

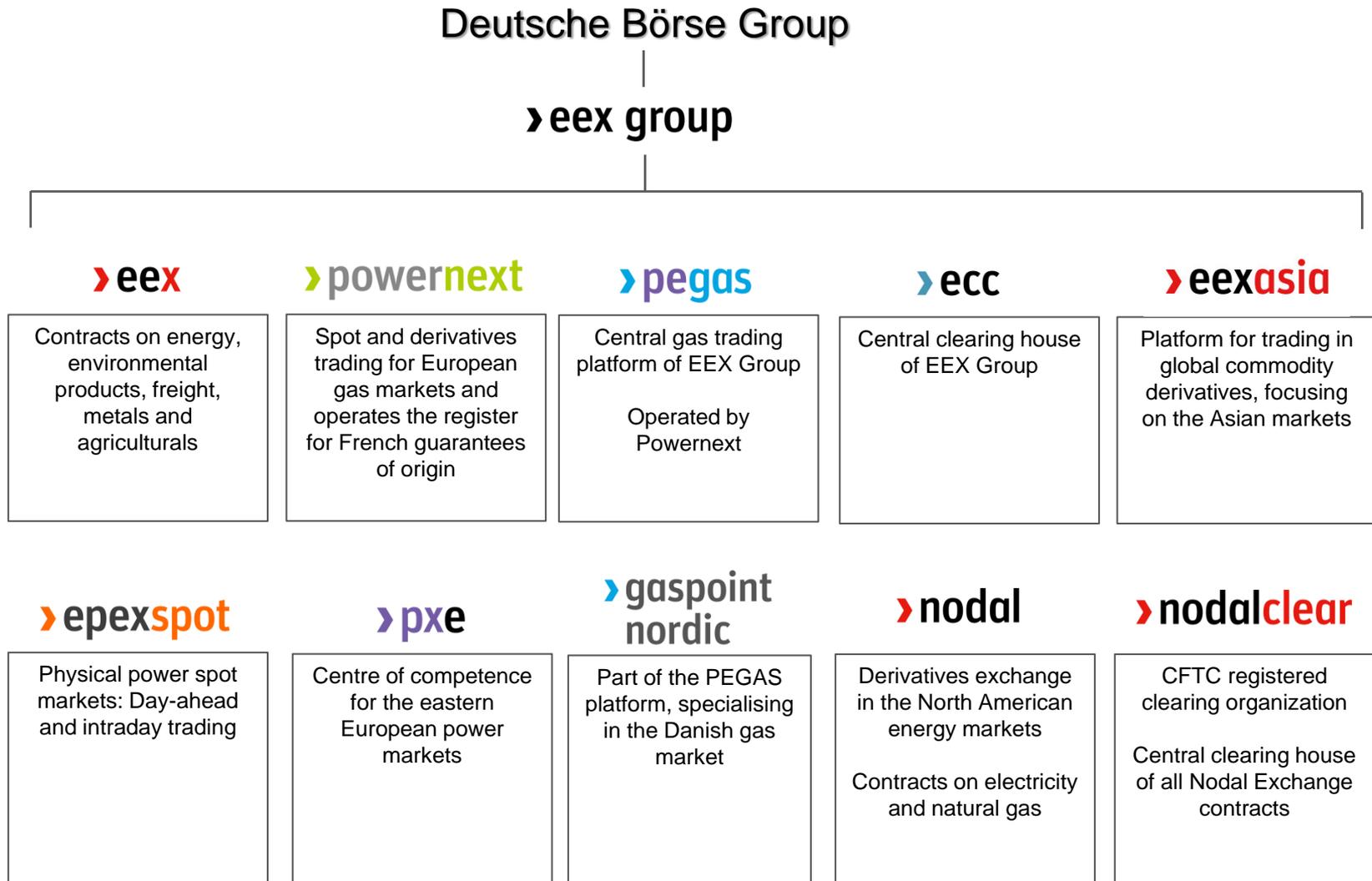
# FTR Clearing (EFTRs) Proposal for PJM

September 24, 2019

# Nodal Exchange Overview

- **Commodity exchange**
  - Designated Contract Market under CFTC jurisdiction; all contracts are futures contracts or options on futures
  - 41% market share of US power futures open interest as of Aug 31, 2019 (819 TWh)
  - 33% market share of US monthly power futures traded volume Jan-Aug 2019 (up from 19% Jan-Aug 2018)
- **Energy, environmental and trucking freight contracts**
  - Providing ability to trade power futures and options on hundreds of hubs, zones, and nodes across seven organized markets (and Mid-C)
    - ISO-NE, NYISO, PJM, MISO, ERCOT, SPP & CAISO
  - Natural gas futures contract for Henry Hub
  - Recently introduced environmental and trucking freight contracts
- **Multiple platforms:**
  - Nodal LiveTrade trading screen as well as Deutsche Börse Group's T7 matching engine with CQG front-end for select contracts
  - Block trades (e.g., broker) submission for clearing
- **All contracts are cleared by Nodal Clear using innovative portfolio margining**
  - Nodal Clear, LLC has been permitted to elect Subpart C under Part 39 of the Commodity Exchange Act
  - Nodal Clear was recognized as a third-country central counterparty by ESMA in March 2017
- **Nodal Exchange became part of the EEX Group on May 3, 2017; EEX Group is in turn part of the Deutsche Börse Group**

