longer	Model all outages 3 days or longer	Model all outages 4 days or longer	DC Energy Proposal: Provide incentive to Transmission owners to maintain outage schedules following auctions.
6	Long Term Auction	High	No Change	Model sliding window of worst case outages using 60 days length criteria	PJM Public Power Coalition Proposal: No residual capability made available, only counterflow offer enabled feasibility available			DC Energy Proposal: Provide incentive to Transmission owners to maintain outage schedules following auctions.
7	Funding	High	No Change	Fund deficient FTRs first from marginal loss surplus credits	Distribute any planning period year end excess revenues first to zones prorated in Stage 1 in which a modeled outage caused proration.	PJM Public Power Coalition Proposal: Year-end excess revenue (congestion and auction revenue) -allocate all revenue beyond what is needed for 100% annual FTR funding pro-rata to transmission customers	Fund FTRs from Day-Ahead Congestion dollars only. Balancing Congestion charged/credited to Load.	Change end of year uplift and hourly calculation to include all positive target allocations and do not allow negative target allocations to offset positive target allocations within a members portfolio
Consensus Reached								

# Annual ARR/ FTR Modeling Options

## Option 3A: No Change to Annual Modeling

- Loop flow approximation has been revised to reflect more appropriate representation of external PJM flow contributions interaction with internal PJM.
- Major Transmission outages that are scheduled which could affect FTR Revenue Adequacy have been modeled in the Annual ARR Allocation and FTR Auction.
- M2M Flow gates have been reviewed and incorporated appropriately into the models.



## Option 3B: Seasonal ARR/FTR

- FTR Working Group from 2007 rejected any action to be taken on development of a seasonal approach.
  - Main Reason for Rejection - Administrative overhead and participant uncertainty compared to relatively small improvement in revenue adequacy.
  - Analysis showed slight improvement in FTR Revenue Adequacy for the 2003/2004 through 2006/2007 planning periods.
  
- Expected Input differences vs. Current Annual process
  - Fall and Spring:
    - ❖ Reduction in capability across Interfaces
    - ❖ Increase in modeled transmission outages
    - ❖ Increase in thermal ratings
    - ❖ Reduction in NSPL used in Allocation
  
  - Summer and Winter:
    - ❖ Increase in capability across Interfaces



## Option 3B: Seasonal ARR/FTR (cont)

- ❖ Updated high level analysis completed using two methods
  - Full simulation not practical
  - Method 1: Impact using seasonal reactive interface ratings only that reflect transmission outages.
    - Estimated 500 additional MWs in Summer, 550 additional in Winter, 450 fewer in Fall, and 625 fewer in Spring.
  - Method 2: Method 1 and also modeled capability reduction from three additional transmission outages in Fall and Spring period only
    - Estimated 500 additional MWs in Summer, 550 additional in Winter, 562 fewer in Fall, and 737 fewer in Spring.
    - Modeled capability reduction as a result of one transmission outage modeled in COMED, PSEG, and APS areas.



Method 1: Impact using seasonal reactive interface ratings only that reflect transmission outages.

Congestion Charge vs. FTR Target Allocation (Excluding Excess Auction Revenue)					
		2009/2010		2010/2011	
		Actual Annual	Estimated Seasonal	Actual Annual	Estimated Seasonal
Summer		-\$15.1	-\$31.1	-\$25.0	-\$95.3
Fall		-\$24.2	-\$14.6	-\$91.0	-\$62.4
Winter		\$3.2	-\$49.8	-\$91.2	-\$159.7
Spring		-\$53.5	-\$33.3	-\$73.2	-\$53.0
Planning Period		-\$89.5	-\$128.7	-\$280.4	-\$370.4

Method 2: Method 1 and also modeled capability reduction from three additional transmission outages in Fall and Spring period only

Congestion Charge vs. FTR Target Allocation (Excluding Excess Auction Revenue)					
		2009/2010		2010/2011	
		Actual Annual	Estimated Seasonal	Actual Annual	Estimated Seasonal
Summer		-\$15.1	-\$31.1	-\$25.0	-\$95.3
Fall		-\$24.2	-\$7.2	-\$91.0	-\$39.5
Winter		\$3.2	-\$49.8	-\$91.2	-\$159.7
Spring		-\$53.5	-\$28.2	-\$73.2	-\$46.6
Planning Period		-\$89.5	-\$116.2	-\$280.4	-\$341.1

