



414 Nicollet Mall
Minneapolis, MN 55401

March 4, 2026

—Via Electronic Filing—

Sasha Bergman
Executive Secretary
Minnesota Public Utilities Commission
121 7th Place East, Suite 350
St. Paul, MN 55101

RE: ERRATA - ANNUAL TRUE-UP COMPLIANCE REPORT
2025 ANNUAL FUEL FORECAST AND MONTHLY FUEL COST CHARGES
DOCKET NO. E002/AA-24-63

Dear Ms. Bergman:

Northern States Power Company, doing business as Xcel Energy, submits the enclosed errata to the Company's 2025 Annual True-Up and Compliance Report filed in this docket on February 27, 2026. The Company inadvertently did not include Part B, Attachment 16 in our initial filing, and so we provide it here.

We have electronically filed this document, and copies have been served on the parties on the attached service lists. Please contact Rebecca Eilers at 612-330-5570 or rebecca.d.eilers@xcelenergy.com or me at 612-330-7681 or lisa.r.peterson@xcelenergy.com if you have any questions regarding this filing.

Sincerely,

/s/

LISA R. PETERSON
DIRECTOR, REGULATORY PRICING AND ANALYSIS

Enclosures
cc: Service Lists

CONGESTION AND CURTAILMENT STRATEGIES COMPLIANCE

Order Point No. 6 of the Commission's August 7, 2025 Order in Docket No. E002/AA-23-153 required the Company to provide the following information in its next annual filing:

- a. *A list of all the strategies Xcel Energy considered and implemented to address congestion and curtailment of energy. At a minimum, the list must include Grid Enhancing Technologies (e.g. Dynamic Line Rating, system reconfiguration, and system optimization), ARR's, FTR's, planning of transmission line projects to address congestion and curtailment within and between Regional Transmission Organizations, sequencing of transmission line outages, and sequencing of the construction schedule of pending transmission line projects; and*
- b. *A comprehensive discussion on the merit of each strategy and how Xcel Energy decides whether to implement each strategy. Xcel Energy must provide a cost-benefit analysis for each strategy or provide a justification for why a cost-benefit analysis cannot be performed.*

Information on the Company's efforts to reduce congestion and curtailment can be found in our 2025 Minnesota Biennial Transmission Projects Report (BTPR) in Docket No. E999/M-25-99. For additional information on curtailment, see Part C, Attachments 1 and 2 of this True-up Report. We address the strategies Xcel Energy has considered and implemented to reduce congestion and curtailment—as well as the Company's rationale for pursuing these measures—in Section I below. Section II below discusses cost-benefit analyses.

I. STRATEGIES TO REDUCE CONGESTION AND CURTAILMENT

The Company has considered and implemented a range of strategies to reduce congestion and curtailment on our system, which we describe in detail below. At a high level, these strategies include Grid Enhancing Technologies (GETs), long-range transmission projects and studies, pilots, and substation upgrades. We also discuss the analyses performed and the factors we consider in determining whether to implement these mitigation measures.

A. Grid Enhancing Technologies

Grid Enhancing Technologies (GETs) have been considered as a short-term solution to help alleviate congestion while longer-term transmission infrastructure is built. While GETs may provide useful in Minnesota, we first must run a transmission system analysis to evaluate whether each GET would be helpful and cost-effective to use. We are accountable to our customers and take pride in delivering safe, reliable, and cost-effective electric service across our entire service area, which requires

thorough evaluation of new technologies through analysis and project pilots where appropriate.

We provided an update on our investigation into using GETs in our Minnesota Service territory as part of the 2025 Biennial Transmission Projects Report (BTTPR), as required under Minn Stat. § 216B.2425 subd. 2.¹ In the balance of this section, we address Dynamic Line Ratings (DLR), system reconfiguration and optimization, and power flow controllers (PFCs).

Dynamic Line Rating

Dynamic Line Rating (DLR) is hardware or software used to calculate the thermal limit of existing transmission lines at a specific point in time by incorporating information on real-time and forecasted weather conditions. Essentially, transmission lines can handle slightly increased electric loads when the ambient temperature is cooler and wind speeds are higher, as both help cool the lines and prevent issues like sagging, collapsing, tripping off, and other integrity compromises. However, while DLRs can help lines handle some increased load, the increase is generally minimal and not a substitute for expanding transmission infrastructure.

The Company currently has one DLR project in Monticello, Minnesota. The project began in the fourth quarter of 2023, when we installed the equipment to collect transmission line ratings. We intend to analyze the data collected this year and next year to ensure the safety and reliability of the line ratings and integrity of the systems and equipment used to generate these ratings. Concurrently, we will continue to evaluate other areas of our Minnesota service territory that could benefit from DLRs.

We also provide analysis below, in Section II.B regarding our evaluation of DLR in Southwest Minnesota.² In that assessment, we reviewed 12 binding constraints and found that only two were potentially suitable for DLR because they were conductor-limited—Scott County and Wilmarth-Eastwood. After applying our screening criteria, we determined that neither were eligible for DLR because they were both caused by temporary outages and DLR is intended for more sustained, long-term conditions.³

¹ Docket No. E999/M-25-99

² We provided our preliminary analysis in our Supplemental Comments in the Nobles Substation docket. We have updated and expanded that analysis in the discussion below.