# Nodal Exchange & Nodal Clear are part of a global exchange family



# Nodal Clear clearing members



- **ADM Investor Services Inc. (FCM)**



**BNP PARIBAS**

- **BNP Paribas Securities Corp. (FCM)**

**BANK OF AMERICA**

- **BofA Securities, Inc. (FCM)**



- **Citigroup Global Markets, Inc. (FCM)**



- **ED&F Man Capital Markets Inc. (FCM)**



- **Goldman Sachs & Co. (FCM)**



- **Macquarie Futures USA LLC (FCM)**

**MIZUHO**

- **Mizuho Securities USA Inc. (FCM)**



- **Morgan Stanley & Co. LLC (FCM)**



**RBC Capital Markets**

- **RBC Capital Markets LLC (FCM)**



- **Royal Bank of Canada**



- **SG Americas Securities LLC (FCM)**

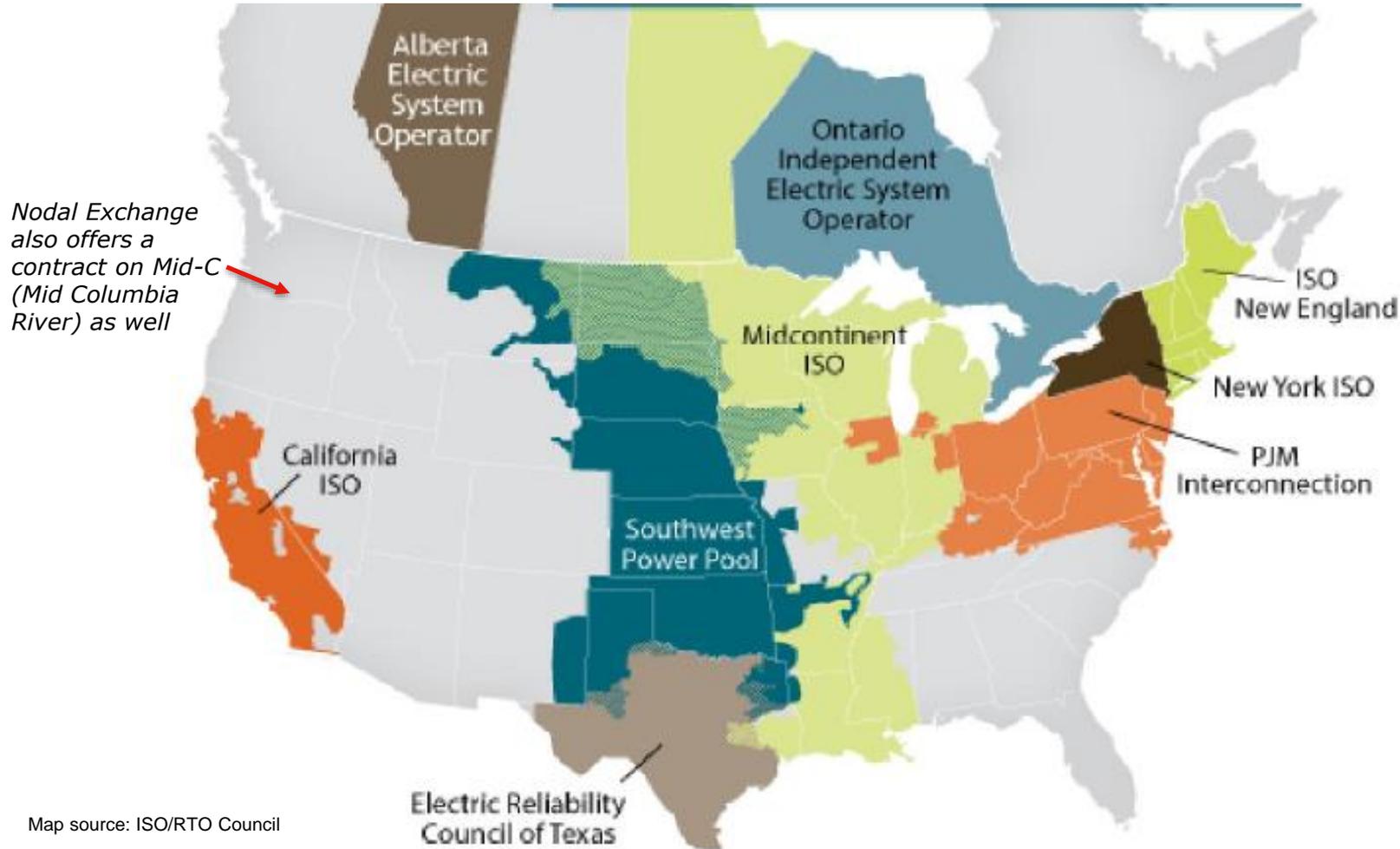
Newedge



- **Wells Fargo Securities LLC (FCM)**

# Nodal Exchange offers contracts that settle to the spot markets in the seven organized markets that have gone “nodal” in the U.S.

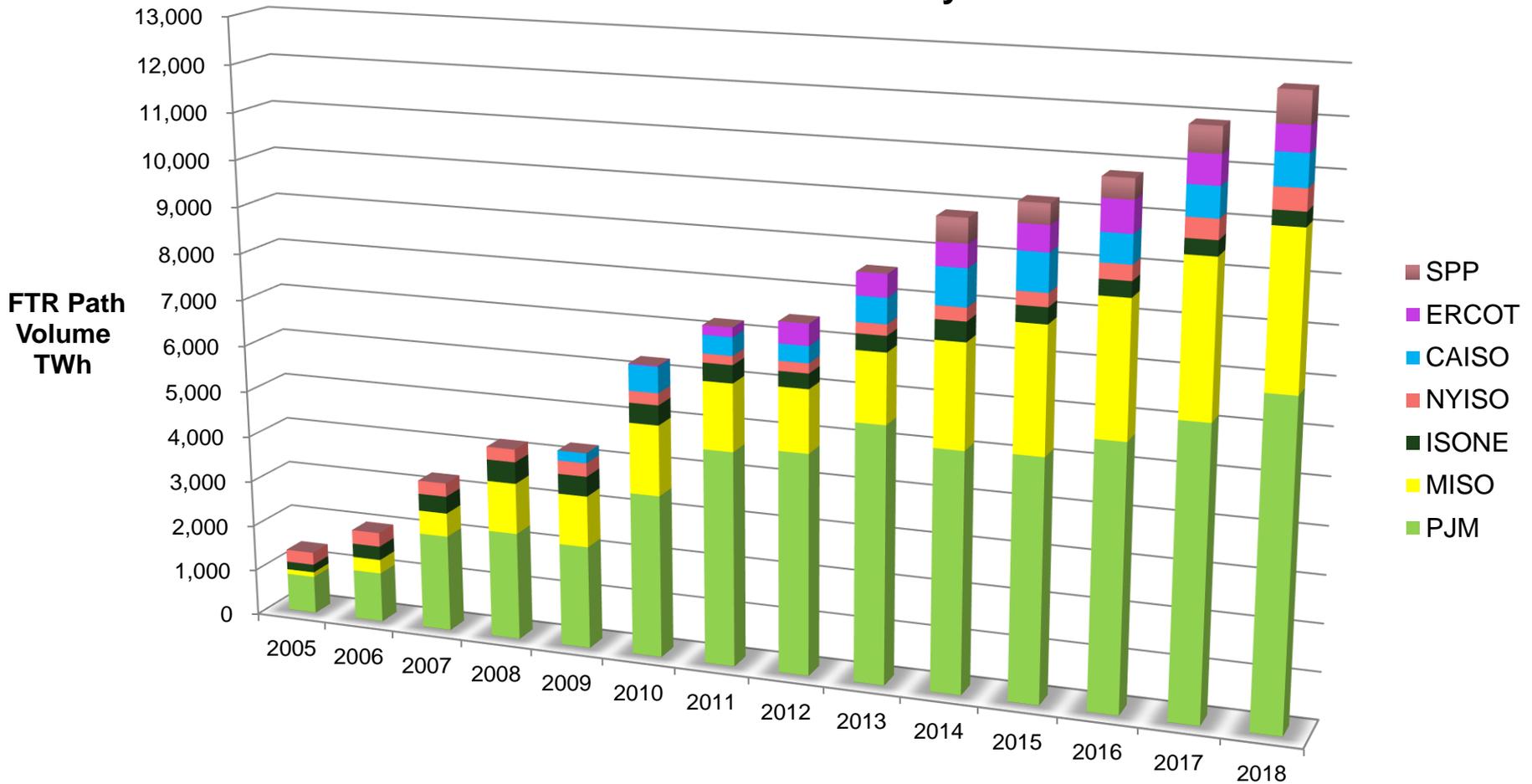
Seven markets currently publish nodal Locational Marginal Prices (LMP) of electricity and offer Financial Transmission Rights (FTR) auctions for their markets based on congestion spreads. These seven nodal organized markets with ~725k MWs of capacity are:  
**ISO-NE, NYISO, PJM, MISO, ERCOT, SPP and CAISO**