## Option 3C: Hybrid 1 Approach

- Single Period Clearing - Same as current process
- Annual ARR Allocation
  - Determine Prorated Stage 1 ARR amount associated with modeled Transmission Outages
  - Allocate a portion of prorated amount for entire planning period based on period when transmission outage is not scheduled out of service.
- Annual FTR Auction
  - Model transmission outages for entire period

## Option 3C: Hybrid 1 Approach Example 1

- Transmission Line out of service from September-November (3 Months)
- ARR Capability on Path A-B without outage= 60 MW
- ARR Capability on Path A-B with transmission line out of service= 50 MW
- Adjustment to ARR capability for period when Transmission line not out of service= $50 + (.75 * 10) = 57.5$

Method	Type	Period Outage Modeled	Cleared ARR <sup>s</sup> *				Average
			June-Aug	Sep-Nov	Dec-Feb	Mar-May	
No Change	Single Period	Full Year	50	50	50	50	50
Seasonal	Multi-Period	Partial Year	60	50	60	60	57.5
Hybrid	Single Period	Full Year	57.5	57.5	57.5	57.5	57.5

\*Actual Clearing for No Change and Hybrid method would be a single period year equal to average. Clearing for Seasonal method would be four separate periods for values identified for appropriate period.

- Example assumes only one outage modeled in all methods. Actual seasonal method could model shorter duration outages in which the cleared ARR amounts could change.

## Option 3C: Hybrid 1 Approach Example 2

- Transmission Line out of service from September-December (4 Months)
- ARR Capability on Path A-B without outage= 60 MW
- ARR Capability on Path A-B with transmission line out of service= 50 MW
- Adjustment to ARR capability for period when Transmission line not out of service= $50 + (.66 * 10) = 56.7$

Method	Type	Period Outage Modeled	Cleared ARRs*				Average
			June-Aug	Sep-Nov	Dec-Feb	Mar-May	
No Change	Single Period	Full Year	50	50	50	50	50
Seasonal	Multi-Period	Partial Year	60	50	50	60	55
Hybrid	Single Period	Full Year	56.7	56.7	56.7	56.7	56.7

\*Actual Clearing for No Change and Hybrid method would be a single period year equal to average. Clearing for Seasonal method would be four separate periods for values identified for appropriate period.

- Example assumes only one outage modeled in all methods. Actual seasonal method could model shorter duration outages in which the cleared ARR amounts could change.

## Option 3D: Hybrid 2 Approach –Residual ARR

- Allocate Residual ARR for periods of year where modeled annual transmission outage that caused stage 1 proration is not scheduled out of service.
- Single Period Clearing - Same as current process
- Annual ARR Allocation and FTR Auction – Same as current process
  - Model transmission outages for entire period
- Residual ARR value determined from monthly prompt auction clearing price for month the Residual ARR is effective.
- Monthly Revenue for Residual ARR period only used for funding ARRs
  - Annual and Long Term Revenues would not fund Residual ARRs
  - Excess monthly revenue after Residual ARR payout continues to go to FTR Revenue bucket for funding FTRs
  - Deficient Monthly Revenues to fund Residual ARRs will result in Residual ARRs being prorated pro-rata based on expected payout ratio. No opportunity for excess from previous or later months to fund deficiencies.