³ In our Supplemental Comments in the Nobles Substation docket, Docket No. E999/CI-24-316, we initially believed that the Wilmarth–Eastwood constraint warranted further consideration. However, we later determined that it was also not a viable DLR candidate.

Power Flow Controllers

Power Flow Controllers (PFCs) are hardware and software used to reroute electricity from overloaded transmission lines to underutilized transmission lines. We are currently reviewing presentations from companies that offer power flow controllers and are internally discussing their potential usefulness for our Minnesota service territory.

We also evaluated the potential usefulness of PFCs in southwestern Minnesota as part of our internal analysis for the Nobles Substation docket. In that review, we identified two lines that could potentially benefit from PFCs—Helena–Scott County (a historically binding constraint) and Wilmarth–Sheas Lake (a future binding constraint). However, Promod economic modeling showed that installing PFCs on these lines would simply shift congestion to other parts of the system, ultimately worsening overall grid congestion. These internal analyses were completed after our comments in the Nobles Substation docket were submitted. We subsequently discussed the results with the Department of Commerce prior to the hearing, and the Department agreed with our conclusions regarding the limited usefulness of PFCs in the region.

Topology Optimization and System Reconfiguration Requests

Topology Optimization (TO) is software that MISO uses to analyze the transmission system to identify potential switching actions—i.e., system reconfigurations—that could reroute electricity from overloaded transmission lines to underutilized ones. TO itself performs the analytical evaluation, while the resulting switching actions are the system reconfigurations that operators may choose to implement. TOs are generally requested by energy producers experiencing curtailments or outages. Before MISO established an application process in 2023, these requests were submitted directly to utilities. Today, MISO screens and evaluates these requests and refers them to local utilities when the request involves a known or suspected local grid issue.

We completed a system reconfiguration at the Hawksnest Substation in 2022, following a request submitted directly to the Company by EDF Renewables, before MISO assumed responsibility for processing these requests. We reconfigured the Hawksnest 345 kV substation by opening breaker 8N85, which helped reduce thermal loading on several lines and reduced curtailments/outages at several windfarms, including EDF Renewables' Red Pine wind farm.

Another system reconfiguration request involving our service territory in southwest Minnesota was submitted by EDF Renewables and Minnesota Power in early 2024. This request involved a temporary system reconfiguration to reduce wind farm curtailments while we upgraded two of our transmission lines. We contacted EPRI for

assistance to study the proposed request. Generally, requesters fund special study requests, and EDF Renewables initially agreed to pay for this one. However, as discussions continued, EDF Renewables withdrew its funding commitment, and thus the study was never initiated. We have since completed upgrades on the two transmission lines, and EDF Renewables' initial request only sought temporary reconfiguration while these lines were offline. Therefore, while the study might inform future area transmission considerations if these particular lines go offline again, the primary driver for EDF's request has been resolved.

We believe that topology optimization analyses—and any resulting system reconfigurations—can help alleviate congestion in the region and will continue evaluating other requests that MISO refers to us.

B. Regional and Local Transmission Studies

As outlined below, the Company has participated in seven transmission studies to help increase reliability and resolve congestion in its Minnesota service territory. These studies span over two decades and demonstrate our persistent efforts to keep expanding the capacity of our transmission grid. Below, we list these studies in chronological order with details about each one. We also note that the Company identified short-, medium-, and long-term measures we are enacting to alleviate congestion in Minnesota in our 2022 Annual Fuel Forecast and Monthly Fuel Cost Charges proceeding.⁴

Buffalo Ridge Wind (1996-1998)

Wind farms first began operating in southwestern Minnesota in the mid-1990s, and the initial Buffalo Ridge Wind study resulted in projects adding 425 megawatts (MW) of capacity to our transmission grid in the area.⁵ This was the first instance where the Company increased the transmission grid's capacity in a specific area to handle more energy than the local load. The projects resulting from this study cost almost \$70 million and included upgrading five substations, adding or upgrading more than 10 transmission lines, and adding four new transformers.

Lake Benton I and II (1999-2002)

As more wind farms were developed in southwestern Minnesota, the Company conducted the Lake Benton studies, leading to projects that upgraded the area's transmission equipment to handle a capacity of 825 MW.⁶ These projects totaled

⁴ See Compliance Filing, December 22, 2021, Docket No. E002/AA-21-295.

⁵ See <https://www.osti.gov/biblio/269373>.

⁶ See <https://lakebenton.us/windpower>.

almost \$140 million and included building two new substations, upgrading four other substations, and adding or upgrading four transmission lines.

Buffalo Ridge Incremental Generation Outlet Study (2005-2008)

This study concentrated on developing smaller scale (115-161 kilovolts (kV)) transmission lines to provide several hundred megawatts of incremental generation outlet capacity.⁷ This resulted in a capacity increase to 1,175 MW in southwestern Minnesota.