Map source: ISO/RTO Council

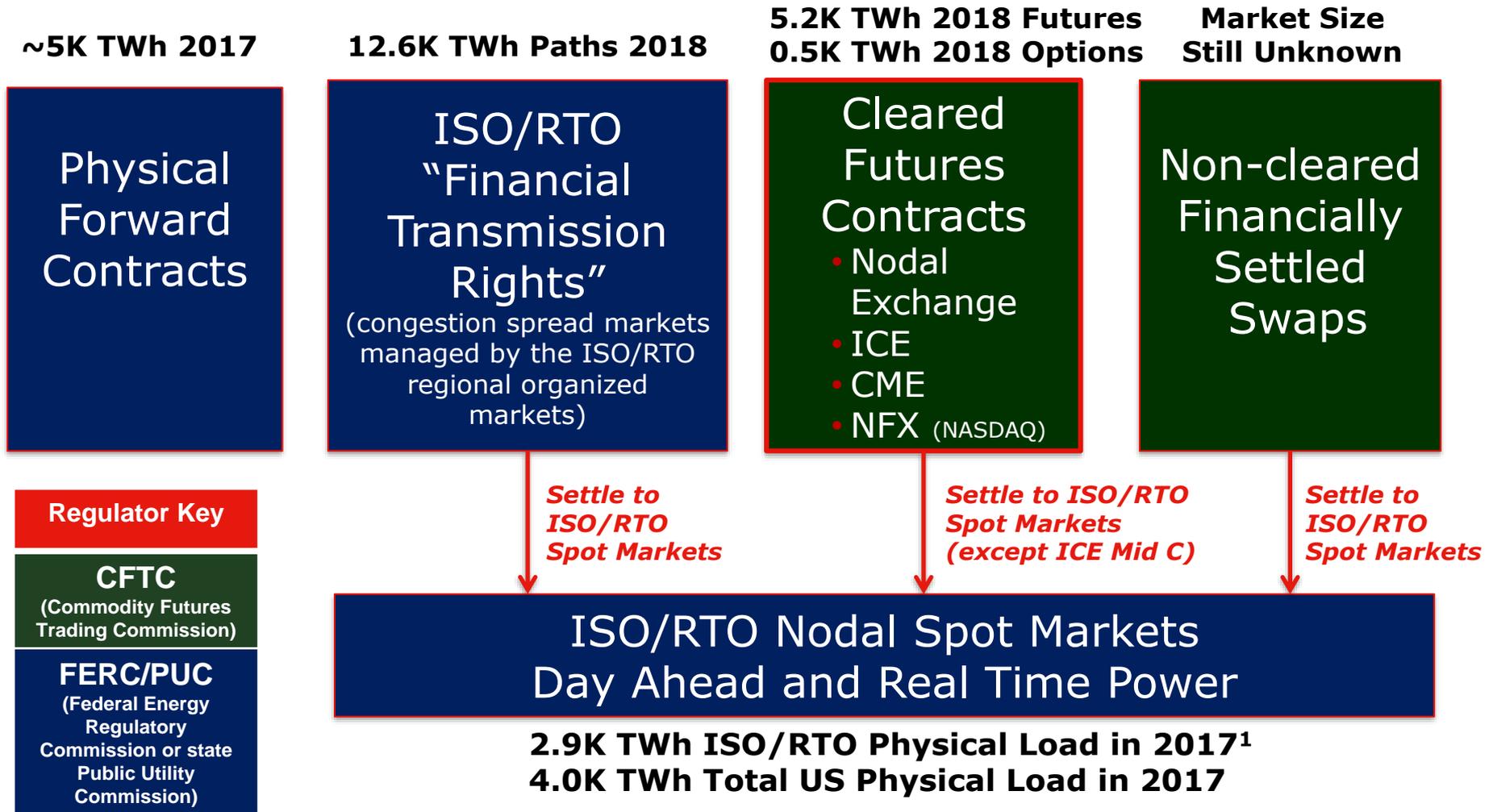
# The ISO/RTO FTR markets continue to grow; growth in 2018 over 2017 was 6.4%

FTR Market Path Volume by Year



Note: The volume is based on awarded obligation volume on both source and sink locations.

# United States Power Markets



1. Approximation based on ISO/RTOs serve ~72% of U.S. population

# What does it mean to settle FTRs through futures by Exchange for Related Position (EFRP) transactions?

- FTR auctions run by the ISO continue to create the FTR positions
- FTR is exchanged for Nodal Exchange futures contracts (i.e., a spread with one futures contract at source and another futures contract at sink) – via execution of an Exchange for FTR (EFTR), a new type of EFRP
- ISO is a counterparty in each EFTR transaction (other counterparty is one of various FTR holders/traders)
- ISO payment mechanism to deliver congestion revenue to FTR holders is replaced with variation margin payments in the futures market; similarly, any payment delivery obligations by the FTR holders are handled through variation margin
- ISO retained congestion revenues will balance any ISO variation margin payments by settlement of the FTR term; similarly, if the FTR is out of the money, the variation margin receipts by the ISO will cover payment obligations to transmission capacity owners

# FTR clearing coverage is extensive—99% of FTR exposure would be covered by Nodal’s proposal

## 100% of auctions are covered

Auction Type	# per Year	Clearing Coverage
Long Term	3-6	100%
Annual	4	100%
BoPP	12	100%

- FTR Clearing would be eligible for all auctions
- FTRs containing all node types aside from load nodes are eligible for clearing:
  - 28% of nodes covered
  - 89% of expiries covered
  - 99% of exposure covered\*

## All node types but load nodes are covered

Node Type	# of locations	Clearing Coverage	# of Expiries	Clearing Coverage
Hub	11	100%	1,056	100%
Zone	20	100%	1,920	100%
Residual Metered EDC	27	100%	2,592	100%
Aggregate	160	100%	15,104	100%
Gen	1,611	100%	154,584	100%
Interface	9	100%	864	100%
EHV	117	100%	488	100%
Load	5,050	0%	21,380	0%
<b>Total</b>	<b>7,005</b>	<b>28%</b>	<b>197,988</b>	<b>89%</b>

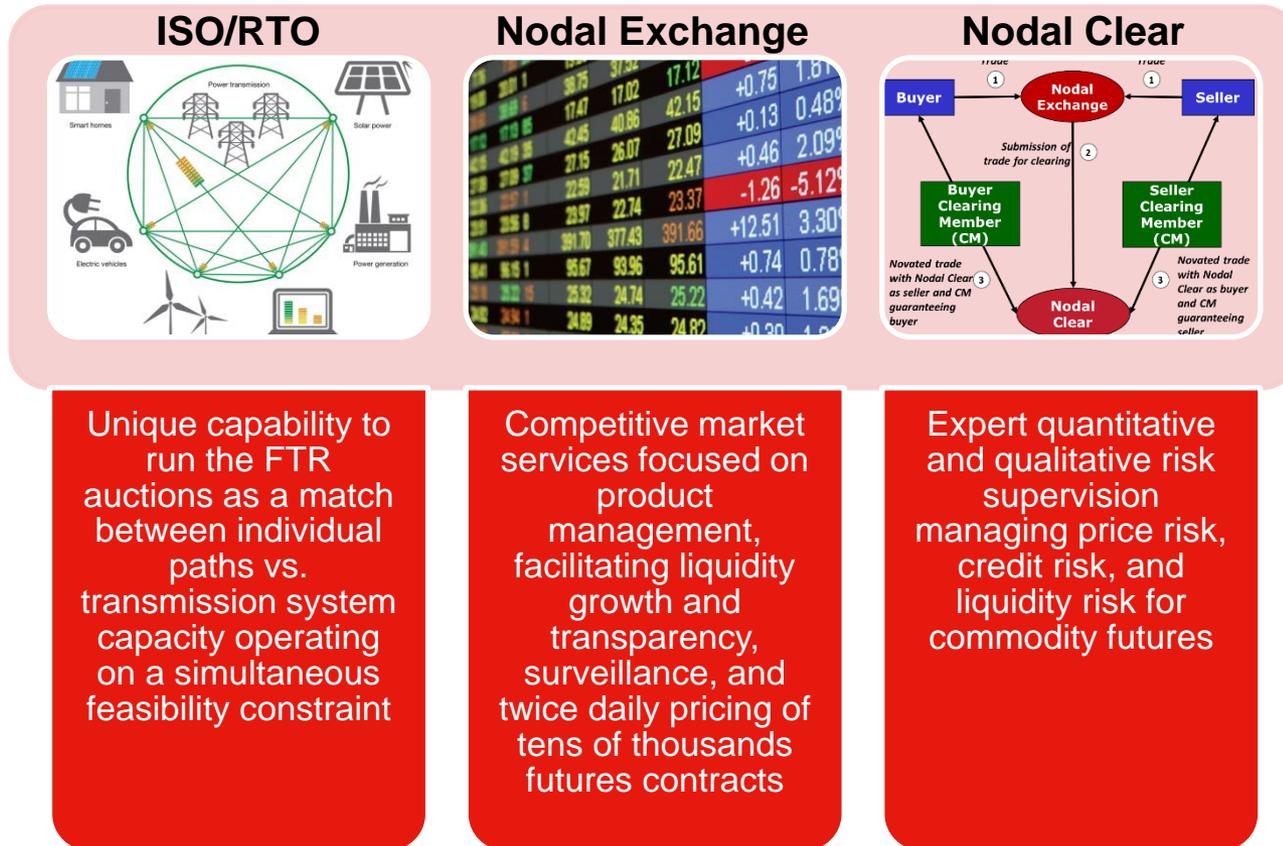
MWhs of PJM FTR Positions*	Clearing Coverage
4,773,892,776.8	99%

\*Exposure calculated using open positions following round 1 of the 20/23 Long Term Auction; paths with source and/or sink that has been only awarded in the prompt month are excluded from clearing