# Annual Option Comparisons

	Annual Options				Comments
	No Change	Seasonal	Hybrid 1	Hybrid 2	
Description	Process same as current	Conduct four separate ARR Allocations and FTR Auctions representative of each season.	Process same as current but allocate a portion of prorated Stage 1 ARR for entire year based on percentage of time outage(s) associated with proration is not scheduled.	Process same as current and allocate Residual ARRs for prorated Stage 1 ARRs associated with transmission outages for the period of time the outage(s) are not scheduled.	
ARR Allocation format	Same as current	4 separate ARR allocations	Same as current	Same as current	
FTR Auction format	Same as current	4 separate FTR Auctions	Same as current	Same as current	
Timeframe	2 Month Process from Late February through Early May	2 months assuming clearing for all four seasons done simultaneously. (Reduction in ARR Allocation and /or Annual FTR Auction Rounds necessary)	2 Month Process from Late February through Early May	2 Month Process from Late February through Early May	In order to complete seasonal method in same time period as current period the ARR allocation stage 2 could be eliminated or ARR allocation stage 2 reduced to two rounds and FTR Annual Auction reduced to two rounds.
Transmission Outages	Outages expected to last 2 months typically modeled	Outages expected to last 15 days or more probably appropriate to be modeled	Outages expected to last 2 months typically modeled	Outages expected to last 2 months typically modeled	Outages to be modeled will be determined based on separate design criteria
Equipment Ratings	Use Summer Ratings	Uses Appropriate season ratings	Use Summer Ratings	Use Summer Ratings	
Peak Load Apportionment	Zonal load distribution based on previous annual peak	Zonal load distribution based on previous season's peak	Zonal load distribution based on previous annual peak	Zonal load distribution based on previous annual peak	
ARR Reassignment	ARR reassignment initialized on June 1 with comparison of 6/1 NSPLs to NSPLs used in allocation	ARR Reassignment initialized first day of each season with comparison of NSPLs to NSPLs used for each season.	ARR reassignment initialized on June 1 with comparison of 6/1 NSPLs to NSPLs used in allocation	ARR reassignment initialized on June 1 with comparison of 6/1 NSPLs to NSPLs used in allocation	Moving to seasonal allocation requires an ARR true-up for the first day of each season back to the initial allocation. This will result in ARR credit changes the first day of each season even for LSEs that had no load shift from previous day.
Implementation Requirements	-	Hard- Challenging to implement by 12/13 Annual Process	Easy	Medium	

# Outages

## Option 4A, 5A, and 6A: No Change Process

- Outages of two months or longer are initially modeled in SFT process in Annual and Long Term Auction. Outages of five days or longer are initially modeled in SFT process in monthly auctions
  - Simultaneous feasibility test includes determining whether and the extent to which each of outages should be included in the clearing optimization program
  
- Determination of outages to model in actual clearing optimization engine
  - Initial outage list reviewed with reliability engineers as to the probability of the transmission outages being approved. Outages often occur during different times of the auction period and would not be allowed by the reliability engineers to occur simultaneously because they would cause reliability concerns.

## Option 4A, 5A, and 6A: No Change Process (cont)

- Outages scheduled in OASIS are sometimes delayed, cancelled, or rescheduled for reasons such as cancelled transmission upgrades, conflicts with other outages, and maintenance cancelations. PJM makes its most reasonable effort to ensure accuracy for what outages to include during the simultaneous feasibility process. Therefore, PJM models the best representation of outages to reflect the expected conditions of the auction time period.
- PJM may also contact Transmission Owners directly to discuss their posted outages to determine whether they will actually be taken, whether any other factors may affect their decisions to take an outage, and whether the outage will occur at the anticipated date. PJM considers any additional information gained during these discussions with the Transmission Owners during its determination of simultaneous feasibility.

Option 4B, 5B, and 6B: Model sliding window of worst case outages using 60 days length criteria in Annual and Long Term Auctions and use 5 days length criteria for monthly auctions.

- Outages will be modeled by determining time period when the largest or most severe outages occur simultaneously within specified time period.
  - Initial list derived from OASIS will be used and PJM will not determine what actually gets used in actual clearing optimization.
  - Increases number of modeled outages in 2011/2012 Annual process from four to twenty.
  - Decreases number of outages typically modeled in monthly auction by about 80%.
  - Potential feasibility issues and optimization failures.
    - Initial posted outage list not approved and many times outages are concurrently scheduled that would not be approved. PJM would need to still have ability to remove outages if could cause optimization failures.
    - Initial posted list usually changes.

Option 4F, 5F, and 6F: Provide incentive to Transmission owners to maintain outage schedules following auctions.

## Current Outage Submission Requirements:

- Outages Scheduled for next planning period and >30 days must be submitted by February 1<sup>st</sup>
- Outages > 5 days must be submitted by the 1st of month six months prior to the start of the outage.

