



Energy Price Formation Senior Task Force Report
PJM Interconnection
Members Committee Webinar
January 22, 2019

The Markets and Reliability Committee (MRC) approved the formation of the Energy Price Formation Senior Task Force (EPFSTF) at its December 21, 2017 meeting to evaluate proposals to enhance energy market and reserve market pricing.

The EPFSTF held its 1st meeting on January 18, 2018. The EPFSTF reviewed the problem statement and issue charge, reviewed the draft EPFSTF charter and workplan, and reviewed PJM's planned response to FERC regarding their Order Instituting Section 206 Proceeding and Commencing Paper Hearing Procedures and Establishing Refund Procedures issued on December 21, 2017 regarding fast-start resources.

The second EPFSTF meeting was held on January 29, 2018. The EPFSTF continued consideration of the charter and workplan, and performed interest identification. The EPFSTF began consideration of Key Work Activity 2 regarding design criteria. The EPFSTF considered plans for education sessions, and received an educational discussion regarding Locational Marginal Pricing calculation and uplift, and received an update on PJM's planned response to FERC's Order Instituting Section 206 Proceeding and Commencing Paper Hearing Procedures and Establishing Refund Procedures issued on December 21, 2017 regarding fast-start resources.

The third EPFSTF meeting was held on February 15, 2018. The EPFSTF continued consideration of the charter and workplan and completed interest identification. The EPFSTF continued consideration of Key Work Activity 2 regarding design criteria and Key Work Activity 3 regarding gaps between design criteria and the current market design.

The fourth EPFSTF meeting was held on March 5, 2018. The EPFSTF completed consideration of the charter. Dr. Scott Harvey, FTI Consulting, provided a presentation reviewing the History of LMP, discussing the goals of implementing LMP pricing in the 1990s, constraints with the LMP design and implementation and the evolution of LMP. The EPFSTF continued consideration of Key Work Activity 2 regarding design criteria and Key Work Activity 3 regarding gaps between design criteria and the current market design. Finally, the EPFSTF briefly reviewed the matrix entries for design components, status quo and options regarding PJM's response to FERC in the fast start resources compliance filing.

The fifth EPFSTF meeting was held on March 29, 2018. The task force completed Key Work Activity 2 – identification of design criteria, and continued work on Key Work Activity 3 – identification of gaps between the design criteria and the current market design, focusing on reserves and shortage pricing. Representatives from ERCOT provided education on ERCOT's Operating Reserves and Reliability Deployment Price Adders. The EPSTF also captured design components to build the options matrix focusing on Shortage pricing and Reserves pricing.



On April 12, 2018 PJM posted a letter from PJM President & CEO Andy Ott which discussed activities of the EPFSTF, addressing suggested focus areas and timelines.

The sixth EPFSTF meeting was held on April 18, 2018. The task force discussed the change in timelines and focus areas suggested in the Board's letter. There were no objections to adopting the proposed timelines and focus areas. The task force continued consideration of Key Work Activity 3 - identification of gaps with current market design. The task force received a presentation on potential design components to consider for Reserve Zone modeling and Synchronized Reserves Market to build the options matrix on Shortage pricing and Reserve pricing.

The seventh EPFSTF meeting was held on May 4, 2018. The task force approved the updated work plan to implement the Board's recommended focus and timelines, and completed Key Work Activity 3 - identification of gaps with current market design. The task force received presentations on highlighting the operations and reliability needs for reserves and the limitations of the current reserve market design, differences between capacity reserves and operational reserves, the fundamentals of market clearing with co-optimization and the concept of lost opportunity cost, and the current cost structure and Manual 15 requirements for Synchronized Reserve offers, as well as an update to the short-term Synchronized Reserve Market goals. The task force reviewed design components and options to build the matrix for EPFSTF focusing on the reserve market.

The eighth EPFSTF meeting was held on May 23, 2018. The task force received presentations on analysis of the concepts and framework for enhancements to the ORDC, as part of the short term goals, the Synchronized Reserves offer margin, and reserve zone modeling (from IMM's perspective). PJM provided an overview of the latest proposal for synchronized reserves, and the task force reviewed the matrix, including design components and options focusing on the reserve market.

The ninth EPFSTF meeting was held on June 8, 2018. The task force received a presentation on current methodology behind Minimum Reserve Requirement (MRR) determination and actions taken during emergency procedures, an Operating Reserves Demand Curve (ORDC) framework that was presented at May 23, 2018 EPFSTF meeting with more examples and continue discussion regarding any adjustments to the uncertainties that are used, a presentation on the consideration of using ORDC for Day Ahead Scheduling Reserve Market, an IMM presentation on analysis of PJM ORDC framework and historical Reserves, and a presentation on Locational Reserve Zone Modeling.

