MISO Transmission Planning

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MISO Transmission Planning Objectives

Fundamental Goal

The development of a comprehensive expansion plan that meets reliability needs, policy needs, and economic needs

- Make the benefits of an economically efficient electricity market available to customers by identifying transmission projects which provide access to electricity at the lowest total electric system cost
- Develop a transmission plan that meets all applicable NERC and Transmission Owner planning criteria and safeguards local and regional reliability through identification of transmission projects to meet those needs
- Support state and federal energy policy requirements by planning for access to a changing resource mix
- Provide an appropriate cost allocation mechanism that ensures that costs of transmission projects are allocated in a manner roughly commensurate with the projected benefits of those projects
- Analyze system scenarios and make the results available to state and federal energy policy makers and other stakeholders to provide context to inform regarding choices
- Coordinate planning processes with neighbors and work to eliminate barriers to reliable and efficient operations
MISO transmission planning philosophy

MTEP Focuses on Minimizing the Total Cost of Energy Delivered to Customers

Goal: Minimum Total Cost: Energy, Capacity and Transmission

High Capacity Cost
Low Transmission Cost

High Transmission Cost
Low Capacity Cost

Total Cost ($)

H
Capacity Cost
L

Transmission Cost
L
H
MISO Transmission Expansion Plan (MTEP)

• 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
MTEP Investment Summary (in millions)

- MTEP03: $1,110
- MTEP05: $816
- MTEP06: $1,550
- MTEP07: $538
- MTEP08: $2,646
- MTEP09: $955
- MTEP10: $1,200
- MTEP11: $6,860
- MTEP12: $1,640
- MTEP13: $1,488
- MTEP14: $2,443
- Proposed MTEP15: $2,483
The Road to the First Multi Value Project Portfolio

First Multi Value Project Portfolio recommended to BOD

Multi Value Project FERC Order
Multi Value Project Tariff Development

Regional Generation Outlet Study I
Regional Generation Outlet Study II

MTEP 05 Exploratory Study
Board of Directors Guiding Principles

MTEP03 Exploratory Study

Explorations of the policy, processes, and transmission solutions required to provide the best value for consumers began in 2003
Value Based Planning develops the most robust plan under a variety of policy and economic future scenarios.

Future Development

- Future 1
- Future 2
- Future N

A variety of policy and economic based Futures provides multiple long-term views of future resource mix.

Long-term Transmission Strategy

Long-term overlay roadmaps guide near-term transmission decisions.

Regional Transmission Plan Development

- Conditions Precedent
- Policy Consensus
- Robust Business Case
- Cost Allocation and Recovery

Long-term Strategy and conditions precedent frame regional transmission plan.

The graphics are for illustrative purposes ONLY.
After additional intensive analysis, the candidate portfolio was refined into a final Multi Value Project Portfolio.
Multi Value Projects reliably and economically enable established energy policy choices

**Multi-Value Project Portfolio**

- Total portfolio construction cost of $5.2 billion
- Total net benefit of $6.7 to $32.8 billion over a 20 – 40 year life
- Provides benefit / cost ratios of 1.8 to 3.0
- Provides annual value of $1.3 B vs. cost of $0.6 B
- 17 elements in the MVP portfolio
- Resolves 650 elemental reliability issues
- Enables 41 million MWh of wind energy
- Supports energy zones for both wind and natural gas
## Multi-Value Project Portfolio Status*

<table>
<thead>
<tr>
<th>MVP No.</th>
<th>Project Name</th>
<th>State</th>
<th>Estimated In Service Date</th>
<th>Status</th>
<th>Cost1</th>
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<tbody>
<tr>
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<td>MTEP Approved</td>
<td>Q1 2016</td>
<td>State Regulatory Status</td>
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<tr>
<td>1</td>
<td>Big Stone-Brookings</td>
<td>SD</td>
<td>2017</td>
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<td>2</td>
<td>Brookings, SD-SE Twin Cities</td>
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<td>2011-2015</td>
<td>2013-2015</td>
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<td>5</td>
<td>N. LaCrosse-N. Madison-Cardinal (a/k/a Badger-Coulee Project) &amp; Cardinal-Hickory Creek</td>
<td>WI/IA</td>
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<td>2018-2020</td>
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<td>ND/SD</td>
<td>2019</td>
<td>2019</td>
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<td>7</td>
<td>Ottumwa-Zachary</td>
<td>IA/MO</td>
<td>2017-2020</td>
<td>2017 - 2018</td>
<td>Pending</td>
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<td>Zachary-Maywood</td>
<td>MO</td>
<td>2016-2018</td>
<td>2016-2018</td>
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<tr>
<td>10</td>
<td>Austin-Pana</td>
<td>IL</td>
<td>2018</td>
<td>2016-2018</td>
<td>Pending</td>
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<tr>
<td>11</td>
<td>Pana-Faraday-Kansas-Sugar Creek</td>
<td>IL/IN</td>
<td>2018-2019</td>
<td>2016-2018</td>
<td>Underway</td>
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<tr>
<td>12</td>
<td>Reynolds-Burr Oak-Hiple</td>
<td>IN</td>
<td>2019</td>
<td>2019</td>
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<tr>
<td>13</td>
<td>Michigan Thumb Loop Expansion</td>
<td>MI</td>
<td>2013-2015</td>
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<td>Pleasant Prairie-Zion Energy Center</td>
<td>WI</td>
<td>2014</td>
<td>2013</td>
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<td>Fargo-Sandburg-Oak Grove</td>
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<td>2016-2018</td>
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<td>2016</td>
<td>2016</td>
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</table>

**Totals:** 5,564 6,471

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### State Regulatory Status Indicator Scale

- ○ Pending
- ● In regulatory process or partially complete
- ●● Regulatory process complete or no regulatory process requirements

1. Estimates provided by constructing Transmission Owners. Costs stated in millions of nominal dollars.

*As of Q1 2016
Looking forward, changing resource mix will drive the needs for robust transmission system

- **Future Development**
  - Jan - May
  - Jul
  - Sept

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

- **Regional Transmission Plan Development**
  - Annual Issues Review
  - Joint Coordinated Plan Study if determined
  - Annual Issues Review

- **Interregional Planning Coordination**
  - Candidate Regional Plan Analysis and Refinement
  - Business Case Development and Cost Allocation

- **Future Refresh**
  - If needed

- **MTEP19 BOD Approval if Conditions Precedent Met**
Questions?

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