



Interregional Transmission Services and Operations: Beyond Order 1000

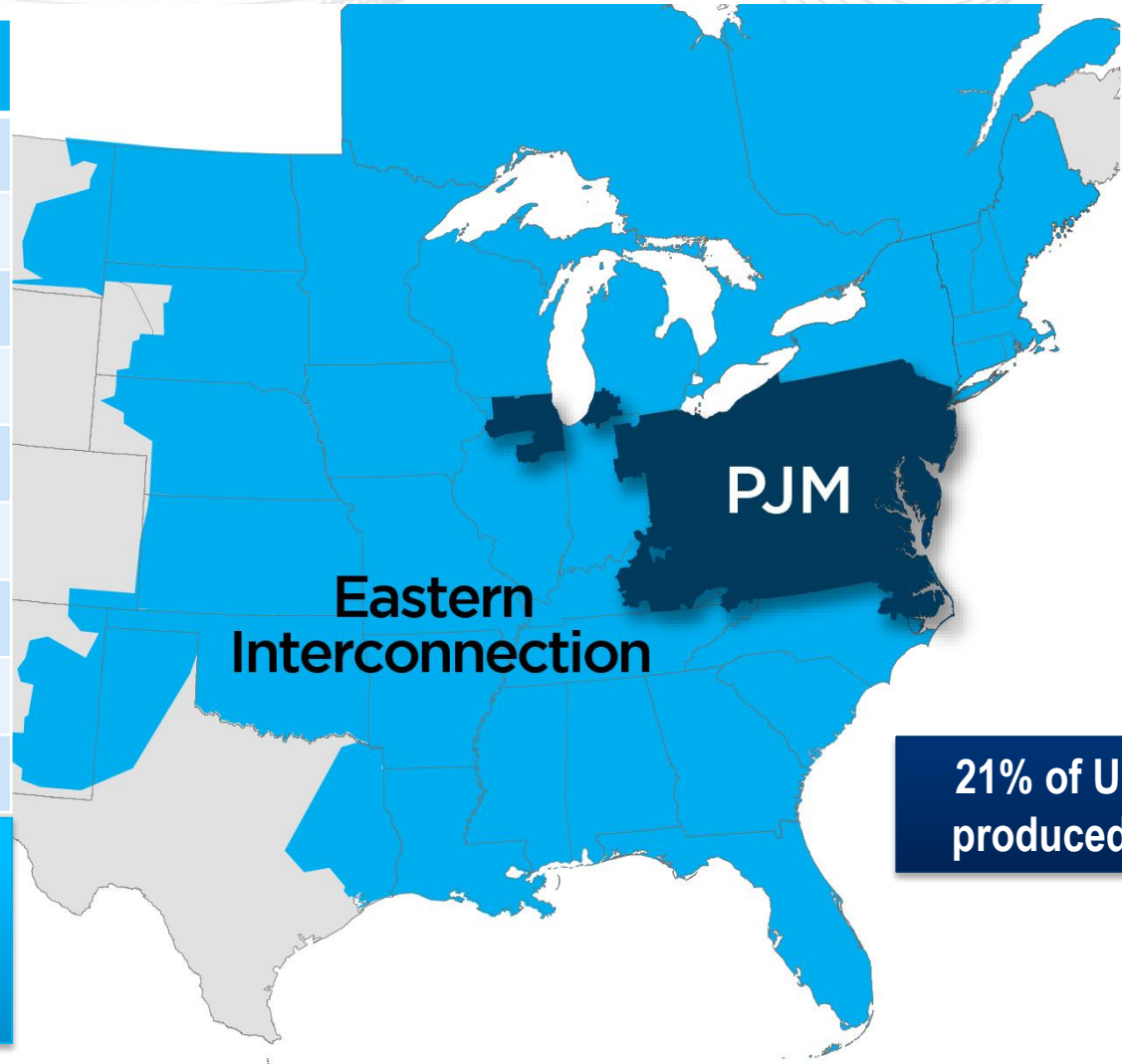
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Harvard Electricity Policy Group

Key Statistics

Member companies	960+
Millions of people served	61
Peak load in megawatts	165,492
MW of generating capacity	171,648
Miles of transmission lines	81,736
2014 GWh of annual energy	792,580
Generation sources	1,304
Square miles of territory	243,417
States served	13 + DC