# Key benefits of exchanging FTRs for cleared futures contracts

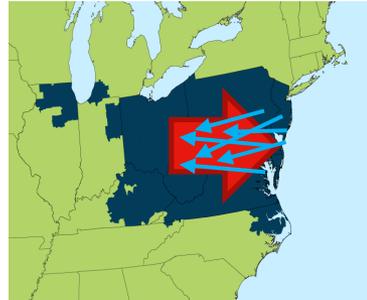
- **Opportunities for secondary market trading, providing much greater liquidity to adjust positions and improve hedges**
- **Improves transparency: Nodal Exchange provides market participants with additional market intelligence on pricing expectations with twice daily marks (i.e., mark to market)**
- **Improved default protection for all ISO FTR participants: credit risk management solution through guaranteed delivery of FTR payment obligations**
  - Defaults handled in cleared environment rather than losses shared by surviving ISO members—***from the participants' perspective, delivery obligations receive enhanced protection***
  - Replaces ISO collateral requirements for holding FTRs with margining related to clearing
- **Enables netting and cross margining of FTR originated positions:**
  - With other power positions (e.g., cleared transactions)
  - With other non-power positions (e.g., natural gas)
  - With futures positions held at multiple ISOs

# EFTRs bring together superior capabilities across entities into one market solution

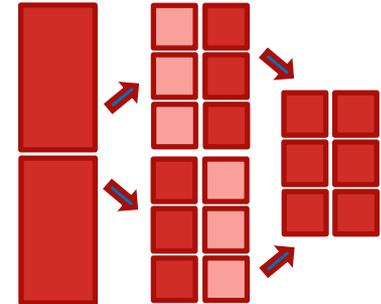


# Overview of EFTRs and Clearing on Nodal Exchange

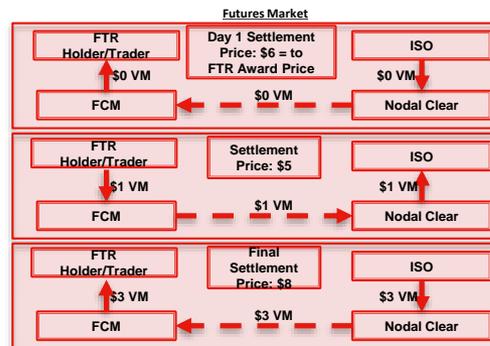
## 1. ISO/RTO runs FTR Auction



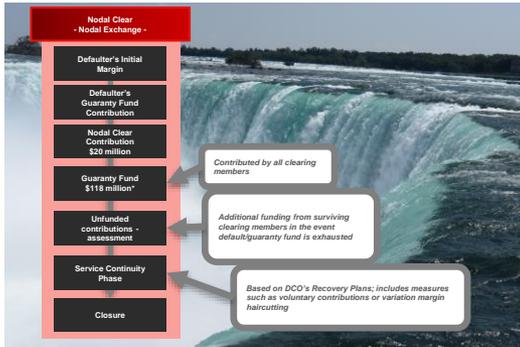
## 2. Exchange of FTRs for futures



## 3. Cash flows alter as futures trade and settle at Nodal Exchange

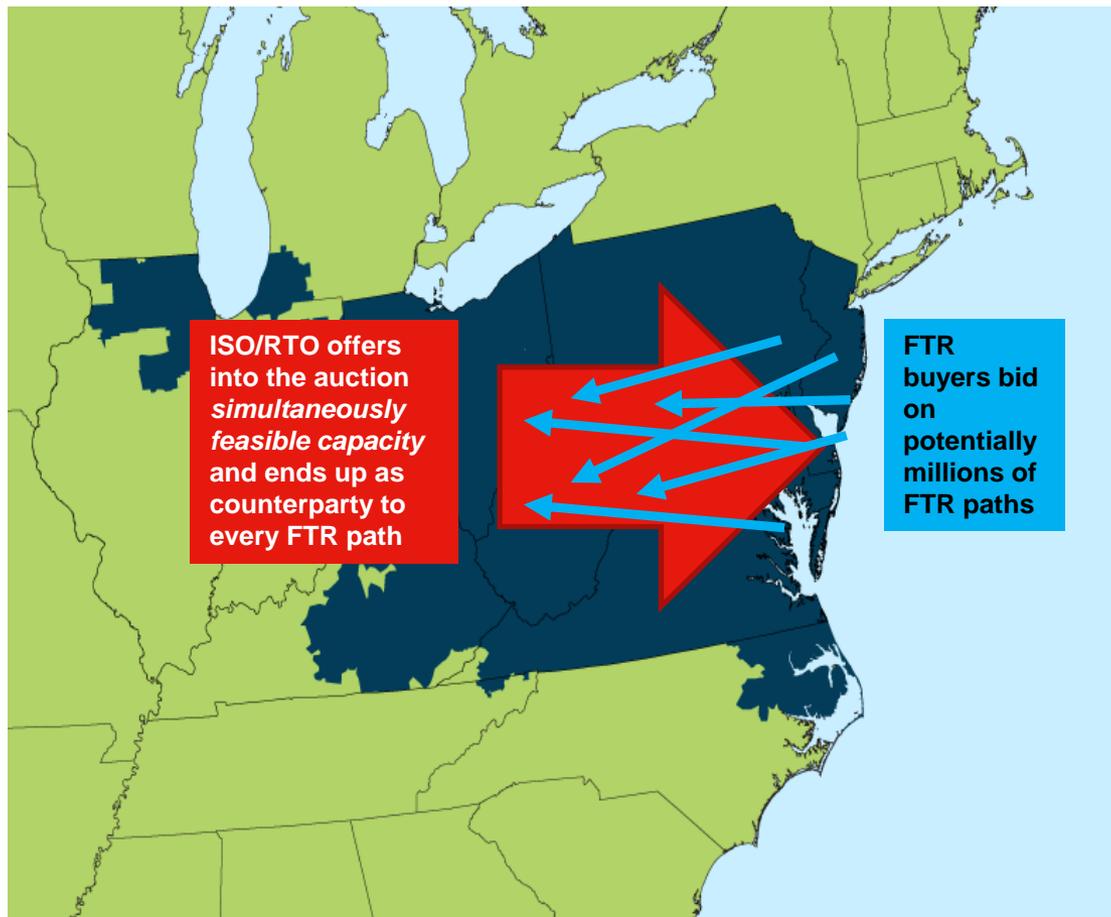


## 4. Risk management that reduces likelihood and impact of defaults



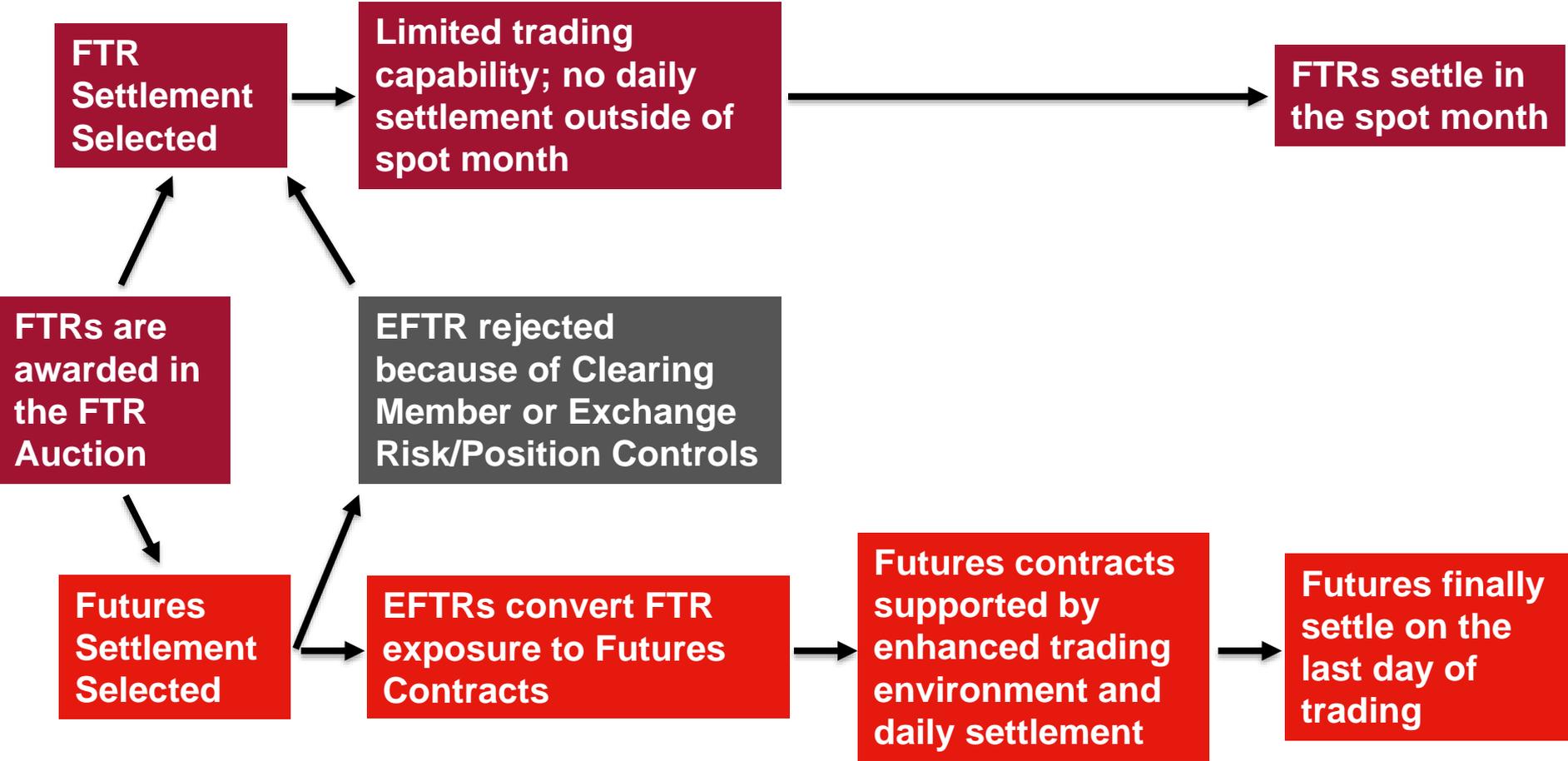