CapX2020 (2004-2017)

A group of 11 utilities serving several upper Midwest states collaborated to plan, develop, and construct new high-voltage transmission lines worth \$2.1 billion, spanning nearly 800 miles across Minnesota, Wisconsin, North Dakota, and South Dakota. This resulted in increasing capacity to 2,400 MW state-wide in Minnesota.

MISO Multi-Value Project (MVP) Portfolio (2011-2024)

This portfolio was studied and approved in 2011 as part of MISO's annual transmission expansion plan. These extensive projects helped prevent the curtailment of 11.3 gigawatts of wind energy across all states served by MISO.

MISO Transmission Expansion Plan 16 Study (2016-2021)

This study resulted in the construction of an approximately 50-mile 345 kV transmission line between the Company's Wilmarth Substation north of Mankato, Minnesota and ITC Midwest's Huntley Substation south of Winnebago, Minnesota.

MISO Long Range Transmission Planning Tranche 1 Study (2020-Present)

This study resulted in a portfolio of 18 transmission projects across MISO's region and included adding more than 2,000 miles of transmission lines to help reduce congestion and improve reliability. The study was completed in 2020, but the resulting projects are still ongoing.

C. MISO's Transmission Planning Studies

There are three studies that the Company and Minnesota Transmission Owners (MTO) are currently conducting to assess congestion and curtailment issues in southwestern Minnesota, including those resulting from the Nobles substation. Below, we discuss each study, detailing its purpose, timeline, and funding sources.

⁷ See <https://puc.sd.gov/commission/dockets/electric/2008/el08-001/f.pdf> at pages 2–5.

Nobles County Transformer Study

This study evaluated adding a third transformer to the Nobles County substation to resolve outages and ensure grid stability in southwestern Minnesota. Currently, the substation has two transformers. When one transformer is offline for routine maintenance, the remaining transformer cannot handle the increased load, leading to outages. The proposed third transformer would help prevent these outages and is projected to be in-service by February 28, 2027. The Company funded this Study and is also funding the project.

Buffalo Ridge Right Sizing Study

This study evaluated replacing an aging 115 kV transmission line with a double circuit line that includes both 115 kV and 345 kV lines. This new line will start in Murray County, just north of Nobles County, and would transfer energy from Nobles County to less congested parts of the transmission grid, reducing curtailments in the area. This double circuit line was approved by MISO's Board of Directors in December 2025 and will move into the MISO Transmission Expansion Plan (MTEP) 2025 cycle. It is expected to be in-service in the early 2030s. The Company funded this Study and will also fund the project.

Joint Targeted Interconnection Queue Study (JTIQ)

The JTIQ was a joint study by MISO and the Southwest Power Pool (SPP) to evaluate transmission solutions and identify reliability issues for interconnection projects. The study resulted in a portfolio of seven projects that would allow interconnection requests spanning multiple MISO and SPP queue cycles to connect at lower costs than through an individual queue cycle.⁸ One of these projects proposed building a new 345 kV transmission line between Lyon County and Jackson County in Minnesota.⁹ The Company is currently reconfiguring this line and proposed routing it through Chanarambie Township in southwestern Minnesota.

This line, along with the proposed line from the Buffalo Ridge Right Sizing Study, would help transfer energy from Nobles County to less congested parts of the transmission grid – reducing curtailments in the county. This project has been approved by MISO and will move into the MTEP 2025 cycle. The JTIQ Portfolio was approved by SPP's Board of Directors on December 9, 2024 and MISO's Board of Directors as part of MTEP24 on December 12, 2024. This line is expected to be in service in the early 2030s. The JTIQ was funded by MISO and SPP.

⁸ See <https://cdn.misoenergy.org/JTIQ%20Report623262.pdf>.

⁹ See <https://cdn.misoenergy.org/20240618%20PAC-RECBWG%20Item%2002%20JTIQ%20Presentation634859.pdf> at slide 9.

2023 MISO Informational Market Congestion Study

This initiative involves a near-term congestion study aimed at identifying facilities expected to experience the most congestion across MISO's region and determine necessary transmission upgrades. The Company is not leading or directly involved in this Study. Our contribution was limited to providing feedback on the Study's methodology.¹⁰ According to MISO's public presentations, the Study has identified 10 projects to upgrade transmission lines or transformers across MISO's region.¹¹ One of these projects includes upgrades to the Stone Lake 345/161 kV Transformer in southwest Minnesota, which the Company owns.¹² The Company is upgrading the Stone Lake transformer to 448 MVA with expected in-service date in the first quarter of 2027.

