State of Minnesota

PowerOn Midwest 765 kV Transmission Project Information Request

Docket Number: E002, ET2, ET6675/CN-25-117
CAH 28-250041617

Date of Request:July 10, 2026

Requested From: Lisa A. Crum, Max Meyer
Attorneys for Midcontinent
Independent System Operator, Inc.

Response Due: July 24, 2026

Analyst Requesting Information: Carol A. Overland, Counsel for North Route Group and NO765MN

Type of Inquiry:

[ ] Financial	[ ] Rate of Return	[ ] Rate Design
[ ] Engineering	[ ] Forecasting	[ ] Conservation
[ ] Cost of Service	[ ] CIP	[x] Other:

Responses that are trade secret or privileged are indicated.

Request No.	
2	(a) In light of opportunities in the many MTEPs released, MISO's Transmission **Expansion** Plan, describe MISO's planning for and inclusion of **non**-transmission alternatives and cost apportionment of these alternatives. (b) Does FERC regard any transmission alternatives as appropriate for cost apportionment? Identify, and if so, how does MISO utilize thee alternatives in MTEP planning? (c) What is the primary barrier to non-transmission alternatives? (d) Explain MISO's current HVDC accreditation policy and why it's under review. (e) What steps has MISO taken: (e)(i) to unlock and enable the benefits of intra- and inter-regional High Voltage Direct Current (HVDC) transmission; (e)(ii) to provide clarity around HVDC market operations and the incorporation of HVDC into transmission planning processes that would help "bottom-up" HVDC development as part of efficient regional and interregional transmission planning; (e)(iii) to enable intra-regional HVDC in market and operations processes; (e)(iv) to include HVDC into MTEP planning. (f) How does comparison of AC and DC line loss factor into MISO's transmission planning? (g) What is the role of Clean Grid Alliance in incorporation of HVDC? Provide copy of the May presentation to committee.

(h) MISO did not want a stay of this Certificate of Need docket, requested "prompt review of the PowerOn Minnesota Certificate of Need application to "help insure that the Applicants can meet their target in-service dates in 2032 and 2034." Comment, p. 3. The route permits (3) are expected to be filed in February. However, the eastern part of this line, where the Certificate of Need is stayed, will have its route application filed in "fall 2026," earlier than the PowerOn Minnesota application filings. In light of this timing, what was basis for MISO objection to a stay?
(i) How did MISO and Applicants coordinate to essentially use the MTEP as basis for the PowerOn Midwest (and Gopher to Badger) application?
(j) A January 16, 2025 presentation, "Incorporating HVDC in Energy and Ancillary Services," showed the benefit of HVDC for reducing losses with high renewable generation. Please explain the correlation.
(k) This presentation also stated that "HVDC affects multiple elements of MISO's business. Identify those elements and the effect of HVDC.
(l) With this awareness of the benefits of HVDC, describe reasonableness or prudency of continuation of use of high voltage AC, 345kV and above, for long distances?

Responses:

(a) In accordance with FERC Order Nos. 890 and 1000, MISO treats generation, demand resources, and other non-transmission alternatives comparably to transmission in MISO's transmission planning process. Through MISO's open and transparent transmission planning process, stakeholders can submit alternatives, including non-transmission alternatives, for evaluation to address identified needs. FERC has not addressed the issue of cost recovery for non-transmission alternatives and MISO's Tariff does not presently provide for the recovery of these costs.

(b) *See* response to Section 2(a).

(c) *See* response to Section 2(a). Non-transmission alternatives are treated comparably in the MISO stakeholder process.

(d) Objection. MISO objects to this request to the extent that it improperly seeks or purports to require the production of documents or information, which is not relevant to the subject matter of the proceeding nor reasonably calculated to lead to the discovery of admissible evidence.

Subject to, and without waiving these objections, MISO states as follows:

MISO's capacity market accreditation rules apply to resources and are not applicable to transmission including HVDC technology. MISO is exploring reforms to External Resource Accreditation, which originally included the topic of HVDC accreditation in the Planning Resource Auction in response to the issue submitted by Southern Renewable Energy Association. However, MISO determined that HVDC accreditation is outside the scope of the External Resource Accreditation issue because transmission investment enables delivery of energy from resources but does not provide capacity itself. Further, the Loss of Load Expectation analysis used to assess resource adequacy doesn't include modeling of transmission topology which would introduce more complexity. Transmission line accreditation would also require a holistic assessment of coordination and agreements neighboring regions.

(e) Objection. MISO objects to this request to the extent that it improperly seeks or purports to require the production of documents or information, which is not relevant to the subject matter of the proceeding nor reasonably calculated to lead to the discovery of admissible evidence.

Subject to, and without waiving these objections, MISO states as follows:

Regarding MISO's steps:

(i) In January 2025, MISO began an assessment of the impacts of HVDC in market and operations processes to explore further benefits from co-optimization of HVDC scheduling. The goal of the effort was to conduct research into the technical challenges and capabilities required to integrate dispatchable HVDC into market processes. The effort culminated in the delivery of the 2025 HVDC Impact Assessment whitepaper that provided insights and recommendations for further development. The whitepaper is available at the following link: https://cdn.misoenergy.org/20251216%20HVDC%20Impact%20Assessment%20Workshop%20Whitepaper731714.pdf.

(ii) *See* response to Section 2(e)(i).

(iii) *See* response to Section 2(e)(i).

