



Minnesota Department of Commerce Grid Assessment Report

Pursuant to Minnesota Statute 216B.62 Subd. 3b(b)

February 1, 2023

Table of Contents

Contents

Table of Contents	2
Executive Summary	3
Department of Commerce Overview	5
Electric System Reliability: Definitions and Risks	10
Electric System Reliability: Planning	12
State Level Planning Activities	12
Regional Level Planning Activities	16
National Level Planning Activities	18
Electric System Reliability: Preparedness	20
State Level Preparedness Activities.....	20
Regional Level Preparedness Activities	22
National Level Preparedness Activities	23
Electric System Reliability: Response	24
State Level Response Activities	24
Regional and National Response Activities	25
Conclusion	26

Executive Summary

This report describes how the Minnesota Department of Commerce (Commerce) has used the grid reliability funding provided under Minnesota Statutes § 216B.62, subdivision 3b, paragraph(a)—and the impact these activities have had on grid reliability in Minnesota.

The report defines what reliability means in the context of the bulk electric system and summarizes the various reliability roles and responsibilities at the state, regional, and federal level. Next, the report summarizes definitions of reliability and a high-level description of risks to the system. Finally, the report describes Commerce’s grid reliability efforts through a framework of (1) planning, (2) preparedness, and (3) response.

In Minnesota, Commerce helps address the reliability implications of resource decisions in individual dockets in front of the Minnesota Public Utilities Commission and takes no position on the best ways to address these risks in this report. The report does include a summary of recent generation and transmission dockets that have addressed reliability-related issues.

Roles and Responsibilities

Before the late 1970s, individual utilities owned and operated their own generation, transmission, and distribution facilities. Starting in 1978, the U.S. Congress passed several laws aimed at encouraging non-utility generators to compete in wholesale electricity markets. Then, in 1996, the Federal Energy Regulatory Commission (FERC) issued a series of orders that encouraged (but did not require) transmission owning utilities to form and join “regional transmission organizations” or RTOs—such as the Midcontinent Area Independent System Operator (MISO). These RTOs would not own but would operate and provide open access to the utility’s transmission system. Nearly all Minnesota electric utilities are now part of MISO.

As a result, many of the critical decisions regarding bulk energy-system reliability and planning in Minnesota occur at the regional level, at MISO, or at the federal agency that regulates MISO— FERC. Commerce, in cooperation with the Minnesota Public Utilities Commission (PUC), therefore, participates actively in MISO and FERC decision-making processes on its own or as part of multi-state advocacy organizations. The report briefly summarizes the roles of Commerce, PUC, FERC, MISO, as well as other relevant entities such as the North American Electric Reliability Corporation (NERC), and our electric utilities. NERC, for example, is responsible for developing the federal bulk electric system reliability standards and guidelines, under FERC oversight.

Evolving Risks

Maintaining the reliability of the high-voltage transmission system has been—and will continue to be—an important component of a successful transition to low-carbon electricity generation. The high-voltage transmission system’s reliability has always been subject to severe weather, large unplanned generator outages, and other risks. Recently, however, the risks are evolving due to generation resource and technology change, increasing severe weather events, transmission constraints, physical and cyber-attacks, new electrification of end-uses, and greater awareness of electricity generation’s environmental impacts.

Many of these issues are addressed at the regional and federal level—not state by state—because the high-voltage transmission system is not confined to the four corners of the state of Minnesota. Therefore, Commerce actively participates in regional and national forums. In addition, activities occur at the state level that contribute to the strength and reliability of the overall grid. This context is important to understanding the complexities of ensuring a reliable electric grid and the importance of Minnesota having a strong public advocate in matters that affect system reliability.

Reliability Planning

Commerce places greater emphasis on grid reliability planning, but preparedness and response functions are also critical, as summarized below. Regarding planning, Commerce relies on staff with various specialties to participate in technical, policy, and planning proceedings at FERC, MISO, and the PUC.

For example, at the regional level, over the last two years, Commerce and the PUC continued to advocate at MISO for long-range transmission planning. In July 2022, MISO approved an initial group of 17 new regional “backbone” transmission line projects to help ensure the reliable and efficient operation of the transmission grid in the Upper Midwest. Three of these projects are in Minnesota. Planning is ongoing for a second group of high-voltage transmission projects in the northern part of MISO.

