FTR Modeling Enhancements for Future Transmission Expansions

Brian Chmielewski

Sr. Analyst, Market Simulation

FTRMPS

October 20, 2017

Current Long-Term FTR modeling practices do not account for future transmission system upgrades

Future upgrades can have significant impacts on congestion revenue

PJM is concerned that its Long-term FTR auction clearing prices may not fully reflect the true future system capability

Under today's construct, the Long-term FTR Auction network model does not include future transmission system expansions

However, the Annual ARR/FTR network model does include upgrades that will be in-service by June 30th

PJM proposal concept: expand this current methodology to the Long-term FTR network model for one year into the future
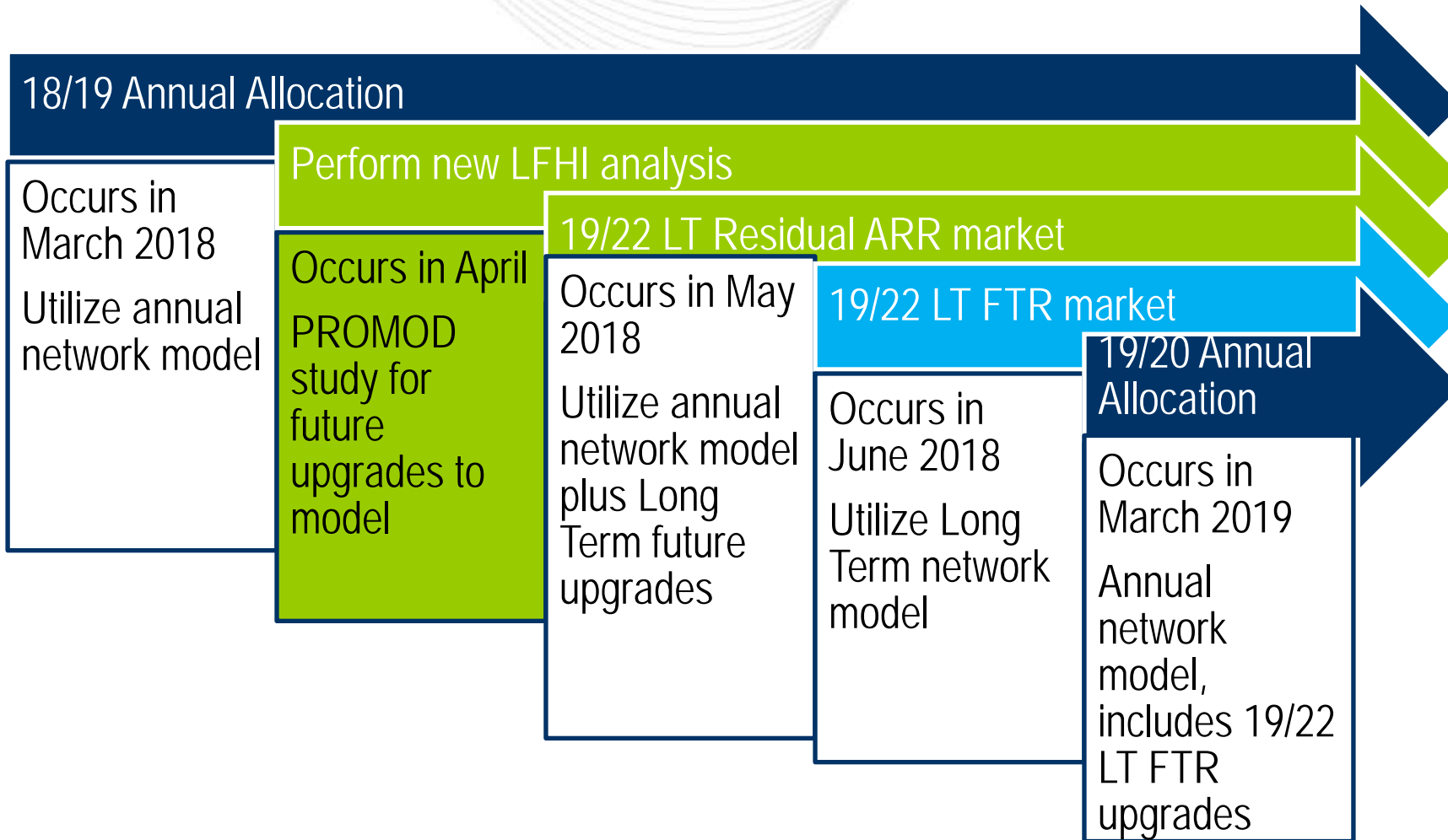
- Timing for transmission upgrades coming into service beyond 18 months can change

