MISO is an independent, not-for profit company that operates the electric transmission system and energy markets in the central United States

- MISO does not own these utility assets
- MISO functionally operates the transmission system on behalf of the asset owners
- MISO commits and dispatches the generation as the market operator

<table>
<thead>
<tr>
<th>MISO Scale</th>
<th></th>
</tr>
</thead>
<tbody>
<tr>
<td>High Voltage Transmission - miles</td>
<td>49,670 → 65,370</td>
</tr>
<tr>
<td>Installed Generation - MW</td>
<td>131,010 → 155,296</td>
</tr>
<tr>
<td>Installed Generation - # of Units</td>
<td>1,242 → 1,336</td>
</tr>
<tr>
<td>Peak System Demand - MW</td>
<td>103,975 → 129,475</td>
</tr>
</tbody>
</table>
MISO and other Regional Transmission Organizations (RTOs) have enabled robust wholesale competition – providing great value to end use consumers

• MISO has enabled wholesale competition by:
  – Removing transmission barriers
  – Putting processes, systems and incentives in place that allow many types of competitors to participate equally
  – Providing data / information transparency

• MISO’s Annual Value Proposition - $2.2 to $2.7 Billion
Most of the history of the US electric industry has been dominated by large vertically integrated utility companies.

Vertically Integrated Utilities
- Investor Owned Utilities
- Municipal Utilities
- Rural Cooperative Utilities

Customers (millions)
- Start Up Era (1880s): 7
- Golden Era (1920s): 22
- Nuclear Expansion (1940s): 27
- Load (1960s): 43
- All Customers: 58

Revenue ($ billions)
- Start Up Era (1880s): 0.5
- Golden Era (1920s): 1.8
- Nuclear Expansion (1940s): 2.3
- Load (1960s): 4.6
- All Customers: 10.6
The early history of the US electric industry was one of rapid growth driven by technical advances, falling prices and growing demand…until the Nuclear Expansion Era

<table>
<thead>
<tr>
<th></th>
<th>Start Up Era</th>
<th>Golden Era</th>
<th>Nuclear Expansion Era</th>
</tr>
</thead>
<tbody>
<tr>
<td><strong>Industry Structure</strong></td>
<td>Vertically Integrated</td>
<td>Vertically Integrated</td>
<td>Vertically Integrated</td>
</tr>
<tr>
<td><strong>Demand Growth</strong></td>
<td>Rapid</td>
<td>Steady 7%/Year</td>
<td>Slowed</td>
</tr>
<tr>
<td><strong>Economies of Scale</strong></td>
<td>Marginal costs less than average costs</td>
<td>Marginal costs less than average costs</td>
<td>Marginal costs more than average costs</td>
</tr>
<tr>
<td><strong>Federal Regulatory Focus</strong></td>
<td>• Investor protection • Universal availability</td>
<td>• Investor protection • Universal availability</td>
<td>Interstate sales</td>
</tr>
<tr>
<td><strong>State Regulatory Focus</strong></td>
<td>Retail rate-setting</td>
<td>Retail rate-setting</td>
<td>Retail rate-setting</td>
</tr>
<tr>
<td><strong>Other Characteristics</strong></td>
<td>• Proliferation followed by concentration • By 1925, 16 holding companies controlled 85% of industry</td>
<td>• Recognized as national monopoly • Consumer rates dropped continuously</td>
<td>• Nuclear costs and slowed technical advances drive consumer rates up for first time</td>
</tr>
</tbody>
</table>
More recent history has been focused on increasing competition in the industry – Encouraging new generation while removing competitive barriers