Xcel Energy/EPRI Study

The concept for this Study stemmed from a temporary system reconfiguration request by EDF Renewables to MISO, aiming to reduce wind farm curtailments while we performed upgrades on two of our transmission lines earlier this year. MISO denied the request due to a known local grid stability issue and asked the Company to review the request instead. With the transmission line work quickly approaching, we contacted EPRI for assistance and received a \$75,000 estimate to study the proposed request. Generally, the requestor funds external study requests. During the Company's discussions, EDF Renewables initially agreed to pay for the study but also sought to expand the scope of it. As discussions continued, EDF Renewables withdrew its funding commitment, and thus the Study was never initiated. We also completed the upgrades on the two transmission lines, and EDF Renewables' initial request only sought a temporary reconfiguration while these lines were offline. Thus, while the study might inform future stability considerations if these particular two lines go offline again, the primary driver for EDF's request has been resolved.

MISO Tranche 2.1 LRTP

This initiative refers to MISO's long-term transmission planning (LRTP) analysis. From MISO's public presentations, the Company expects that two of the approved

¹⁰ See

[https://cdn.misoenergy.org/PSC%20Stakeholder%20Comment%20on%20MTEP24%20Near%20Term%20Congestion%20Study%20\(PAC-2021-1\)_Xcel631788.pdf](https://cdn.misoenergy.org/PSC%20Stakeholder%20Comment%20on%20MTEP24%20Near%20Term%20Congestion%20Study%20(PAC-2021-1)_Xcel631788.pdf). We note that none of our suggestions were incorporated.

¹¹ See

[https://cdn.misoenergy.org/20230927%20PSC%20Item%20006%20Near%20Term%20Congestion%20Study%20\(PAC-2021-1\)630307.pdf](https://cdn.misoenergy.org/20230927%20PSC%20Item%20006%20Near%20Term%20Congestion%20Study%20(PAC-2021-1)630307.pdf) at slide 6.

¹² *Id.*

projects will help mitigate congestion in southern Minnesota.¹³ The first project involves upgrading an existing substation in southern Minnesota to a new voltage level to better handle the increased energy production.¹⁴ The second project involves building a new 765 kV transmission line from this substation to load centers in the Twin Cities, helping transfer wind power from congested areas to less congested parts of the grid.¹⁵ Tranche 2.1 was approved and projects are in various stages of approval.

D. Non-Wires Alternatives

Non-wires alternatives (NWA), have also been considered for recent projects in order to implement short-term solutions during the ongoing transmission development. This section discusses NWAs that are not GETs. Below, we describe some of our recent efforts in Minnesota.

Forman Transformer Rating Increase

We partnered with Otter Tail Power Company to evaluate and subsequently increase the emergency rating of the Forman Transformer at the substation in Forman, North Dakota.¹⁶ Although this substation is not in Minnesota, it affects congestion in this region because the Forman substation is connected to transmission lines that transfer power from this area to load centers. Increasing the emergency rating of this transformer enhances the substation's capacity. The previous emergency rating for this transformer was based on a decades-old manufacturer's recommendation using older technology. We funded a study of the transformer and the substation equipment to determine if the emergency rating could be safely increased. The evaluation confirmed that the upgrades to the substation in recent years allowed for a safe increase in the transformer's emergency rating. This, in turn, boosted the energy capacity of the Forman substation, reducing curtailments at wind farms in southwestern Minnesota. This project was completed in the first quarter of 2021.

Wilmarth-Swan Lake Transmission Line Rating Increase

We increased the ratings on this line by adjusting our water clearance marks to reflect short-term flood forecasts. Lines with increased ratings can carry more electricity. The original ratings for this line were based on the 100-year floodplain levels for the area because we could not accurately forecast flood levels every year. Because we can now accurately forecast floods for the upcoming year, we adjusted the line rating

¹³ See

<https://cdn.misoenergy.org/20240315%20LRTP%20Workshop%20Tranche%202%20Anticipated%20Portfolio632013.pdf> at slide 6.

¹⁴ *Id.*

¹⁵ *Id.*

¹⁶ Otter Tail Power Company owns the substation where this transformer is located.

accordingly. The rating on this line has been increased, except when a flood is forecasted, in which case we decrease the rating. This project was completed in the third quarter of 2024.

Scott County-Blue Lake Transmission Line Meter Upgrades

We increased capacity on a 345 kV transmission line between Scott County and Blue Lake by removing an old meter that had a maximum reading below what the connecting substation could handle. Removing this old meter did not affect the safety or reliability of this line or connected substation. This project was completed in the third quarter of 2022.

Battery Storage

We are currently conducting an internal study to determine substations that would most benefit from battery storage to ease generation restraints. After we decide whether and if so, which substations to focus on, we will evaluate what battery size is needed to help ease capacity generation constraints. We will prioritize installing battery storage sites at areas experiencing the most generation constraints.

We provided updates in our 2025 Minnesota Biennial Transmission Projects Report (BTTPR) in Docket No. E999/M-25-99. That report specifically discusses the Nobles County Congestion Analysis where Xcel Energy Transmission Planning performed a screening system impact study (SIS) to evaluate voltage stability benefits of a future battery energy storage system (BESS) to the local area around the Nobles 115/345 kV station.

