

Long Term FTR Market Education

February 7, 2018

Jointly developed and supported by Exelon, DC Energy, and Vitol

Agenda

- *Forward Markets*
- *Commercial Usage of Long Term FTRs*
- *Indications of a Healthy Long Term FTR market*

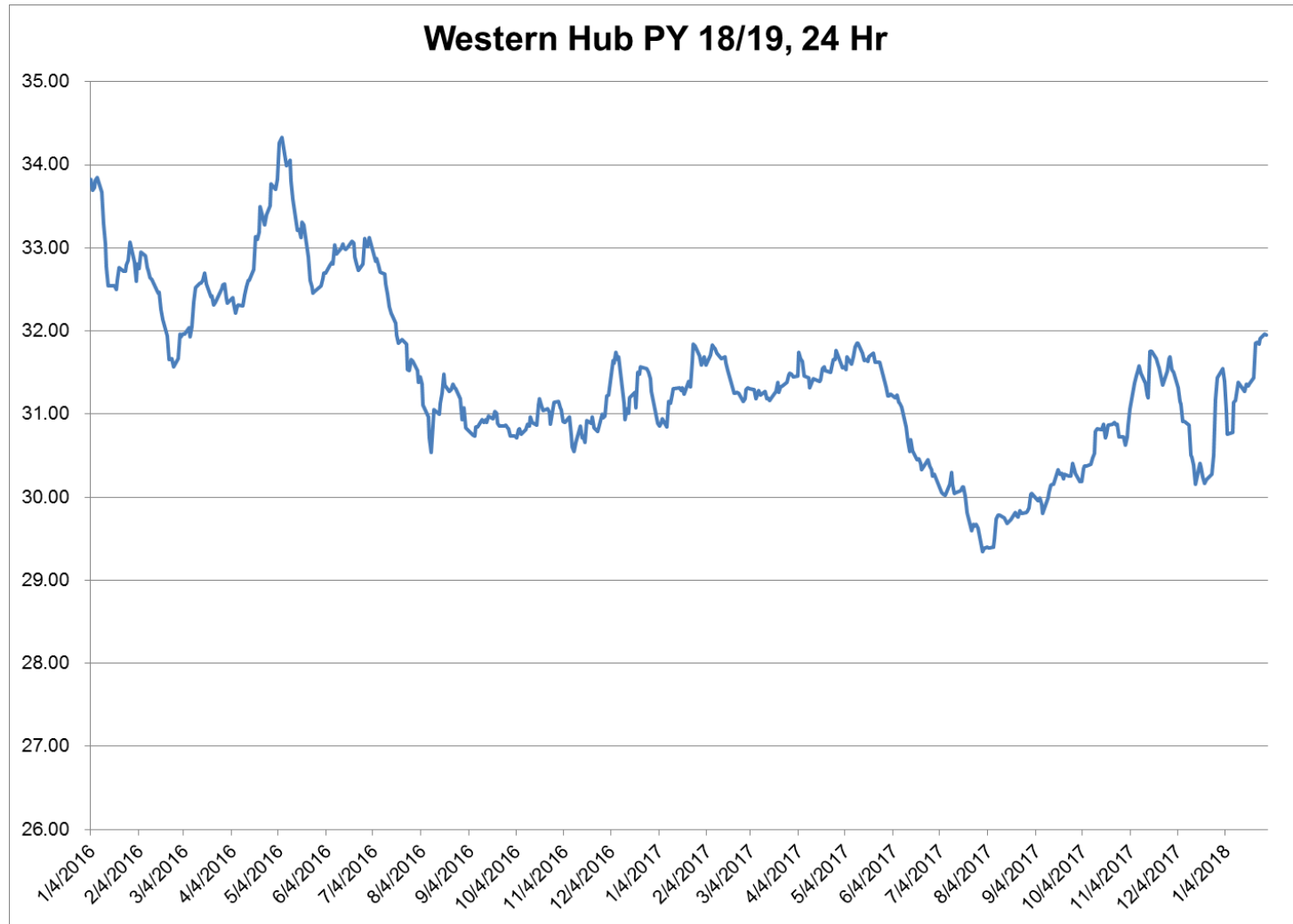
Key Takeaways

- *LT FTR market has features similar to forward markets for other products*
- *LT FTR market is needed for hedging forward positions, providing liquidity, and creating forward price transparency*
- *LT FTR market is robust, is an important market for providing granular forward pricing, and is working well*
- *Sponsoring companies support maintaining the current design of the LT FTR market*