Commerce also participates in individual cases and policy decisions at MISO and FERC either as part of a regional organization—such as the Organization of MISO States—or separately. For example, Commerce has participated in a variety of recent MISO initiatives to address long-term resource adequacy needs and reliability criteria, including a new seasonal resource adequacy construct.

At the state level, in addition to these regional and federal efforts, the report also briefly describes Commerce’s extensive participation in utility planning dockets that have addressed resource adequacy and reliability.

Reliability Preparedness and Response

In addition to reliability planning, the State of Minnesota and Commerce help respond to grid reliability events, either through activities that prepare for energy related emergencies or by undertaking activities that bolster grid resilience. Commerce plays a supporting role to many others at the state, regional, and federal level charged with emergency preparedness, management, and response. These responsibilities are defined in state statute and executive order and are summarized in this report.

For example, on November 15, 2021, President Biden signed into law the \$1.2 trillion Infrastructure Investment and Jobs Act (IIJA). Many of the key provisions provide an opportunity for Minnesota to build a stronger, more resilient grid that can withstand grid reliability associated risks. Therefore, Commerce staff are making efforts to take advantage of the funding opportunities that specifically address bulk electricity system concerns as well as the advancement of the distributed generation technologies to build resilience into the grid.

Impact on Reliability

In summary, Commerce actively participates in regional and federal efforts to understand and respond to reliability issues and related resource adequacy policies. Recently, NERC emphasized that effective regional transmission and integrated resource planning processes are the key to managing the pace of resource change in a manner that minimizes energy risks and other elements that are essential for a reliable grid. An activity Commerce prioritizes in its daily efforts.

Commerce approaches its grid reliability work through a framework of planning, preparedness, and response at the state, regional, and federal level. Most of Commerce staff time is spent on reliability planning activities, including (1) providing analysis for state-level decisions such as integrated resource plans, utility resource acquisition proposals, state energy security planning, and (2) participating in regional and national decisions that affect resource adequacy, transmission planning, and other aspects of grid reliability—at both MISO and at FERC.

Additional responsibilities that fall under the preparedness and response functions include real-time system monitoring for elevated risks, participating in and observing preparedness tabletop exercises, involvement with national trade organizations, and duties associated with emergency response as assigned through executive orders. All these efforts contribute to grid reliability in Minnesota.

Department of Commerce Overview

Mission

For more than 150 years, the Minnesota Department of Commerce and its predecessor agencies have served Minnesotans. Our mission is to protect and assist consumers, to ensure a strong, competitive, and fair marketplace, and to engage people and communities across the state.

Strategic Priorities

- Protect the public interest through consumer protection, consumer education, assistance to consumers, safety, health, and financial security, and lowering inequities.
- Serve as a trusted public resource for consumers and businesses by listening and learning from the Minnesotans Commerce services, being effective stewards of public resources, advocating for Minnesota consumers and develop a policy, programmatic, and regulatory environment that meets their needs.
- Reduce economic barriers within Commerce regulatory oversee and reduce disparities within those of all races, ethnicities, religions, economic statuses, gender identities, sexual orientations, (dis)abilities, and zip codes.
- Ensure all, especially historically disadvantaged Minnesotans, are resilient to Minnesota's climate and engaged in advancing efforts to mitigate climate change.
- Ensure a strong, competitive, and fair marketplace for Minnesotans.

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Report to the Minnesota Legislature

The Minnesota Department of Commerce, Division of Energy Resources (Commerce or the Department) submits the following report pursuant to Minnesota Statutes 216B.62, subdivision 3b. Pursuant to Minnesota Statutes 3.197: This report cost approximately \$3,850 to prepare, including staff time.

Under Minnesota Statutes 216A.07, subdivision 3a., the Department of Commerce is responsible for representing the interests of Minnesota residents, businesses, and governments before bodies and agencies outside the state that implement regional, national, and international energy policy and that regulate and implement regional or national energy planning or infrastructure development.