    - This raises concerns with FTR over-allocations and FTR underfunding

- Methodology for studying only those impactful upgrades

    - Low frequency High Impact methodology

- One year out modeling allows for ARR capability to be carved out and preserved for the next Annual Allocation

    - Preserves FERC mandated LSE priority rights to congestion revenues

Component	Status Quo	PJM Modification	PJM Reasoning
In-service Timing	N/A; For Annual Auctions, FTR group models future upgrades in service by 6/30 of that planning period	Extend Annual process to Long Term. Model upgrades in service by 6/30 of YR1 of Long Term Auction	• In-service timing beyond 18 months is uncertain • Conservative approach for FTR revenue adequacy
What Upgrades Will Be Modeled in LT Auctions	None	Filter upgrades via "low frequency high impact" method	Capture only those upgrades that will impact congestion
ARR Holder Priority Rights to Congestion Revenues	All Planning Period ARRs Self-Scheduled as FTRs in Long Term Auction Model	SQ + Run new Residual ARR Market to carve out additional MWs created by upgrades	Preserve additional transmission capability created by future upgrades

- Upgrades will be determined via "LFHI" method
  - Perform power flow analysis specifically monitoring historical DA constraints from the previous calendar year with more than $5M in congestion revenue contribution
  - Apply upgrades to studied topology and determine where there is a 10% delta in flow across those monitored constraints
- This method will ensure only significant, impactful upgrades are considered for the long term FTR model
  - If applied for 17/20 LT Auction, 3 upgrades out of 21 would have met this criteria
  - Power flow analysis allows for study of impact from multiple upgrades

- As previously shown, beyond 12 months out in-service timing becomes uncertain
  - Roughly 1/3 of projects were late, looking out past 12 months
- Solution is to compromise potential modeling accuracy with conservative revenue approach
  - Only model those upgrades that will be in-service and confirmed by June 30th of LT FTR Auction YR1
- The revised In-Service dates, due to newly identified drivers, are available on pjm.com and in some cases, they are presented at the TEAC.

- PJM Future modeling must ensure ARR holders maintain priority rights to congestion revenues

- Currently, this is achieved by self-scheduling all ARRs for the planning period into the Long-term FTR Auction network model

  - "Carve out" capability of LT Auction model

- PJM's proposal preserves the status quo and adds an additional step to ensure any incremental capability created by to-be modeled transmission system upgrades is also preserved

  - Done through a new "Long-term Residual ARR Market"

  - Escalate modeled ARRs by annual growth rate

18/19 Annual Allocation

Occurs in March 2018

Utilize annual network model

Perform new LFHI analysis

Occurs in April

PROMOD study for future upgrades to model

19/22 LT Residual ARR market

Occurs in May 2018

Utilize annual network model plus Long Term future upgrades

19/22 LT FTR market

Occurs in June 2018

Utilize Long Term network model

19/20 Annual Allocation

Occurs in March 2019

Annual network model, includes 19/22 LT FTR upgrades

- Looking for group consensus today in order to provide first reads at MIC and MRC in November

- Implement May 1, 2018 for 19/22 Long-term auction

- Note: A credit methodology change to account for future transmission system upgrades is also going through the stakeholder process
    - Utilizes PROMOD forecasted congestion LMPs and applies significant deltas for prevailing flow FTRs, i.e. increased credit requirements for prevailing flow FTRs that are projected to lose value in future

Appendix

- ARRs prorated in Stage 1B of the Annual Allocation may be allocated Residual ARRs for the following:
  - Increased transmission capability made available by certain transmission upgrades made during the planning year that were not modeled in the Annual ARR Allocation
  - Increased transmission capability made available for periods when Annual ARR modeled transmission outages are not out of service

Residual ARR MWs plus previously awarded Stage 1 and Stage 2 MWs cannot exceed the Network Service Peak Load value for a particular participant

Residual ARRs are effective the first month the increased transmission capability is modeled in the Monthly FTR Auction

Economic value of Residual ARRs are based on the MW amount and the nodal clearing price difference between the source and sink nodes for the FTR Obligations resulting from each monthly FTR Auction the Residual ARR is effective

- Market is created with prorated stage 1B requests from Annual Allocation
  - All ARR requests from stage 1B that did not fully clear

- Proration is done manually by operator until violated facilities are minimized as much as possible
  - Constraint basis – residual requests that impact violated constraints are prorated