

The View from PJM: Operating Competitive Markets over a Multi-State Footprint

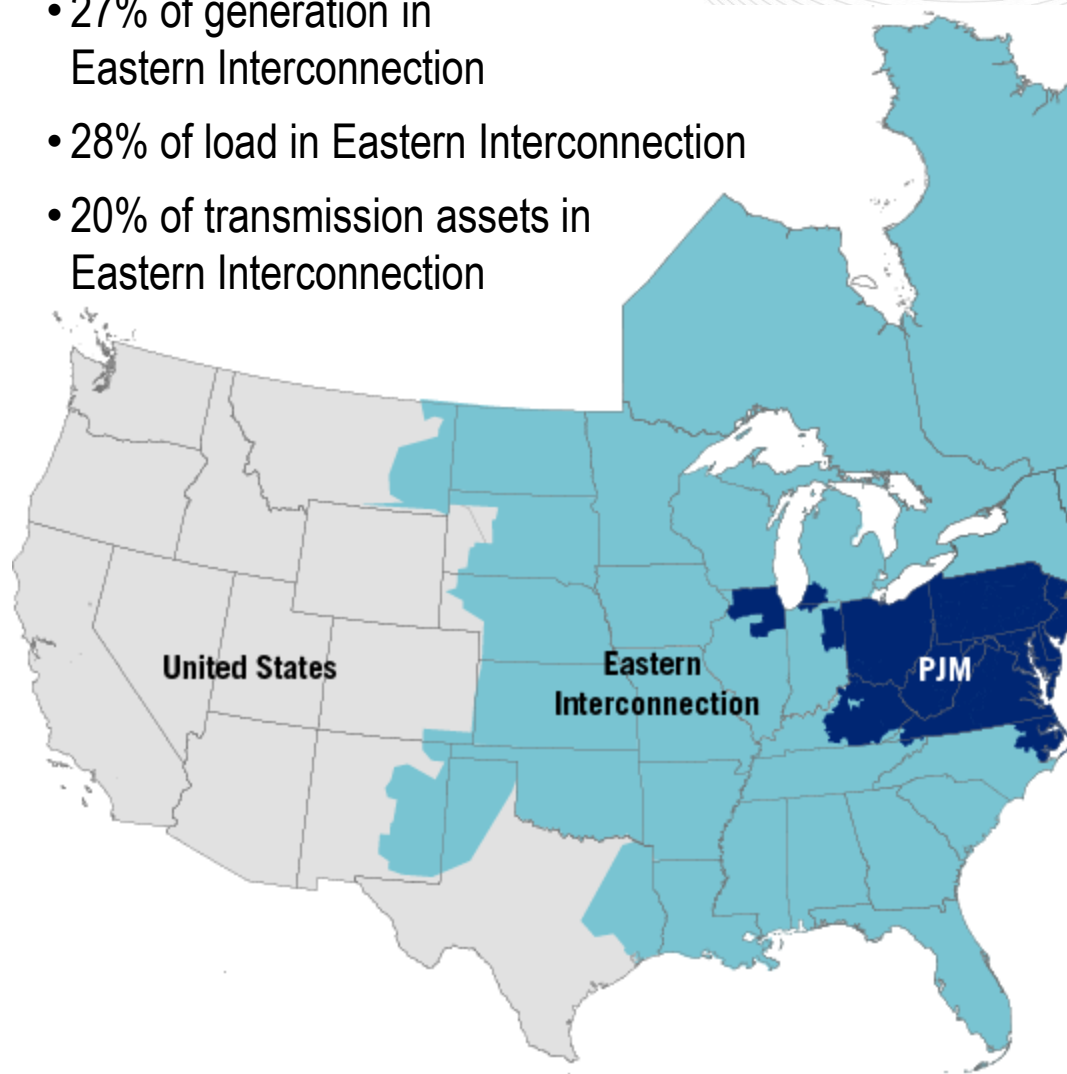
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PJM as Part of the Eastern Interconnection

