Purpose:
Propose DER Affected Systems Study technical practices and process elements

Key Takeaways:
• MISO proposes additional refinements to screening practices, incorporating stakeholder feedback to consider loading outside of peak.
• MISO proposes modeling assumptions, analysis approaches, and constraint criteria for DER Affected Systems Studies.
• MISO shares information on how the study process fits within the proposed quarterly cadence.
2022 Planned IPWG Meeting Dates with Draft DER Interconnection Topics

<table>
<thead>
<tr>
<th>Date</th>
<th>Draft Topics*</th>
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<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>
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<tr>
<td>June 6</td>
<td>Process and coordination pre-MISO analysis</td>
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<td>August 15</td>
<td>MISO DER Affected System Studies</td>
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<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*
Today’s discussion focuses on coordination and processes after screening but before the DER Affected Systems Study.

**Screening and invoicing process**

- **TO/MISO** determines need for MISO review
- **TO** provides screening/study information to MISO
- **MISO Invoices TO**
- **TO** provides payment to MISO
- **TO and/or EDC invoice DER customer**
- **MISO groups DER by substation and performs affected systems study**

Focus of Today’s Discussion

*Note: Conceptual flow diagram presented at the February 7 IPWG as an example process. Steps may be modified through the current IPWG discussions.*
Proposed Screening and Process Refinements

Follow-up from June IPWG Feedback
MISO posted Stakeholder feedback and responses, which contributed to adjusting MISO’s screening working proposal

- Several Stakeholders reiterated a desire to expand screening assumptions beyond peak system conditions only. **MISO is adjusting the current screening proposal to include off-peak load conditions.**

- MISO is retaining its proposal that Transmission Owners coordinate with MISO on DER information and deposit exchanges.

- Several Stakeholders indicated that MISO’s proposed ten (10) Business Day timeframe for funding study deposits could be challenging. MISO will consider this feedback as the overall process proposal is refined.

- **MISO shares new details on when additional substation screening would be triggered, following a screen or study that has already been completed at a particular substation.**

MISO’s revised screening proposal includes shoulder peak conditions in addition to summer peak

- The revised screening proposal would assume full injection of DER resources at summer peak and/or shoulder peak, drawing from MISO’s BPM-15 fuel dispatch philosophy.¹

<table>
<thead>
<tr>
<th>DER Fuel Type for Screening</th>
<th>Summer Peak</th>
<th>Shoulder Peak</th>
</tr>
</thead>
<tbody>
<tr>
<td>Solar</td>
<td>x</td>
<td></td>
</tr>
<tr>
<td>Storage</td>
<td>x</td>
<td>x</td>
</tr>
<tr>
<td>Wind</td>
<td>x</td>
<td>x</td>
</tr>
<tr>
<td>Hybrid²</td>
<td>x</td>
<td>x</td>
</tr>
<tr>
<td>Diesel Engines</td>
<td>x</td>
<td></td>
</tr>
<tr>
<td>Combustion Turbine</td>
<td>x</td>
<td></td>
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<tr>
<td>Waste Heat</td>
<td>x</td>
<td>x</td>
</tr>
<tr>
<td>Oil</td>
<td>x</td>
<td></td>
</tr>
<tr>
<td>Hydro</td>
<td>x</td>
<td>x</td>
</tr>
</tbody>
</table>

An “x” denotes that the loading conditions would be included in the 5 MW DER injection screen.

² Exception: a combination of only diesel, solar, CT, or Oil would only be dispatched for summer peak. Otherwise, the full amount of DER is dispatched under both shoulder peak and summer peak conditions. As a simplifying assumption, the full hybrid capacity would be dispatched during each condition for screening. The dispatch allocation would be more granular for affected system studies, in accordance with BPM-15 practices.
MISO shared new details on when additional substation screening would be triggered, following a screen or study that has already been completed at a particular substation.

- For process efficiency, after screening is triggered at a substation, MISO proposes that one megawatt or greater of additional capacity would need to be requested to trigger subsequent screening (i.e., “1 MW screening dead band”).
- The proposal requires additional MISO recordkeeping and coordination with TOs with additional details to be finalized through this process.

Example application of 1 MW screening dead band:
1. “Lake Substation” has DER interconnection requests that equate to 5.5 MW of DER injection onto transmission at summer peak and/or shoulder peak.
2. TO performs 5MW injection screen and requests a MISO study.
3. MISO performs DER Affected Systems Study and determines no impacts.
4. An additional 0.5 MW of DER injection is proposed at Lake Substation.
5. The TO considers the aggregate 6 MW of DER injection with the new 1 MW screening dead band limit (currently set at 6.5 MW for Lake Substation) and determines no request for study is needed. Should the TO request a study, MISO would review records and respond that none is needed.
6. An additional 0.75 MW of DER is proposed at Lake Substation.
7. The TO applies the aggregate 6.75 MW of DER injection against 6.5 MW dead band limit and requests a MISO study for new/incremental 1.25 MW of DER injection.¹