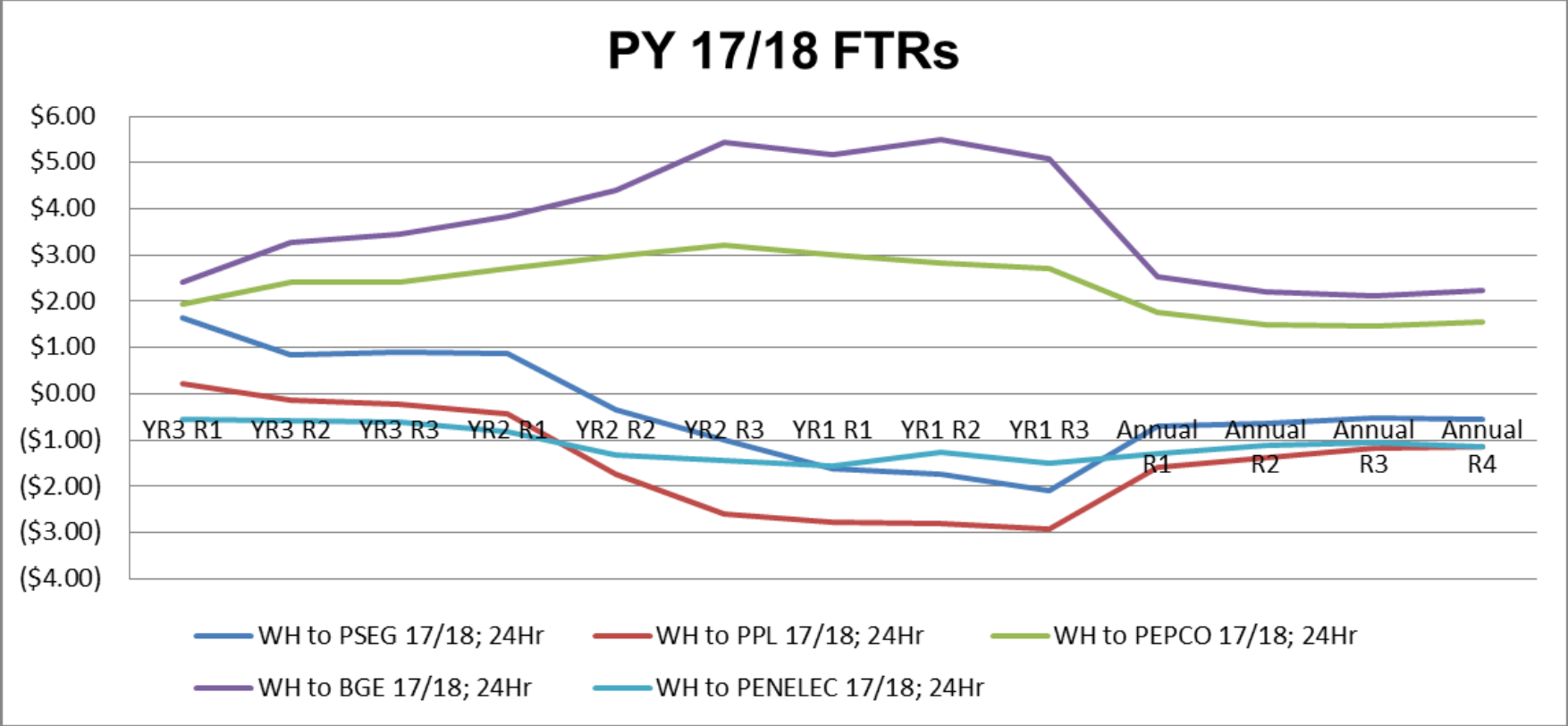
Forward Markets

- *Tradeable, forward markets are needed to facilitate commercial activity/competition*
 - *Hedging*
 - *Risk warehousing*
 - *Trading and portfolio development*
- *Forward markets exist for electricity, basis, fuels, RECs, etc.*
 - *Basis product is similar to an FTR*
- *Major trading hubs have the most robust liquidity*
 - *Off-hub markets exist for PJM load zones but participation is lower than at West Hub*
- *Commercial activity in forward markets creates a forward price curve*
 - *Transparency for all participants*
 - *Instructive for valuing forward commercial interests (e.g. forward nat gas and electricity prices are useful in valuing a generation asset)*
 - *Forward prices can, and often do, change over time for any given delivery period*

Forward Prices Change Over Time



LT FTR Prices Change Over Time



LT FTR Market

- *LT FTR market provides desirable commercial attributes of a forward electricity market*
 - *Hedges for forward congestion exposure for physical transactions (e.g. load, generation)*
 - *Trading and portfolio development that fosters competition and risk warehousing services*
 - *Forward price transparency*
- *LT FTR market provides a superior venue for market participants to transact in congestion on a forward basis*
 - *Auctions create a natural liquidity event*
 - *Auction results produce a transparent granular locational forward price curve*
 - *Participants can obtain tailored quantities*