- 27% of generation in Eastern Interconnection
- 28% of load in Eastern Interconnection
- 20% of transmission assets in Eastern Interconnection



**21% of U.S. GDP
produced in PJM**

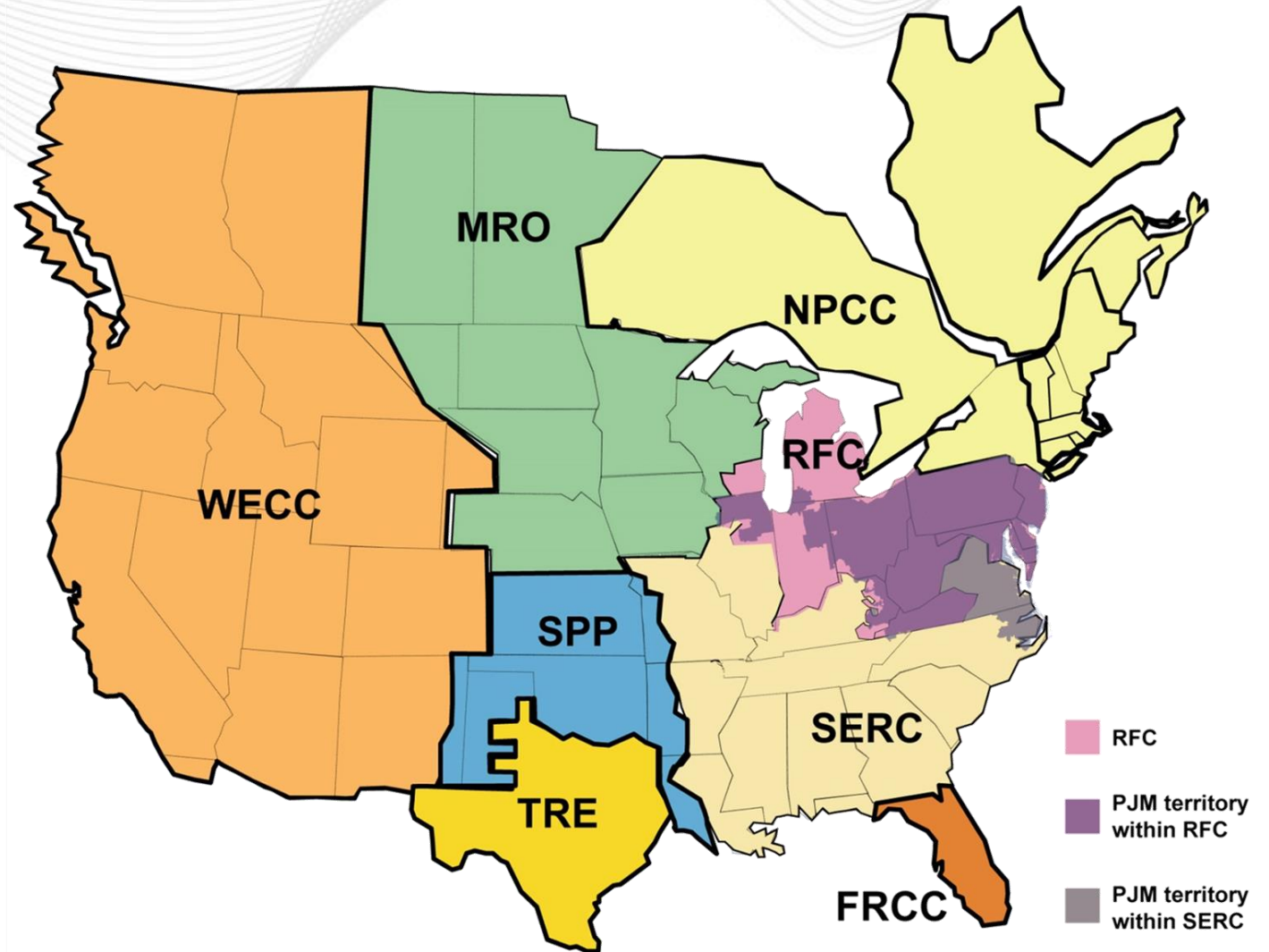
As of 5/2016

- Coordinated operation for transmission constraints
- Efficient energy transfers between regions
- Inter-regional transmission planning coordination



SERC Reliability Risk Team (RRT)

- SERC Reliability Risk Team has identified loop flows as a major Reliability Risk for the SERC region
- SERC Operating Committee mandated a study for two specific TLR 5 issuances in January and February 2016.
- PJM submitted “system snapshots” for the requested dates in PSS/e format.
- PJM will participate in the coordinated analysis performed by the SERC Near Term Study Group (NTSG).