# The FTR auctions, which serve a unique and critical role in the organized power markets, continue unchanged

FTR auctions allow market participants to hedge the value of transmission capacity across the electricity market area

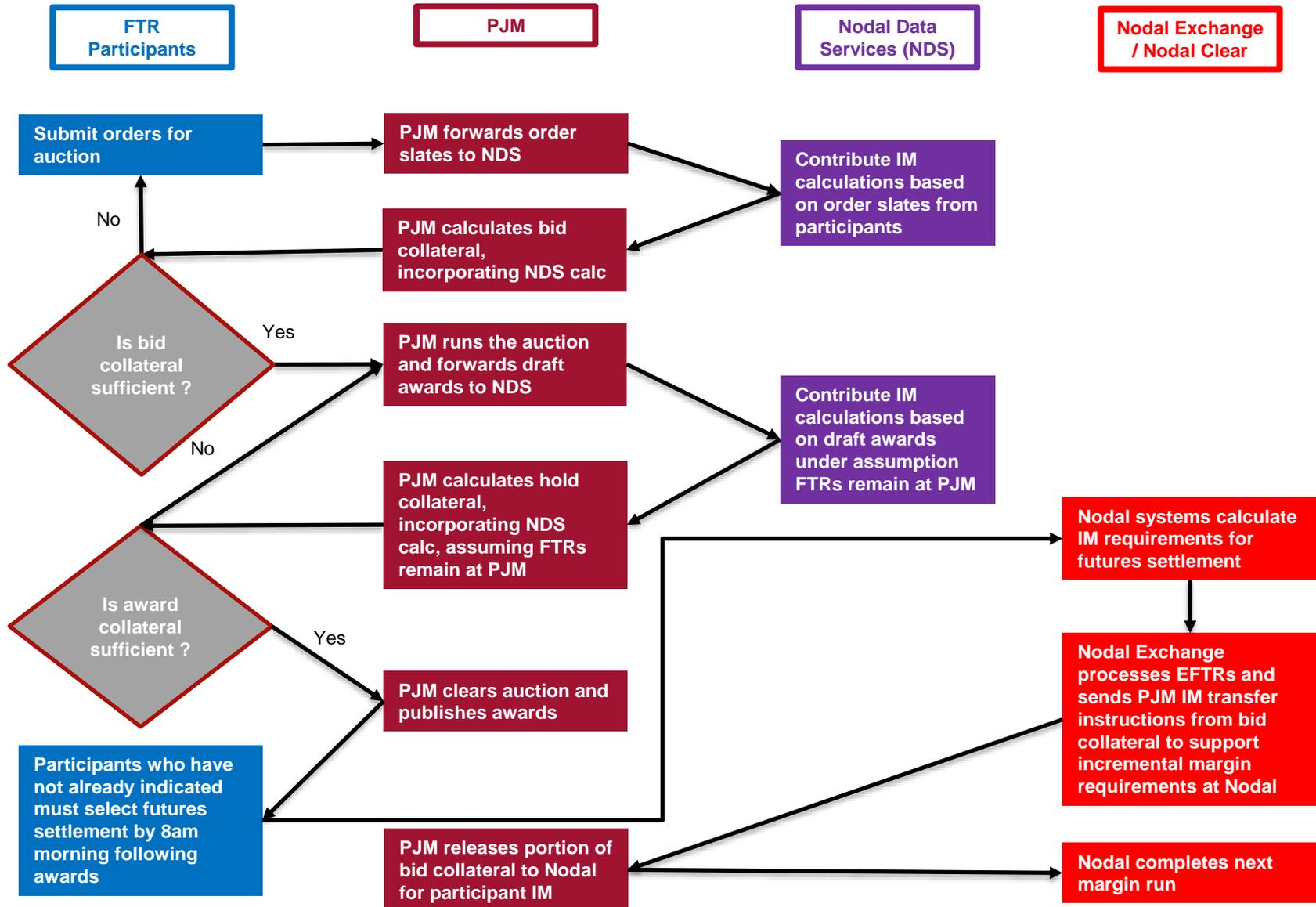


- The FTR auctions run by the ISOs/RTOs represent a one to many matching, with the ISO/RTO serving as the counterparty to all FTRs
- The auction takes into account the system capacity constraints and solves for both the total awards and the individually awarded FTR prices based on a simultaneous feasibility test
- The expertise required to ensure feasible results is a core competence of the ISO/RTO in their role as grid operator
- Due to the physical nature of the grid and the role as the grid operator, only the ISO/RTO can create FTRs which are needed for hedging market risk

# After FTRs have been awarded, participants have the option to settle in the traditional FTR market or in the futures markets via EFRP



# Auction Workflow



# After the EFRP, the FTR payment obligations are fulfilled via margin payments of the economically equivalent futures

## FTR Market

**ISO Awards FTR to Holder/Trader at a price of \$2,112 per MW (\$6.00/MWh)**

FTR: 50 MW Hub A (source) to Zone B (sink), Peak, April 2020 (i.e., B/A Spread)

Holder/Trader Position: Long B/A Spread at \$2,112 per MW (\$6.00/MWh)

ISO Position: Short B/A Spread at \$2,112 per MW (\$6.00/MWh)

=

## Futures Market

**Economically Equivalent Futures**

Holder/Trader Position:  
 Long 50MW Zone B, Peak, April 2020 at \$39/MWh  
 Short 50MW Hub A, Peak, April 2020 at \$33/MWh  
 Trader is Long B/A spread at \$6.00/MWh = FTR Position