LT FTR Participation Drivers

- *How an entity participates in forward markets, such as LT FTRs, is driven by commercial interest...*
 - *Expected participation in load auctions*
 - *Generation development and output*
 - *Portfolio development*
 - *Capital investment*
- *...and risk appetite*
 - *Ability to value and manage risk components*
 - *Tolerance for exposure to various risk elements*
- *Commercial interest does not imply willingness to take on all forward risk components, such as forward congestion*
 - *For example, a generation owner may be willing to take on forward production risk at its bus but not the basis risk associated with selling forward at a liquid hub*
 - *Direct purchase of LT FTRs or transacting with another entity with LT FTRs can hedge forward congestion risk*

Commercial Evaluation and Management

- *Entities consider many components when evaluating the value of forward products, including LT FTRs*
 - *Weather forecasts*
 - *Expected supply/demand and grid conditions*
 - *Cost of capital and collateral*
 - *Other risk elements (liquidation, volatility, regulatory changes, etc.)*
- *Once executed, forward transactions must be monitored and managed*
 - *Market conditions (supply, demand, fuel inputs, weather forecasts, etc.) change over time*
 - *Regulations and market rules may change*
 - *Prices may become more/less volatile*
 - *Tolerance for risk may change*
- *Diversity of market participants (and risk appetites) fosters greater opportunities for competitive forward transacting and price transparency*
 - *Mixture of physical and financial participants in the LT FTR market provides this diversity*

Commercial Usage of LT FTRs

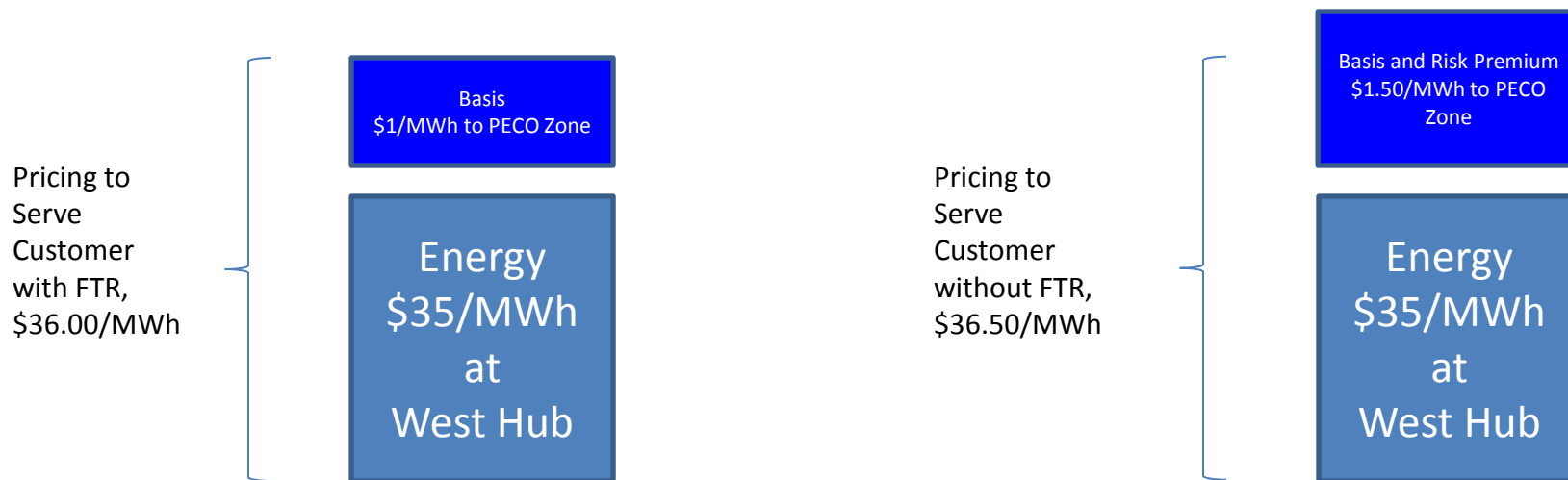
- *Long Term FTR Auctions are a component of the overall congestion hedging program for a load and generation portfolio*
- *Load*
 - *Provides congestion price certainty and transparency to our customers*
 - *Opportunity to manage risk of load serving deals for up to 3 years*
 - *Load auction and deal pricing mechanism*
- *Generation*
 - *Congestion price certainty*
 - *Primary instrument beyond Annual FTR Auction to manage generator bus risk*
 - *Asset Valuation*