(iv) HVDC transmission is currently evaluated during MTEP development. HVDC transmission has various applications including serving as a long lead line for remote generation, as a tie-line between asynchronous systems, and for long distance intra-regional/interregional power transfers. Each use case has unique

considerations that need to consider the specific technology and control modes that have significant effect on cost and benefits. In regional planning applications that involve significant system expansion to reinforce the system, HVDC is not a wholesale replacement for AC transmission. The overall design must consider the distances and capacity requirements as well as any upgrades for integration with the existing transmission network to assess the relative cost-effectiveness. The feasibility of HVDC solutions requires appropriate modeling and control capabilities to ensure the system performs as designed. As discussed in the MTEP24 Report, the distances and power transfer requirements associated with the needs identified in the LRTP Tranche 2.1 analysis informed the selection of 765 kV backbone as the appropriate solution.

(f) The line losses of AC and DC transmission lines are one factor that is considered during the MTEP development process when MISO is evaluating the voltage and type of transmission lines that will be included in the MTEP. MISO discussed lines losses among other factors at the March 8, 2023 MISO Planning Advisory Committee meeting during the development of LRTP Tranche 2.1. The presentation is available at the following link: https://cdn.misoenergy.org/20230308%20PAC%20Item%2007%20Discussion%20of%20765%20kV%20and%20HVDC628088.pdf.

(g) *See* the response to Information Request No. 1(d).

(h) As stated in the Information Request, the expected filings in 2026 are "earlier than the PowerOn Minnesota application filings," so the expected delay in the case of the PowerOn project would be greater. Furthermore, the Applicants' concern regarding a stay is taken on good faith that it might disrupt the timing for development of the PowerOn project.

(i) Once projects developed in the MISO transmission planning process are approved as part of the MISO Transmission Expansion Plan by the MISO Board of Directors, transmission developers are assigned or selected to pursue planning, permitting, construction, and operation of MTEP projects. Applicants were assigned the portion of the MTEP24 facilities that are referred to in Docket No. CN-25-117 as the PowerOn Midwest project.

(j) Objection. MISO objects to the request to the extent is vague, ambiguous, uses terms that are subject to multiple interpretations, but are not properly

defined for purposes of these discovery requests, or otherwise provides no basis from which MISO can determine what information is sought (citation to the "January 16, 2025 presentation" is missing).

Subject to, and without waiving these objections, MISO states as follows:

The Information Request does not provide the January 16, 2025 document it references, but MISO did give a presentation titled "Incorporating HVDC in Energy and Ancillary Service Market Operations" at the January 16, 2025 MISO Market Subcommittee meeting. The presentation did not "show[] the benefit of HVDC for reducing losses with high renewable generation." Rather the presentation discussed the challenges of integrating HVDC into market processes. The presentation points to an issue in which co-optimization of HVDC dispatch maximizes losses in response to negative prices typically associated with high penetration of renewable resources. The interaction of HVDC schedules with congestion in the AC network can cause circular flows which drive the optimization algorithm to maximize losses to relieve congestion. The issues are discussed in more detail in the 2025 HVDC Impact Assessment whitepaper referenced above: https://cdn.misoenergy.org/20251216%20HVDC%20Impact%20Assessment%20Workshop%20Whitepaper731714.pdf. The January 16, 2025 presentation given at the Market Subcommittee is available below: https://cdn.misoenergy.org/20250116%20MSC%20Item%2011%20Incorporating%20HVDC%20in%20Energy%20and%20Ancillary%20Services%20(MSC-2024-8)671688.pdf.

(k) Objection. MISO objects to the request to the extent is vague, ambiguous, uses terms that are subject to multiple interpretations, but are not properly defined for purposes of these discovery requests, or otherwise provides no basis from which MISO can determine what information is sought. MISO objects to this request to the extent that it improperly seeks or purports to require the production of documents or information, which is not relevant to the subject matter of the proceeding nor reasonably calculated to lead to the discovery of admissible evidence (indication of "this presentation" is missing).

Subject to, and without waiving these objections, MISO states as follows:

The Information Request does not provide the January 16, 2025 document it references, but MISO did give a presentation, referenced above, titled

"Incorporating HVDC in Energy and Ancillary Service Market Operations" at the January 16, 2025 MISO Market Subcommittee meeting. The presentation discussed the need to investigate the challenges of incorporating HVDC transmission and to coordinate the modeling and process changes necessary to incorporate HVDC technology in system planning, operations and ancillary services markets, resource adequacy and other areas such as financial transmission rights. The January 16, 2025 presentation given at the Market Subcommittee is available below: https://cdn.misoenergy.org/20250116%20MSC%20Item%2011%20Incorporating%20HVDC%20in%20Energy%20and%20Ancillary%20Services%20%28MSC-2024-8%29671688.pdf. These elements of MISO's business and the impact of HVDC on those elements are discussed in detail in 2025 HVDC Impact Assessment whitepaper available at the following link: https://cdn.misoenergy.org/20251216%20HVDC%20Impact%20Assessment%20Workshop%20Whitepaper731714.pdf.

(l) As stated in the response to Section 2(f) above, MISO considered lines losses, cost per MW-Mile, land use per MW-Mile, flow control, and contingency impact among other factors in determining the appropriate voltage and type of transmission for projects in the LRTP Tranche 2.1 portfolio at the March 8, 2023 MISO Planning Advisory Committee meeting. The MTEP24 Report discusses the factors considered in selecting the appropriate technology to meet the needs identified in the LRPT Tranche 2.1 analysis and the ultimate conclusion drawn from balancing those factors. The line lengths and high-power transfers associated with the PowerOn facilities do not support the selection of HVDC technology given the higher cost per MW-mile.

Objections prepared by: MISO Counsel

Response by: Jeanna Furnish

Title: Senior Director of Expansion Planning

Department: Transmission Planning

Telephone: 317.249.5400

Sources of information:

MTEP24 Report Chapter 2, Appendix E.1 to the Application