E. Ambient and Wind Adjusted Ratings

DLRs help alleviate thermal constraints on transmission lines that are limited by the conductor. We currently use an internal tool that provides ambient, or temperature-adjusted, ratings for all our transmission lines that are 115 kilovolts or higher.

When there is too much generation for the transmission grid in the area to handle, MISO communicates with utilities to confirm line ratings before binding transmission facilities to limit generation and maintain grid stability. When MISO informs us that our facilities may be affected, we provide them with ambient-adjusted ratings, which adjust the line ratings based on the forecasted high temperature for the day. This allows for increased line ratings, resulting in reducing congestion. For the Chanarambie-Pipestone and Pipestone-Split Rock lines, we also provide wind-adjusted line ratings based on assumed wind speed for lines. When the temperature is cooler and/or the wind speed is higher, our tools help us inform MISO that the line ratings can be increased, thus limiting or eliminating binding of our facilities.

While we do not broadly employ DLR, our long-standing practices achieve similar results. The ambient-adjusted ratings we provide to MISO help alleviate congestion when temperature conditions permit.

II. STRATEGY IMPLEMENTATION AND PROJECT ASSESSMENT AND ANALYSIS

The Company conducts ongoing assessments to evaluate whether potential projects or strategies could alleviate or resolve congestion within Minnesota. Order Point 6(b) requires the Company to provide a cost-benefit analysis (CBA) for each strategy or explain why a CBA cannot be performed. This section explains why a CBA is not feasible for many of the mitigation measures discussed above—including various GETs and NWAs—and describes the types of qualitative and technical evaluations the Company performs in place of a full CBA.

A. Cost-Benefit Analysis

A CBA was not performed for any of the congestion-relief strategies listed above because the projects lacked quantifiable benefits, sufficient data, or the maturity needed to support a monetized analysis. In several cases, subsequent assessments also demonstrated limited or no congestion-relief potential, making further analysis inappropriate. The primary reasons a CBA could not be completed are outlined below.

1. Benefits Cannot Be Quantified or Monetized

Many early-stage congestion-relief strategies—particularly those involving emerging technologies like GETs—produce benefits that are qualitative, policy-driven, or exploratory. These include operational learning, innovation value, and alignment with long-term energy policy goals, which are difficult to assign defensible dollar values.

For example, in the Minnesota DLR pilot, the primary near-term benefits were non-monetary: (i) establishing data-collection methods and telemetry standards across three vendors; (ii) developing operating procedures for integrating dynamic ratings alongside our existing seasonal and ambient-adjusted ratings; and (iii) training system planners and operators to interpret and act on DLR outputs. Because our system already uses seasonal/ambient ratings, incremental capacity gains were uncertain, and the project's immediate value lay in learning and process development rather than measurable, persistent congestion relief. Those learning benefits are real but not readily monetizable in a way that would produce a meaningful CBA.

2. *Projects Not Yet Mature (Pilots or Exploratory Stage)*

A defensible CBA requires a well-defined project scope, credible cost estimates, validated performance data, and stable operating assumptions. Pilot programs rarely meet these criteria. In Minnesota, the DLR pilot illustrates this challenge. The pilot footprint and use cases evolved throughout the testing period because most congested facilities in Minnesota are not significantly limited by conductor ratings. Costs varied widely among vendors and site conditions, and performance results focused on data quality and feasibility rather than predictable, repeatable congestion benefits. Integration requirements—including new data streams, alarm thresholds, and operator protocols—also remained in development. Because the pilot’s purpose was to determine feasibility rather than deliver measurable congestion relief, advancing to a CBA would have required assumptions not supported by stable evidence.

3. *No Suitable Lines or Facilities*

A CBA also requires credible inputs, including identifiable transmission lines or facilities where a mitigation strategy could produce measurable benefits. When no such locations exist, a CBA cannot be meaningfully performed. For example, in our internal analysis of potential DLR and PFC applications in southwest Minnesota, we were unable to identify any suitable candidates. Although two lines in the region were technically conductor-limited and therefore initially screened as DLR-eligible, both constraints were caused by temporary outages, making them unsuitable because DLR is intended for longer-term, recurring conditions. Likewise, while two constraints appeared initially eligible for PFCs, modeling showed that installing PFCs would simply shift congestion to other parts of the grid, ultimately worsening overall system performance. In the absence of facilities where these technologies could produce net system benefits, a CBA could not be performed.

4. *Many Projects are Too Small to Justify a CBA*

Conducting a CBA requires substantial analytical resources, including detailed modeling, load-flow analysis, scenario development, engineering review, and cost estimation. These studies can take months to complete and require coordination across planning, engineering, operations, and finance teams. Many of the incremental congestion-relief strategies we pursue—such as targeted GET’s installations, NWAs, or small operational adjustments—are relatively modest in scale and limited in duration, making the effort required for a full CBA disproportionate to the scope of the project.