- PJM has worked with TVA and Duke Energy (Progress and Carolina).
- Operating procedures have been developed and provided to System Operators to help mitigate congestion experienced during real-time operations.
- PJM Operations has shared these “areas of congestion” and associated operations guides with the PJM Planning group to help support Inter-regional planning coordination.

PJM requires pseudo-ties for external resources committed as Capacity Performance resources.

- PJM and MISO have been working on near-term operating procedures for existing pseudo-ties.
- PJM and MISO are also discussing long-term solutions to resolve challenges for new and future pseudo-ties.



PJM is...

- Working with our southern neighbors who are not participants in the Congestion Management Process (CMP).
- Dedicated to creating transparency with respect to Market Flows created by PJM Dispatch and external capacity resources.
- Introducing third party flowgates as provided in the CMP to help create this transparency.

This will allow for PJM to account for market flows in it's Day-Ahead Market solution and mitigate flowgate congestion experience in non-market areas.

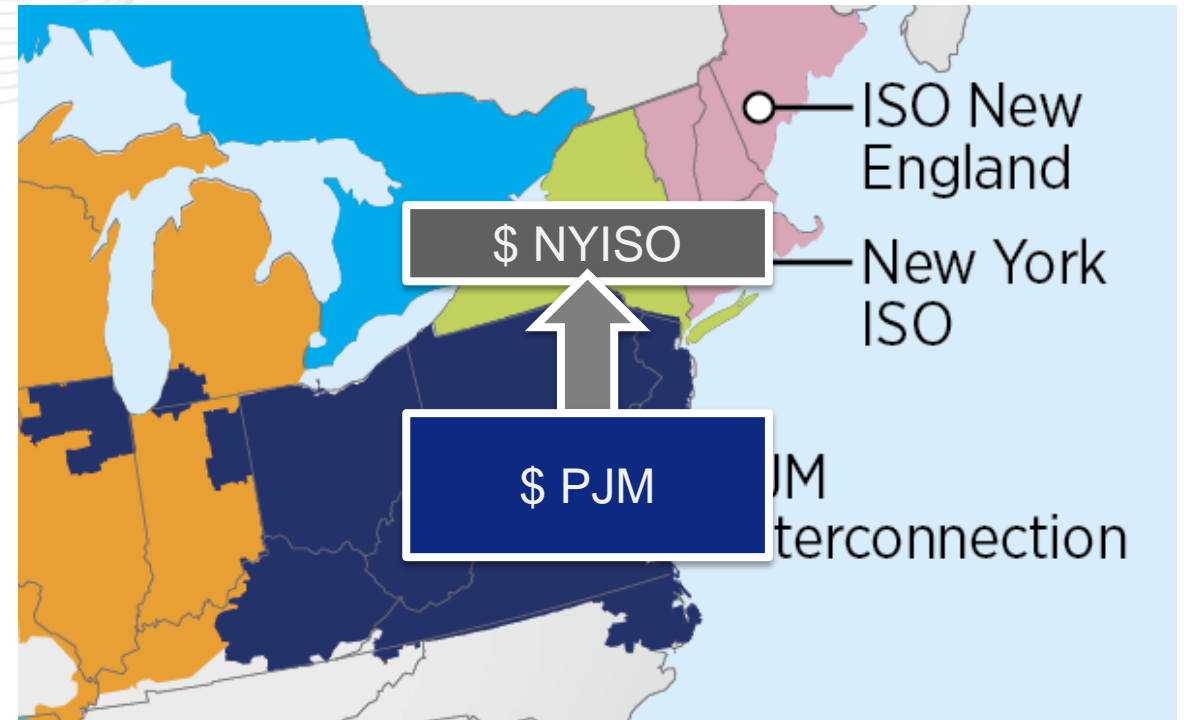




- Interface Pricing Efforts
- MISO and PJM have agreed on a compromise solution
- Implementation coincident with the beginning of the 2017 Planning Year to coincide with annual ARR/FTR processes

