

DEVELOPMENT OF REGIONAL ELECTRICITY MARKETS

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February 2005

Voluntary Regional Coordination

- Old, vertically-integrated utilities had a long history of regional coordination
 - Generation reserve-sharing agreements
 - Jointly-owned transmission
 - Joint ownership in large generating units
 - Joint dispatch of generating units
 - Sharing of information and technological improvements

Reasons for Coordination

- Cost Savings
 - Savings from jointly dispatched generating units shared by all
 - Generation reserve-sharing allowed participants to carry less excess generation
 - Joint ownership of large coal and nuclear generation allowed small entities to enjoy the economies of scale of large generation
- History of cooperation among vertically-integrated utilities with common issues
- Reliability—coordination to ensure reliability

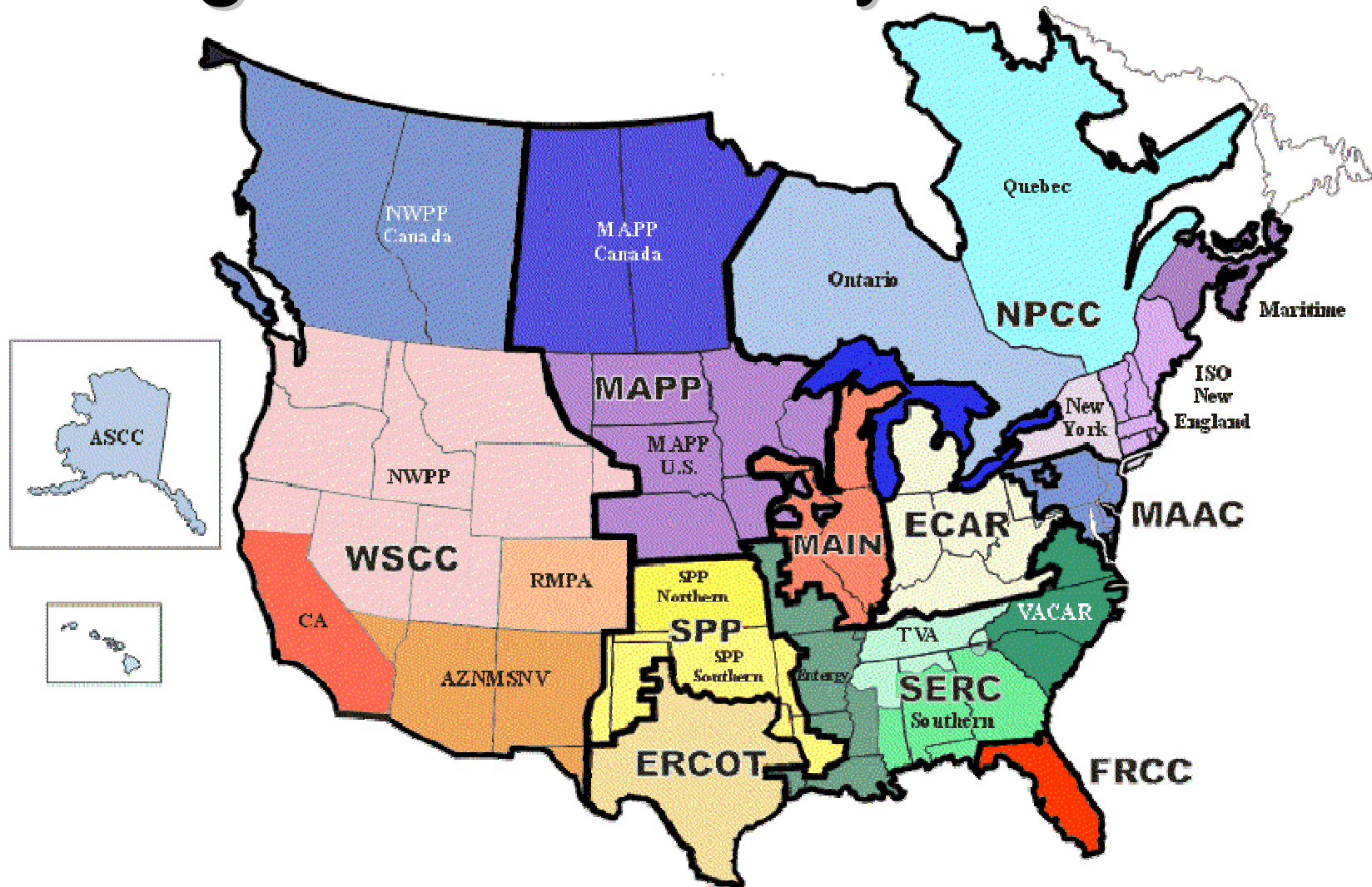
Chronology of Significant Events

- 1968 NERC and RRCs formed
- 1970's oil crisis and high electricity prices
- 1978 PURPA—created a special class of non-utility generators (QFs)
- 1992 EPAct provided for third party access to transmission systems
- 1996 FERC Orders 888 and 889—transmission open access and information system mandate
- ISO formation
- Order 2000—competitive electricity markets
- 2003—FERC White Paper on Standard Market Design (SMD)

North American Electric Reliability Council

- Formed after 1965 Northeast blackout
- Voluntary organization whose mission is to ensure that the bulk power system in North America is reliable, adequate and secure
- 10 Regional Reliability Councils (RRC)
- Configuration of RRCs based on physical design of transmission systems and historic cooperation among various utilities

Regional Reliability Councils



Regional Reliability Councils

- ECAR—East Central Area Reliability Coordination Agreement
