

Compliance Approach to Some Portions of Order 1920 Long-Term Regional Transmission Planning Requirements

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Compliance Topics Covered in This Presentation

- Long-Term (LT) Scenario Framework
 - Factor Categories (FC)
 - LT Scenario use
 - Interaction with Order 1000 processes
- Identification of LT Needs
 - Analyses
 - Definition of Long-Term Needs (LT Needs)
 - Definition of Core and Additional LT Needs
 - Addressing LT Needs
- Evaluation and Selection of Long-Term Transmission (LT) Facilities
 - Voluntary Funding Opportunities
- LTRTP Cycle

Note: other compliance requirements, including the interaction of Order 1920 with non-Order 1000 planning processes, such as the interconnection process and local planning, will be addressed in a future meeting



LTRTP Scenario Framework



- Base (LT) Scenario is most probable (as required if TP adopts Base/High/Low structure)
 - Year-10 case in addition to required Year-20 cases
- Low and High Scenarios are bookends for transmission needs
- Extreme weather sensitivities for each scenario aligned with TPL-008 standard



Order 1920 Required Seven Factor Categories (Recap)

Required Factor Categories

- 1. Laws and regulations affecting future resource mix and demand
- 2. Laws and regulations on decarbonization and electrification
- 3. Integrated Resource Plans and expected supply obligations for LSEs
- 4. Trends in technology and fuel costs within and outside of the electricity supply industry, including shifts toward electrification of buildings and transportation
- 5. Retirements
- 6. Generation interconnection requests and withdrawals
- 7. Utility commitments and other public policy goals



- PJM will not discount FC1-3, consistent with Order 1920 requirements
 - PJM will consult with and consider the position of the PJM Area Relevant State Entity Committee (PARSEC) for FC1-3 and 7 as required by Order 1920
 - PJM will develop a portal to solicit local policy inputs
- PJM will use best-available data to model FC1-7 as required by Order 1920
- Considerations on other factors:
 - PJM will model announced and policy-driven deactivations (FC5) in the Base Scenario
 - Generator Owners can submit documentation demonstrating their plans to comply with federal and state laws and regulations for PJM consideration
 - PJM could consider modeling age-based deactivations in the High Scenario
 - PJM will not model corporate commitments in the Base Scenario but could consider them for the High Scenario (Order 1920-A removed corporate commitments from FC7)



Use of LT Scenarios and Interaction with Order 1000

- Use of LT Scenarios for LTRTP
 - The Base Scenario is the primary scenario used to identify LT Needs and LT Facilities to address those needs (LT Solutions)
 - The High and Low Scenarios identify risks and inform the evaluation and selection process to identify a robust plan (see slide 17)
- Interaction with Order 1000 processes:
 - Order 1920 process informs Order 1000 processes (see slides 9-10)
 - Order 1920 Year-10 case *replaces* Order 1000 Year-8 reliability case
 - Order 1000 Market Efficiency cases beyond the Year-5 case will be consistent with Order 1920 Base Scenario's cases



Identification of LT Needs



LTRTP Reliability Analysis

- Order 1920 Reliability tests
 - Use conductor limits (consistent with current Order 1000 practices)
 - Year-10 case, analysis consistent with Year-5 analyses to better inform them
 - Year-20 cases, simplified analysis:
 - Generation Deliverability, single and tower contingencies only
 - Additional analysis as needed to confirm Year-10 case needs



LTRTP Economic Analysis

- Order 1920 Economic analyses
 - Use conductor limits (consistent with current Order 1000 practices)
 - Year-10 case, economic analysis consistent with Year-5 Market Efficiency analysis to better inform Order 1000 Market Efficiency process
 - **Year-20 cases**, *simplified economic analysis*:
 - Simplified monitoring higher voltage only
 - Focus on improving system efficiency with regard to generation deliverability (system-wide production cost, decrease curtailments)



Identification of LT Needs

- LT Needs are those that are identified through reliability and economic analyses (as defined on slides 9-10) on the Base, Low, and High Scenarios and are expected to require Long-lead solutions (six years or more lead-time, per OA definition)
- PJM will use the following principles to guide the identification LT Needs:
 - Voltage level of the facility affected by the reliability violation or congestion
 - Severity of the issue
 - Addressing a severe overload may require a larger solution with longer lead-time
 - Number and geographic concentration of the facilities affected by the violation/congestion
 - Many needs in close proximity may indicate the opportunity for a larger solution
- The use of these principles depends on the time-horizon
 - In year 20 the criteria to identify LT Needs is more stringent than in year 10



Addressing LT Needs

- Order 1920 does not require PJM to select any LT Facility
- PJM must ensure that LT Needs are addressed to keep the lights on. Order 1920 allows this to occur through holistic analysis:
 - "Core" LT Needs establish a minimum set of actionable needs
 - "Additional" LT Needs establish a supplementary set of actionable needs that the states will work with PJM on how to best address
- LT Facilities addressing LT Needs (including Core LT Needs) may produce multiple types of benefits – reliability, economic and policy benefits



Core LT Needs and Additional LT Needs Drivers

Core LT Needs

Minimum set of actionable LT Needs that PJM will pursue within an Order 1920 competitive window

(1) PJM load growth (includes policies that are in the PJM Load Forecast)

