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Capacity Allocation in a Regional Transmission Organization

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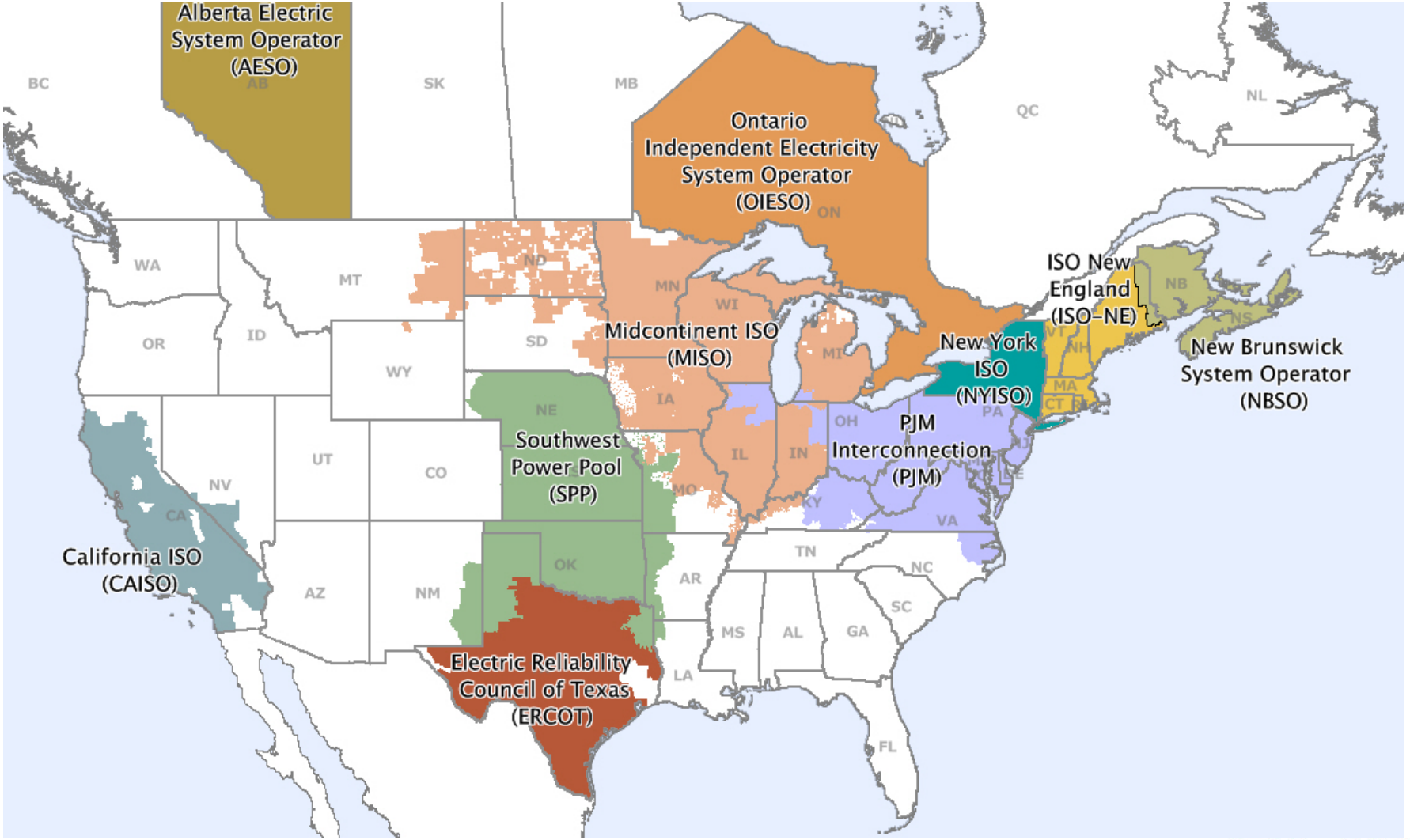
OMS
Organization of MISO States

Introduction to the OMS

- Midcontinent of North America is served by a Regional Transmission Operator "MISO"
  - Details at https://www.misoenergy.org/Library/Repository/Communication%20Material/Corporate/Corporate%20Fact%20Sheet.pdf
- OMS members are the retail regulators in the region.
  - 15 US states
  - 1 Canadian province
  - 1 city regulator
- Significant trade between MISO region and neighboring regions in US and Canada