- ERCOT—Electric Reliability Council of Texas
- FRCC—Florida Reliability Coordinating Council
- MAAC—Mid-Atlantic Area Council
- MAIN—Mid-America Interconnected Network

Regional Reliability Councils

- MAPP—Mid-Continent Area Power Pool
- NPCC—Northeast Power Coordinating Council
- SERC—Southeastern Electric Reliability Council
- SPP—Southwest Power Pool
- WSCC—Western Systems Coordinating Council

Significance of PURPA

- Public Utilities Regulatory Policies Act of 1978 (PURPA)
- Created a special class of non-utility generators known as qualifying facilities (QFs)
- PURPA required traditional utilities to purchase power from QF facilities at the utilities' avoided cost
- Success of PURPA was the beginning of competition in the electricity industry

ISO Formation

- In response to FERC Order 888, PJM was approved in 1997 to become an Independent System Operator (ISO)
- As an ISO, PJM's mission included the creation and operation of a robust, competitive and non-discriminatory wholesale electric market

Historical Perspective

- The PJM Power Pool began in 1927
- Traditional members were the eight vertically integrated electric utilities (transmission owners) providing electric service in the Mid-Atlantic States: Pennsylvania, New Jersey, Maryland, Delaware, Virginia, and the District of Columbia
- Created to provide customers with greater reliability, higher efficiency and lower costs for electricity

Federal Oversight

- PJM operates within the jurisdiction of the Federal Energy Regulatory Commission (FERC)
- FERC regulators oversee interstate transmission and wholesale energy markets

FERC Order 2000

- In 2001, the PJM ISO was conditionally approved under FERC Order 2000 to function as a Regional Transmission Organization (RTO)
- Full RTO approval was granted in 2003
- As an RTO, PJM is required to fulfill certain functions

