Monitor flow of power over the high voltage transmission system
Schedule transmission service
Security analysis
Manage power congestion through locational marginal pricing (LMP) energy market
Long term regional transmission planning
Real time and day ahead energy markets
5-minute security-constrained dispatch of entire market (maintaining reliability in most economic manner)
What We Do

- Provide Transmission Services
- Maintain and Enhance Reliability
  - Ensure real-time operating reliability of the interconnected bulk transmission systems
  - Interact with 26 Balancing Authorities and maintain system reliability
- Centralize Generation Dispatch and Outage Management
  - Efficiently dispatch market generation assets every 5 minutes
  - Manage congestion via Locational Marginal Pricing (LMP), Transmission Loading Relief (TLR) and Seams agreements
  - Evaluate all resources within the Midwest ISO footprint as a pool
- Provide Market Services
  - Operate Day-Ahead & Real-Time Markets
  - Administer auctions for Financial Transmission Rights (FTR)
- Seams Coordination
  - Market to Non-Market
  - Market-to-Market
- Regional Planning
  - Ensure long-term (1+ years) plan availability for adequate resources and transmission
  - Integrate and assess transmission and resource plans
Midwest ISO Facts

- 230 Market Participants
- 36 Control Areas within reliability region
- 119,207 MW of peak load
- 137,000+ MW generating capacity
- 98,600 miles of transmission lines
- 947,000 square miles
- 1,504 generating units in the reliability footprint
- Operates an energy market that processes an average of $3 billion per month
State Estimation and Contingency Analysis

- **State Estimator**
  - New solution every 90 seconds
  - On-site 24x7 support – very high availability

- **Contingency Analysis**
  - 7500+ contingencies
  - New solution in under five minutes
  - Node-breaker definitions
MISO Regional Operations
Summer Readiness

- Fall Emergency Response Drills
- April 20, 2006 Summer Readiness Workshop
- Backup Control Center Drills
- Running system from St. Paul
- Spring Operator sessions and procedure review
- 18% footprint reserve margin
MISO Market Operations

- Locational Marginal Pricing (LMP) based upon Security Constrained Economic Dispatch (SCED)
- SCED minimizes cost to serve load while maintaining reliability of electrical system
- 1,435 Commercial Pricing Nodes
- Net Scheduled Interchange (NSI) sent every 4-seconds.
- Generator instructions calculated and sent every 5-minutes
- Dispatch consistent with offer parameters submitted by Market Participant
What We Do

- Centralize Generation Dispatch and Outage Management
Benefits of the Midwest Market

Financial
- Open Access
- Centralized Dispatch
- Transmission Expansion
- Energy Markets

Operational
- System Reliability
- Assessment of Contingencies
- Congestion Management
- Comprehensive Coordination
- Outage Planning
MISO Market Benefits - Specific Examples

More Transmission Maintenance

- Transmission Operators have planned to take maintenance outages to replace structures on a key 345kV transmission line in the Midwest during June and July 2006. This results in reduced maintenance costs.
- Prior to MISO Market, this type of maintenance would only have been scheduled during the spring and fall.
- Transmission owners have gained such confidence in the MISO Market’s security constrained dispatch that they are now comfortable performing maintenance of this type during the summer months.
- The maintenance will result in better reliability on the system.
Managing Costs with Independent Market Monitor

- In one specific instance, a market participant attempted to inappropriately inflate prices of their generation in order to profit from conditions on the system.
- If left unchecked, these actions could have increased costs to our members by as much as $2M per day.
- MISO was able to identify the issue and contacted the Independent Market Monitor who took action to mitigate these prices to reference values.
- MISO’s actions protected our member companies and their customers from substantial and inappropriate costs.
More Simultaneous Generation Maintenance