Commercial Usage of LT FTRs

- *The Long Term FTR product provides for hedging opportunities for physical and financial transactions*
- *Example: LSEs that participate in wholesale load auctions hedge energy prices using West Hub or NI Hub forward contracts, but the load may be in a different geographic location than the hedge (i.e. difference between TO zone and hub)*
- *FTRs allow a mechanism for LSEs to hedge that risk if desired*
- *In the case LSEs are not able to hedge the basis, they may add additional risk premiums and charge more to cover the uncertainty due to this risk. This risk premium may be passed to load/customers*
- *Customers will not pay for this risk premium if LSEs are able to successfully hedge the basis with the long term FTR product*

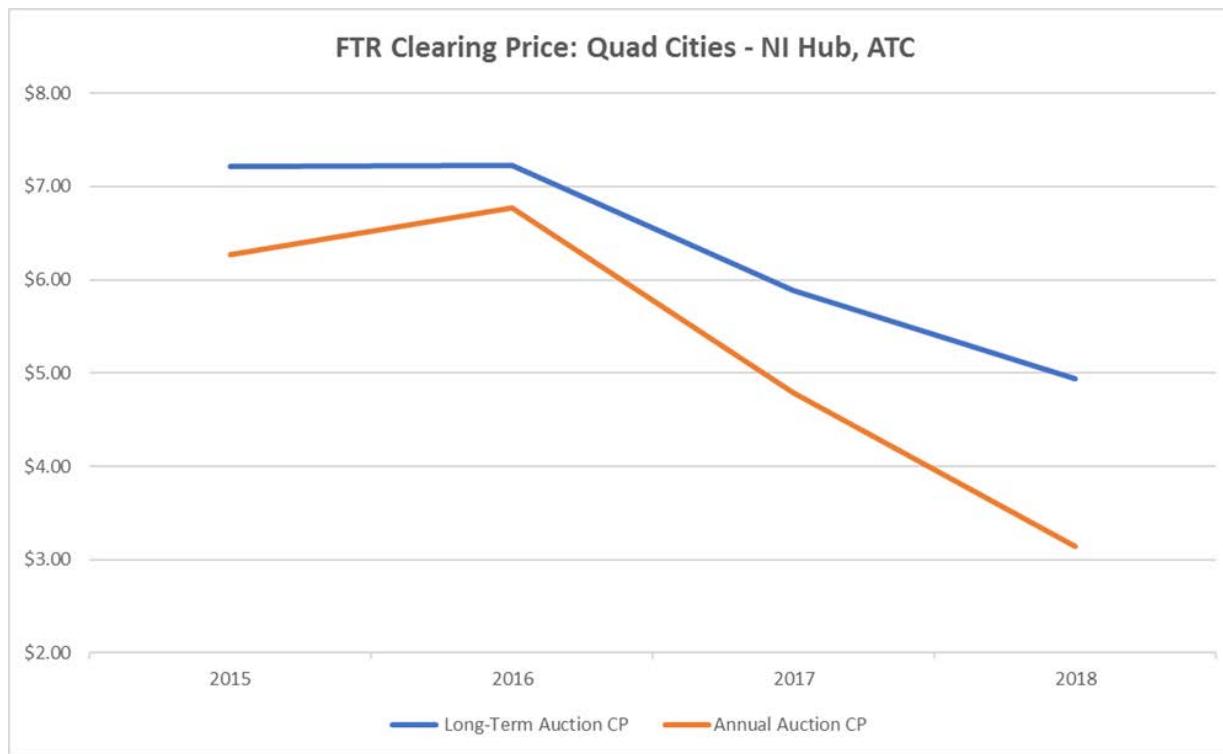
Commercial Usage of LT FTRs

- Consider a generic wholesale load pricing deal for 1,000 MW in PECO Zone
 - Energy (ATC) = \$35/MWh energy
 - Basis = \$1/MW using Long-Term FTR hedge
 - If no Long-Term FTR was acquired to hedge basis risk, a risk premium may be added to the offer, and customer could face an increase of \$4.4M ($1,000 \text{ MW} * \$0.50/\text{MWh} * 8760 \text{ h}$).



