Long Range Transmission Planning: Tranche 1
LRTP Workshop
March 25, 2022
Agenda

• Draft Tranche 1 Portfolio Proposal
• Process Review
• Project Assessment
  • Central-East Region Corridor
  • Missouri
  • Iowa
  • Minnesota-Wisconsin
  • North Dakota-Northwest Minnesota
  • Central/Northern Minnesota
• Next Steps
Draft Tranche 1
Portfolio Proposal
The transmission development need is urgent as the resource fleet rapidly evolves

- A transmission plan is needed to reliably enable the goals and plans of MISO states, utilities and industries.
- The resource mix has been evolving at an increasing pace for more than 10 years; MISO queue has almost 56 GW of solar.
- Reliability will become increasingly difficult as renewable energy levels increase throughout the region.
  - Instantaneous wind peak records were set on November 1st, 15th, and December 23rd, where MISO set its existing instantaneous wind peak of 20.2 GW serving 26.8% of MISO’s load.
  - Total In Service Wind is 26.5 GW with as much as an additional 4,500 MW expected to come online in next 12 months.
  - MISO Futures project renewable penetration ranging from 26% to 50% in less than 20 years.
The overarching objective of LRTP translates to the planning level objectives

- Long Range Transmission Planning is necessary to ensure a reliable and efficient regional and interregional transmission system that enables the changing portfolio across the near and long term and is part of the comprehensive Reliability Imperative Initiative.
The overarching objective of LRTP translates to the planning level objectives:

- Develop scenario-based Futures with resource forecast and Siting
- Apply appropriate cost allocation
- Development of planning models utilizing Futures
- Recommend preferred solutions for MTEP implementation
- Identify potential transmission issues
- Evaluate the effectiveness of various solutions
- Proposals for solutions to issues

**PROCESS**
Tranche 1 Portfolio proposal is the culmination of two years of Futures development, modeling, and engineering and represents the most complex transmission planning study effort in MISO’s history.

- Portfolio embodies needed transmission for the everchanging fleet
- Addresses needs across the entirety of the MISO Midwest subregion
- More work still to do regarding additional Futures and will be addressed in tranche 2
Preliminary project cost estimates for LRTP Tranche 1 is $10.4 B for projects located across the MISO Midwest subregion

<table>
<thead>
<tr>
<th>Draft LRTP Tranche 1 Portfolio</th>
<th>Location</th>
<th>Estimated Project Cost ($M)*</th>
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</thead>
<tbody>
<tr>
<td>Jamestown-Ellendale 345kV</td>
<td>Western MN-Dakotas</td>
<td>$955</td>
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<tr>
<td>Bigstone-Alexandria 345kV – Cassie's Crossing</td>
<td>Western MN-Dakotas</td>
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<td>Wilmarth – North Rochester – Tremval – Eau Claire – Jump River 345kV</td>
<td>MN-WI</td>
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<td>Tremval – Rocky Run – Columbia</td>
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<td>Iron Range – Benton – Cassie's Crossing</td>
<td>Western MN-Dakotas</td>
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<td>Webster – Franklin – Morgan Valley 345kV</td>
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<td>Madison – Ottumwa – Skunk River – Ipava – Maple Ridge 345kV</td>
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<td>Paxton – Sidney 345kV</td>
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<td>Oneida – Nelson Road 345kV</td>
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<tr>
<td>Underbuild (facilities to be identified prior to final approval)</td>
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<td>$350</td>
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<tr>
<td><strong>Total Portfolio Project Cost</strong></td>
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<td><strong>$10,380</strong></td>
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</table>

*Final costs under development for MTEP21 Report Appendix*
Process Review
Workshops and Stakeholder feedback an integral element of LRTP process and success
The model building process used for LRTP is representative of the cyclic MTEP process with MISO futures data set

- Generation and load forecasts taken from MTEP futures
- Regional Resource Forecasts, retirements, and re-empowerments

*MTEP21 updates included
Reliability Assessment involves multiple iterative phases to identify the issues and test the solutions.

**Base LRTP Models**
- MTEP21 Futures
  - Resource Forecast, Retirements, Load
- MTEP20 Topology*
- Dispatch Methodology

**Issue Identification**
- Contingency Analysis
- Impact of Generation siting on results
  - Local/Regional
  - Additional Scenarios
- Transfer Analysis
- Stability Analysis

**Solution Testing**
- Regionally focused
- Alternatives will draw from Indicative Roadmap and other proposed solution as appropriate to resolve the observed issues
- Compare and choose solutions

*MTEP21 updates included*
Next Steps
Tranche 1 approval will be delayed until July 2022 to facilitate more stakeholder review and engagement.
Contact

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- Jarred Miland (jamiland@misoenergy.org)
- Matt Tackett (mtackett@misoenergy.org)
Thank You
Appendix
Links

• Models and results (requires UNDA/CEII): https://misoenergy.sharefile.com/home/shared/fof89d75-4353-4393-bcd2-f543bb3ce5f1
• Long Range Transmission Planning Webpage
  • https://www.misoenergy.org/planning/transmission-planning/long-range-transmission-planning/