North American RTOs



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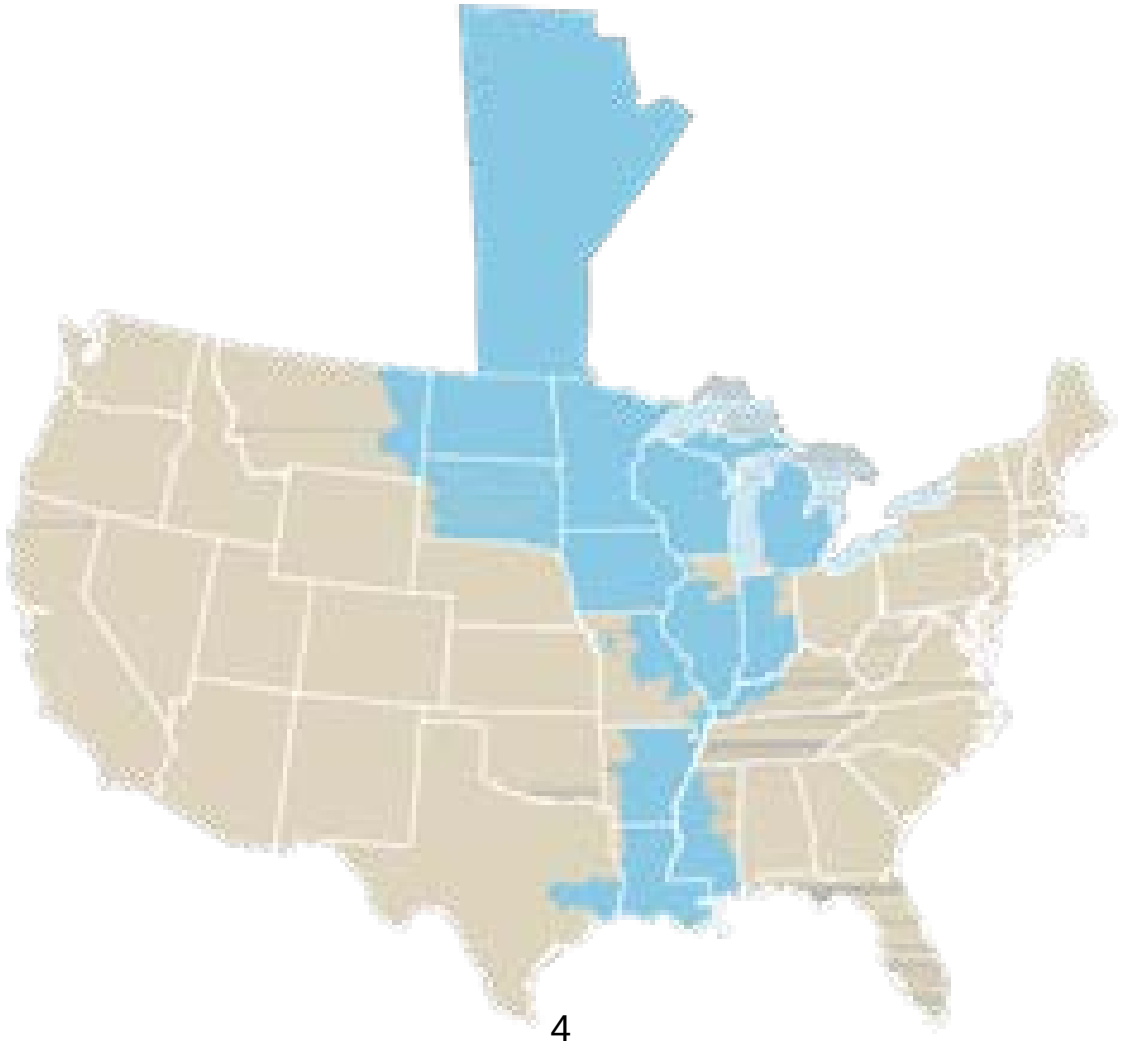
MISO Footprint

December 2013



MISO Market characteristics

- 2000 pricing nodes
- 1800 generating units
- 360+ market participants
- 48 million population served
- Peak Load: 109.36 MW (January 7, 2014)
- 65,000 miles / 105,000 km of transmission

Asset Ownership in MISO

- 30+ transmission owners
- 70+ generating companies
- 30+ load-serving entities / distribution systems
- US RTOs operate but do not own transmission facilities
- RTOs must not have an economic interest in buying and selling power

Internal MISO market operations

- Energy is dispatched through Day Ahead and Real-Time markets
  - Energy market re-dispatched every five minutes
- Markets use Security Constrained Economic Dispatch
  - Dispatch is based on Locational Marginal Prices
  - LMP has three components
    - Marginal Energy Component (energy price)
    - Congestion component
    - Losses Component
  - LMP = MEC+MCC+MLC

Internal transmission usage follows energy market dispatch

- Usage of the transmission facilities are "allocated" through this dispatch model
  - This is not an explicit allocation
  - Buyers and sellers are not matched
- Major flows of power in MISO are west to east, moving wind and hydro generation to more populous markets. South to north flows may increase as coal plants are retired.

