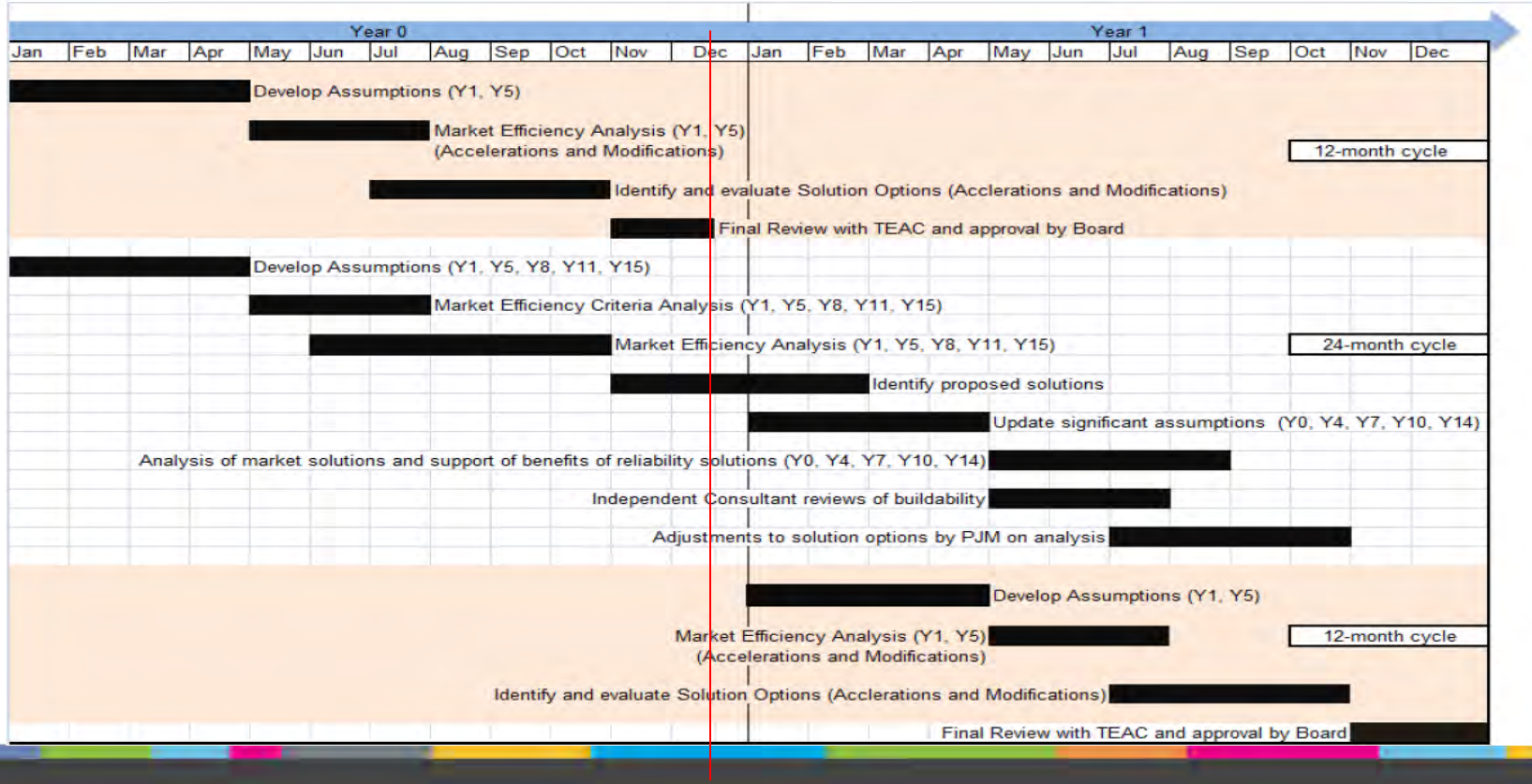
Transmission Expansion Advisory Committee
Market Efficiency Update

December 15, 2016

Agenda

- 2016/17 Long-Term Window Update
- Recommended Congestion Drivers for 2016/17 Long-Term Window
- 2016 Acceleration Analysis Conclusions
- Next Steps

