MISO Vision – The most reliable, value-creating RTO

MISO Mission – Work collaboratively and transparently with our stakeholders to enable reliable delivery of low-cost energy through efficient, innovative operations and planning

Strategic Objectives

Market and Grid Positioning
- Portfolio Evolution (Environmental Policy and Economics)
- Electric – Gas Coordination
- Seams Optimization
- Grid Technology Advancement
- Infrastructure Development Enablement

Serve & Grow Membership
- Serve Existing Members – North/Central
- Serve Existing Members – South
- Strategic Member Expansion

Provide Independent Thought Leadership
- Regional Modeling & Analytics
- Policy-Level Relationships, Reputation & Visibility
- Platform Provider for Policy Implementation

Strategy Initiatives

Strategic Competencies

People

Process

Technology
Competitive Retail Solution
Changes to MISO’s Resource Adequacy processes are needed as reserves approach the minimum reliability target (Reserve Margin)

MISO’s current resource adequacy mechanism has been effective for traditionally regulated load and for retail choice load during a period when resources far exceeded the planning reserve margin

Load growth, retirements and elimination of excess supply requires new resource investments to serve both traditionally regulated and retail choice load

State and local jurisdictional processes will identify the need for and ensure timely investments to satisfy the reserve margin requirements for jurisdictional load

Retail choice loads have procured excess capacity owned by regulated utilities

Retail choice load can no longer rely on excess supply from regulated utility investments

In competitive retail areas, auction prices must signal the need for investment to satisfy the reserve margin requirements
The Competitive Retail Solution (CRS) ensures future reliability consistent with design criteria

<table>
<thead>
<tr>
<th>Preserves Existing Construct</th>
<th>• Planning Resource Auction remains unchanged</th>
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</table>
| Fair Treatment of All Consumers and Suppliers | • All supply resources inside and outside of MISO may sell capacity in the proposed auction  
• Maintains fungible capacity product throughout MISO – does not differentiate between merchant or non-merchant resources |
| Builds on Existing Market Designs | • Foundational design components are consistent with FERC precedent and have been adopted by other RTOs  
• Process familiar to Michigan and Illinois, which already utilize forward procurement in other portions of their jurisdiction  
• All supply and demand receive the same clearing price for a given auction differentiated only by their location (Local Resource Zone) |
| Improves Reliability and Decreases Price Volatility | • According to the analysis by The Brattle Group, the CRS proposal achieves greater reliability and lower price volatility than the status quo or Hybrid System-Wide Prompt proposal |
CRS and State Jurisdictional Authority

Four design elements that respect States’ jurisdictional authority

- **Long-Term RA Planning Process**
  A jurisdictional authority that establishes a planning process may elect to opt Competitive Retail Demand out of the CRS

- **Prevailing State Compensation Mechanism (PSCM)**
  Demand subject to a PSCM is excluded from consideration in the Forward Resource Auction (FRA); Resource Adequacy is demonstrated through a Fixed Resource Plan (FRAP) in the Planning Resource Auction

- **Materiality Threshold**
  A state cannot override the materiality threshold, bringing another state into the CRS

- **Forward FRAP**
  Through submission of a Forward FRAP, and subsequent exclusion of Forward FRAP’d demand from the FRA
## Key Design Elements of the Competitive Retail Solution

<table>
<thead>
<tr>
<th>Key Design Element</th>
<th>Description</th>
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<tbody>
<tr>
<td>Demand Participation</td>
<td>Applicable to retail choice demand based on a bright line test</td>
</tr>
<tr>
<td>Options to Demonstrate Resource Adequacy</td>
<td>Forward Resource Auction (FRA), Forward Fixed Resource Adequacy Plan (FFRAP), long-term planning process, and Prevailing State Compensation Mechanism (PSCM)</td>
</tr>
<tr>
<td>Forward Resource Auction Structure</td>
<td>Distinct three year forward auction for retail choice demand; does not change existing Planning Resource Auction (PRA) for non-choice demand</td>
</tr>
<tr>
<td>Forward Resource Auction Demand Curve</td>
<td>Sloped demand curve formulated using independent analysis performed by The Brattle Group</td>
</tr>
<tr>
<td>Forward Resource Auction Supply Participation</td>
<td>All internal resources (generation and demand response) and imports may elect to participate</td>
</tr>
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Seams Update
MISO continues to make progress with our seams neighbors

**SPP:**
- Implemented settlement agreement with SPP and Joint Parties on transmission capacity sharing.
- Implemented Market to Market on 03/01/2015
- Completed 2014-2015 coordinated transmission study
- Performing a targeted study in 2016/2017
- Developing scope for a coordinated overlay study to address the changing resource mix in 2017 through 2019

**PJM:**
- Reached agreement on interface pricing solution
- Implementing Coordinated Transaction Scheduling
- Eliminated $20 million project cost threshold for market efficiency projects
- Committed to 2016-17 Coordinated targeted study
- Coordinated CPP impact assessment in progress
- Preparing to file tariff changes to create new Targeted Market Efficiency Project Type
- Implemented “NIPSCO” Order

**Southeast Seam:**
- Implementing Order 1000 interregional coordination processes
- Implemented settlement agreement with SPP and Joint Parties on transmission capacity sharing.
- Reviewed regional planning processes in April 2016

**ERCOT:**
- Collaborating on joint planning study
2016 MISO-SPP Targeted Study

- The 2016 Coordinated Targeted Study will serve as a foundational study for a longer-term, broader study effort
- MISO and SPP will study 7 total needs for the 2016 study
- MISO and SPP have begun discussions on an MISO-SPP overlay scope, which will include a quantification of benefits and coordination of modeling assumptions.