## Possible options:

- Allocate portion of annual auction excess revenues to transmission owners for approved outages for next planning period that are greater than 30 days of length, that were submitted on time, and who maintained schedule as initially submitted.
- Allocation portion of monthly auction revenues to transmission owners for approved outages greater than 5 days of length, that were submitted on time, and who maintained scheduled as initially submitted.
- Allocate portion of any end of year excess to transmission owners who maintained outage schedule for above requirements.
- Other Options?

## Option 6C:

No residual capability made available, only counter flow offer enabled feasibility available

- Current Long Term Auction available capability is the residual capability after the removal of the capability created by the current planning period ARR.

  - Option 6C would remove all capability

- Zero FTR capability available.
  - Only allow FTRs to clear if there is counter flow FTRs capability created.

# Funding



# Design Criteria 7 – FTR Funding

- Option 7A: No Change
- Option 7B: Fund FTR shortfalls from Marginal Loss Surplus Credits
- Excess marginal loss collection for 2010 was over \$800 million.  
FTR Shortfall for 2010/2011 planning period was about \$254 million
- Option 7C: Distribute any planning period year end excess revenues first to zones prorated in Stage 1.
- Distribute only to zones in which modeled outage caused proration
  - Allocate using load ratio share for periods when outage not scheduled
  - Value using monthly auction prompt period clearing prices or day-ahead congestion prices
- Option 7D: Year-end excess revenue (congestion and auction revenue) - allocate all revenue beyond what is needed for 100% annual FTR funding pro-rata to transmission customers

## Design Criteria 7 – FTR Funding (cont)

Option 7E:

Fund FTRs from Day-Ahead Congestion dollars only.  
Balancing Congestion charged/credited to Load.

- End of year excess used first to fund negative balancing congestion.
- Creates incentive for Load to participate in day-ahead market which might ultimately reduce negative balancing congestion.
- Revenue Adequacy would be 100% for past years of revenue inadequacy.



## Design Criteria 7 – FTR Funding (cont)

Option 7F: Change end of year uplift and hourly calculation to include all positive target allocations and do not allow negative target allocations to offset positive target allocations within a members portfolio.

Section 5.2.5 (c) 2 of Tariff:

*For each Market Participant that held an FTR during the Planning Period, the Office of the Interconnection shall calculate the total target allocation associated with all FTRs held by the Market Participant during the Planning Period provided that, the foregoing notwithstanding, if the total target allocation for an individual Market Participant calculated pursuant to this section is negative the Office of Interconnection shall set the value to zero.*



## Design Criteria 7 – FTR Funding (cont)

Option 7F (cont): Change end of year uplift and hourly calculation to include all positive target allocations and do not allow negative target allocations to offset positive target allocations within a members portfolio.

### Uplift Example Current:

End of year uplift required for entire market= \$1 million

Participant A:            Positive Target Allocations = \$1 million  
                                 Negative Target Allocations = -\$1 million  
                                 Net Target Allocations =            0  
                                 Uplift Charge=                    0

Participant B:            Positive Target Allocations = \$4 million  
                                 Negative Target Allocations = 0  
                                 Uplift Charge= \$1 million

### Uplift Example proposed:

End of year uplift required for entire market= \$1 million

Participant A:            Positive Target Allocations = \$1 million  
                                 Negative Target Allocations = -\$1 million  
                                 Uplift Charge= \$1million \*(\$1 million/\$5 million) = \$200,000

Participant B:            Positive Target Allocations = \$4 million  
                                 Negative Target Allocations = 0  
                                 Uplift Charge= \$1 million \*(\$4 million/\$5 million)= \$800,000