2016/17 Market Efficiency Timeline



2016/17 Market Efficiency Cycle Timeline

Item	Schedule
Long Term Proposal Window	Nov 1, 2016 – Feb 28, 2017
Analysis of Proposed Solutions	March 2017 - November 2017
Determination of Final Projects	December 2017

2016/17 Long-Term Window Update

- Market Efficiency base cases were posted on 11/01/2016
  - PROMOD cases, and supporting documentation were posted on Market Efficiency Web page
    - http://www.pjm.com/planning/rtep-development/market-efficiency.aspx

- Proposal window opened on November 1, 2016

- Proposal window will close on February 28, 2017

- Market Efficiency Questions
  - Send to the RTEP e-mail distribution (rtep@pjm.com) with “Market Efficiency” in the subject line header

2016/17 Long-Term Window Posted Data

- Input Assumptions:
  - http://www.pjm.com/planning/rtep-development/market-efficiency.aspx
- PROMOD Data (requires CEII and ABB PROMOD License)
  - http://www.pjm.com/planning/rtep-development/market-efficiency/economic-planning-process.aspx
  - 2016/17 Base Cases
    - Market Efficiency Base Case
    - Case Descriptions
    - Procedure for Executing PROMOD Simulations
  - 2016 ARR Model
    - PROMOD Case: PJM ME Base ARR Mapping 20161118 *(XML file)*
    - Market Pnode to PROMOD Mapping (XLSX file)
  - Sample Data (ZIP file)
    - PROMOD Test Case
    - Test results
- Additional Files
  - Benefit / Cost Evaluation Tool
    - Market Efficiency Benefit/Cost Evaluation Spreadsheet and Example

2016/17 Long-Term Window Posted Docs

- Problem Statement
  - http://www.pjm.com/~/media/planning/rtep-dev/expan-plan-process/ferc-order-1000/rtep-proposal-windows/2016-2017-rtep-long-term-proposal-window-problem-statement.ashx
- Recommended Congestion Drivers (requires CEII)
  - http://www.pjm.com/planning/rtep-development/expansion-plan-process/ferc-order-1000/rtep-proposal-windows.aspx
- 2016 Base Congestion Results
  - http://www.pjm.com/planning/rtep-development/market-efficiency.aspx

2016/17 Long-Term Window Recommended Congestion Drivers

Facilities Recommended for Proposal (updated On 11/09/2016)			*2021 Input Assumptions with 2021 Topology*		*2024 Input Assumptions with 2021 Topology*		
Facility Name	AREA	TYPE	Frequency (Hours)	Market Congestion ($ Millions)	Frequency (Hours)	Market Congestion ($ Millions)	Notes/Potential Upgrade
Conastone to Graceton 230 kV	BGE	LINE	972	$58.3	1,044	$72.1	
Graceton to Bagley 230 kV	BGE	LINE	1,265	$33.0	1,518	$49.6	
Susqeuhanna to Harwood 230 kV	PPL	LINE	166	$4.0	201	$5.6	
Bosserman to Olive 138 kV	AEP	LINE	17	$0.4	71	$2.0	Interregional Constraint

Acceleration Analysis

Acceleration Analysis

- Scope
  - Determine which reliability upgrades, if any, have an economic benefit if accelerated or modified.
- Study Years
  - 2017 and 2021 set of economic input assumptions used to study impacts of approved RTEP projects
- Process
  - Compare market congestion for near term vs. future topology
  - Estimate economic impact of accelerating planned upgrades

Acceleration Analysis Status

- Finalized PROMOD modeling work for 2017 and 2021 AS-IS cases
- Completed PROMOD runs
- Compared the board approved reliability upgrades with the congestion reductions between the AS-IS and the ME Base cases.

