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Regional Transmission Organizations

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History of Regional Transmission Organizations (RTOs)

- RTOs grew out of FERC Order Nos. 888/889 where the FERC suggested the concept of an Independent System Operator (ISO) as one way for existing electricity power pools to satisfy the requirement of providing non-discriminatory access to the transmission system.
- FERC Order No. 2000 encouraged the voluntary formation of RTOs to administer the transmission grid on a regional basis and outlined twelve characteristics and functions that an RTO must satisfy.
- As of 2012, there are nine ISO/RTOs operating in North America.
- The Midcontinent ISO (“MISO”) was established in 1998 as an ISO and was approved as the nation's first RTO by FERC in 2001.
- PJM evolved from a tight power pool and was designated an RTO by the FERC in 2001.

FERC Order Nos. 888 & 889

- FERC issued Order Nos. 888 & 889 on April 24, 1996.
- Intended to establish competition in the generation market and enforce fair access of the transmission system by external users.
- Order Nos. 888 & 889 marked the point where the trading of electricity gained a firm foothold.
- Order No. 888 was the “Standards of Conduct Order”, requiring, among other things, the functional separation of power schedulers and marketers within vertically integrated utilities from their company’s transmission operations and functions.
- Order No. 889 was the “Oasis Order”, detailing exactly how all participants in the electricity market should interact with transmission providers – including affiliated power marketers wanting access to their own parent company’s transmission system.

FERC Order No. 2000

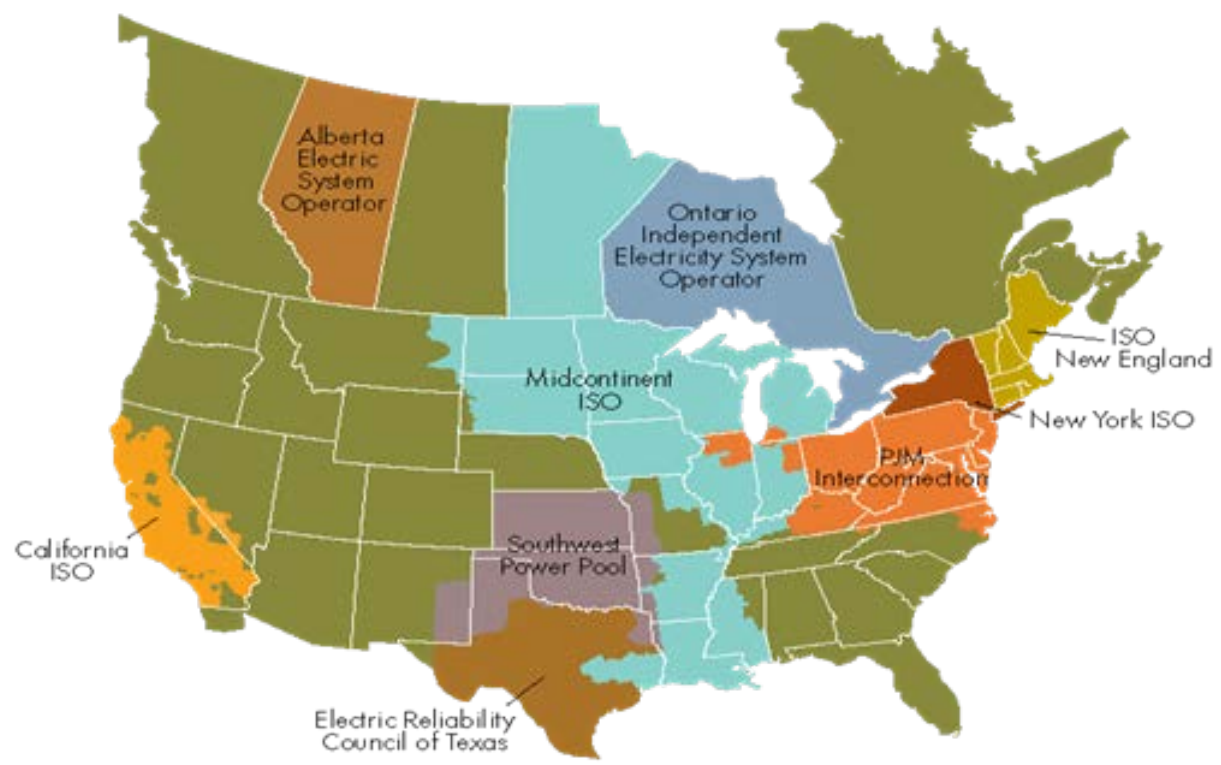
- Issued by the FERC on December 29, 1999.
- Order No. 2000 codified what it means to be an RTO including its minimum characteristics, functions and ratemaking policy.
- An organization wanting to achieve RTO status must petition the FERC for approval and meet 4 minimum characteristics and 8 minimum functions.
- RTO participation is voluntary. RTOs only have “operational control” of a utility’s transmission facilities.
- **Characteristics of an RTO**
 1. Independence from market participants;
 2. Appropriate scope and regional configuration;
 3. Possession of operational authority for all transmission facilities under the RTO's control; and
 4. Exclusive authority to maintain short-term reliability.

FERC Order No. 2000, continued.

- **Functions of an RTO**

1. Administer its own tariff and employ a transmission pricing system that will promote efficient use and expansion of transmission and generation facilities;
2. Create market mechanisms to manage transmission congestion;
3. Develop and implement procedures to address parallel path flow issues;
4. Serve as a supplier of last resort for all ancillary services required in Order No. 888 and subsequent FERC orders;
5. Operate a single OASIS site for all transmission facilities under its control with responsibility for independently calculating TTC and ATC;
6. Monitor markets to identify design flaws and market power; and
7. Plan and coordinate necessary transmission additions and upgrades.
8. Interregional coordination for reliability and transmission service.