<table>
<thead>
<tr>
<th>Industry Structure</th>
<th>Increased Competition Era</th>
<th>Regional Transmission Organization Era</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>Largely vertically</td>
<td>Increasingly modular</td>
</tr>
<tr>
<td></td>
<td>integrated with new</td>
<td></td>
</tr>
<tr>
<td></td>
<td>generators emerging</td>
<td></td>
</tr>
<tr>
<td>Demand Growth</td>
<td>Varied</td>
<td>Slow but steady</td>
</tr>
<tr>
<td>Federal Regulatory Focus</td>
<td>• Encouraging new generation competitors</td>
<td>• Open, non-discriminatory transmission access</td>
</tr>
<tr>
<td></td>
<td>• Independent Power Producers (IPPs)</td>
<td>• Encouraging new generation</td>
</tr>
<tr>
<td></td>
<td>• Qualified Facilities (QFs)</td>
<td>• Exempt Wholesale Generators (EWGs)</td>
</tr>
<tr>
<td>State Regulatory Focus</td>
<td>• Move from declining block rate making (which encouraged consumption)</td>
<td>• Renewable Portfolio Standards (RPS)</td>
</tr>
<tr>
<td></td>
<td>• Move to marginal cost pricing</td>
<td>• Retail deregulation</td>
</tr>
<tr>
<td></td>
<td>• Retail deregulation</td>
<td></td>
</tr>
<tr>
<td>Other Characteristics</td>
<td>Transmission access blocked new generation</td>
<td>• Emergence of new industry business models</td>
</tr>
<tr>
<td></td>
<td></td>
<td>• Environmental concerns increase</td>
</tr>
<tr>
<td></td>
<td></td>
<td>• Fuel cost variability / volatility</td>
</tr>
</tbody>
</table>
The current industry structure is more accommodating of diverse business structures with competition across multiple segments.

**Generation**
- Traditional Generation
  - Owned by Vertically Integrated Utilities

**Transmission**
- Owned by Vertically Integrated Utilities
  - Independent Transmission Companies (TransCos)
  - Regional Transmission Organizations

**Distribution**
- Owned by Vertically Integrated Utilities
- Independent Power Producers (IPPs)
- Renewable Power Producers
- Exempt Wholesale Generators (EWGs)
- Qualified Facilities (QFs)

**Load**
- Load served under Traditional Cost of Service Regulation
- Load served under deregulated contract
- Vertically Integrated Wires Companies
  - Owned by Vertically Integrated Utilities
  - Owned by “Wires Company” (divested of generation)
Federal Energy Regulatory Commission (FERC) Orders 888 / 889 opened up transmission access

**Order 888**

Utilities required to:
- File open access, non-discriminatory transmission tariffs
- “Functionally unbundle” their generation and power marketing functions
- Provide unbundled ancillary transmission services

**Order 889**

- Establishes Open Access Same Time Information System (OASIS) to reserve transmission service
- Provides all current and potential users the same access that the actual transmission owner has
- Establishes standards of conduct to functionally separate transmission and wholesale power merchant functions

**Effects**

- Establishment of Independent System Operators (ISOs) to manage transmission
- Divestiture of generation units by vertically integrated utilities
- Notable increase in power marketers and independent generators
- Development of retail competition in states
- Large industrial customers received lower costs
FERC Order 2000 created Regional Transmission Organizations designed to increase wholesale competition

**Purpose:**
- Eliminate continuing opportunities for transmission discrimination
- Reduce engineering and economic inefficiencies
  - Bulk power system reliability
  - Difficulties in computing transmission capacity
  - Regional coordination of transmission congestion
  - Pancaked transmission rates

### RTO Required Characteristics

<table>
<thead>
<tr>
<th>Minimum Standards</th>
<th>Minimum Functions</th>
</tr>
</thead>
<tbody>
<tr>
<td>• Independent from market</td>
<td></td>
</tr>
<tr>
<td>• Regional scope of operations</td>
<td></td>
</tr>
<tr>
<td>• Authority to plan and expand</td>
<td></td>
</tr>
<tr>
<td>• “Open architecture” policy to allow structural modifications</td>
<td></td>
</tr>
<tr>
<td>• Transmission tariff administration</td>
<td></td>
</tr>
<tr>
<td>• Transmission system congestion management</td>
<td></td>
</tr>
<tr>
<td>• Transmission access administration</td>
<td></td>
</tr>
<tr>
<td>• Market monitoring—Ensuring fair competition</td>
<td></td>
</tr>
<tr>
<td>• Transmission planning and expansion</td>
<td></td>
</tr>
<tr>
<td>• Coordination between regions</td>
<td></td>
</tr>
</tbody>
</table>
MISO footprint and business model allow for widespread participation in industry