Additionally, Minnesota Statutes 216B.62, subdivision 3b, paragraph (a) allows the Department of Commerce to assess up to \$500,000 per fiscal year to perform the duties outlined in Minnesota Statute 216.07, subdivision 3a and to conduct

analysis that assesses energy grid reliability at state, regional, and national levels. Minn. Stat. § 216B.62, subd. 3b, paragraph (b) further requires that by February 1, 2023, the commissioner of commerce must submit a written report to the chairs and ranking minority members of the legislative committees with primary jurisdiction over energy policy. The report must describe how Commerce has used utility grid assessment funding under paragraph (a) and must explain the impact the grid assessment funding has had on grid reliability in Minnesota.

With the aforementioned authority to assess utilities and perform certain duties, Commerce has used this funding to provide for staffing that fulfills the outlined responsibilities. Historically, this funding supports the equivalent of three full-time employees; Commerce approaches the grid assessment related work through a framework of planning, preparedness, and response. For the assessment, approximately 80% of the funding is used for planning, 15% for preparedness, and 5% for response. This includes all activities under this framework at the state, regional, and federal level.

Electric System Reliability

Introduction

The primary goals of electricity system planning are affordability, sustainability, and reliability.¹ The Department of Commerce has a variety of responsibilities, through regulatory and programmatic functions, that support balancing these three components of electricity system planning. The focus of this report is on one of these goals: reliability. Broadly, grid reliability refers to the electric system's ability to supply and deliver enough energy to meet consumer demand. This report focuses on the bulk electric system's reliability and Commerce's efforts to advance the interests of residents, businesses, and governments in reliability related matters. Commerce's activities have centered on a framework of planning, preparedness, and response to electric system reliability issues through activities at the state, regional, and national levels.

Understanding the context of overall electric system reliability helps put the issue of the bulk electric system's reliability into perspective. For example, most Minnesotans are used to periodic, short-term electricity disruptions on the low-voltage distribution system due to local events like ice storms. Those sorts of disruptions are much more common than wide-scale disruptions to the regional high-voltage transmission system. Totally eliminating localized distribution-level outages due to these circumstances is typically not feasible due to the ratio of cost to benefit so most live with periodic disruptions. Similarly, providing 100% reliability on the high-voltage transmission system, otherwise known as the bulk electric system, would be expensive and therefore must be balanced with the costs that ultimately impact customer utility bills.

The emergence of new electric generation technologies, the growing number of severe weather events, and increasing awareness of the environmental impacts of electricity generation, transmission, and distribution are driving new challenges in electricity system planning. Many of these issues are addressed at the regional and federal level—not state by state—because the electric grid is not confined to the four corners of the state of Minnesota. However, some activities occur at the state level that can contribute to the strength and reliability of the overall grid.

In Minnesota, Commerce helps address the reliability implications of resource decisions in individual dockets in front of the Minnesota Public Utilities Commission and takes no position on the best ways to address reliability risks raised in this report. A summary of recent generation and transmission dockets that support grid reliability in Minnesota is provided later in this report.

The first section of this report summarizes the various roles and responsibilities of different actors at the state, regional, and federal level as it relates to electricity system reliability, grid reliability in the context of the bulk electric system, as well as a high-level summary of risks to the electricity delivery system. The rest of this report is divided into the following sections that describe Commerce's efforts to support grid reliability:

- Electric System Reliability Planning
- Electric System Reliability Preparedness
- Electric System Reliability Response

The purpose of this report is to further detail the responsibilities and activities of Commerce to ensure Minnesotans are represented in venues that could impact grid reliability and ultimately their livelihoods. The report's conclusion will summarize Commerce's activities related to grid reliability, the impact of these activities and why the grid assessment funding continues to be critical to ensuring the public interest is served.

¹ [ESIG Redefining Resource Adequacy for Modern Power Systems 2021](#)

Federal, State, Regional, and Utility Roles and Responsibilities

Minnesota is part of a regional, national, and international electricity delivery system. While this report is focused on outlining Commerce’s activities pursuant to the grid assessment funding, it is important to recognize there are numerous entities at a state, regional, and federal level that have an impact on grid reliability. Below is an overview of some of the key actors:

- **Federal Energy Regulatory Commission (FERC)** – FERC is an independent agency that regulates interstate transmission of natural gas, oil, and wholesale sales of electricity.² FERC approves wholesale electric transmission tariffs that encourage companies to build electric transmission infrastructure which is critical to electricity delivery and reliability. This agency has regulatory authority over multiple entities that establish and enforce reliability standards, including the North American Electric Reliability Corporation and regional transmission operators such as the Midcontinent Independent System Operator.
- **North American Electric Reliability Corporation (NERC)** – NERC is a not-for-profit regulatory authority comprised of six regional entities with a mission to “assure the effective and efficient reduction of risks to the reliability and security of the grid.”³ NERC develops and enforces reliability standards, assesses seasonal and long-term reliability, monitors the bulk transmission system, and provides professional and technical training for industry personnel.⁴ NERC reliability standards define the planning and operating requirements for the bulk transmission system which impacts how the regional transmission system operates and the utilities that provide generation and capacity for those regional markets. NERC falls under the regulatory jurisdiction of the FERC.
- **Midwest Reliability Organization (MRO)** – In 2007, FERC approved delegation agreements between NERC and six (6) Regional Entities that carry out certain grid reliability functions—including monitoring and enforcing compliance for reliability standards—within specific geographic areas. As one of these Regional Entities, MRO ensures compliance with mandatory reliability standards by entities who use, own, or operate the North American bulk power system, including these entities located in Minnesota. MRO conducts assessments of the grid’s ability to meet demand in this region as well as provides analysis of regional system events. MRO provides open forums for stakeholders in the region to address risk and improve operations for grid reliability.⁵
- **Regional Transmission Organizations (RTOs)** – RTOs aim to provide efficient and reliable transmission of power through the bulk electric transmission system. Most of Minnesota’s electricity providers are members of one of these RTOs: the Midcontinent Independent System Operator, also known as MISO. MISO was established following FERC Order 2000. Two small areas of western Minnesota participate in a neighboring RTO, the Southwest Power Pool (SPP).⁶ MISO is primarily responsible for planning and operating the high-voltage transmission system in our region. MISO is a non-profit organization that manages the generation and transmission of high-voltage electricity across 15 states and the Canadian province of Manitoba.⁷ MISO has extensive stakeholder processes to ensure a collaborative and transparent space that enables low-cost, efficient, and reliable services. The Minnesota Public Utilities Commission and the Department of Commerce actively participate in the MISO decisions, in part, through participation in the Organization of MISO States—or OMS. The OMS represents the collective interests of state and local utility regulators in the MISO region.
- **Electric Utilities** - There are three (3) investor-owned (IOU) electric utilities in Minnesota; forty-four distribution

² <https://www.ferc.gov/what-ferc-does>

³ <https://www.nerc.com/Pages/default.aspx>

⁴ <https://www.nerc.com/AboutNERC/Pages/default.aspx>

⁵ <https://www.mro.net/about/>

⁶ <https://www.spp.org/about-us/>

⁷ <https://www.misoenergy.org/about/>

cooperatives served by five generation & transmission (G&T) providers; over 125 municipal electric utilities served by five municipal power agencies (aggregators or G&Ts) with approximately thirty independent municipal utilities.⁸ As described above, nearly all owners of generation and transmission assets in Minnesota participate in the regional transmission system managed by MISO and a small part of the state with SPP. The RTOs ensure compliance with NERC and FERC standards and requirements that impact system reliability. There are four rate-regulated electric utilities (Xcel Energy, Minnesota Power, Ottertail Power and Dakota Electric Association) under the regulatory authority of the Minnesota Public Utilities Commission. Utilities are primarily responsible for meeting applicable reliability standards established and enforced under the above authorities.