The tenth EPFSTF meeting was held on June 13, 2018. The task force received a presentation on the IMM's proposal for Synchronized Reserves, and captured design components and options to the EPFSTF matrix focusing on the reserve market. Stakeholders received a summary of the presentation on Locational Reserve Zone Modeling that was given at the June 8, 2018 EPFSTF meeting.

The eleventh meeting was held on June 25, 2018. The task force continued discussion of Locational Reserve Zone Modeling, received presentations from the IMM regarding the Offer Margin Adder and conceptual thoughts on ORDC reforms, and received a presentation from PJM expanding on the ORDC framework focusing on how the Synchronized Reserve and Primary Reserve products could be co-optimized.



The twelfth meeting of the task force was held on July 17, 2018. PJM completed the presentation begun at the last meeting regarding the ORDC framework focusing on how the Synchronized Reserve and Primary Reserve products could be co-optimized. PJM also presented on potential adjustments to the ORDC to account for Operator actions. PJM also discussed updates to the proposal on Locational Reserve Zone Modeling for short term goals. The task force received a report from the Operating Committee related to their evaluation of the operational basis for adding a Real-time 30 Minute Reserve product. All proposal options were reviewed in the matrix, and the task force reviewed the workplan and basis for action.

The thirteenth meeting of the task force was held on August 6, 2018. PJM provided an update on potential adjustments to the ORDC for Operator Actions, and the IMM gave a presentation on ORDC from their perspective. PJM staff reviewed the executive summaries of PJM proposals on Synchronize Reserves, ORDC and Reserve Zone modeling.

The fourteenth meeting of the task force was held on August 22, 2018. PJM presented on the frequency of out of market adjustments to the ORDC, the value of additional reserves procured beyond the MRR, and the methodology that will be used for simulation results of the PJM proposal for EPFSTF. The IMM provided a presentation on SR Must Offer Requirements.

The fifteenth meeting of the task force was held on September 26, 2018. The IMM presented updates to their proposal regarding the ORDC, and PJM provided answers to questions related to ORDC from prior meetings. PJM also presented simulation results of the PJM proposal and reviewed potential Settlement changes for a consolidated Synchronized Reserve Market.

The sixteenth meeting of the task force was held on October 12, 2018. PJM reviewed updates made to the simulation results data for the PJM proposal. The IMM provided a presentation on the latest IMM proposal and discussed follow up items from the September 26, 2018 Task Force meeting. The task force discussed its work plan.

The seventeenth meeting of the task force was held on November 1, 2018. PJM presented additional data posted for the previously completed simulations of their proposal. PJM and the IMM discussed how their proposals aligned with the groups goals. Mr. Gregory Pakela, DTE Energy Trading, presented a new proposal. Mr. James Wilson, Wilson Energy Economics, provided a presentation commenting on PJM's ORDC proposal. The task force reviewed the proposals in the matrix, and discussed its work plan.

The eighteenth meeting of the task force was held on November 28, 2018. PJM presented updates to its ORDC proposal, and Monitoring Analytics presented a comparison of the PJM and IMM ORDC proposals. Stakeholders reviewed additional updates to the matrix, as well as a new proposal from the DC Office of the Peoples' Counsel. The task force discussed its work plan.

The nineteenth meeting of the task force was held on December 14, 2018. The Board sent a letter to PJM Stakeholders directing PJM management to work with the stakeholders to come to consensus on the six components that were identified, by January 31, 2019. PJM presented more details on the comprehensive proposal and a paper was also posted in support of it. PJM also reviewed simulation results of the comprehensive proposal. The task force discussed work plan leading up to January 31, 2019.



The twentieth meeting of the task force was held on January 4, 2019. PJM presented more details on the comprehensive proposal on the use of \$2000 penalty factor, use of ORDC in Day-Ahead and the basics around 30 minute Reserves. IMM discussed their proposal on Scarcity Revenue. A new proposal was introduced by Wilson Energy Economics on a 7th component to be considered. DC OPC and Calpine reviewed their respective proposals. Finally, the task force discussed its work plan.

The twenty first meeting of the task force was held on January 11, 2019. PJM presented more details on the comprehensive proposal on Balancing Settlements. PJM also presented simulation result for the winter timeframe from December 2017-January 2018. PJM presented on options on managing risk of Day Ahead reserve assignment and presented on how other ISO's manage such risk. IMM presented on calculating scarcity rents, scarcity rent true up, calculation of forced outage probability and issues with Day Ahead Reserve Market. Wilson Energy Economics presented an 8th component to be considered as part of the comprehensive package. Finally, the task force discussed its work plan.

Next meeting: January 17, 2019

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