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



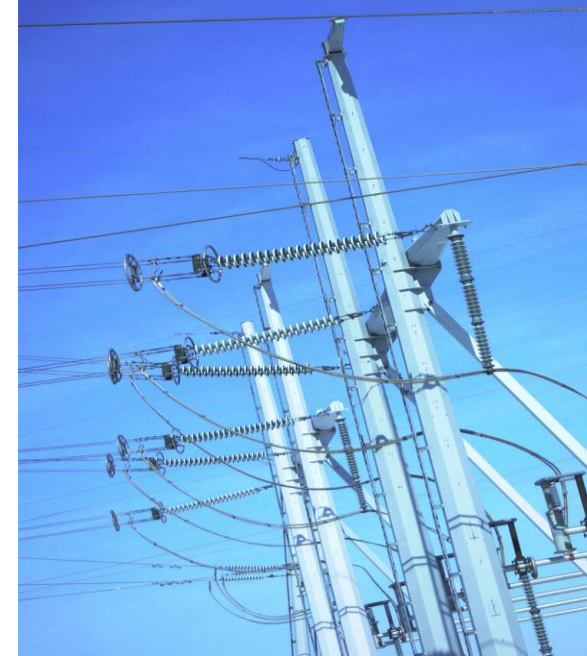
KEY STATISTICS

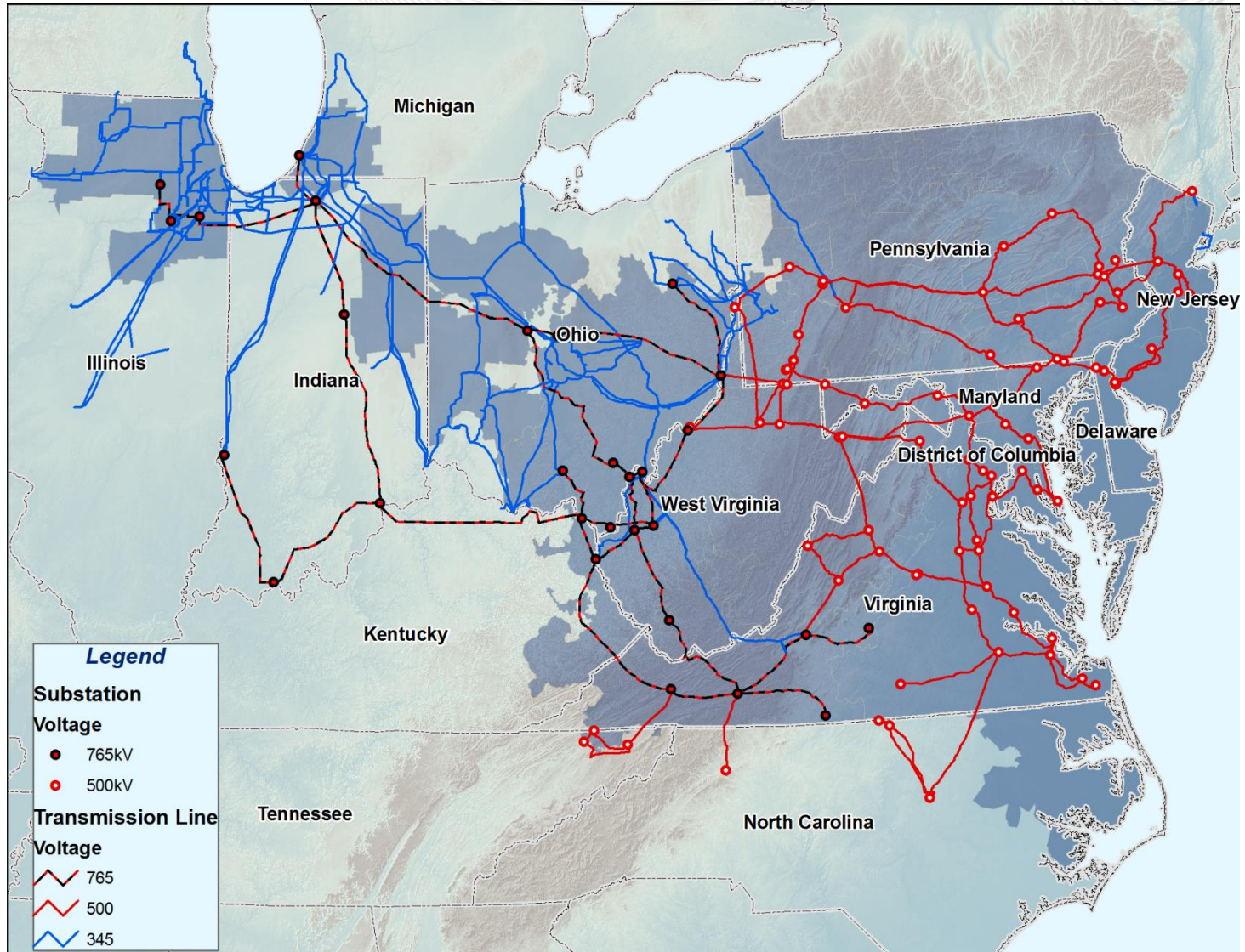
PJM member companies	850+
millions of people served	61
peak load in megawatts	165,492
MW of generating capacity	183,604
miles of transmission lines	62,556
2012 GWh of annual energy	793,679
generation sources	1,376
square miles of territory	243,417
area served	13 states + DC
externally facing tie lines	191