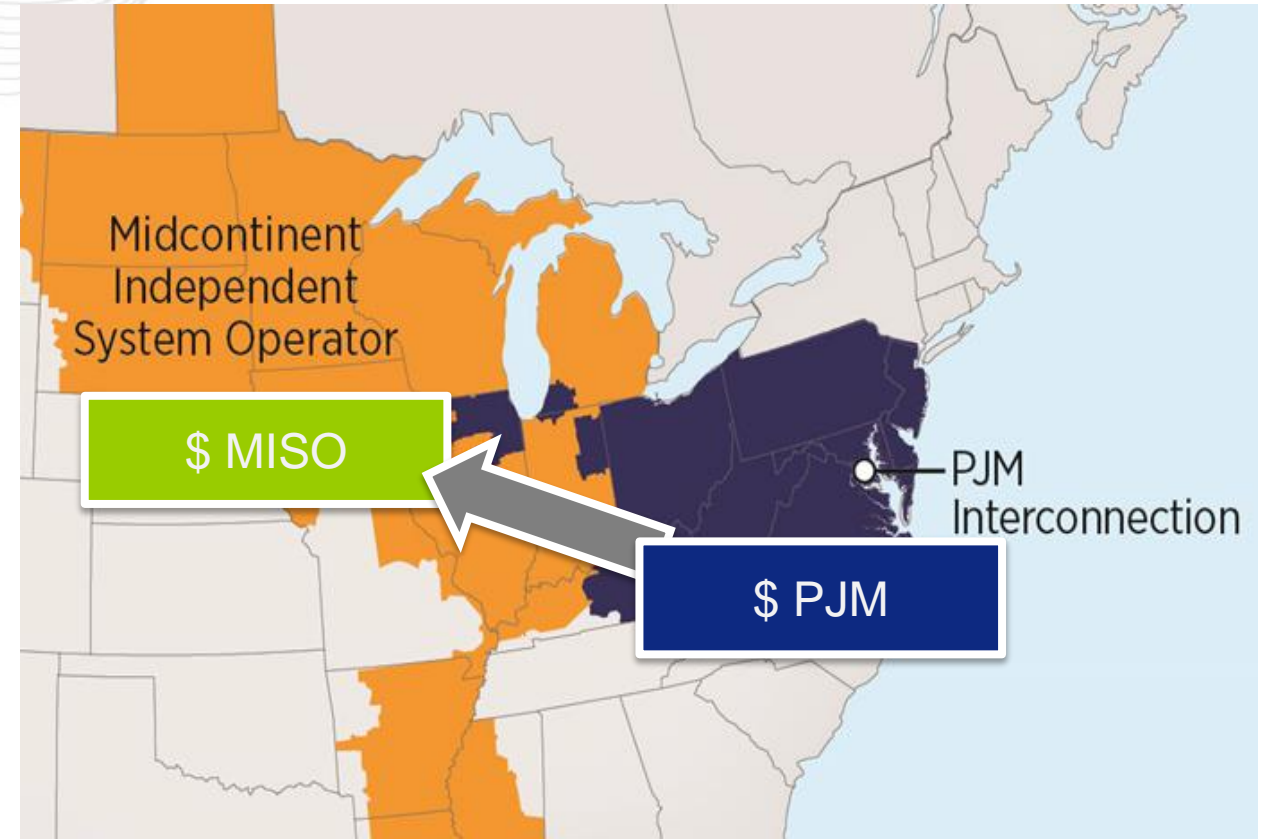
The objective of Coordinated Transaction Scheduling (CTS) is to improve interchange scheduling efficiency

- Increase alignment of energy scheduling with interface prices
- Adds the option for Market Participants to schedule energy transactions across the NYISO/PJM interface using an interface bid



