FTR Auction System Overview

FTR Group

AFMTF Technical Workshop

September 13, 2021

- PJM and Stakeholders agreed to conduct a series of technical workshops to identify current IT limitations and a pathway for implementing additional hedging flexibility in the FTR/ARR market.

- The purpose of these workshops is for stakeholders to better understand the underlying Markets IT infrastructure in order to evolve the FTR market to meet the future needs of market participants.

- These systems are complex and resources constrained – all concerns cannot be addressed in the short-term (6-12 months)
  - PJM and stakeholders must either work around identified issues or create a priority roadmap for long-term solutions

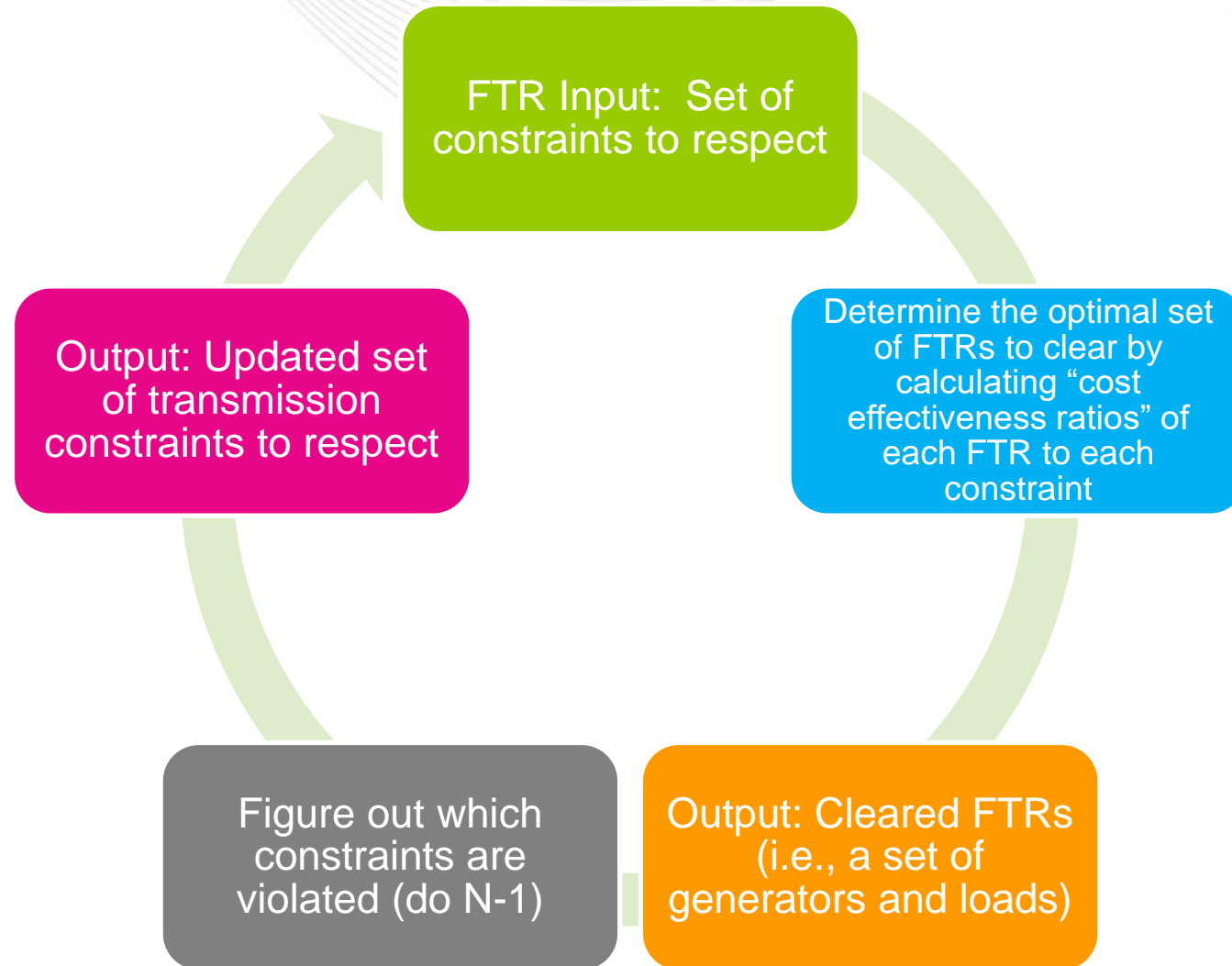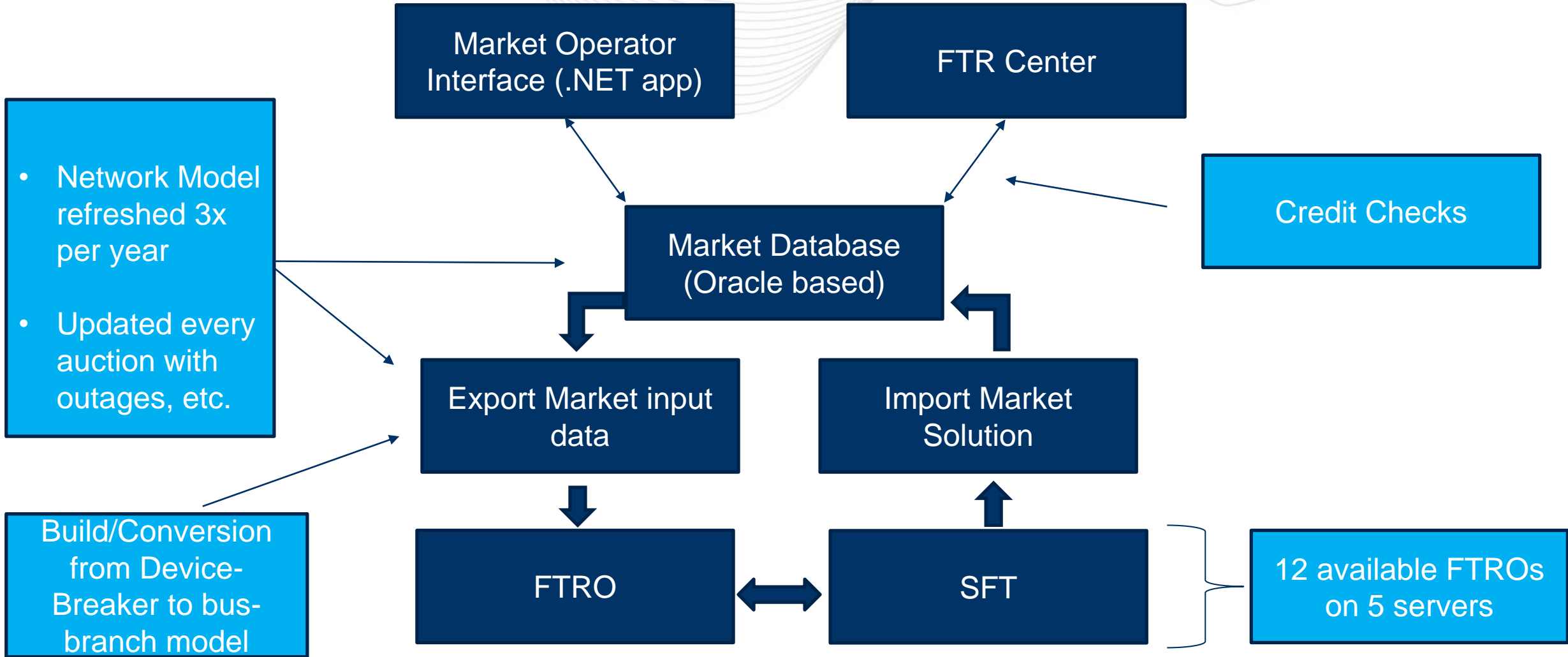Introduction and Education → Issue Identification and Alternatives → Report back to MIC/AFMTF with plan to discuss business rule changes
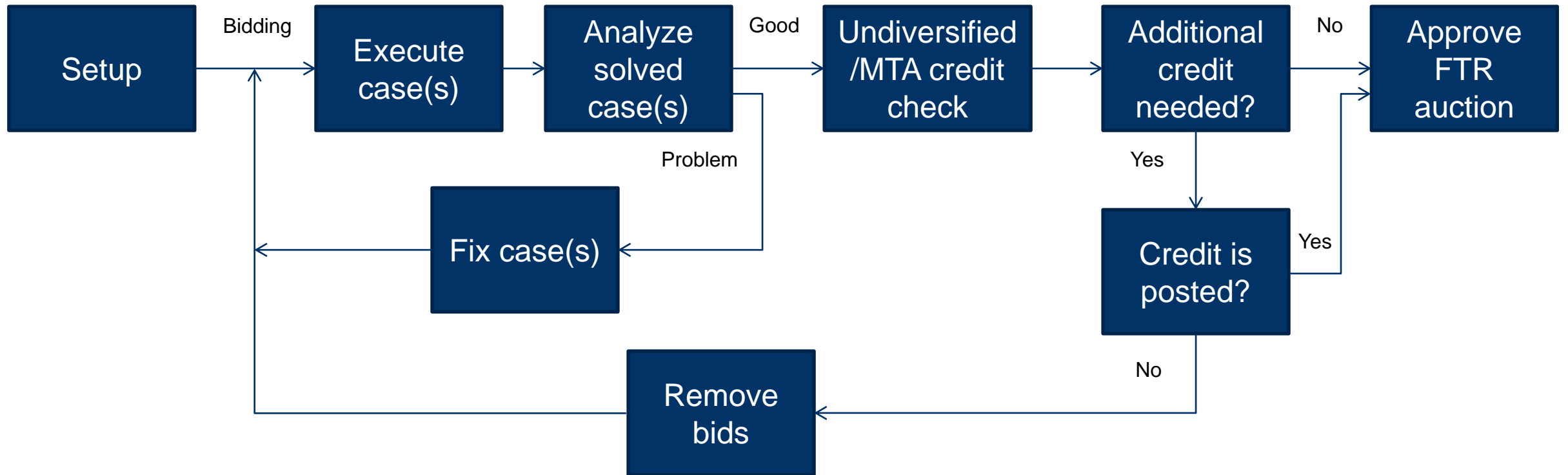
Two-four workshops over the course of two-three months to complete work