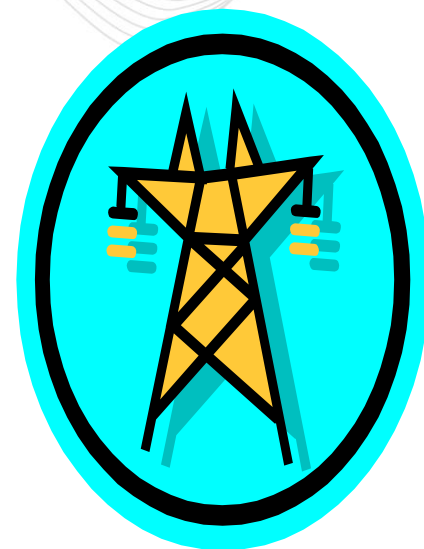
**21% of U.S. GDP
produced in PJM**

As of 7/1/2013

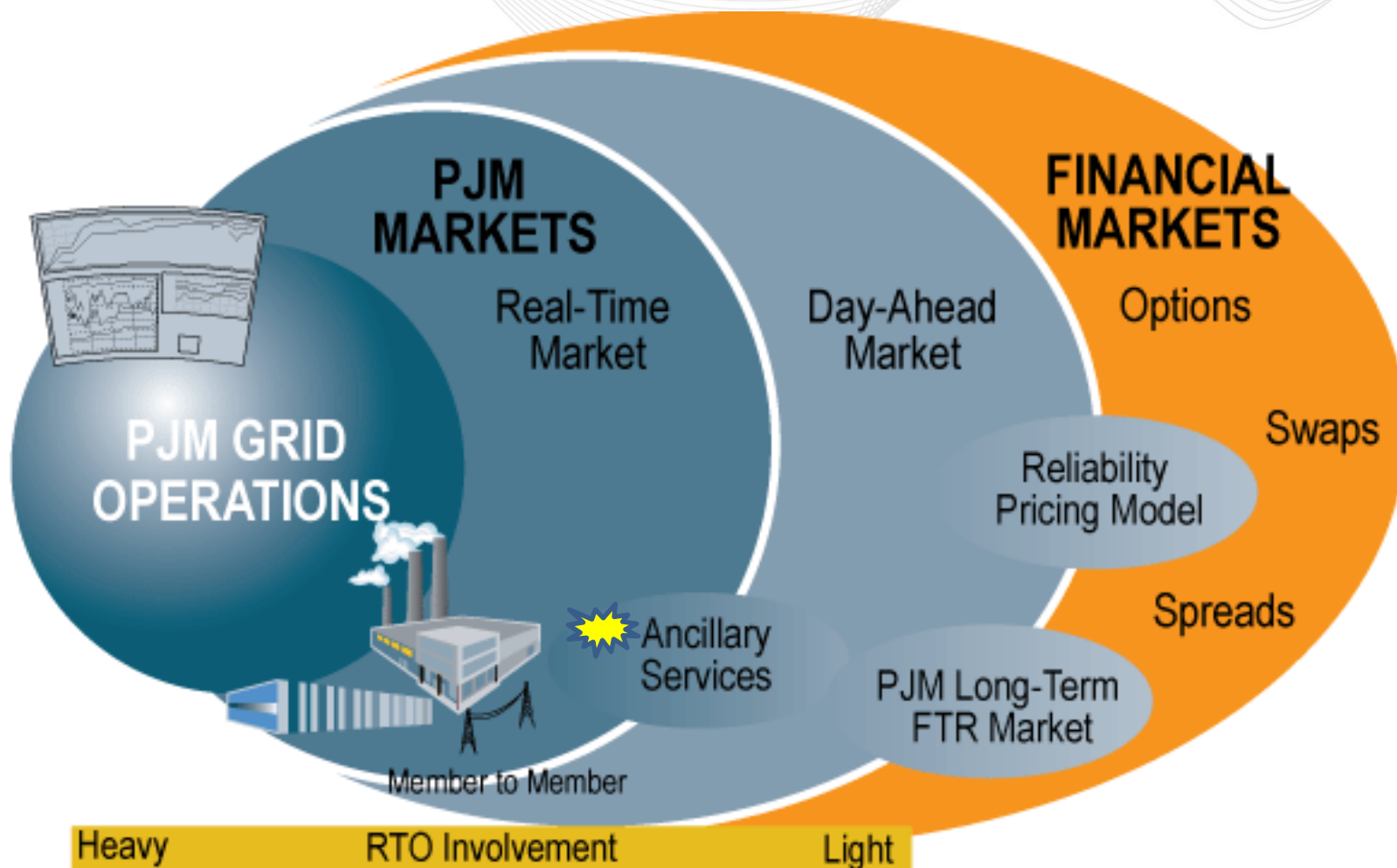
- Operate the bulk electric power grid for reliability
- Facilitate various electric markets
- Plan for transmission expansion
- Monitor the markets to ensure competitiveness
- Provide exceptional customer/member service
- Share best practices with neighboring and international system operators