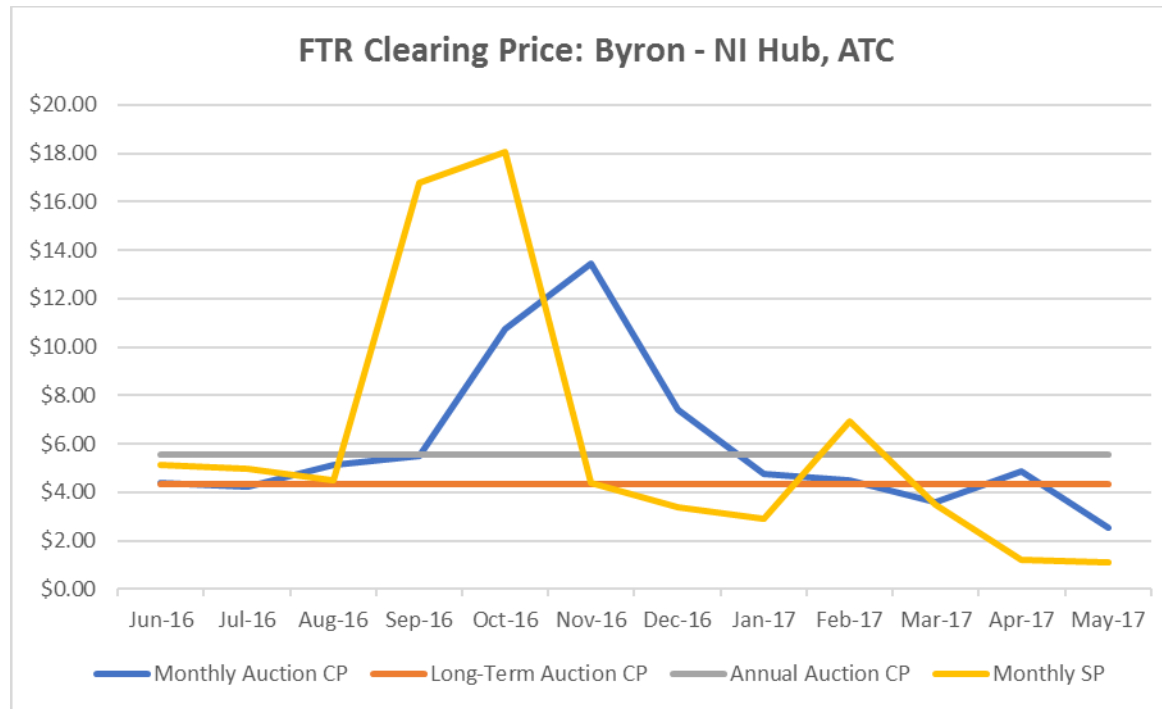
- Customers at both the wholesale and retail level benefit from the Long Term FTR product as it provides competitive suppliers with an instrument to better manage risks between supply and delivery locations

Long Term FTR Clearing Prices Are Not Always Cheaper than the Annual Product



- *There are many factors that contribute to why pricing outcomes may be different in the Long Term FTR Auction and the Annual Auction.*
 - *Full Capability vs Residual Market*
 - *Transmission Outage and New Transmission Build Assumptions*
 - *Risk Tolerance*
 - *Credit Required to Participate*

The Current Structure of the PJM FTR Market Creates Many Opportunities to Hedge Risk