- Fundamentally, the FTR market clearing software must solve an optimization problem:
  - Objective function: maximize bid-based revenue
  - Subject to transmission constraints (market limits, N-1, etc.)
- The solution mechanism is an iterative process:

FTR Optimizer (FTRO) → Simultaneous Feasibility Test (SFT)

FTR Input: Set of constraints to respect

Determine the optimal set of FTRs to clear by calculating "cost effectiveness ratios" of each FTR to each constraint

Output: Cleared FTRs (i.e., a set of generators and loads)

Figure out which constraints are violated (do N-1)

Output: Updated set of transmission constraints to respect

Market Operator Interface (.NET app)

FTR Center

Credit Checks

- Network Model refreshed 3x per year

- Updated every auction with outages, etc.

Market Database (Oracle based)

Export Market input data

Import Market Solution

Build/Conversion from Device-Breaker to bus-branch model
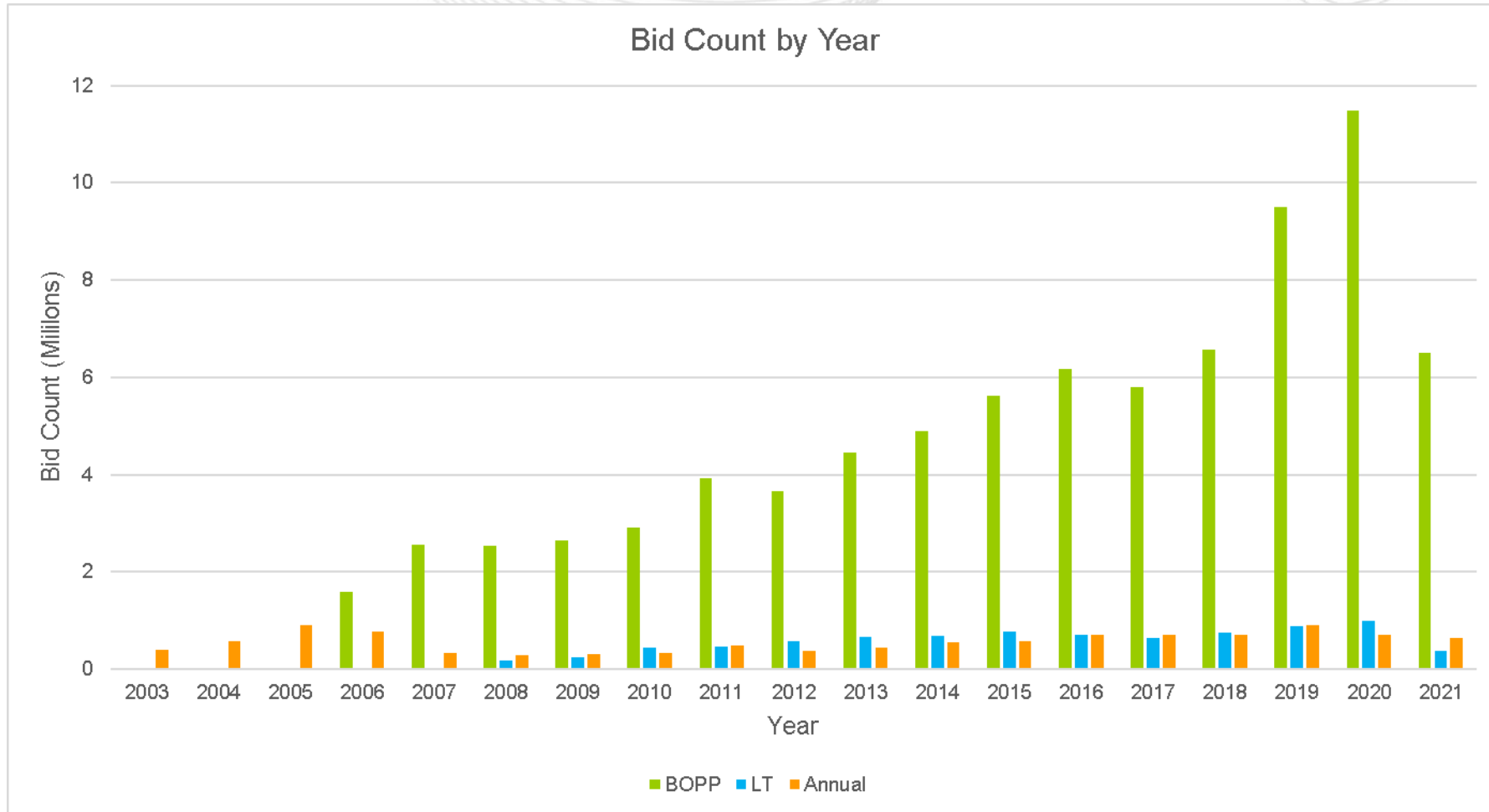
FTRO

SFT

12 available FTROs on 5 servers

- PJM network model utilized by the FTR Auction System includes:
  - Complete monitoring of all MP-1 designated PJM facilities
  - 1,000+ monitored contingencies
  - 26,000+ pnodes (19,000+ busses)

- PJM utilizes 5 servers capable of running 12 FTR simple period (non-overlapping) cases simultaneously (2-7 hours completion time)
  - 100,000-300,000 FTR bids per period

- Existing software was implemented in 2002, refreshed in 2014, and currently being redesigned (nGEM project)
  - Hardware is reviewed for possible upgrades every two years
  - FTR Center refreshed in 2015