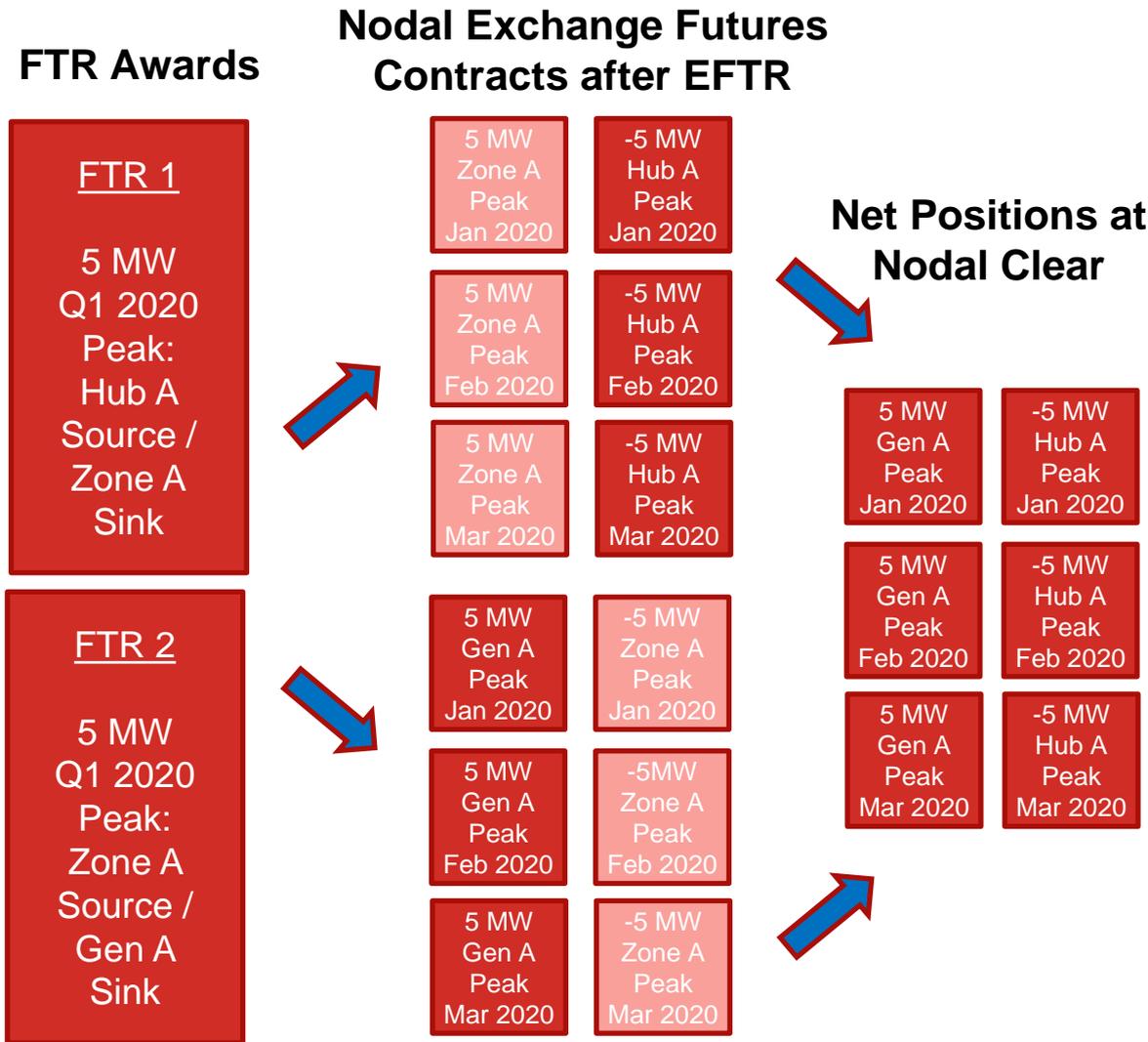
ISO Position:  
 Short 50MW Zone B, Peak, April 2020 at \$39/MWh  
 Long 50MW Hub A, Peak, April 2020 at \$33/MWh  
 ISO is Short B/A spread at \$6.00/MWh = FTR Position



*FTRs exchanged via EFRP to Nodal Exchange and cleared via Nodal Clear using Energy + Congestion futures contracts. As a spread, the energy component drops out as energy is the same value at any given time within an ISO*



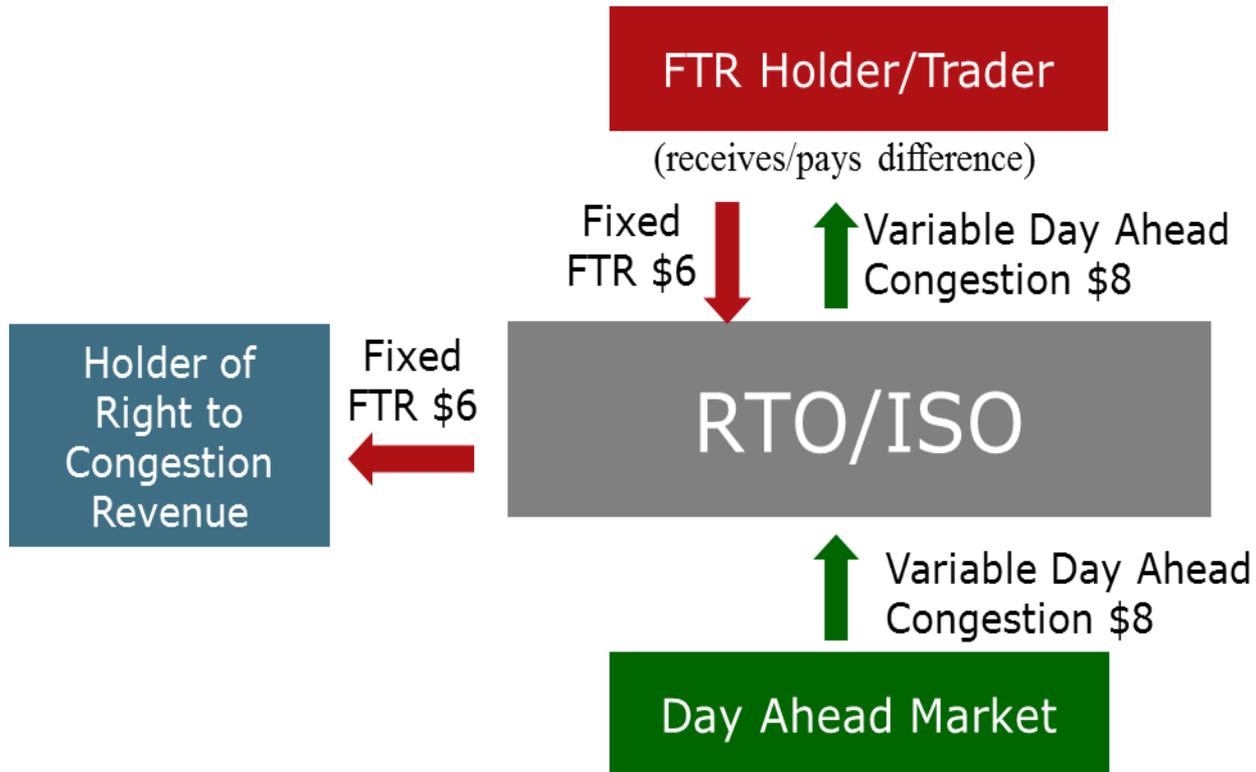
# Once converted, Nodal contracts automatically net offsetting positions



- In this example, 2 quarterly FTRs decompose into pairs of long and short monthly futures contracts following the EFTR conversion
- Once converted into positions, netting occurs automatically across the portfolio
- Both transactions (i.e., the individual EFTRs) and positions are tracked at Nodal Exchange, creating flexibility around trade and position management
- Position netting clarifies actual position exposure and facilitates accurate risk management
- Maintaining transaction histories supports strategy evaluation and encourages secondary trading and portfolio management

The current FTR market cash flows ensure that owners of transmission capacity receive the fixed payments due from the FTR auctions, while the FTR traders take the difference between the FTR auction price and the realized congestion in the spot market . . .