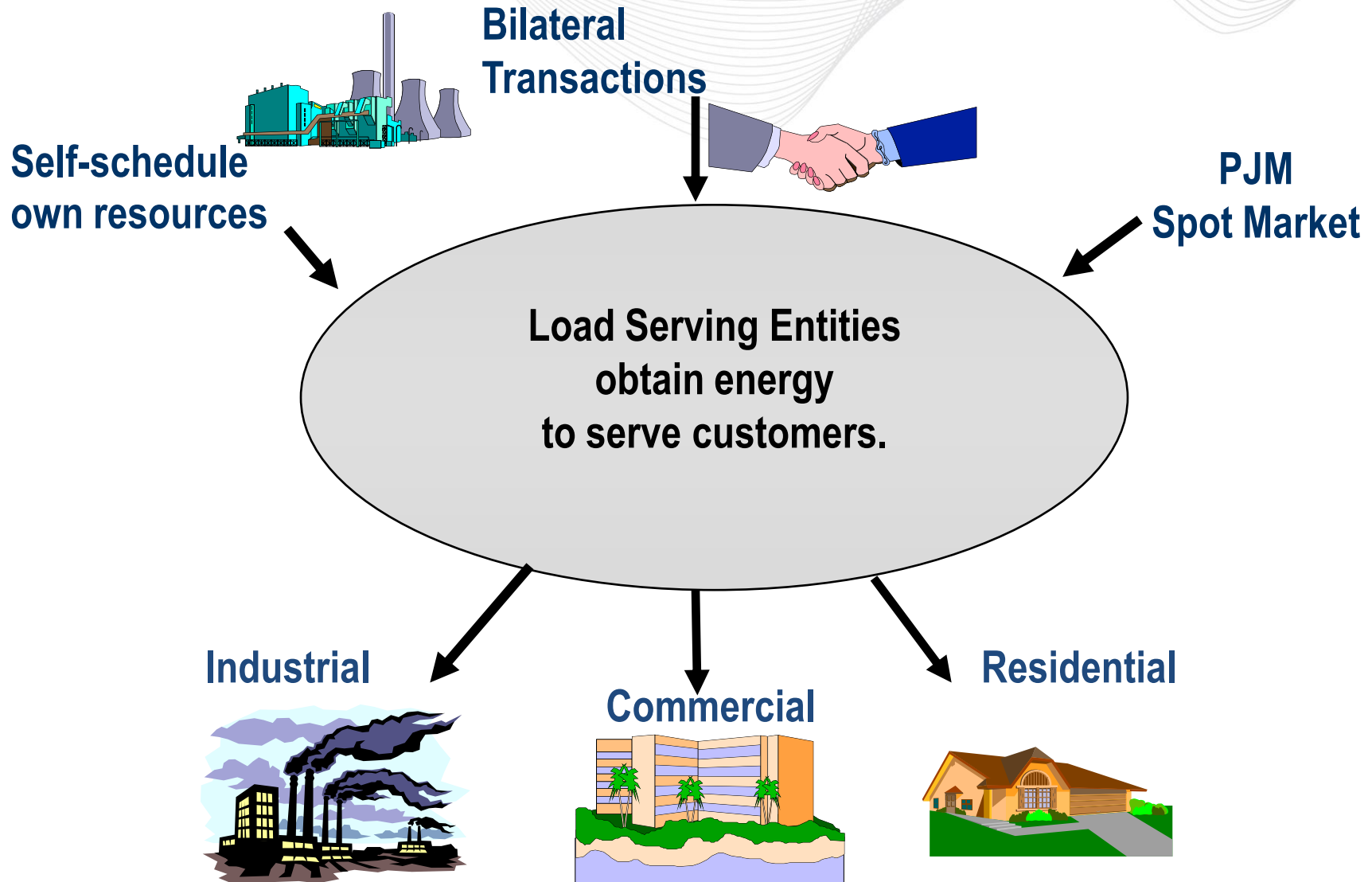






Overview of PJM Electricity Markets



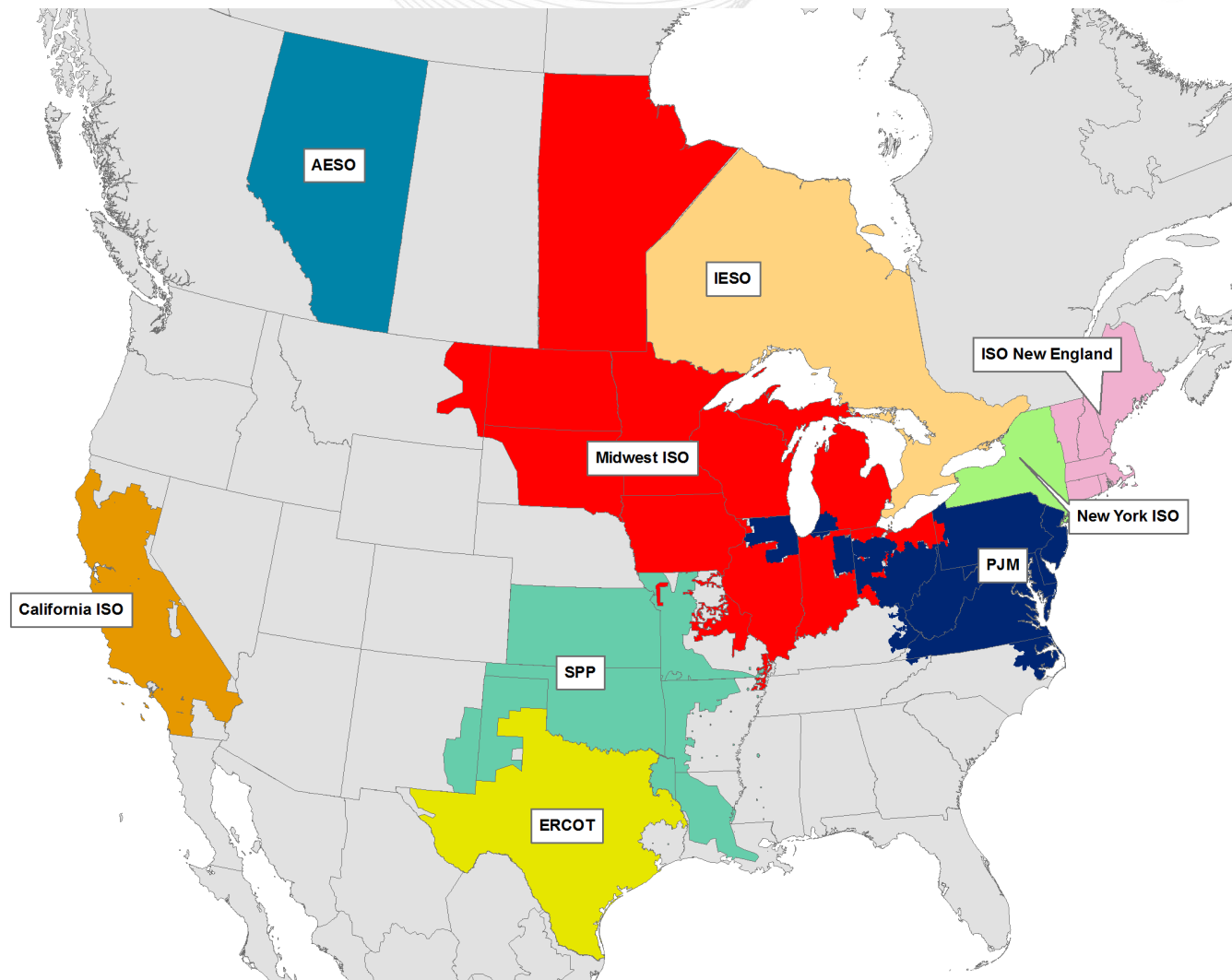


- Two Energy Markets
 - Day-Ahead
 - Real-Time
- Reliability Pricing Model (RPM) Auction
- Financial Transmission Rights (FTRs) Auction
- Ancillary Services
 - Regulation Market
 - Synchronized Reserve Market
 - Blackstart Service
 - Reactive Services

PJM Cross-Border Coordination

- Inter-regional
- International

Nine Major North American RTOs / ISOs





- Adequate Infrastructure
- Grid Code
- Transmission Pricing and Cost Allocation
- Establishment of Balancing Markets
- Handling schedules and deviations
- Emergency Procedures
- Billing and Settlements
- Dispute Resolution

Cross-Border Trading: Regulatory Challenges and Opportunities



Capacity Portability

- Unit Specific Commitments vs. “Slice of System” Capacity Obligation