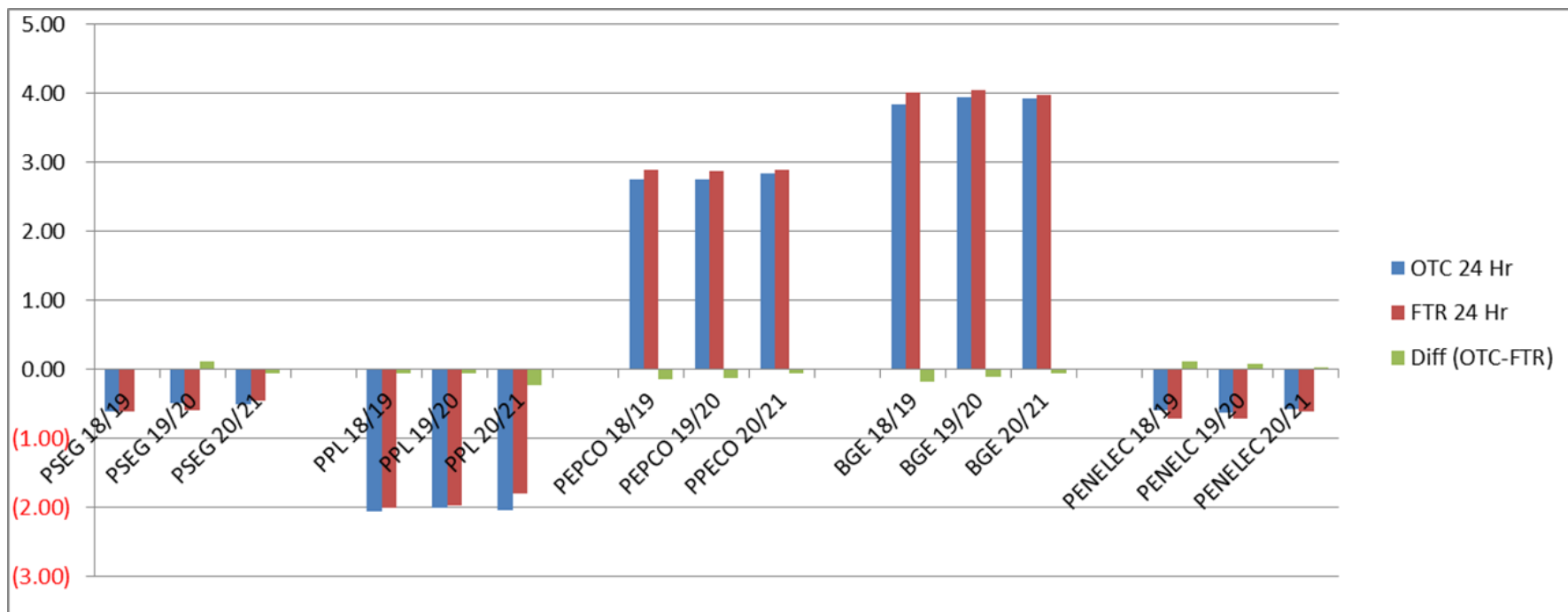
- *As highlighted above, the clearing prices between the Long Term, Annual, and Monthly FTR products for this one sample path vary greatly.*
- *Actual settlement in the PJM Day-Ahead market can vary greatly from the clearing price for these products.*
- *Long Term FTRs provide an opportunity to acquire hedges to minimize volatility and price risk.*

LT FTR Market Is Healthy and Vibrant

- *On comparable paths, price convergence exists between LT FTR results and OTC basis market*
 - *A better comparison vs. comparing LT FTR prices to annual FTR prices*
 - *Markets provide a “check” on one another*
- *Profits from buying LT FTRs and selling in the annual auction are not automatic*
- *LT FTR market changed after the polar vortex*
 - *Profits decreased*
 - *Participation increased*