Cross-Border Transactions

- Because of its central location, MISO has many cross-border relationships
- By volume, most MISO external transactions are with the adjoining PJM and SPP regions.
- The PJM market uses an economic dispatch model similar to MISO's
  - Under a Joint Operating Agreement, MISO and PJM use information from the other area to optimize its markets
  - Market rules are not identical, and there is occasional friction, i.e. defining "deliverability"

Cross-Border Transactions

- The SPP operates without an economic dispatch energy market (until April 2014)
  - MISO and SPP have a Joint Operating Agreement that allows use of the other system
- Other external MISO transactions are based on bilateral contracts
  - These transactions have distinct buyers matched with specific sellers
- FERC Order 1000 requires coordination agreements across each seam

MISO – Manitoba Market Characteristics

MISO = 100,000+ MW

Manitoba = 5,000 MW

- Manitoba is 95% hydro
- Manitoba's resources complement MISO's
- Transfer capability is strong but less than the Manitoba smaller system
- Manitoba has sovereignty constraints

MISO – Manitoba Coordination Market Features

- MISO and Manitoba Hydro developed a coordination arrangement that allows reliability, planning, and scheduling to be highly integrated
- MISO knows what resources are available from Manitoba, and can call on them
- Manitoba can transact at the border as a market participant, essentially giving it optional use of the MISO energy market up to the limit of the transfer capability
- The arrangement allows seasonal flows of surplus hydro generation, and reverse flows during drought years

Bilateral Transactions

- Bilateral contracts provide for the transfer of energy and financial responsibility for energy from suppliers to consumers.

Two types of Bilateral Transactions

- Physical Schedules transfer physical Energy, into, out of, and through the MISO Footprint.
  - Called Import, Export and Through schedules
  - Bilateral transactions only occur within the MISO Footprint as a result of "Grandfathered Agreements" that existed before the MISO market
- Financial schedules establishing obligations of the buyer and seller for congestion and losses.
- Market Participants must specify the receipt and delivery points, source and sink points, the MW quantity, and the time period of the schedule

Benefits of Physical Bilateral Transactions

- Physical Bilateral Transactions extend MISO energy prices into an external area, increasing efficiency of the Energy Market.
- They provide additional hedging mechanisms for Market Participants with physical load and generation.
- They open the market to more participants, increasing market stabilization and liquidity.

Financial contracts allocate financial risk

- If Source and Delivery Point nodes are the same, the Buyer is financially responsible for congestion and loss charges. The buyer is willing to pay the congestion and loss charges associated with this transaction.
- If the Sink and Delivery Point nodes are the same, the Seller is financially responsible for all congestion and loss charges associated with this transaction.

Transmission Service Priority

- Highest to Lowest priority:
  - Firm
  - Non-firm network
  - Non-firm monthly
  - Non-firm weekly
  - Non-firm daily
  - Non-firm hourly
  - Non-firm secondary
- Import, export, and through transaction requests must be cleared by MISO and other transmission providers

Can external transactions constrain an internal market?

- The contract priorities for physical schedules can result in internal constraints
- Market optimization may achieve the financial results by re-dispatching the physical path
- Financial contracts accept the risk of congestion costs, and thus do not add market constraints
- Persistent constraints are studied in the MISO planning process and may justify new facilities

MISO Transmission Cost Allocation

- Capital costs of transmission facilities are allocated through a separate mechanism
  - Project types are identified during the planning process
- MISO bases the coat allocation method on the reason that "drives" the construction of a transmission line
- These methods have encouraged construction of hundreds of projects
  - Midwest Transmission Expansion Plan 2014 lists 253 projects, totalling $1,187,425,995

MISO Cost Allocation Methods

Allocation Category	Driver(s)	Allocation to Beneficiaries
Participant Funded ("Other")	Transmission Owner identified project that does not qualify for other cost allocation mechanisms.	Paid by requestor (local pricing zone)
Transmission Delivery Service Project	Transmission Service Request	Generally paid for by Transmission Customer; Transmission Owner can elect to roll-in into local pricing zone rates
Generation Interconnection Project	Interconnection Request	Primarily paid for by requestor; 345 kV and above 10% postage stamp to load
Baseline Reliability Project	NERC Reliability Criteria	Paid by local pricing zone
Market Efficiency Project	Reduce market congestion when benefits are 1.25 times in excess of cost	345 kV and above: 80% distributed to local resource zones (LRZs) commensurate with expected benefit, 20% postage stamp to load
Multi-Value Project	Address energy policy laws and/or provide widespread benefits across footprint	100% postage stamp to load