For example, the Scott County–Blue Lake 345 kV meter upgrade simply involved removing an older meter that constrained the line below what the substation could support; the work was completed quickly in Q3 2022 and provided incremental capacity without requiring complex study. Similarly, the Wilmarth–Swan Lake rating increase involved adjusting clearance assumptions based on improved flood-forecasting capabilities, allowing higher ratings except when flood conditions are predicted; this operational adjustment was completed in the third quarter of 2024. For projects like these—small, targeted, and operational in nature—a qualitative assessment of feasibility and system impact provides a more practical and proportionate evaluation approach than a resource-intensive monetized study.

5. *Use of EnCompass Modeling Instead of CBAs*

In addition to qualitative assessments, the Company also conducts EnCompass modeling in place of a traditional CBA for certain projects—such as the Nobles battery project. EnCompass allows the Company to assess system-level production cost impacts, curtailment reductions, operational value, and overall grid interactions under a variety of load, generation, and transmission conditions. Because the benefits of projects like the Nobles battery depend on how they perform within the broader system rather than on isolated project-level economics, EnCompass modeling provides a more appropriate and comprehensive analytical framework than a stand-alone CBA. This approach helps ensure that the Company evaluates resource additions based on their total contribution to system operations and customer benefits.

B. Sample Qualitative Project Assessment

Our DLR internal evaluation, first conducted as part of the Nobles Substation docket and updated below, illustrates our assessment process. We did not perform a CBA for these efforts because the projects did not advance to a viable, ongoing deployment. After identifying candidate locations and conducting targeted testing, results did not demonstrate the expected congestion-relief benefits, so we did not proceed further.

As part of this work, we reviewed the most impactful constraints in southwestern Minnesota to determine whether DLR could help, considering both day-ahead and real-time binding constraints. We identified a total of 12 constraints. We also examined the causes of these constraints and identified four categories: (1) stability constraints, (2) thermal constraints on transformers, (3) thermal constraints on transmission lines limited by the conductor, and (4) thermal constraints on transmission lines limited by substation equipment. Table 1 below shows the number of constraints in each category.

Table 1¹⁷
Constraint Summary – Southwest Minnesota

Constraint Cause	Number of Constraints	Applicability of DLR
Stability	1	No. These constraints are generally caused by voltage-limit concerns, not thermal limits of transmission lines.
Thermal – Transformer	6	No. DLR is not applicable to these constraints as they are designed for use on transmission lines.
Thermal – Line (Conductor Limited)	2	Yes. DLR has the potential to help these constraints if they meet certain criteria.
Thermal – Line (Substation Limited)	3	No. DLR is not applicable to these constraints as they are designed for use on transmission lines.

As Table 1 outlines, DLR has the potential to address thermal constraints on transmission lines that are limited by the conductor. Our analysis identified two constraints in this category: (1) Wilmarth-Eastwood, and (2) Scott County-Scott County Tap. Since both constraints were related to transmission outages, we believed DLRs may be helpful if one of these three criteria is met:

- 1) a specific outage frequently occurs on a certain line,
- 2) there is a future long-term planned outage on a certain line, or
- 3) a certain line is expected to become a binding constraint as future transmission facility and line upgrades are completed.

Unfortunately, neither constraint satisfied these criteria as they were driven by temporary outages, so neither was suitable for DLR. In other words, these two thermal constraints were not caused by a specific outage that frequently occurs, there is no future long-term planned outage, and neither constraint involves transmission lines expected to become a binding constraint as future transmission facility and line upgrades are completed.

This assessment demonstrates how we use targeted technical evaluations to explore fast-implementing solutions for potential congestion relief. Although a CBA was not performed, we considered the practical costs and benefits at each step and will

¹⁷ Table 1 provides a summary of constraints in southwestern Minnesota based on the day-ahead market.

undertake formal, monetized analysis when a strategy matures, shows persistent system benefit, and meets the thresholds for broader deployment.

CERTIFICATE OF SERVICE

I, Victor Barreiro, hereby certify that I have this day served copies of the foregoing document on the attached list of persons.

xx by depositing a true and correct copy thereof, properly enveloped with postage paid in the United States mail at Minneapolis, Minnesota