## FTR Market



. . . Moving the open interest to a futures market ensures the same ultimate cash flows are paid, but shifts the timing of the payments in accordance with market expectations

Illustration

**Futures Market**

*A. Immediately upon EFTR*



*B. Interim periods prior to final settlement (twice daily every business day)*



*C. Final settlement*



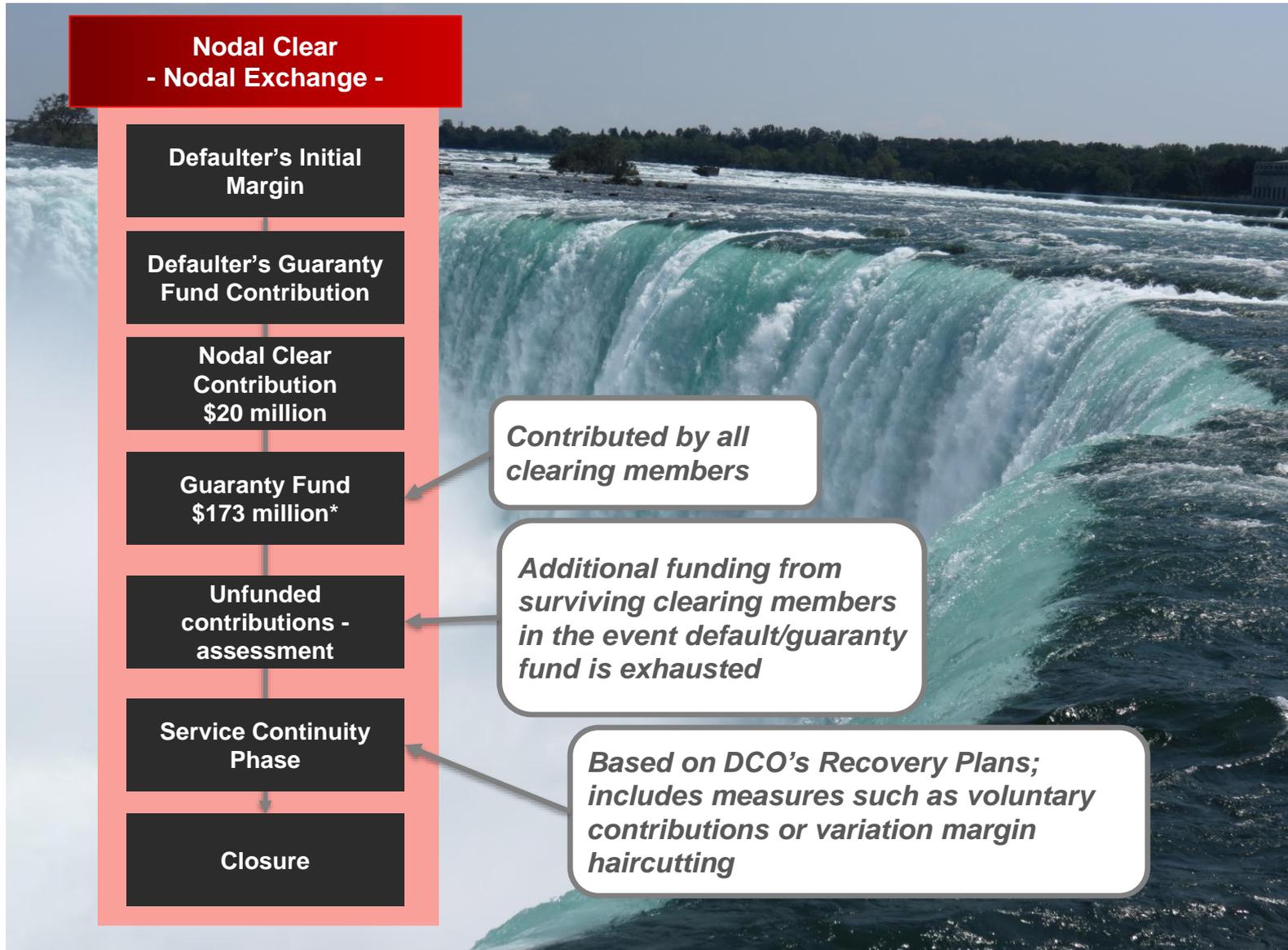
FTR cash accounting vs. futures mark-to-market accounting: Intra-month settlements differ but final profit/loss for the equivalent position are identical. In the example below, a Q4 PECO/Western Hub Peak FTR and its futures equivalent are awarded on Dec 15, 2018 for 1,000 MWh at an average price of -\$4.53/MWh, and finally settle on May 31, 2019 for a profit of \$7,250.

		<u>Award Date</u>			<u>Settlement Dates</u>				
<b>Futures Contract Prices</b>	<b>Expiry</b>	<b>15-Dec-18</b>	<b>31-Dec-18</b>	<b>31-Jan-19</b>	<b>28-Feb-19</b>	<b>31-Mar-19</b>	<b>30-Apr-19</b>	<b>31-May-19</b>	
Western Hub Peak E+C	Mar-19	\$49.85	\$50.85	\$50.60	\$52.60	\$52.10			
Western Hub Peak E+C	Apr-19	\$39.45	\$40.45	\$40.20	\$42.20	\$41.70	\$42.70		
Western Hub Peak E+C	May-19	\$38.30	\$39.30	\$39.05	\$41.05	\$40.55	\$41.55	\$41.05	
PECO Peak E+C	Mar-19	\$47.10	\$49.10	\$48.60	\$52.10	\$51.35			
PECO Peak E+C	Apr-19	\$33.90	\$35.90	\$35.40	\$38.90	\$38.15	\$40.15		
PECO Peak E+C	May-19	\$33.00	\$35.00	\$34.50	\$38.00	\$37.25	\$39.25	\$38.00	
<hr/>									
<b>FTR Profit/Loss</b>	<b>Month</b>	<b>15-Dec-18</b>	<b>31-Dec-18</b>	<b>31-Jan-19</b>	<b>28-Feb-19</b>	<b>31-Mar-19</b>	<b>30-Apr-19</b>	<b>31-May-19</b>	
PECO/Western Hub Peak	Mar-19					\$2,000			
PECO/Western Hub Peak	Apr-19						\$3,000		
PECO/Western Hub Peak	May-19							\$2,250	
<b>Total FTR Profit</b>						<b>\$2,000</b>	<b>\$3,000</b>	<b>\$2,250</b>	
<b>Cumulative FTR Profit</b>						<b>\$2,000</b>	<b>\$5,000</b>	<b>\$7,250</b>	
<hr/>									
<b>Futures Contract VM</b>	<b>Expiry</b>	<b>15-Dec-18</b>	<b>31-Dec-18</b>	<b>31-Jan-19</b>	<b>28-Feb-19</b>	<b>31-Mar-19</b>	<b>30-Apr-19</b>	<b>31-May-19</b>	
Western Hub Peak E+C	Mar-19		-\$1,000	\$250	-\$2,000	\$500			
Western Hub Peak E+C	Apr-19		-\$1,000	\$250	-\$2,000	\$500	-\$1,000		
Western Hub Peak E+C	May-19		-\$1,000	\$250	-\$2,000	\$500	-\$1,000	\$500	
PECO Peak E+C	Mar-19		\$2,000	-\$500	\$3,500	-\$750			
PECO Peak E+C	Apr-19		\$2,000	-\$500	\$3,500	-\$750	\$2,000		
PECO Peak E+C	May-19		\$2,000	-\$500	\$3,500	-\$750	\$2,000	-\$1,250	
<b>Total VM</b>			<b>\$3,000</b>	<b>-\$750</b>	<b>\$4,500</b>	<b>-\$750</b>	<b>\$2,000</b>	<b>-\$750</b>	
<b>Cumulative VM</b>			<b>\$3,000</b>	<b>\$2,250</b>	<b>\$6,750</b>	<b>\$6,000</b>	<b>\$8,000</b>	<b>\$7,250</b>	