¹MISO anticipates the full 6.75 MW of DER would be accounted for during the study, though only the DER contributing to the new 1.25 MW would be considered as potential cause of new impacts in the next study cycle.
DER Affected System Studies

New MISO Proposals
Discussion topics today cover study assumptions, inputs, and processes

- Modeling assumptions and inputs
- Analysis and constraint criteria
- Process and timeline
MISO proposes modeling assumptions and inputs for DER studies that generally align with other Affected Systems Studies

• The latest DPP Phase 3 model would be selected.
  • This aligns with the “first-ready first-serve” affected systems approach outlined in the FERC’s June 16, 2022, NOPR on Improvements to Generator Interconnection Procedures and Agreements.¹

• MISO would select peak and shoulder peak models based on BPM-015, Section 6.1.1.1.2 (Study Case Development).
  • DER will be dispatched against local area generators.

• MISO has a partial view of existing DER, which is included as negative load in the MTEP models when reported by members.

• New DER information already submitted by the TO for screening is sufficient for MISO’s DER Affected Systems Study.

MISO’s tools and technical thresholds are the same as those used in other Affected Systems Studies

MISO will study the cumulative DER at each substation across as a group, applying BPM-015 criteria to evaluate and assign impacts at the substation level.

- **MISO proposes only performing steady state analysis** (i.e., exclude short circuit and stability analysis).
  - PSS®E and TARA are used to perform steady state power flow analysis and transfer limit calculations, aligned with BPM-015, Section 6.1.1.1.7 (*Permissible Software Tools*).

- **Thermal analysis** follows BPM-15, Section 6.1.1 (*Thermal Analysis*) with constraints evaluated using Section 6.1.1.1.8 (*Criteria Used to Determine Constraints*) for evaluating thermal constraints.

- **Steady state voltage analysis** follows Section 6.1.1.2, which references Local Balancing Authority criteria.
MISO’s proposed DER affected systems study timeline is 90 calendar days, aligned with the proposed quarterly DER study cadence.

1. Agreements and deposits
2. Model development and review
3. Steady state analysis
4. MISO results review and report drafting
5. Report delivery and DER customer comment resolution

The 90-calendar day timeframe is inclusive of these steps.

Agreements and deposits are required before the 90-calendar-day timeframe begins. The screening process collects needed DER study information.

FERC’s June 16th, 2022, Generator Interconnection NOPR¹ proposes a 90-day timeframe from Affected System Study agreement execution to report delivery, which is similar to MISO’s DER Affected System study proposal.

[¹] FERC, Docket No. RM22-14-000, Improvements to Generator Interconnection Procedures and Agreements. June 16, 2022. Available at: https://www.ferc.gov/media/rm22-14-000
DER Affected Systems Agreements and Deposits will run in parallel with previous study cycle report delivery and comment resolution

Related to deposits, MISO will track study costs and communicate current spending levels using existing Generator Interconnection processes. In summary:

- MISO finance provides monthly statements on charged amounts.
- At study close-out, MISO issues a final statement along with any remaining deposit funds.
To manage DER project withdrawal study implications, MISO proposes using study information to reassign impacts, within a defined timeframe

- When a DER substation is found to have a system impact, MISO would note in the study report the MW capacity that could proceed without an impact.
- Indicative costs for any proposed mitigations would also be included.
- The TO could use the information to adjust allocation of system upgrade costs without additional study or coordination.
- However, MISO is looking for certainty of what DER remains active within a relatively short timeframe after concluding a study and is considering several process elements:
  - Require active DER with an impact to sign the facilities study agreement and fund the deposit within short timeframe (e.g., 10 days) of DER Study Report finalization in order to continue with the current cycle.
    - Otherwise, the DER substation could remain “active” from the Relevant Electric Retail Regulatory Authority and utility perspective but is placed in a later MISO group for study, should the DER choose to fund that study deposit.
    - Transmission Owners might consider tying a DER customer decision not to fund Facilities Studies with DER application withdrawals, which is outside of MISO’s jurisdiction.

This proposal is most applicable for single, thermal constraints. While anticipated to be less common, DER-driven voltage constraints or multiple levels of thermal constraints could challenge this proposed method.
At the October IPWG, MISO will discuss study results reporting in greater detail

- At a high level, MISO envisions a report much like the SPP cluster study reports, which are publicly available.
  - Please note MISO’s proposal to exclude dynamics for DER Affected Systems studies, which are included in the MISO-SPP study report.
- October’s discussion will also include proposals for facilities study and system upgrade processes, which MISO views to be outside of the 90-calendar-day study timeframe.

Stakeholder Feedback Request

- MISO is requesting feedback on the following MISO DER Affected System Proposals presented today by September 9, 2022.
  - Modeling selection and dispatch assumptions
  - Type of analysis selected
  - Study process components, including the 90-day timeline for DER study
  - Process certainty (i.e., DER withdrawal study implications)

- Feedback requests and responses are managed through the Feedback Tool on the MISO website: [https://www.misoenergy.org/stakeholder-engagement/stakeholder-feedback/](https://www.misoenergy.org/stakeholder-engagement/stakeholder-feedback/)
Contact Information

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