xx electronic filing

Docket No. **E002/AA-24-63**

Dated this 4th day of March 2026

/s/

Victor Barreiro
Regulatory Administrator

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14	Ian M.	Dobson	ian.m.dobson@xcelenergy.com	Xcel Energy		414 Nicollet Mall, 401-8 Minneapolis MN, 55401 United States	Electronic Service		Yes	24-63AA-24-63
15	Richard	Dornfeld	richard.dornfeld@ag.state.mn.us		Office of the Attorney General - Department of Commerce	Minnesota Attorney General's Office 445 Minnesota Street, Suite 1800 Saint Paul MN, 55101 United States	Electronic Service		No	24-63AA-24-63
16	Christopher	Droske	christopher.droske@minneapolismn.gov	Northern States Power Company dba Xcel Energy-Elec		661 5th Ave N Minneapolis MN, 55405 United States	Electronic Service		No	24-63AA-24-63
17	Brian	Edstrom	briane@cubminnesota.org	Citizens Utility Board of Minnesota		332 Minnesota St Ste W1360 Saint Paul MN, 55101 United States	Electronic Service		No	24-63AA-24-63
18	Rebecca	Eilers	rebecca.d.eilers@xcelenergy.com	Xcel Energy		414 Nicollet Mall - 401 7th Floor Minneapolis MN, 55401 United States	Electronic Service		Yes	24-63AA-24-63
19	John	Farrell	jfarrell@ilsr.org	Institute for Local Self-Reliance		2720 E. 22nd St Institute for Local Self-Reliance Minneapolis MN, 55406 United States	Electronic Service		No	24-63AA-24-63
20	Sharon	Ferguson	sharon.ferguson@state.mn.us		Department of Commerce	85 7th Place E Ste 280 Saint Paul MN, 55101-2198 United States	Electronic Service		No	24-63AA-24-63
21	Lucas	Franco	lfranco@liunagroc.com	LIUNA		81 Little Canada Rd E Little Canada MN, 55117 United States	Electronic Service		No	24-63AA-24-63
22	Edward	Garvey	garveyed@aol.com	Residence		32 Lawton St Saint Paul MN, 55102 United States	Electronic Service		No	24-63AA-24-63
23	Allen	Gleckner	agleckner@elpc.org	Environmental Law & Policy Center		35 E. Wacker Drive, Suite 1600 Suite 1600 Chicago IL, 60601 United States	Electronic Service		No	24-63AA-24-63
24	Matthew B	Harris	matt.b.harris@xcelenergy.com	XCEL ENERGY		401 Nicollet Mall FL 8 Minneapolis MN, 55401 United States	Electronic Service		Yes	24-63AA-24-63
25	Shubha	Harris	shubha.m.harris@xcelenergy.com	Xcel Energy		414 Nicollet Mall, 401 - FL 8 Minneapolis MN, 55401 United States	Electronic Service		Yes	24-63AA-24-63

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26	Amber	Hedlund	amber.r.hedlund@xcelenergy.com	Northern States Power Company dba Xcel Energy-Elec		414 Nicollet Mall, 401-7 Minneapolis MN, 55401 United States	Electronic Service		No	24-63AA-24-63
27	Adam	Heinen	aheinen@dakotaelectric.com	Dakota Electric Association		4300 220th St W Farmington MN, 55024 United States	Electronic Service		No	24-63AA-24-63
28	Katherine	Hinderlie	katherine.hinderlie@ag.state.mn.us		Office of the Attorney General - Residential Utilities Division	445 Minnesota St Suite 1400 St. Paul MN, 55101-2134 United States	Electronic Service		No	24-63AA-24-63
29	Michael	Hoppe	lu23@ibew23.org	Local Union 23, I.B.E.W.		445 Etna Street Ste. 61 St. Paul MN, 55106 United States	Electronic Service		No	24-63AA-24-63
30	Frank	Hornstein	frank.hornstein@minneapolismn.gov	City of Minneapolis		350 South 5th Street Minneapolis MN, 55415 United States	Electronic Service		No	24-63AA-24-63
31	Alan	Jenkins	aj@jenkinsatlaw.com	Jenkins at Law		2950 Yellowtail Ave. Marathon FL, 33050 United States	Electronic Service		No	24-63AA-24-63
32	Richard	Johnson	rickjohnson@cozen.com	Cozen O'Connor		150 S. 5th Street Suite 1200 Minneapolis MN, 55402 United States	Electronic Service		No	24-63AA-24-63
33	Sarah	Johnson Phillips	sjphillips@stoel.com	Stoel Rives LLP		33 South Sixth Street Suite 4200 Minneapolis MN, 55402 United States	Electronic Service		No	24-63AA-24-63
34	Michael	Krikava	mkrikava@taftlaw.com	Taft Stettinius & Hollister LLP		2200 IDS Center 80 S 8th St Minneapolis MN, 55402 United States	Electronic Service		No	24-63AA-24-63
35	Carmel	Laney	carmel.laney@stoel.com	Stoel Rives LLP		33 South Sixth Street Suite 4200 Minneapolis MN, 55402 United States	Electronic Service		No	24-63AA-24-63
36	Annie	Levenson Falk	annielf@cubminnesota.org	Citizens Utility Board of Minnesota		332 Minnesota Street, Suite W1360 St. Paul MN, 55101 United States	Electronic Service		No	24-63AA-24-63
37	Ryan	Long	ryan.j.long@xcelenergy.com			414 Nicollet Mall 401 8th Floor Minneapolis MN, 55401 United States	Electronic Service		Yes	24-63AA-24-63
38	Alice	Madden	alice@communitypowermn.org	Community Power		2720 E 22nd St Minneapolis	Electronic Service		No	24-63AA-24-63