Efficient Energy Transfers: MISO – PJM CTS

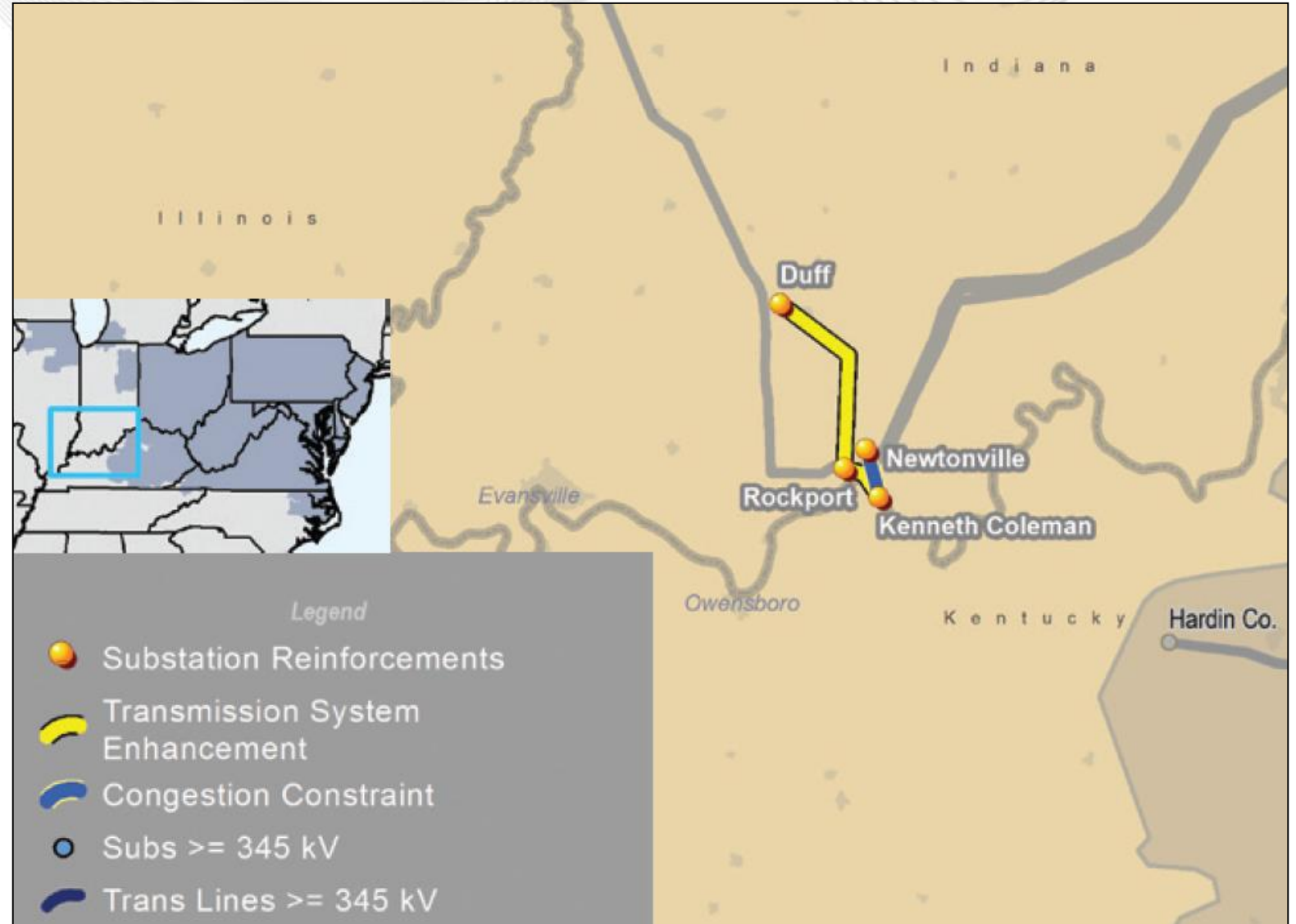
- FERC issued an order on April 18, 2016 approving the implementation of Coordinated Transaction Scheduling across the MISO-PJM interface (Effective date of March 1, 2017)
- MISO and PJM development efforts remain underway