(2) Deactivations (announced and anticipated policy-driven deactivations)

(3) Additional generation to meet resource adequacy target criteria

Additional LT Needs

Identified needs that go beyond Core LT Needs; can be included within an Order 1920 competitive window in addition to Core LT Needs (see next slide)

Examples of Additional LT Needs:

- Additional generation above the resource adequacy target criteria (including policy-driven generation not part of Core Needs, possibly less certain gen.)
- Standalone economic LT Needs (not overlapping with reliability test violations)



Examples of Core LT Needs and Additional LT Needs

<i>Core LT Needs</i> : identified through reliability tests (e.g. generation deliverability) and associated with:		Additional LT Needs: any LT Need that is not Core		
Load Forecast	Examples:Electrification targetsDER targetsData centers	Stand-alone economic needs	 Examples: Significant congestion on a high voltage line Significant curtailments 	
Deactivations (announced and anticipated policy-driven deactivations)	 Examples: EPA Coal Combustion Residuals Illinois CEJA 	Generation above 1-in-10 resource adequacy target criteria	 Examples: Least-economic policy driven generation above 1-in-10 (e.g., if states' RPS are such to drive 	
Generation up to 1-in-10 resource adequacy target criteria, with consideration of policies affecting new generation, except resource- specific targets*	 Examples, <i>if needed to meet up to the 1-in-10 reliability criteria</i>: Delaware 28% RPS target by 2030 Maryland 14.5% RPS solar carveout by 2030 		 Virginia's OSW target of 5.2 GW by 2034 Michigan's storage target of 2.5 GW by 2029 	

* Unless resources have GIA, WMPA or completed SAA. Currently these resource-specific targets correspond to "State Energy Storage Targets" and "State Offshore Wind Targets" tabs of the State Policies Workbook.



Evaluation and Selection



Evaluation Steps

- Sequential evaluation steps to gradually screen and identify more efficient and cost effective LT Solutions:
 - 1. Feasibility (cost and constructability analyses)
 - 2. Do-no-harm
 - 3. Project addresses Core LT Needs or Additional LT Needs with commitments
 - 4. Benefits used to further screen among alternative LT Solutions
 - Maximize sum of Order 1920 Seven Enumerated Benefits





- Principles for Selecting LT Solutions:
 - Required in-service date vis-a-vis lead-time of the LT Solution
 - e.g., select if the need is expected in 12 years and the project lead-time is 12 years; wait if the lead-time is 8 years
 - Robustness of the solution across Base, Low, and High Scenarios and sensitivities, including extreme weather
 - Expandability
 - Benefits and costs (including for acceleration)
- PJM will not set a minimum benefit threshold for Core LT Needs
- PJM and states can define different evaluation and selection criteria for LT Solutions addressing Additional LT Needs



Voluntary Funding Opportunities

- Voluntary funding opportunities for the states or interconnection customers arise from:
 - Solutions addressing Additional LT Needs
 - Selection of a different solution than the one emerging from applying PJM's evaluation process and selection criteria



LTRTP Cycle



LTRTP Cycle

	y - 1	y 0	y + 1	y + 2	y + 3
	Months O N D	JFMAMJJASOND	JFMAMJJASON	DJFMAMJJASOND	JFMAMJJASONDJ
Input Gathering (pre-cycle start)					
- Policy and IRP inputs (FC 1-2-3-7)	3				
- PJM inputs (FC 4-5-6)	3				
Scenario Development (cycle starts)					
 States and other stakeholder discussions 	12				
- Scenario preparation	11				
- Scenario first draft					
- Scenarios/models locked					
- Update powerflows and build economic models	2				
Analysis					
 Reliability and economic analyses 	7				
- Competitive window	6				
Solutions			, 1 1 1		
- Solution evaluation	8		1 1 1 1		
- First read					
- Second read					
 Voluntary funding decisions 	3		1 1 1 1		
- Holistic plan evaluation	4				
- First read					
- Second read			, 1 1 1 1		
Cost Allocation			1 1 1 1		_
 Counterfactual request 					
 Ex-ante cost allocation calculations 	6				
 Ex-post cost allocation period 	6		- 		
Board approval					



Order 1920 and Order 1000 Cycles

	у 0	y + 1	y + 2	y + 3
	JFMAMJJASOND	JFMAMJJASOND	JFMAMJJASOND	JFMAMJJASOND
LTRTP (Order 1920)				
- Assumptions/Modeling				
- Analysis				
 Solutions (window dark shade) 				
- Rev w/ TEAC/PARSEC, Board				
Near-Term Reliability (Order 1000)				
- Assumptions/Modeling				
- Analysis				
- Solutions (window dark shade)				
- Review with TEAC, Board				
Market Efficiency (Order 1000)				
- Assumptions/Modeling				
- Analysis				
- Solutions (window dark shade)				
- Review with TEAC, Board				



Next Steps

- April 10 TEAC:
 - Compliance Track
 - Continue discussion on this deck's topics
 - Discuss PJM's compliance approach to additional requirements (e.g., Benefits, Reevaluation, Alternative Transmission Technologies, Coordination Between Interconnection and Order 1000 Processes, Local Planning, etc.)
 - Scenario development track



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Compliance Approach to Some FO1920 LTRTP Requirements

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