Bid Count by Year
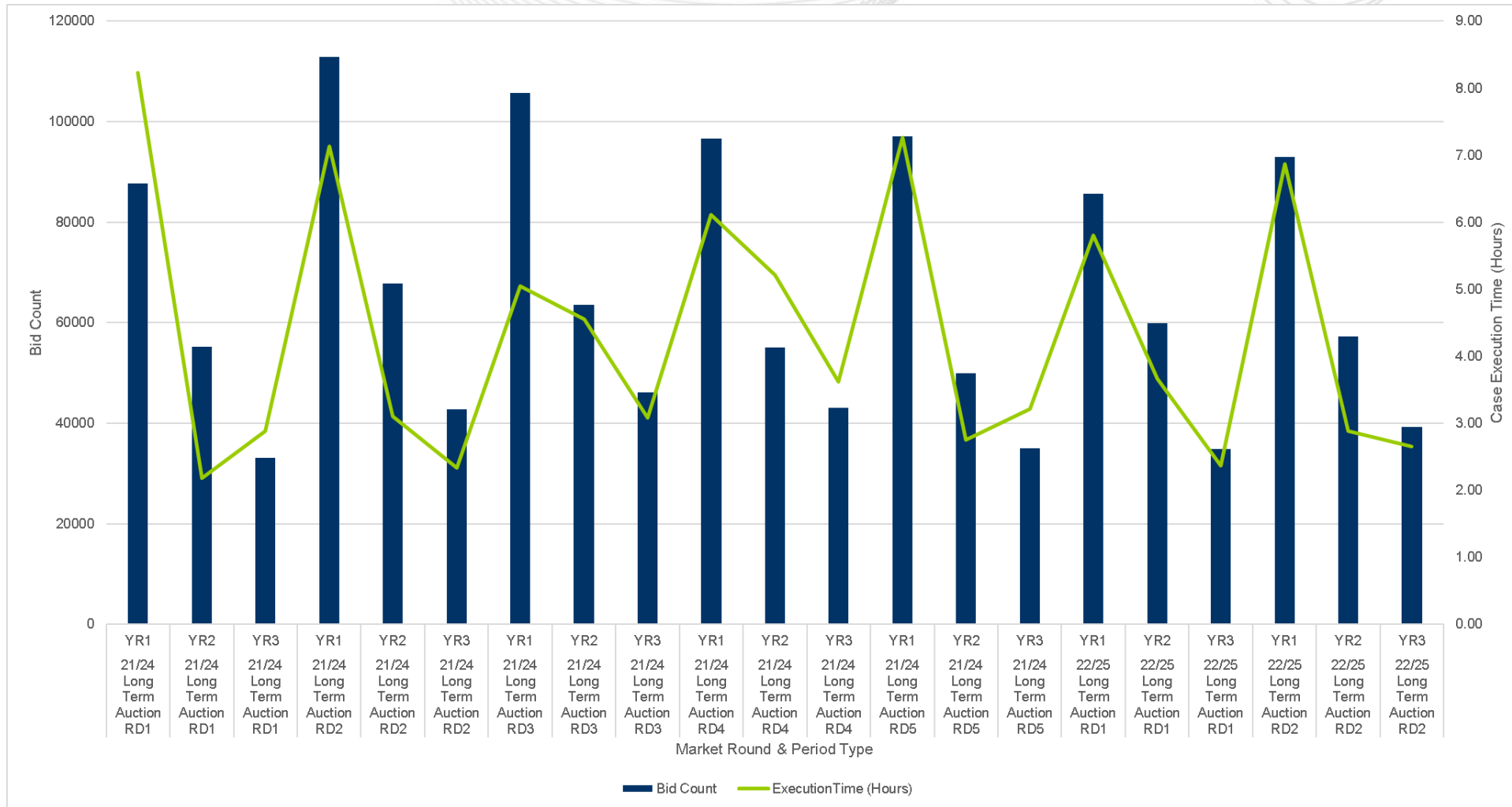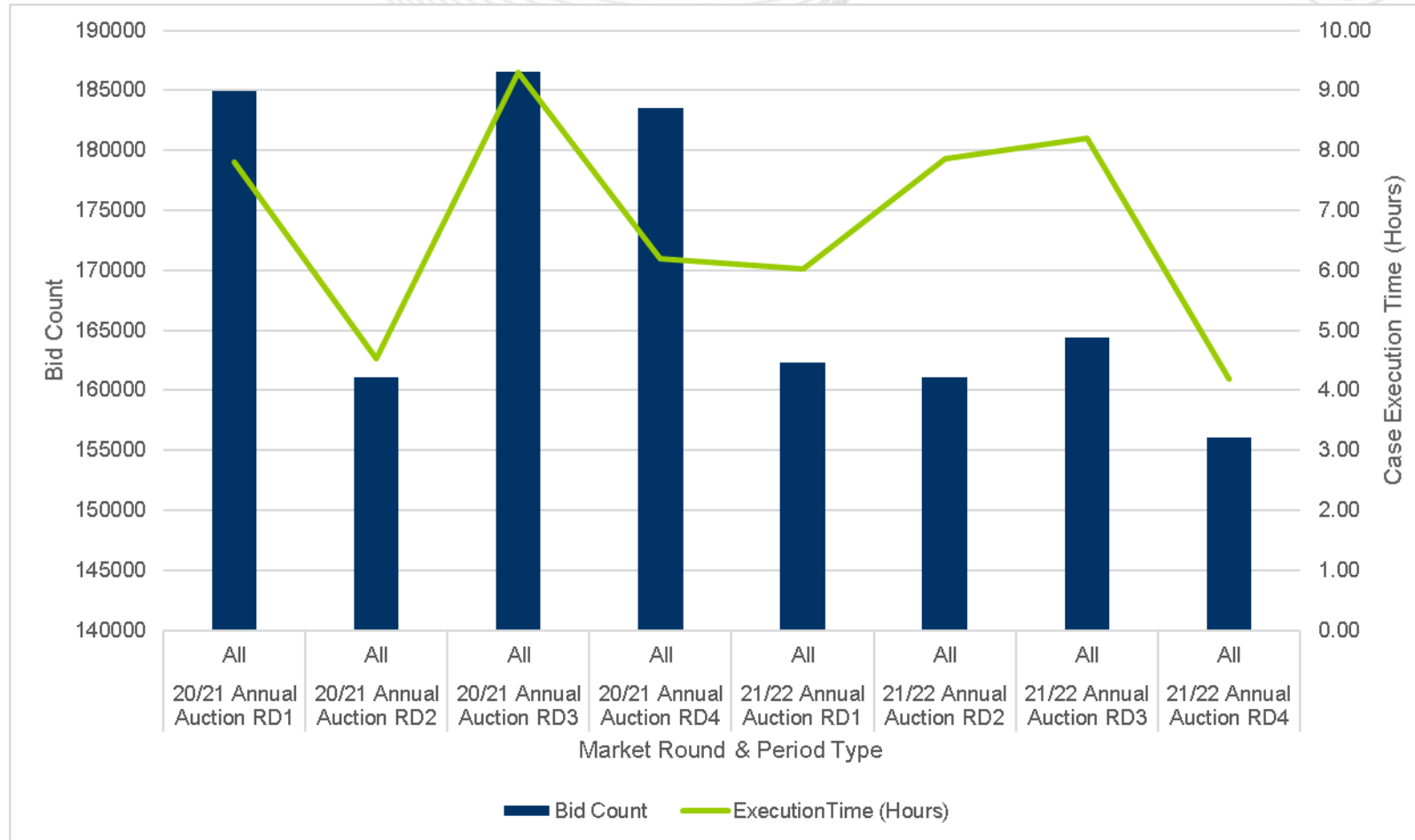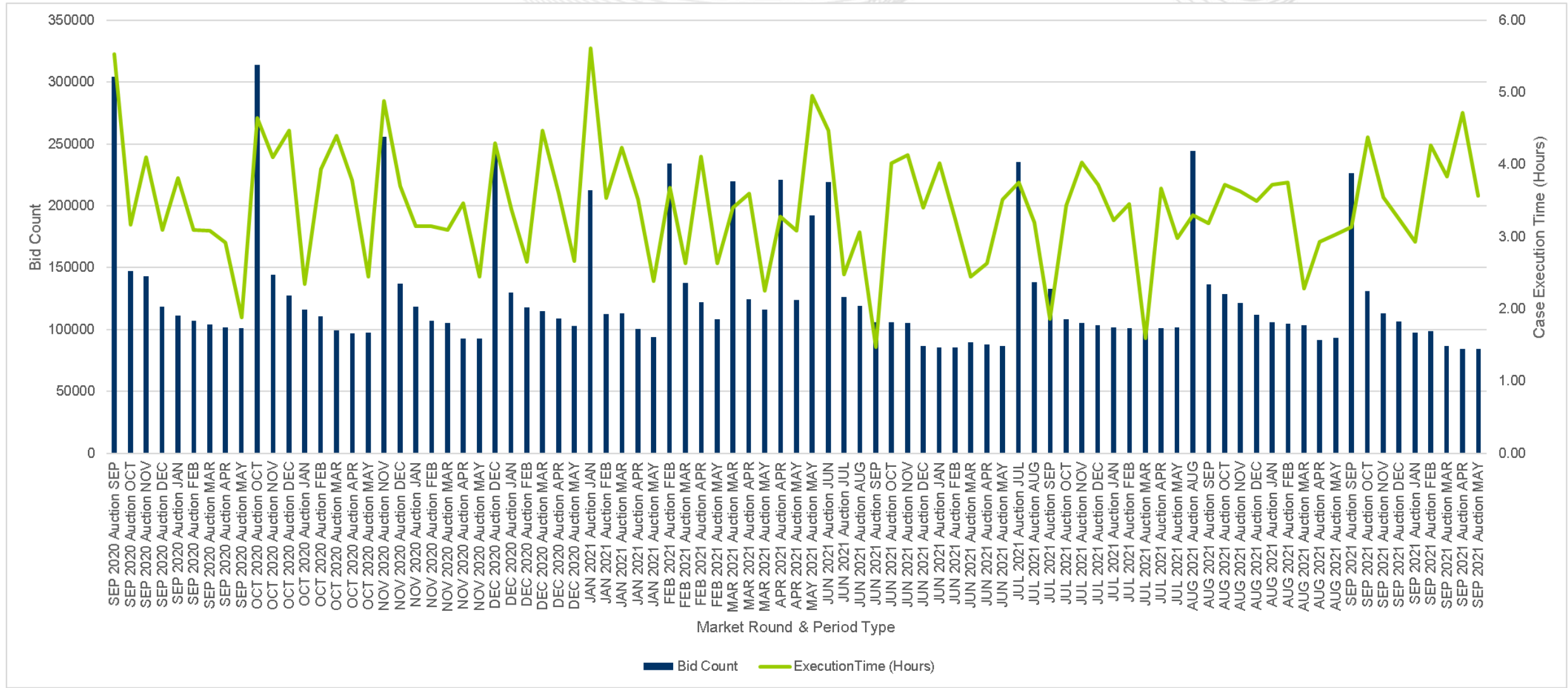
- Overlapping FTR periods and class types degrade performance of FTRO
  - Must solve optimization for multiple periods simultaneously, leading to longer and additional FTRO-SFT iterations
  - Timely posting of results is extremely important

- Additional requirements for ARR/FTR stakeholders
  - Multiple nomination cycles
  - Different ARR MW awards / $ values throughout planning period

- Cross-RTO comparisons

Facilitator:
David Anders,

David.Anders@pjm.com

Secretary:
Ankit Kharod

Ankit.Kharod@pjm.com

SME/Presenter:
FTR Group

FTRGroup@pjm.com

Member Hotline

(610) 666 – 8980

(866) 400 – 8980

custsvc@pjm.com