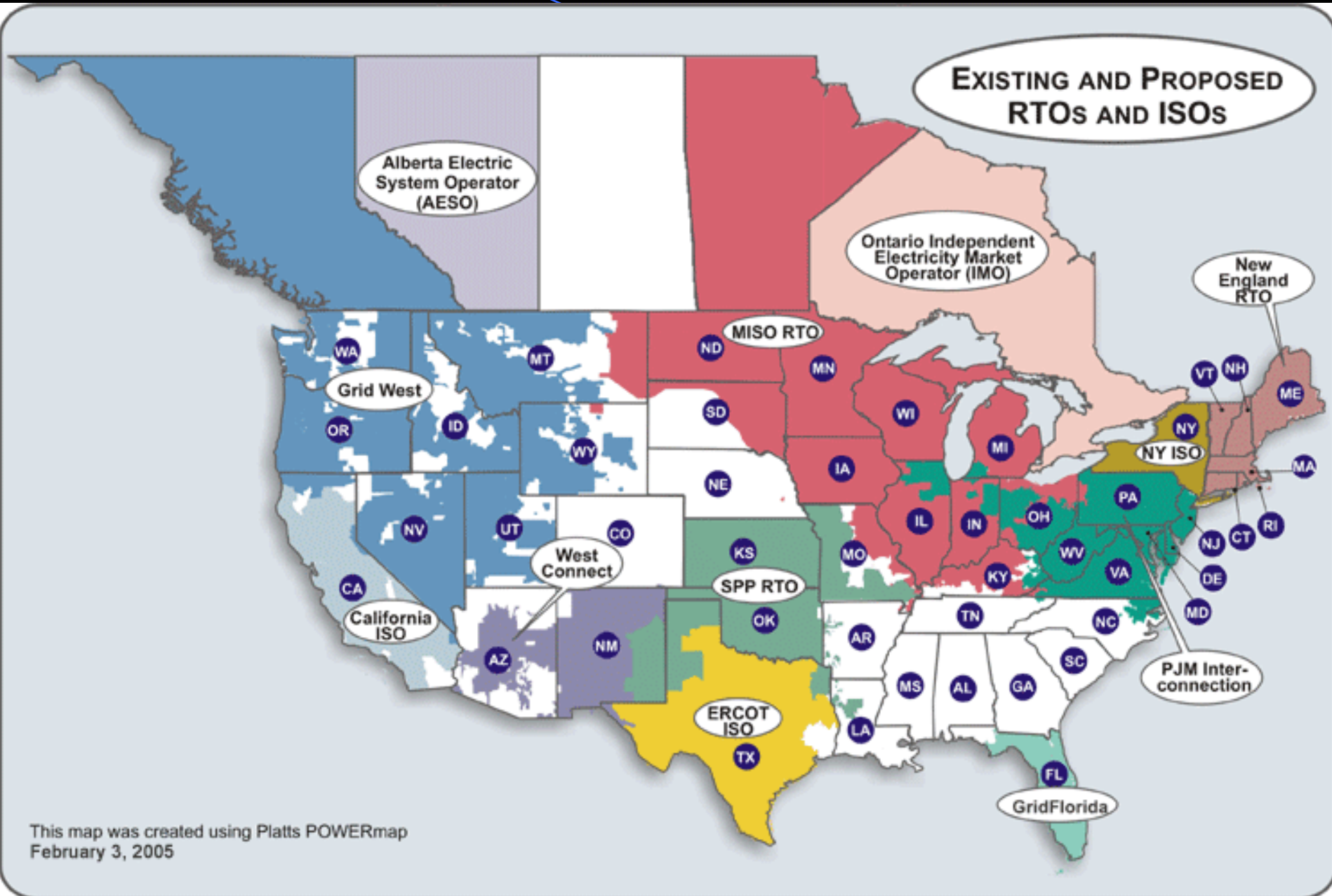
RTO Functions

- Independent Governance
- Short Term Reliability
 - Transmission Service
 - System Scheduling
 - Economic Dispatch
 - Emergency Procedures
 - Ancillary Services

RTO Functions

- Long Term Reliability
 - Transmission Expansion
 - General Interconnection
 - Capacity Adequacy Planning
- Markets
 - Energy
 - Capacity
 - Ancillary Services
- Market Monitoring

RTOs and ISOs



PJM Control Area

- PJM is the largest power pool in the United States and operates the largest wholesale electricity market in the world
- PJM has recently more than doubled in size, as additional members were integrated into the market

Current Scale of Operations

- Population served – 45.3 million
- Members - more than 330
- Generating sources – approximately 1000
- Generating capacity - approximately 137,500 megawatts
- Peak demand – 110,700 megawatts
- Annual energy delivery - 625 million megawatt-hours
- Transmission lines – 49,970 miles

PJM's Benefits to States

- Independent administrator of the region's wholesale electric market
- Responsible for ensuring a reliable transmission system
- Conducts market monitoring
- Provides for comprehensive regional transmission expansion planning
- Acts as an informational and technical resource to regulators

Barriers to Expansion of Markets

- Economic—less expensive generation in South/West—concerns about cost shifting
- Technical
 - Geographic impediments such as Rocky Mountains
 - Seams between existing ISOs and RTOs
- Institutional
 - ERCOT isolation
 - State/Federal jurisdictional issues

Future State of Markets

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