U.S. Regional Transmission Organizations



MISO

- MISO was established in 1998 as an ISO and was approved as the nation's first RTO by FERC in 2001.
- Headquartered in Carmel, Indiana with operation control centers in Carmel and Eagan, Minnesota. Developing an operations center in Little Rock, Arkansas.
- Generation capacity of 196,824 MW (reliability) and almost 66,000 miles (145,200 km) of transmission.
- Launched the operation of its day-ahead and real-time energy markets in 2005. Currently wholesale electricity market includes 362 participants that serve over 48 million people, with \$18.4 billion annual gross market charges.
- Launched the operation of its ancillary services markets in 2009, which provide both energy and operating reserves, as well as regulation and response services that support reliable transmission service.
- MISO operates as reliability coordinator and oversees the regional planning and expansion of the transmission grid within the MISO footprint.

PJM

- PJM was established in 2001 and is headquartered in Valley Forge, Pennsylvania.
- PJM currently serves over 61 million customers.
- PJM currently includes more than 830 companies and 1,376 generation sources, which provide 183,604 megawatts of generating capacity.
- PJM oversees 62,556 miles (146,423 km) of transmission lines and over 6,038 transmission substations.
- PJM delivers over 832 million megawatt-hours of electricity annually.
- PJM operates as reliability coordinator and oversees the regional planning and expansion of the transmission grid within the PJM footprint.

What are the Benefits of an RTO?

- **Non-Discriminatory Access to the Transmission System.** Facilitated through the use of an Open Access Transmission Tariff (OATT) that is governed by FERC and administered by the RTO.
- **Efficient market operations.** This means operating energy, capacity, and ancillary service markets using low-cost unit commitment, dispatch and congestion management techniques.
- **Larger, Competitive and “More Liquid” Energy Markets.** RTO rules encourage greater market participation, greater liquidity and increased market options for energy buyers and sellers.
- **Coordinated Regional Planning.** RTO-administered integrated transmission system planning with regional expansion needs and plans is intended to produce greater transmission benefits at a lower cost than a utility-by-utility process.

RTO Benefits, continued

- **Improved Reliability.** This is typically achieved through efficient resource sharing and formalized rules for handling “seams” issues with neighboring RTO and non-RTO entities.
- **Competitive Markets.** RTOs employ an independent market monitor that is charged with assessing market competitiveness and preventing the exercise of market power by RTO members.
- **Alternative Resource Options.** RTOs have recently pushed hard to integrate alternative resources, such as demand response and renewable energy, in the RTO’s resource mix.
- **Risk Management Tools.** RTOs provide market participants with various hedging/financial products, including financial transmission rights, intended to allow market participants to mitigate transmission congestion risks.

Quantitative Benefits of RTOs?

- PJM claims that its services provide regional savings benefits of more than \$2 billion annually including savings from energy production cost of \$340-\$445 million annually.
- MISO claims total annual economic benefits in the range of \$1.8- \$2.4 billion, including an estimated \$180-\$200 million annually for its centralized dispatch of energy operations.
- There is some dispute concerning the valuation of these RTO benefits and cost savings. However, it is clear that most RTO stakeholders see positive benefits from participation in an RTO.
- There are still areas where market design and operational considerations could provide even greater benefits to RTO stakeholders.

Seams Issues between PJM & MISO

- MISO and PJM both operate very large electricity markets and share a common border.
- The border of PJM and MISO is jagged and runs through the middle of Illinois. This seam raises efficiency questions and operational concerns.
- The FERC conditioned the initial configuration of PJM and MISO on the seams issues between PJM and MISO being addressed by a Joint and Common Market (JCM) that would allow both markets to operate as if one large market.
- The JCM was intended to address issues such as joint-regional transmission planning, economic dispatch, data exchange, outage and market coordination, and price transparency/convergence between the two RTOs.

Seams Issues between PJM & MISO

- RTOs, some Stakeholders and the FERC lost their enthusiasm for a JCM and removed the JCM obligation from MISO and PJM.
- Recent complaints filed by utilities in both PJM and MISO regarding an alleged lack of interregional planning and capacity portability between PJM and MISO have resurrected both concerns and efforts regarding the development of a PJM-MISO JCM.
- The FERC issued an order finding that the issues raised in the interregional planning complaint were “premature” and overlapped with issues in another FERC docket (Order No. 1000) and has effectively held the complaints in abeyance until those issues are resolved.
- The FERC has also directed the two RTOs to hold discussions and develop proposals to address JCM issues. FERC Staff was also ordered to participate in the discussions and monitor their progress in resolving the JCM issues.

Tres Amigas SuperStation

- Located in Clovis, New Mexico.
- Will connect the Eastern Interconnection, the Western Interconnection and the Texas Interconnection via three 5 GW superconductive high-voltage DC transmission lines.
- ERCOT currently has 5 DC ties to the two interconnections, totaling 1,100 MW. The Tres Amigas design is scalable to 30 GW.
- Primary purpose is to serve as a power market hub and to facilitate the transfer of renewable electricity among the three interconnections. Will also increase reliability of the U.S. grid.
- Cost estimates vary between \$1-\$2 billion.
- Project was initiated in 2009. Current expected commercial start-up date is 2016.