



First Pan-Arab Energy Trade Conference

Towards an effective regional cooperation in
electricity and gas trade among the Arab countries

**THE NILE RITZ-CARLTON • CAIRO
NOVEMBER 6-7, 2019**

Evolution of a Regional Electricity Market: The PJM Experience

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Historic Context of North American Electricity Market



- Decentralized Regulatory Authority (U.S. States)
- Retail Regulation is Jurisdiction of States
- Wholesale Regulation is Jurisdiction of Federal Government
- Transmission Jurisdiction Divided by States and Federal Government
- Note On Canada:
 - All Authority is with Provinces
 - Only Federal Authority is Approval of Sales to U.S.

Market Structure



- Vertically Integrated Monopolies
- Contract Transmission Access
(Voluntary for Transmission Owners)
- Public Utility Policy Act of 1978

Market Structure (continued)



- Energy Policy Act of 1992 and Evolution of Open Access
Emergence of Non-Utility Generators
- Actual and/or Functional Vertical Disaggregation
- Cost-Based Wholesale Tariffs Replaced by
Market-Based Rates
Residual Power to Regulate when Market
Power Exists

Historic Context of PJM



1927: Three Utilities (in Pennsylvania, New Jersey, and Maryland Power Pool)

- To Capture Efficiencies in Joint Least Cost Dispatch and Transmission Services
- Original Operations Managed by Designated Member
- Membership Grows Over the Years

1962: EMS IT System Makes Transmission Operations
Transparent to Members

- Real Time Information

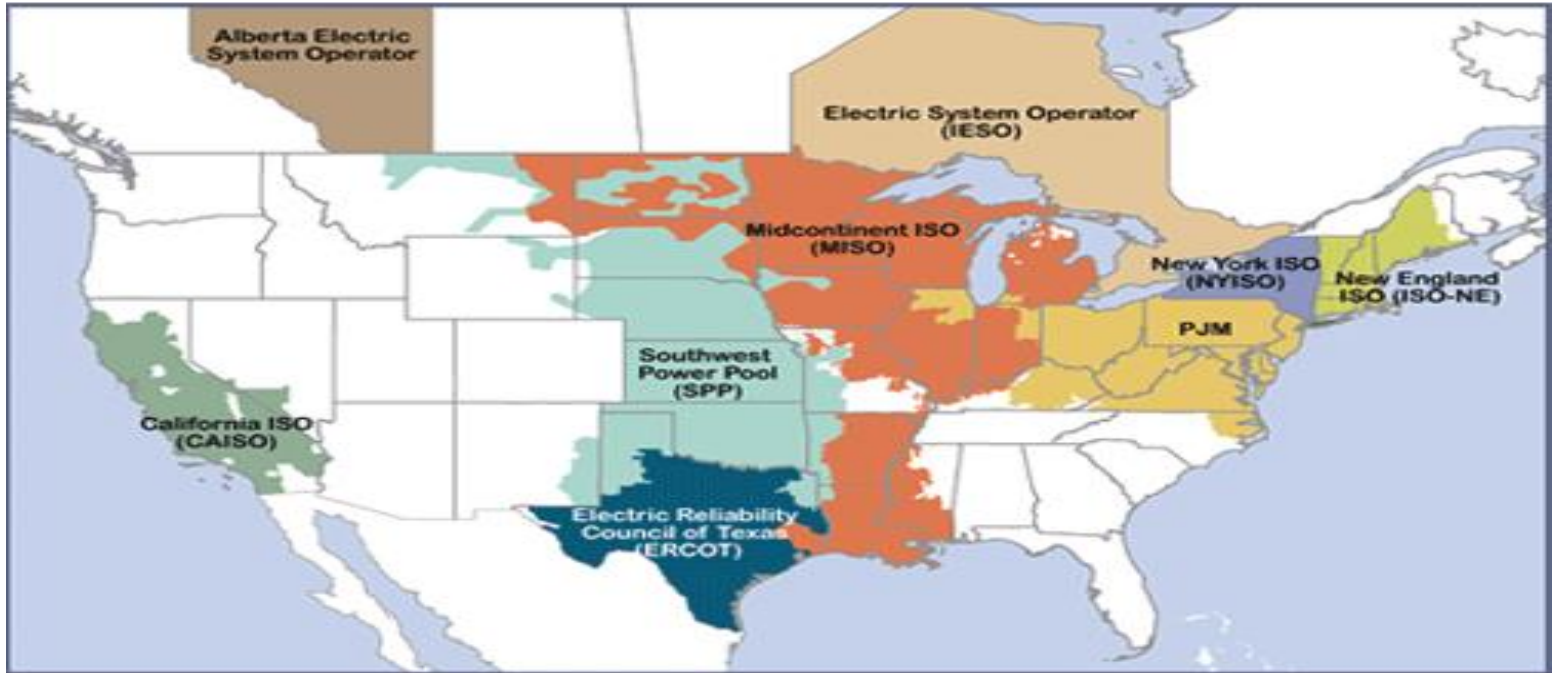
Historic Context of PJM (continued)



1993-1997 PJM Transition to Independent System Operator
(First in North America)

- Not For Profit
- Disinterested in Market Outcome
- Functions as Market Operator
- Operates System But Does Not Own Transmission Assets
- Operates Under Transparent Protocols

Organized Markets in North America / Independent System Operators



Emergence of PJM Market Model



- Cost Based Dispatch Replaced by Bid Based Dispatch
Day Ahead Prices
- Generators paid Market Clearing Price, not Prices Bid
- Socialized Prices Replaced by Locational Marginal Cost Pricing of Transmission
- Competitive Ancillary Services Market

Emergence of PJM Market Model



- Demand Response
- Energy Price Cap and Capacity Market
- Hedging/Trading Enabled (for Energy, Capacity, and Transmission (FTR))

Governance



- Independent Board of Directors with Regulatory Oversight
- Extensive Stakeholder Involvement
- Participatory Planning Process
- Efforts to Synthesize Policies of Diverse Political Jurisdictions (e.g. Carbon Emissions)

Conclusions



- Transition from Reliability Backup and Asset Sharing to Fully Competitive market
- Focus on Competitive Energy Market
- Reduction of Re-dispatch Through Use of Locational Price Signals
- Diversification of Resource Options (e.g. Demand Response, Storage, Smart Technology)



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Thank You!