# Design Criteria 7 – FTR Funding (cont)

## Option 7F (cont): Monthly Example:

		June	July	August	September	October	November	December	January	February	March	April	May	Total
Participant 1 Target Allocation	FTR 1	-\$1	-\$1	-\$1	-\$1	-\$1	-\$1	-\$1	-\$1	-\$1	-\$1	-\$1	-\$1	-\$12
Participant 1 Target Allocation	FTR 2	\$1	\$1	\$1	\$1	\$1	\$1	\$1	\$1	\$1	\$1	\$1	\$1	\$12
Participant 1 Target Allocation	Net	\$0	\$0	\$0	\$0	\$0	\$0	\$0	\$0	\$0	\$0	\$0	\$0	\$0
Participant 2 Target Allocation	FTR 3	\$4	\$2	\$1	\$1	\$1	\$1	\$1	\$1	\$1	\$1	\$1	\$1	\$16
Total Funds available for FTRs		\$3	\$1	\$1	\$1	\$1	\$1	\$1	\$1	\$1	\$1	\$1	\$1	\$14
Total Shortfall		\$1	\$1	\$0	\$0	\$0	\$0	\$0	\$0	\$0	\$0	\$0	\$0	\$2

### Current Rules:

	June	July	August	September	October	November	December	January	February	March	April	May	Total
Participant 1 Payout	\$0	\$0	\$0	\$0	\$0	\$0	\$0	\$0	\$0	\$0	\$0	\$0	\$0
Participant 2 Payout	\$3	\$1	\$1	\$1	\$1	\$1	\$1	\$1	\$1	\$1	\$1	\$1	\$14
Monthly Payout % Participant 1	100%	100%	100%	100%	100%	100%	100%	100%	100%	100%	100%	100%	100%
Monthly Payout % Participant 2	75%	50%	100%	100%	100%	100%	100%	100%	100%	100%	100%	100%	88%
Market Revenue %	75%	50%	100%	100%	100%	100%	100%	100%	100%	100%	100%	100%	88%

### Proposed Rules:

	June	July	August	September	October	November	December	January	February	March	April	May	Total
Participant 1 Payout	-\$0.20	-\$0.33	\$0.00	\$0.00	\$0.00	\$0.00	\$0.00	\$0.00	\$0.00	\$0.00	\$0.00	\$0.00	-\$0.86
Participant 2 Payout	\$3.20	\$1.33	\$1.00	\$1.00	\$1.00	\$1.00	\$1.00	\$1.00	\$1.00	\$1.00	\$1.00	\$1.00	\$14.86
Monthly Payout % Participant 1	80%	67%	100%	100%	100%	100%	100%	100%	100%	100%	100%	100%	93%
Monthly Payout % Participant 2	80%	67%	100%	100%	100%	100%	100%	100%	100%	100%	100%	100%	93%
Market Revenue %	80%	67%	100%	100%	100%	100%	100%	100%	100%	100%	100%	100%	93%

	End of Year Uplift Charge Current Rules	Revenue % Current Rules	End of Year Uplift Charge Proposed Rules	Revenue % Proposed Rules
Participant 1	\$0	100%	\$0.86	93%
Participant 2	\$2	88%	\$1.14	93%
Total	\$2		\$2.00	

## Preliminary Package Development

Packages*	Description	Voting Items included	Anticipated Implementation	Company that created Package
1	No Change	3A, 4A, 5A, 6A, 7A	Fall 2011	PJM
2	Capability Reduction	3A, 4A, 5A, 6C, 7A	2012/2013 Annual Process	Member
3	Seasonal 1 - 15 day outage modeling	3B, 4E, 5A, 6A, 7A	2013/2014 Annual Process	PJM
4	Seasonal 2 - 10 day outage modeling	3B, 4D, 5A, 6A, 7A	2013/2014 Annual Process	PJM
5	Hybrid 1	3C, 4A, 5A, 6A, 7A	2012/2013 Annual Process	PJM
6	Hybrid 2	3D, 4A, 5A, 6A, 7A	2012/2013 Annual Process	PJM
7	Funding 1 - Marginal Loss	3A, 4A, 5A, 6A, 7B, 7C	2012/2013 Annual Process	PJM
8	Funding 2 - Balancing Congestion charged/credited to Load	3A, 4A, 5A, 6A, 7E	2012/2013 Annual Process	PJM

\* Items 1A, 1B, and 1C are non-voting items included in all packages.

\*Item 2A has already been approved by Members Committee.

- Additional Packages
- Request for preferred package
- Consensus on one Package

- Vote on Preferred Packages if consensus not reached
- Develop specific rules for each package
- Make recommendation to MIC