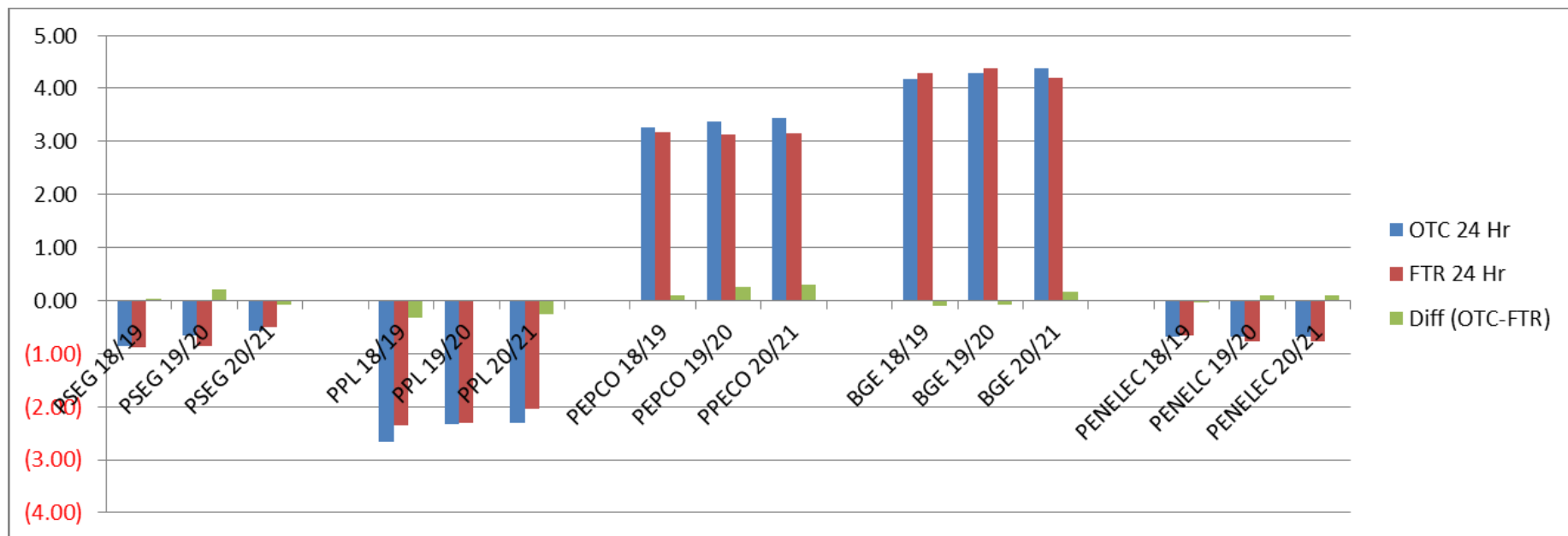
Convergence of LT FTRs and OTC Basis

- LT FTR Round 2 results, adjusted for losses vs. OTC basis prices (from Sep. 2017; all contracts source at Western Hub)*



Convergence of LT FTRs and OTC Basis

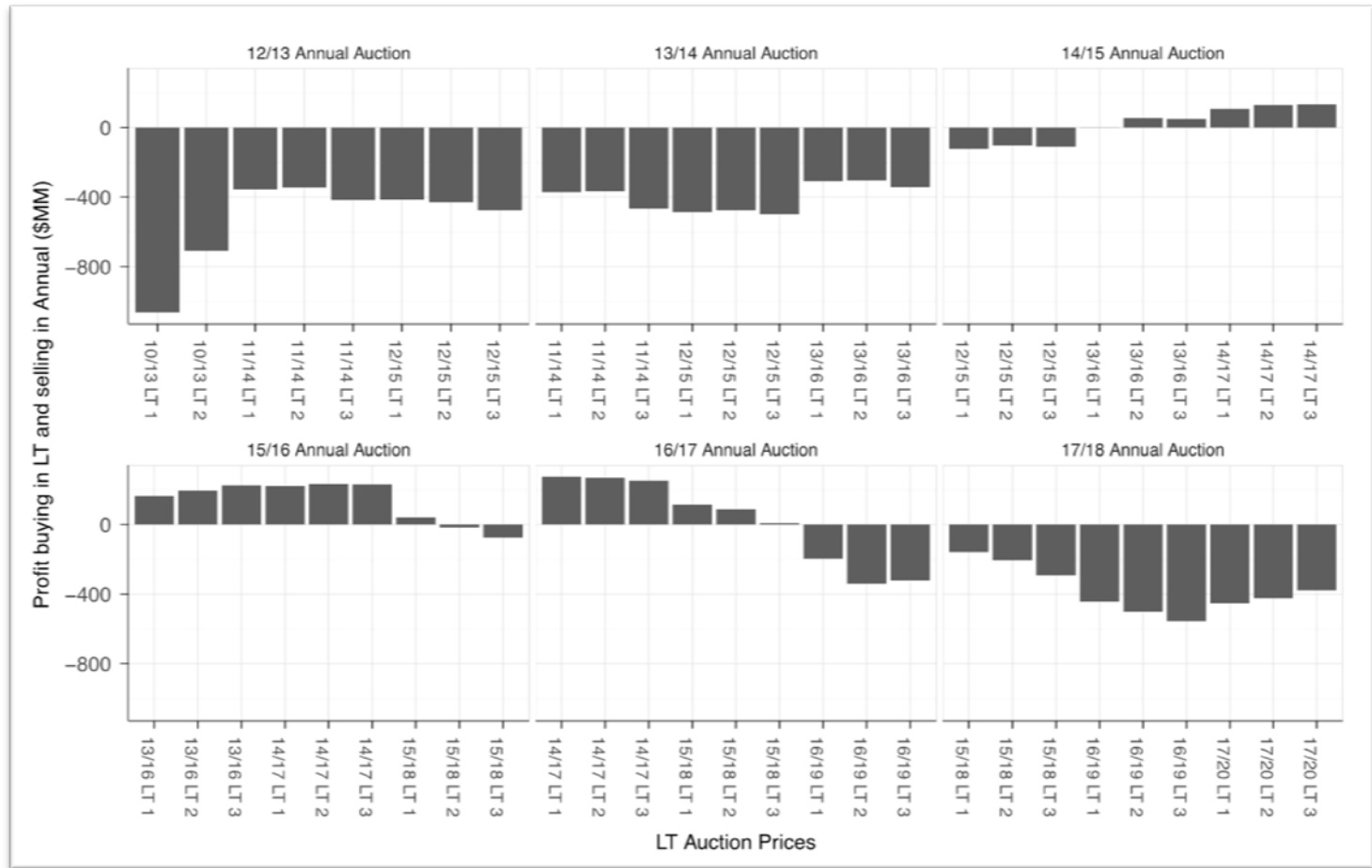
- LT FTR Round 3 results, adjusted for losses vs. OTC basis prices (from Dec. 2017; all contracts source at Western Hub)*