**Market Participants**

<table>
<thead>
<tr>
<th>Category</th>
<th>Number</th>
</tr>
</thead>
<tbody>
<tr>
<td>Vertically Integrated Transmission Owners</td>
<td>33 → 37</td>
</tr>
<tr>
<td>Independent Transmission Companies</td>
<td>2</td>
</tr>
<tr>
<td>Power Marketers</td>
<td>49</td>
</tr>
<tr>
<td>Independent Power Producers</td>
<td>27 → 80+</td>
</tr>
<tr>
<td>Transmission Dependent Municipals / Cooperatives</td>
<td>17 → 30+</td>
</tr>
</tbody>
</table>

**Industry Stakeholders**

<table>
<thead>
<tr>
<th>Category</th>
<th>Number</th>
</tr>
</thead>
<tbody>
<tr>
<td>State Regulatory Agencies</td>
<td>11 → 16</td>
</tr>
<tr>
<td>Consumer Advocates</td>
<td>12</td>
</tr>
<tr>
<td>Environmental Groups</td>
<td>8</td>
</tr>
</tbody>
</table>
The MISO 2011 Value Proposition

Benefit by Value Driver
(in $ millions)

- Improved Reliability: $382-$572
- More Efficient Use of Existing Assets: $426-$470
- Reduced Need for Additional Assets: $1,590-$1,914
- MISO Cost Structure: ($248)
- Total Net Benefits: $2,150-$2,708

• Footprint Diversity
• Generator Availability Improvement
• Demand Response

• Dispatch of Energy
• Regulation
• Spinning Reserves
• Wind Integration
RTOs have produced a number of benefits for generation and other resources

• All resources compete equally
  • Traditional generation – Coal, gas, nuclear, hydro, etc…
    ▪ Regardless of ownership
  – Renewable generation – Wind, solar, biomass, etc…
  – Emerging technologies – Flywheels, storage, etc…
  – Demand side resources – Interruptibles, dispatchable load, etc…

• All stakeholders have full access to pricing information
  – Operating Reserves and Regulation
    ▪ Day-Ahead – Hourly, Real-Time – 5 minutes
However, RTOs have not yet found a proven market solution to incentivize generation/resource investment

<table>
<thead>
<tr>
<th>MISO’s Resource Adequacy Market</th>
<th>Centrally Procured Capacity Market Model</th>
</tr>
</thead>
<tbody>
<tr>
<td>• Relies on state regulatory authority to authorize generation/resource investment</td>
<td>• RTO runs an auction to procure generation/resources on behalf of the load in their area</td>
</tr>
<tr>
<td>• Primary cost recovery is through regulated recovery of investment costs</td>
<td>• Typically 1-3 years ahead</td>
</tr>
<tr>
<td>• MISO operates a “voluntary” capacity auction to facilitate capacity market</td>
<td>• Has worked well to incentivize demand resources</td>
</tr>
<tr>
<td>• Bilateral capacity market also strong</td>
<td>• Has not been proven to incentivize new generation construction, especially baseload resources</td>
</tr>
</tbody>
</table>
Transmission users have seen significant benefits from RTOs

- Elimination of “pan-caked” (duplicative) transmission charges
- Equal access to transmission system
  - Interconnect of facilities
  - Transmission reservations
- Market based congestion management
- Consistent calculation of available transmission capacity
- Centrally coordinated transmission planning
  - Bottom Up – Reliability – Transmission Owner
  - Top Down – Economic – RTO in concert with all stakeholders
MISO uses a Locational Marginal Pricing (LMP) Methodology

**What is LMP?**
- Price for energy, including congestion and losses
- Used to calculate, settle and communicate energy prices

**LMP Concept**
- The market price of any commodity should be the cost of bringing the next unit of that commodity to market
The US Nuclear energy industry has benefited from a strong industry safety organization that is independent from but complimentary to federal regulatory and enforcement efforts.

**Basic Principles**

1. Whole industry is hostage to the worst nuclear operator in the country
2. Meeting regulations is just “the price of admission”
3. Given 1&2, industry must go beyond the minimum level to keep everyone safe
4. You can be committed to excellence from within, but achieving excellence requires a willingness to learn from everyone

**Industry Commitment**

- Strong senior leadership necessary
  - From nuclear owners
  - From organization itself
- Industry participants must be:
  - Transparent – sharing both best practices and problems/issues
  - Self critical – willing to really take a hard look at what is working and not working
  - Open – receptive to other options/input from outside

**Types of Activities**

- Plant evaluations – Operations, processes, personnel, systems, equipment
- Training and accreditation of operations
- Event analysis and information exchange
- Assistance as required