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39	Kavita	Maini	kmaini@wi.rr.com	KM Energy Consulting, LLC		961 N Lost Woods Rd Oconomowoc WI, 53066 United States	Electronic Service		No	24-63AA-24-63
40	Christine	Marquis	regulatory.records@xcelenergy.com	Xcel Energy		414 Nicollet Mall MN1180-07-MCA Minneapolis MN, 55401 United States	Electronic Service		Yes	24-63AA-24-63
41	Mary	Martinka	mary.a.martinka@xcelenergy.com	Xcel Energy Inc		414 Nicollet Mall 7th Floor Minneapolis MN, 55401 United States	Electronic Service		Yes	24-63AA-24-63
42	Erica	McConnell	emcconnell@elpc.org	Environmental Law & Policy Center		35 E. Wacker Drive, Suite 1600 Chicago IL, 60601 United States	Electronic Service		No	24-63AA-24-63
43	Andrew	Moratzka	andrew.moratzka@stoel.com	Stoel Rives LLP		33 South Sixth St Ste 4200 Minneapolis MN, 55402 United States	Electronic Service		No	24-63AA-24-63
44	Christa	Moseng	christa.moseng@state.mn.us		Office of Administrative Hearings	P.O. Box 64620 Saint Paul MN, 55164-0620 United States	Electronic Service		No	24-63AA-24-63
45	David	Niles	david.niles@avantenergy.com	Minnesota Municipal Power Agency		220 South Sixth Street Suite 1300 Minneapolis MN, 55402 United States	Electronic Service		No	24-63AA-24-63
46	Carol A.	Overland	overland@legalelectric.org	Legalelectric - Overland Law Office		1110 West Avenue Red Wing MN, 55066 United States	Electronic Service		No	24-63AA-24-63
47	Generic Notice	Residential Utilities Division	residential.utilities@ag.state.mn.us		Office of the Attorney General - Residential Utilities Division	1400 BRM Tower 445 Minnesota St St. Paul MN, 55101-2131 United States	Electronic Service		Yes	24-63AA-24-63
48	Kevin	Reuther	kreuther@mncenter.org	MN Center for Environmental Advocacy		26 E Exchange St, Ste 206 St. Paul MN, 55101-1667 United States	Electronic Service		No	24-63AA-24-63
49	Amanda	Rome	amanda.rome@xcelenergy.com	Xcel Energy		414 Nicollet Mall FL 5 Minneapolis MN, 55401 United States	Electronic Service		Yes	24-63AA-24-63
50	Joseph L	Sathe	jsathe@kennedy-graven.com	Kennedy & Graven, Chartered		150 S 5th St Ste 700 Minneapolis MN, 55402 United States	Electronic Service		No	24-63AA-24-63
51	Elizabeth	Schmiesing	eschmiesing@winthrop.com	Winthrop & Weinstine,		225 South Sixth Street	Electronic Service		No	24-63AA-

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52	Peter	Scholtz	peter.scholtz@ag.state.mn.us		Office of the Attorney General - Residential Utilities Division	Suite 1400 445 Minnesota Street St. Paul MN, 55101-2131 United States	Electronic Service		No	24- 63AA- 24-63
53	Janet	Shaddix Elling	jshaddix@janetshaddix.com	Shaddix And Associates		7400 Lyndale Ave S Ste 190 Richfield MN, 55423 United States	Electronic Service		No	24- 63AA- 24-63
54	Joshua	Smith	joshua.smith@sierraclub.org			85 Second St FL 2 San Francisco CA, 94105 United States	Electronic Service		No	24- 63AA- 24-63
55	Ken	Smith	ken.smith@districtenergy.com	District Energy St. Paul Inc.		76 W Kellogg Blvd St. Paul MN, 55102 United States	Electronic Service		No	24- 63AA- 24-63
56	Beth	Soholt	bsoholt@cleangridalliance.org	Clean Grid Alliance		570 Asbury Street Suite 201 St. Paul MN, 55104 United States	Electronic Service		No	24- 63AA- 24-63
57	Byron E.	Starns	byron.starns@stinson.com	STINSON LLP		50 S 6th St Ste 2600 Minneapolis MN, 55402 United States	Electronic Service		No	24- 63AA- 24-63
58	Scott	Strand	sstrand@elpc.org	Environmental Law & Policy Center		60 S 6th Street Suite 2800 Minneapolis MN, 55402 United States	Electronic Service		No	24- 63AA- 24-63
59	Carla	Vita	carla.vita@state.mn.us	MN DEED		Great Northern Building 12th Floor 180 East Fifth Street St. Paul MN, 55101 United States	Electronic Service		No	24- 63AA- 24-63
60	Joseph	Windler	jwindler@winthrop.com	Winthrop & Weinstine		225 South Sixth Street, Suite 3500 Minneapolis MN, 55402 United States	Electronic Service		No	24- 63AA- 24-63
61	Kurt	Zimmerman	kwz@ibew160.org	Local Union #160, IBEW		2909 Anthony Ln St Anthony Village MN, 55418-3238 United States	Electronic Service		No	24- 63AA- 24-63
62	Patrick	Zomer	pzomer@cozen.com	Cozen O'Connor		150 S. 5th Street, #1200 Minneapolis MN, 55402 United States	Electronic Service		No	24- 63AA- 24-63