<table>
<thead>
<tr>
<th>NEED ID</th>
<th>CONSTRAINT</th>
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<tbody>
<tr>
<td>1</td>
<td>Rugby WAUE-Rugby OTP Tie</td>
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<tr>
<td>2</td>
<td>Hankinson - Wahpeton 230kV FLO Jamestown - Buffalo 345kV</td>
</tr>
<tr>
<td>3</td>
<td>Sub3 - Granite Falls 115kV Ckt1 FLO Lyon Co. 345kV Ckt1</td>
</tr>
<tr>
<td>4</td>
<td>Sioux Falls - Lawrence 115kV FLO Sioux Falls - Split Rock 230kV</td>
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<tr>
<td>5</td>
<td>Northeast - Charlotte 161kV FLO Northeast - Grand Ave West 161kV</td>
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<tr>
<td>6</td>
<td>Neosho - Riverton 161kV FLO Neosho - Blackberry 345kV</td>
</tr>
<tr>
<td>7</td>
<td>Brookline 345/161kV Ckt 1 Transformer FLO Brookline 345/161kV Ckt 2 Transformer</td>
</tr>
</tbody>
</table>
Regional Transmission Projects/Studies
The MTEP is the culmination of all planning efforts performed by MISO during a given planning cycle.

- Establishes the recommended regional plan that integrates expansion based on reliability, transmission access, market efficiency, public policy and other value drivers across all planning horizons.

- An annual report is produced, with most projects being approved in December.

*Access Planning includes both the long term Transmission Service Queue and the Generator Interconnection Queue.
Missouri MTEP15 Projects

**Campbell 138 kV Substation**
- **Project Description:** Replace 138 kV, 3000 A, 40 kA capacitor bank breaker at position H8 with a 1200 A minimum breaker capable of interrupting 50 kA (63 kA preferred).
- **Cost:** $410,000
- **In Service Date:** 12/1/2015
- **Project Type:** Reliability

**Hitt 161/34 kV Substation**
- **Project Description:** Install 161 kV breaker and extend 161 kV line 0.2 miles. Relocate 40 Mvar, 161 kV capacitor bank from Wedekind to Heritage Substation. Install 2-161 kV bus-tie breakers at Heritage, 3-161 kV breakers at Wedekind, and 1-161 kV breaker at Cape.
- **Cost:** $10,174,000
- **In Service Date:** 06/1/2016
- **Project Type:** Reliability

**New Mill Creek 161 kV Substation**
- **Project Description:** Construct new Mill Creek 161 kV substation
- **Cost:** $32,000,000
- **In Service Date:** 06/1/2017
- **Project Type:** Reliability
**Missouri MTEP16 Projects**

**McBaine Line Terminal Upgrades**

*Project Description:* Upgrade McBaine-McBaine Tap line to 249 MVA (300501 bus). Replace a switch (from 600 A to 1200 A) and a wave trap (from 600 A to 2000 A).

*Cost:* $50,000

*In Service Date:* 03/1/2016

*Project Type:* Reliability

**Cape-Kelso-2 and Kelso-Miner-2**

*Project Description:* Increase ground clearance to and perform line hardware verification to permit operation at 120 degrees C. Upgrade terminal equipment at Cape, Kelso, and Miner Substations.

*Cost:* $5,586,082

*In Service Date:* 12/1/2016

*Project Type:* Other -Condition

**Page-Sioux-4 Reconductoring**

*Project Description:* Replace 14.28 miles of 2-300 kcmil Copper conductor with conductor matching or exceeding the capability of the rest of the line (954 kcmil ACSR conductor)

*Cost:* -

*In Service Date:* 12/1/2016

*Project Type:* Other -Condition
MTEP 2016 level of investment is consistent with prior years

Cumulative investment:
- $12.5 billion constructed
- $26.1 billion approved*

*MTEP16 includes proposed projects
**Amounts are shown in millions
Looking forward, changing resource mix will drive the needs for robust transmission system
Multiple Drivers for Future Transmission Needs

Objective is to take a holistic look at multiple drivers to maximize the value of regional transmission

- Changes in resource mix
- North/Central and South footprint diversity
- Reliability to address generation retirements driven by age or policy
- Low cost energy delivery across footprint
- Federal and state energy policy compliance planning
Regional Transmission Overlay Study develops the most robust plan under a variety of policy and economic future scenarios.
Regional Transmission Overlay Study is a multi-year process to position the grid in support of changing resource mix.

- **Phase I Future Development**
  - Jan - May: Future Development
  - Jul: Future Weights
  - Sept: Capacity expansion and siting

- **Phase II Long Term Transmission Strategy**
  - Regional Need Identification: Transmission overlay development and refinement
  - Overlay Robustness testing
  - Candidate Regional Plan Formation

- **Phase III Regional Transmission Plan Development**
  - Candidate Regional Plan Analysis and Refinement
  - Business Case Development and Cost Allocation

- **Interregional Planning Coordination**
  - Annual Issues Review
  - Joint Coordinated Plan Study if determined

- **2016**
  - 1st Qtr.
  - 2nd Qtr.
  - 3rd Qtr.
  - 4th Qtr.

- **2017**
  - 1st Qtr.
  - 2nd Qtr.
  - 3rd Qtr.
  - 4th Qtr.

- **2018-2019**
  - 2018
  - 2019

- **MTEP19 BOD Approval if Conditions Precedent Met**
For Additional Questions:

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