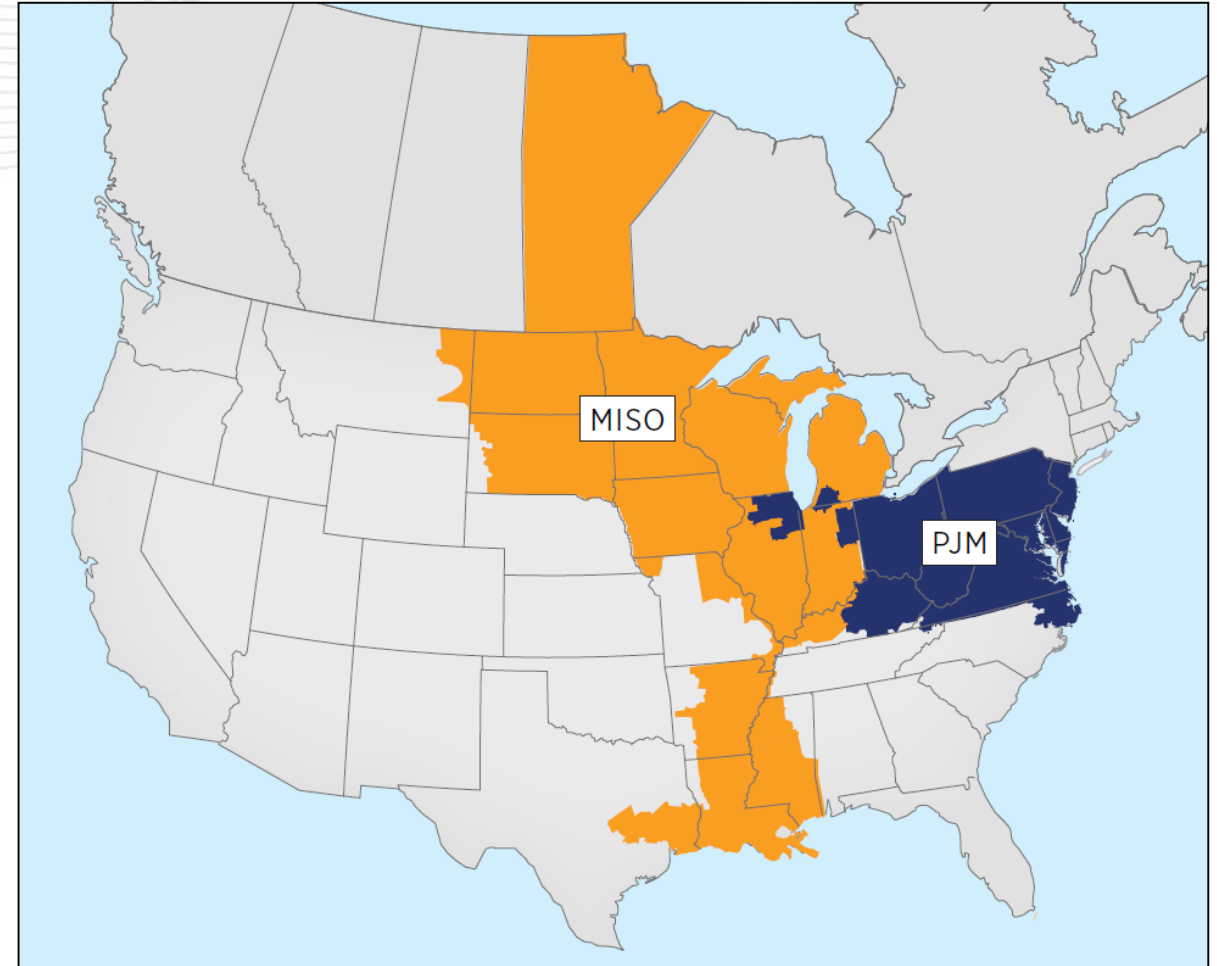


- Cross Border Transmission Planning
- Interregional Planning Stakeholder Advisory Committee 2016 priorities and timelines under review
 - Prioritizing the approval process for targeted studies
 - Replacing the interregional 1.25 benefit/cost ratio with a less stringent screen
 - Enhance the cost/benefit market efficiency project assumptions and metric calculations
- Generation Interconnection Queue Coordination
 - PJM reviewing MISO generation interconnection queue changes with MISO to determine the impacts to the current queue coordination process
 - PJM and MISO formalizing queue and retirement study processes