- During Spring 2006 maintenance period, several large generation plants were off-line simultaneously in a state neighboring Indiana.
- MISO detected a potential problem and recognized the need to commit additional generation within the Market to maintain adequate voltages and maintain flows within limits. MISO developed procedures to deal with potential reliability scenarios.
- MISO coordinated with local transmission operators on daily basis to efficiently and reliably manage the situation.
- Prior to MISO Market operations, taking this many units out of service in one area for maintenance simultaneously was unheard of.
MISO Market Benefits - Specific Examples

More Power Import Capability

• During record heat and peak loading in Summer 2005, MISO Market enabled members to import more power

• Rather than curtailing large imports to manage congestion via NERC TLR as in the past, MISO market provided correct signals to run key generators in a manner to allow more economic energy imports at peak times

• MISO members reported that the MISO Market allowed them to avoid emergency energy procedures several times during summer 2005
MISO Market Benefits

- LMP and SCED tools have significantly enhanced the effectiveness while lowering the cost of regional reliability coordination.

- These examples demonstrate how MISO is prepared to assist the utilities this summer.
MISO Market Benefits - Specific Examples

Monitoring and responding to extreme conditions

- In March 2006, several dangerous storms moved across the MISO footprint, resulting in more than 25 transmission facilities being forced from service and widespread power outages (70,000+ customers) across the Midwest. Majority of the damage was focused on the Springfield, Illinois area.

- Midwest ISO's broad system visibility, study capabilities, personnel and advanced applications allowed MISO to reliably manage the high voltage transmission system throughout these events.

- MISO’s ability to see the big picture, monitor the region in and around the impacted areas, and direct appropriate actions allowed member utilities to focus their efforts on restoring their system(s) in a reliable and timely manner.
MISO Market Benefits - Specific Examples

Quicker Reaction = Greater Reliability

- Control room operators are able to proactively take actions to prevent transmission emergencies, resulting in increased transmission system reliability and cost savings to customers

- In April of 2005, a critical transmission line connecting Minnesota to Wisconsin was forced out of service due to a large fire. MISO had less than 15 minutes advance notice of this outage

- MISO operators quickly diverted energy flows off the transmission line and directed quick-start units on line to further reduce flows and enable parallel lines to reliably absorb the remaining flow on the line when it was forced out
Watching our neighbors

- In late 2005, MISO and its members began observing excessive North to South energy flows over and above system operating limits.
- MISO discovered the cause to be a product being sold by PJM called “Pay-Thru-Congestion” which allowed PJM to sell transmission service above the capacity of the transmission system – while providing no way to relieve its impact on facilities outside of PJM’s boundaries.
- MISO contacted PJM to implement restrictions that allow PJM to continue offering this service while respecting MISO facility limits.
Joint and Common Market

Scope

- 233,500 megawatts peak load
- 290,500 megawatts of generating capacity
- 1.29 million gigawatts hours of annual energy
- 152,000 miles of transmission lines
- 350+ members
- 79.5 million end-use consumers
MISO Committees Organizational Chart
Current Initiatives

- Capacity market proposal
- Long term FTRs
- Economic expansion of the grid: cost allocation
- Recovery of costs from elimination of tolls between MISO and PJM
- Joint and common market with PJM
Current Issues/Recent Developments

- Market one year anniversary
- Summer assessment: 18% reserve margin
- ICF study stakeholder review, released 7/06
- RSG virtuals order: request for stay
- Broadly constrained area order
- New member: Southern Minnesota Municipal Power Agency
- Ancillary market working group
Upcoming

- 6/5 Resource adequacy proposal informational filing
- 6/14 State of the market report presented
- 6/21 MARC RTO panel, Columbus
- 7/6 ICF study meeting
- 9/1 RECB 2 filing
- 9/20 Advisory committee meeting, Saint Paul
For more information

- Tour our control centers
- Participate in a stakeholder meeting or webcast
- Visit our website: www.midwestmarket.org
- Contact your state rep:
  - Sherman Elliott: selliott@midwestiso.org
  - 217.522.6674