Purpose:
Frame proposed DER Interconnection IPWG objectives and workplan for 2022

Key Takeaways:

• The Xcel Energy – MISO study agreement may offer a starting point for DER interconnection coordination at MISO

• MISO requests stakeholders engage relevant internal SMEs and review state and utility DER interconnection practices
Objectives for DER Interconnection at 2022 IPWG

Document (1) DER interconnection process handoffs between Transmission Owners and MISO and (2) a framework for MISO’s DER interconnection study process.

Types of questions to be addressed:

- How do MISO studies fit with State processes?
  - Is a MISO process accounted for in State requirements currently (e.g., Affected Systems studies)? Are rules changes necessary in some states?
- When should a Transmission Owner (TO) request a MISO study?
  - What analysis should be performed by the Electric Distribution Companies (EDC) and TO ahead of requesting a MISO study?
  - What, if any, guidance should MISO provide to TOs (e.g., technical thresholds/screening)?
- What information should be provided by the EDC and TO to MISO?
- What result details/breakdowns are needed from MISO studies for TOs and EDCs to perform business functions?
- What are the lines of communication between the DER Customer, EDC, TO, and MISO?
- What amount of time should be allocated for each process steps?
- What agreements are needed for MISO studies (e.g., pro forma)?
MISO is now looking to address “C” as called out in previous FERC Order 2222 IPWG presentations.

DER growth in the MISO footprint offers multiple related interconnection issues

A
DER aggregations on the distribution system access the wholesale markets (FINANCIAL)

B
DER's will connect to the distribution system and participate wholesale markets, and inject power into the distribution system which reaches the transmission system (PHYSICAL)

C
DER's will connect to the distribution system and participate only in retail programs, but may inject power onto the transmission system (PHYSICAL)

- We will discuss only A and B in relation to Order 2222
- While issue C is important, it is beyond the scope of Order 2222

Presented at the July 13th, IPWG. Full deck available at: https://cdn.misoenergy.org/20210713%20IPWG%20Item%2004%20FERC%20Order%202222%20568422.pdf
## 2022 Planned IPWG Meeting Dates with Draft DER Interconnection Topics

<table>
<thead>
<tr>
<th>Date</th>
<th>Draft Topics*</th>
</tr>
</thead>
<tbody>
<tr>
<td>February 7</td>
<td>Framing and objectives</td>
</tr>
<tr>
<td>April 11</td>
<td>DER technical thresholds and pre-MISO analysis</td>
</tr>
<tr>
<td>June 6</td>
<td>Process and coordination pre-MISO analysis</td>
</tr>
<tr>
<td>August 15</td>
<td>MISO DER analysis</td>
</tr>
<tr>
<td>October 10</td>
<td>Post-analysis processes: study results and system upgrades</td>
</tr>
<tr>
<td>November 14</td>
<td>Reserved for topics needing additional time</td>
</tr>
</tbody>
</table>

*Distributed Energy Aggregated Resource (DEAR) Technical Review topics may be added, pending FERC’s acceptance of MISO’s 2222 compliance filing*
DER Interconnection General

- DER interconnection is State jurisdictional.
- State process requirements sometimes define Transmission and Affected Systems Studies.
- Details of Affected System Studies are often left open in State requirements since study conditions and participating parties may vary widely.
- Terminology is important – State and MISO processes may use the same term differently.
  - Language needs to be harmonized across transmission and distribution.
What’s in the Xcel Energy – MISO Affected System Agreement?

**General**

- Utility determines the need for transmission study (Recitals)
- Study purpose is to review potential impacts on MISO operated transmission system (Recitals)
- Interconnection customer is responsible for study costs and system upgrade costs, if applicable (Recitals)
  - Takes cost-causer pays approach for system upgrades (1.9)
- Study scope agreed upon in writing prior to each study (1.3)
- Previously studied DER is out-of-scope, except for purposes of including aggregate impacts (1.8)

The above is a summary of relevant IPWG topics.
The full agreement is posted with today’s meeting materials: 20220207 IPWG Item 04 NSP-MISO-Affected System Study Agreement.pdf
What’s in the Xcel Energy – MISO Affected System Agreement?