No Easy Profits from Buying Annual FTRs in LT and Selling in Annual

Profits of Buying Annual FTRs in LT and Selling in Annual

Buying Annual FTRs at LT prices and selling at Average Annual Price over 4 Rounds

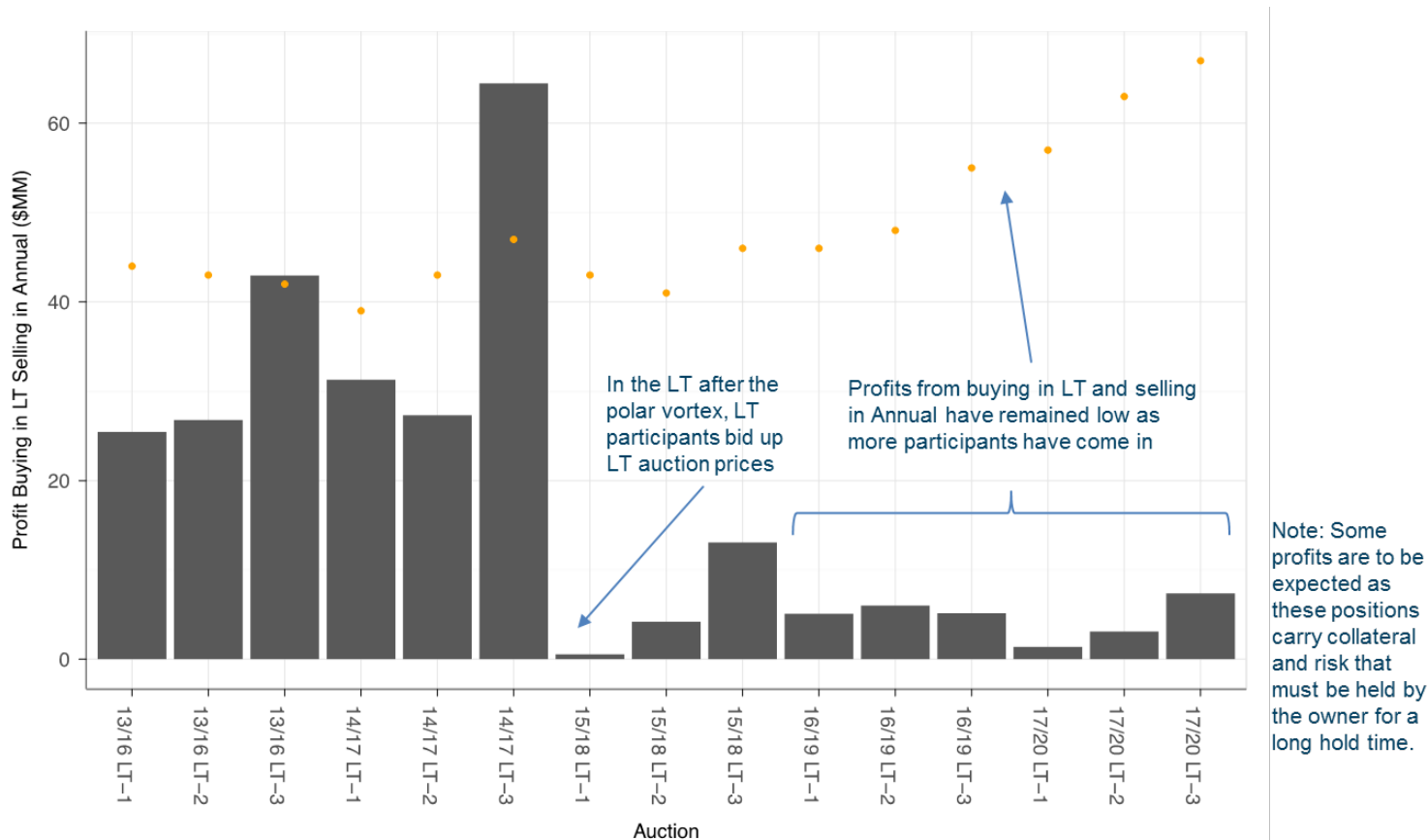


- *This points to LT pricing being a good price signal to the market on the major capacity elements.*

Market Changed After the Polar Vortex

Profits of buying LT FTRs and selling in annual auction

Average Annual Price over 4 Rounds



- *Profits made from buying the LT and selling in the annual have significantly decreased since the polar vortex and with increasing competition*

Key Takeaways

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