- Pricing of Capacity Obligations: Administrative Cost-Based, Bid-Based?
- Binding call rights on transmission and fixed rules on curtailment priorities
- Capacity Planning: Load Serving Entity Obligation or System Operator Obligation

Energy Markets:

- Common rules and pricing
- Obligations to Redispatch across the border
- Grandfathering of existing transmission rights

Joint Operating Agreement: PJM and Midwest ISO

- Congestion Management: Coordination of Flowgates
- Exchange of Operating Data: Real time generator data, planning data, facilities data
- Flow data, reliability data, interchange schedules
- Consistency of modeling for ATC, congestion management, outage scheduling

Planning:

- Defining “benefits” across the border---Must project benefit each region?
- Allocation of costs---Solutions-based flow model vs. socialization of costs across a footprint
- Harmonizing each country’s public policy
- Dispute resolution

Basic Cross-Border Tools:

- Redispatch of generation when cost effective to solve constraint across the border;
- Respecting and modeling each entity's AFC determinations;
- Outage schedule: Joint Approvals
- Emergency coordination, drills and authority
- Planning and cost allocation of cross-border facilities: 1.25 benefit to cost ratio

- Planning: Requirement of Cross-Border Benefits
 - Benefit/Cost Ratio of 1.25
- Coordination of Reliability Planning
- Economic Planning: identifying Market Efficiency Projects
- Joint Operating Agreement Link:
 - ***<http://www.pjm.com/~media/documents/agreements/joa-complete.ashx>***

LET'S TALK...



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