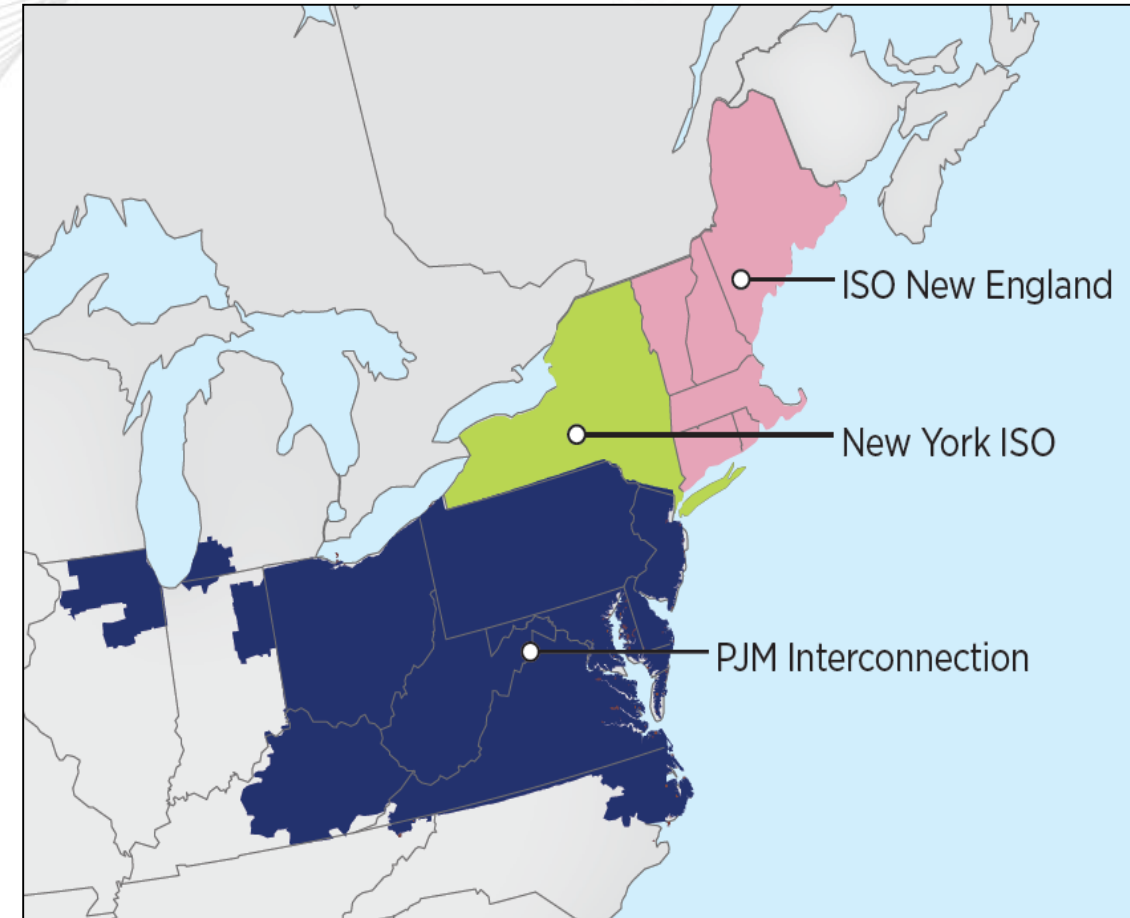
- MISO – Mitigate congestion constraint in Southern Indiana
- PJM – Eliminate the operating guide and special protection scheme at Rockport generating station.



- Focus on congestion issues along common interface
- Identify targeted and cost effective solutions to congestion that can be implemented in the near-term
- Better understanding of factors that cause congestion and planned system enhancements that can address it



- Coordination of queued interconnection requests exhibiting potential cross-border impacts
- Joint review of significant gas generation expansion near PJM/NY ISO border
- PSE&G/ConEd wheel change impacts
- Latest Northeast Coordinated System Plan Report finalized May 9, 2016
- Proposed HVDC merchant project near Erie West under joint review



Joint study to evaluate potential impacts from loop flows caused by MISO generation resources that cleared PJM 2016/2017 Reliability Pricing Model Base Residual Auction for delivery to PJM.

- Agreed to enhanced coordination and planning data exchange
- Established enhanced operating practices to mitigate impacts
- SERC to study parallel flow issues in 2016



New southeast planning arrangement per FERC Order No. 1000 compliance

- Exchange of planning data
- Joint review of regional plans
- Determine interregional transmission that may be more effective than regional plans

Operational / Planning issues

- Tie line loadings (TVA, CPL, OVEC)
- Parallel flow issues (LGE/KU)
- End-of-life facilities (Dominion)