Acceleration Analysis: 2017 Load, Generation and Economic Assumptions

Congestion Decreases Associated With Approved Reliability Projects - 2017 Study Year			2017 Study Year			Upgrade Responsible for Congestion Reduction	ISD
			2017 Topology	2021 Topology	Congestion Savings ($ Millions)		
Constraint Name	AREA	TYPE	Year 2017 Congestion ($ Millions)	Year 2017 Congestion ($ Millions)			
Milford to Steele 230 kV	DP&L	LINE	$3.2	$0.0	$3.2	PJM RTEP B2633.1: New 230 kV transmission line between Salem and Silver Run.	2019
BAYWAY_Q to Doremus Pl 138 kV	PSE&G	LINE	$1.4	$0.0	$1.4	PJM RTEP B2436: PSEG Northern NJ 345 kV Project.	2018
ZION EC ;RP TO ZION STA ; R 345kV	CE	LINE	$2.1	$0.0	$2.1	MISO MTEP P8065: Reconfigure the Pleasant Prairie-Arcadian 345 kV and Zion-Libertyville: 345 kV transmission lines to loop into new station.	2020
Milford to Cool Springs 230 kV	DP&L	LINE	$1.4	$0.2	$1.2	PJM RTEP B2633.1: New 230 kV transmission line between Salem and Silver Run.	2019

Note: For a particular flowgate, the congestion savings for the 2017 study year are calculated as the difference in simulated congestion between the PROMOD case with AS-IS 2017 topology and the PROMOD case with the RTEP 2021 topology.

Acceleration Analysis: 2021 Load, Generation and Economic Assumptions

Congestion Decreases Associated With Approved Reliability Projects - 2021 Study Year			2021 Study year			Upgrade Responsible for Congestion Reduction	ISD
			2017 Topology	2021 Topology	Congestion Savings ($ Millions)		
Constraint Name	AREA	TYPE	Year 2021 Congestion ($ Millions)	Year 2021 Congestion ($ Millions)			
Susquehanna to Harwood 230 kV	PPL	LINE	$9.8	$3.7	$6.1	PJM RTEP S1107: Upgrade Harwood 230 kV Substation by building 230 kV yard to current standards and replacing old equipment.	2020
Milford to Steele 230 kV	DP&L	LINE	$4.4	$0.0	$4.4	PJM RTEP B2633.1: New 230 kV transmission line between Salem and Silver Run	2019
05GABLSS to Tidd 138 kV	AEP	LINE	$3.6	$0.0	$3.6	PJM RTEP S1067: Rebuild Tidd-Gable 138kV circuit.	2018
East Towanda to East Sayre 115 kV	PENELEC	LINE	$2.4	$0.0	$2.4	PJM RTEP B2621: Replace relays at East Towanda and East Sayre 115 kV substations.	2018
McDowell to Shenango 138 kV	ATSI	LINE	$2.3	$0.0	$2.3	PJM RTEP B2413: Replace a relay at McDowell 138 kV substation.	2018
Juniata to Cumberland 230 kV	PPL	LINE	$2.0	$0.0	$2.0	PJM RTEP S0945.8: Rebuild the Juniata - Cumberland 230 kV Line.	2021
BAYWAY_Q to Doremus Pl 138 kV	PSE&G	LINE	$2.0	$0.0	$2.2	PJM RTEP B2436: PSEG Northern NJ 345 kV Project.	2018
ZION EC ;RP TO ZION STA ; R 345kV	CE	LINE	$1.3	$0.0	$1.3	MISO MTEP P8065: Reconfigure the Pleasant Prairie-Arcadian 345 kV and Zion-Libertyville 345 kV transmission lines to loop into new station.	2020

Note: For a particular flowgate, the congestion savings for the 2021 study year are calculated as the difference in simulated congestion between the PROMOD case with AS-IS 2017 topology and the PROMOD case with the RTEP 2021 topology.

Acceleration Analysis: Results

- Reliability upgrades did not provide significant congestion benefits in the acceleration analysis
- Moreover, reliability upgrades responsible for congestion reductions are unlikely to be accelerated
  - ISD is in near future, or
  - project scope too large to accelerate
- Update will be provided if any of facilities may be accelerated.

Next Steps

Milestone	Schedule 2016 - 2017
Proposal Window Closing	February 28, 2017
Base Case Update Significant Assumptions (mid cycle update)	March – April 2017
Project Analysis	March – November 2017
Final TEAC Review and Board Approval	December 2017

Questions?

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