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

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PJM Interconnection, L.L.C.
• 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
- MWs 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
PJM Functions

- 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
PJM Maintains Reliability through Markets
Options for Energy Supply

Load Serving Entities obtain energy to serve customers.

- Self-schedule own resources
- Bilateral Transactions
- PJM Spot Market
- Residential
- Commercial
- Industrial
PJM’s Operational Markets and Services

• 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

- AESO
- IESO
- ISO New England
- New York ISO
- California ISO
- SPP
- ERCOT
- PJM
- Midwest ISO
Cross Border Trading: Key Ingredients
KEY INGREDIENTS FOR CROSS-BORDER TRADING

- 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
REGULATORY CHALLENGES re: CROSS-BORDER TRADING

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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