# Risk management implications for the EFTR

- For traditional market participants, the futures contracts resulting from EFTRs will be risk managed according to the traditional Clearing Member risk intermediated solutions (initial margin, default waterfall in case of default by a Clearing Member, recovery and wind down if necessary)
- For the ISO, as the counterparty to all the EFTRs transacted with its FTR holders, Nodal Clear will be taking on an enhanced role in managing and directing the resources available to meet variation margin obligations on Nodal Exchange (CFTC approval pending)
  - This role includes unparalleled, real time “view”, “pull/call”, “push/pay” privileges on a line of credit specifically set up to meet its variation margin requirements with Nodal Clear
- In order to manage the risk posed by the ISO, Nodal Clear will be authorized to require the reduction of the ISO’s open interest (per Nodal Clear Rule 3.10).
  - However, as the ISO and the FTR participants have ongoing delivery obligations in the physical market, rather than liquidate the ISO’s positions at Nodal Exchange, Nodal Clear will transfer non-settled positions back to be reestablished as FTRs on the ISO, via a “**Reverse EFTR**”, to the extent necessary to prevent ISO default
  - This removal of open interest would require the ISO’s original EFTR counterparties to reestablish their non-settled position as FTR(s) on the ISO as well. Such parties’ forward exposure will be preserved but shifted from the Exchange back to the ISO
  - Consistent with the shift of open interest, any excess collateral resulting in the EFTR counterparties’ futures account will be moved to the ISO to provide collateral protection for the revived FTRs

# Default Waterfall – the clearinghouse has several layers of protection to insulate participants from defaults



\* As of Sep 16, 2019

# FTRs are exchanged for Nodal futures contracts upon EFTR execution

[Back up](#)

	FTR Awards*				Award Price (\$/MWh)
	PJM	Utility	Bank	Non-Bank	
Q4 '19 BGE / Western Hub FTR	-10 MW	10 MW			\$2.00
Q4 '19 ATSI / AD Hub FTR	-20 MW	20 MW			\$1.50
Q4 '19 Susquehanna / BGE FTR	-5 MW		5 MW		\$0.45
EFTRs to Futures (FTRs at ISO Market are suspended as well)					EFTR Price (\$/MWh)
	PJM	Utility	Bank	Non-Bank	
Q4 '19 BGE / Western Hub Spread	-10 MW	10 MW			\$2.00
Q4 '19 ATSI / AD Hub Spread	-20 MW	20 MW			\$1.50
Q4 '19 Susquehanna / BGE Spread	-5 MW		5 MW		\$0.45
EOD Portfolio at Nodal Exchange					EOD Price (\$/MWh)
	PJM	Utility	Bank	Non-Bank	
Q4 '19 Western Hub	10 MW	-10 MW			\$30.00
Q4 '19 AD Hub	20 MW	-20 MW			\$29.00
Q4 '19 BGE	-5 MW	10 MW	-5 MW		\$32.00
Q4 '19 ATSI	-20 MW	20 MW			\$30.50
Q4 '19 Susquehanna	-5 MW		5 MW		\$32.45

\* This example envisions FTRs awarded from the Balance of Planning Period (BoPP) auction in December 2018 for Q4 2019 positions, which in PJM covers the March through May period.

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Nodal trading participants are then able to adjust their positions with traditional trading at Nodal Exchange; the ISO is prohibited from conducting market trades at Nodal Exchange

[Back up](#)

	Market Trades at Nodal Exchange				Award Price (\$/MWh)
	PJM	Utility	Bank	Non-Bank	
Q4 '19 Susquehanna / BGE Spread			-5 MW	5 MW	\$0.75
	EOD Portfolio at Nodal Exchange				EOD Price (\$/MWh)
	PJM	Utility	Bank	Non-Bank	
Q4 '19 Western Hub	10 MW	-10 MW			\$31.00
Q4 '19 AD Hub	20 MW	-20 MW			\$29.75
Q4 '19 BGE	-5 MW	10 MW	0 MW	-5 MW	\$33.25
Q4 '19 ATSI	-20 MW	20 MW			\$31.50
Q4 '19 Susquehanna	-5 MW		0 MW	5 MW	\$34.00

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In the event Nodal Clear foresees the ISO missing a margin call, Nodal Clear has the authority to require the ISO to Reverse EFTR (i.e., EFRP of Nodal futures back to original FTR positions on the ISO)

[Back up](#)

	Remaining portion of original FTRs reestablished at ISO				Award Price (\$/MWh)
	PJM	Utility	Bank	Non-Bank	
Q4 '19 BGE / Western Hub FTR	-10 MW	10 MW			\$4.00
Q4 '19 ATSI / AD Hub FTR	-20 MW	20 MW			\$2.50
Q4 '19 Susquehanna / BGE FTR	-5 MW		5 MW		\$1.15
	Related Futures Transactions to zero out PJM's positions				EFTR Price (\$/MWh)
	PJM	Utility	Bank	Non-Bank	
Q4 '19 BGE / Western Hub Spread	10 MW	-10 MW			\$4.00
Q4 '19 ATSI / AD Hub Spread	20 MW	-20 MW			\$2.50
Q4 '19 Susquehanna / BGE Spread	5 MW		-5 MW		\$1.15
	Remaining Portfolio at Nodal Exchange				Current Settlement Price (\$/MWh)
	PJM	Utility	Bank	Non-Bank	
Q4 '19 Western Hub	0 MW	0 MW			\$40.00
Q4 '19 AD Hub	0 MW	0 MW			\$35.00
Q4 '19 BGE	0 MW	0 MW	5 MW	-5 MW	\$44.00
Q4 '19 ATSI	0 MW	0 MW			\$37.50
Q4 '19 Susquehanna	0 MW		-5 MW	5 MW	\$45.15

# Key take-aways from ISO position removal example

Back up

- **This procedure allows Nodal Clear to manage the stability of the clearinghouse while ensuring that affected trading participants retain identical market exposure**
  - Any futures contract expiries that have settled remain settled—final settlement is assured.
- **The Reverse EFTR transactions can be executed immediately. The EFTR transaction history provides the exact template for the remaining open interest that needs to be transferred.**
- **The requirement to Reverse EFTR to manage risk is a term of the original EFTR transaction impacting the ISO, the original FTR traders, and the Clearing Members that authorize the EFTR transactions**
  - Re-establishing the ISO's outstanding futures positions as FTRs and executing the associated transactions at Nodal Exchange must occur with the original FTR traders
    - The original FTR payment delivery obligations to the physical market participants must continue. Only by reestablishing the remaining forward interest of the original FTRs can these payments continue
    - Traders can manage Reverse EFTR risk using multiple channels, including through trading activity at Nodal Exchange as well as in the FTR market
  - Clearing Members guarantee the performance of the original EFTR transactions and must be able to hold FTRs on the ISO in the event a Nodal trading participant cannot. As a result, before enabling customers to execute EFTRs, Clearing Members must demonstrate that they or a third party designee is authorized to hold FTRs

# Proposed FTR Clearing Fee Structure:

- **For participants, the proposed cost of clearing FTRs on Nodal would be composed of two types of fees:**
  - **The Exchange Fee and Clearing Registration Fee:** Transaction fees totaling \$0.0050/MWh, paid on the path level upon execution of EFTR to Nodal Exchange (75% discount on current fees).
  - **Settlement Fee:** For positions that remain at expiration, a fee of \$0.0025/ MWh is be applied on the expiry level at final settlement. The settlement fee applies to the participant's open interest rather than transactions, and thus is largely driven by the level of netting that occurs in the futures portfolio.
- **PJM as a trading participant and clearing member will not be charged any fees by Nodal Exchange or Nodal Clear and will not be expected to contribute to the Guaranty Fund (CFTC approval pending)**
- **PJM costs associated with establishing a sufficiently sized line of credit and for any interest paid on LOC balances are being analyzed to determine the best mechanism to make the LOC cost effective**

**Slide subject to change**

# ISO Steps to Support EFTRs

## ISO Stakeholder Approval

### Tariff changes

### Nodal Exchange Membership

- Sign Participant Agreement
- Comply with Nodal Exchange Rulebook

### Nodal Clear Membership

- Sign Clearing Member Agreement
- Comply with Nodal Clear Rulebook
- Financial Requirement – Line of Credit
  - Sized by Nodal Clear and issued by an approved financial institution
  - Real time “view”, “pull/call”, “push/pay” privileges assigned to Nodal Clear

Thank you!