Process (2.2.1, 2.2.2, 2.2.3)

- Utility determines when to request a study under the following conditions:
  - New or additional backflow onto transmission during peak load conditions at a particular substation
  - Requires a new feeder to allow for interconnection
  - Requires a MISO system upgrade to allow for interconnection
- MISO determines which specific analyses to include (e.g., power flow, stability, etc.)
  - Study models and details determined during kickoff meeting between MISO and utility
  - Study is performed on aggregate DER at the substation level
  - MISO makes final determination of MISO operated transmission system impacts, using applicable standards, guidelines, procedures, and criteria
  - Utility communicates results to Interconnection Customer(s)

The above is a summary of relevant IPWG topics.
The full agreement is posted with today’s meeting materials: 20220207 IPWG Item 04 NSP-MISO-Affected System Study Agreement.pdf
What’s in the Xcel Energy – MISO Affected System Agreement?

**Process (2.2.4, 2.4)**

- Utility provides MISO information on the group of proposed DER at the substation level.
  - Information provided no later than 30 business days prior to the start of the upcoming periodic study cycle (substation, model, data, etc.)
  - MISO invoices the Utility $60,000 as a standard deposit for each study group by substation, no later than 10 business days after receiving information.
  - Utility provides payment, no later than 30 business days after receiving the invoice.
  - MISO schedules a kick-off meeting with Utility and other affected system owners, upon request.
  - Target study deadline is agreed upon in the Statement of Work (2.4)

The above is a summary of relevant IPWG topics. The full agreement is posted with today’s meeting materials: 20220207 IPWG Item 04 NSP-MISO-Affected System Study Agreement.pdf
What’s in the Xcel Energy – MISO Affected System Agreement?

Facilities Study for Upgrades (2.2.4, 2.4)

- A Facility Study is likely when study shows MISO operated system upgrades are needed
  - The exact next steps are determined between MISO and the Utility
- The Facilities Study would examine scope, cost, and timeline for needed upgrades
- MISO and the Utility could decide to (1) enact a Facilities Study agreement or (2) provide high-level, non-binding cost and timeline estimate
- Interconnection Customers are responsible for final upgrade costs prior to commencement of the work
- Interconnection is contingent on required work being completed

The above is a summary of relevant IPWG topics.
The full agreement is posted with today’s meeting materials: 20220207 IPWG Item 04 NSP-MISO-Affected System Study Agreement.pdf
What analysis and coordination could be needed leading up to a MISO DER study?

- TO determines need for MISO study
- TO provides study information to MISO
- MISO DER by substation and performs relevant analyses
- Minimum of 30 business days
- Quarterly batches
- MISO sends invoice within 10 business days
- TO and/or EDC invoice DER customer
- TO provides payment to MISO
- Within 30 business days of invoice
- Start of MISO’s next quarterly DER study cycle
Some State Interconnection Processes include Transmission Studies and Affected systems Studies

Minnesota DER Interconnection Process (MNDIP)

1. Transmission system impact identified?
2. Area EPS coordinate necessary Transmission Study with Transmission Provider
3. Area EPS coordinate necessary Transmission Provider and Affected Systems to provide Transmission Impact Study and Results in a timely manner

State of Minnesota Distributed Energy Resources Interconnection Process, V2.3. Approved by 4/19/19 Order. Available at: https://mn.gov/puc/assets/MN%20DIP_tcm14-431769.pdf
DER Interconnection next steps

Please review your specific utility and State DER context, considering:

- State interconnection requirements and potential MISO study process
- Current transmission owner business practices for reviewing DER impacts

- April 11th IPWG DER Interconnection focus areas
  - Thresholds, screens, or studies TOs perform prior to MISO studies
Contact Information

Patrick Dalton
pdalton@misoenergy.org
Questions?