- **Public Utilities Commission (PUC)** – The PUC is a state regulatory body that, among other responsibilities sets rates and terms of service for rate-regulated electric utilities. The PUC is a decision-making authority that balances the need for safe and reliable utility services while ensuring the reasonable cost of providing that service.⁹ The PUC reviews and approves petitions for large energy infrastructure projects including electricity generation and transmission as well as utilities’ long-term plans for electricity generation that can impact system reliability. The PUC’s authority and responsibilities are established by the state legislature through Minnesota Statute, specifically Chapter 216.¹⁰ Additionally, various Commissioners and staff at the PUC participate in the Organization of MISO States (OMS), represent Minnesota’s interests on various reliability related committees at MISO, NERC, NARUC. The PUC also holds routine meetings with MISO and utilities to specifically address issues within the bulk power system and concerns related to grid reliability and security.
- **Department of Commerce (Commerce or the Department)** – Commerce, among other responsibilities, advocates for the public interest in proceedings before the PUC. As part of this advocacy, Commerce staff investigate regulated utility matters and provides objective financial and economic analysis on behalf of the public and makes recommendations to the PUC to aid in its decision-making.¹¹ Additionally, Commerce advocates on behalf of the public in regional and national venues established through FERC, MISO, and others to ensure Minnesota’s interests are effectively represented when decisions are being made that impact system reliability. Commerce’s energy related regulatory authority is established by the state legislature in Minnesota Statute, specifically under Chapter 216. Commerce’s role related to energy matters is further established through Executive Order 19-26: *Continuing the Office of Energy Security as the Division of Energy Resources within the Department of Commerce*.¹² This order recognizes the importance of energy on issues of cost, efficiency, reliability, and environmental impact. As a result, a Division within the Department of Commerce was created to specifically address energy issues and the impacts of those issues on the everyday lives of Minnesotans. Commerce has assigned staff to fulfill various executive orders and statutory obligations that address grid reliability through planning, preparedness, and response activities.

⁸ <https://minnesota.maps.arcgis.com/apps/webappviewer/index.html?id=95ae13000e0b4d53a793423df1176514/>

⁹ <https://mn.gov/puc/about-us/what-we-regulate/>

¹⁰ <https://www.revisor.mn.gov/statutes/part/UTILITIES>

¹¹ <https://mn.gov/commerce/industries/energy/utilities/utility-resources-rates/>

¹² <https://www.lrl.mn.gov/archive/execorders/19-26.pdf>

Electric System Reliability: Definitions and Risks

The North American Electric Reliability Corporation (NERC) has primary responsibility for developing enforceable standards and guidelines to maintain the reliability of the bulk electric system (BES).¹³ NERC Reliability Standards are intended to establish requirements for bulk power system owners and operators, so they deliver an adequate level of reliability.

NERC defines the interconnected high-voltage transmission system in terms of two basic and functional aspects: *Resource Adequacy* and *Operating Reliability*.¹⁴ For the purpose of this report, Commerce is using these definitions to frame the importance of certain functions such as resource planning or evaluating utility plans to acquire resources to grid reliability.

Resource Adequacy

NERC defines resource adequacy as the ability of the electricity system to supply the aggregate electric power and energy requirements of the electricity consumers at all times, taking into account scheduled and expected unscheduled outages of system components.

Resource adequacy can also be described as having enough resources available in the bulk power system to meet demand throughout the year, while accounting for uncertainty in both generation and demand. Some uncertainties, described below, are becoming more important, such as correlated generator outages and changes in the weather. By evaluating these uncertainties statistically, grid planners project their resource needs to reach an acceptably low level of risk of capacity shortages. Risk metrics can then be used to determine how much investment our high voltage transmission system requires, how much new generation should be built, what type of generation should be built, and which generation can retire.¹⁵ Most of this report describes ongoing resource adequacy issues on the bulk electric systems and Commerce's ongoing efforts to plan, prepare, and respond to related reliability issues on this system.

Operating Reliability

NERC defines operating reliability as the ability of the electricity system to withstand sudden disturbances, such as electric short circuits or unanticipated loss of system components.

According to NERC, system disturbances affect operating reliability when they cause the unplanned or uncontrolled interruption of customer demand. When these interruptions are contained within a localized area, they are considered unplanned interruptions or disturbances. When interruptions spread over a wide area of the grid, they are referred to as "cascading blackouts," the uncontrolled successive loss of system elements triggered by an incident at any location. Operating reliability issues can include (1) transmission system stability such as frequency and voltage deviations, (2) low short-circuit strength, and (3) resilience in the face of storms and extreme weather events. In addition, the security focus of NERC and the industry has expanded over the past decade to include withstanding disturbances caused by physical or cyber-attacks.¹⁶

¹³ NERC defines the Bulk Electric System (BES) as a defined subset of the Bulk Power System that includes all facilities necessary for the reliable operation and planning of the Bulk Power System.

¹⁴ [NERC Long-Term Reliability Assessment Dec. 2022](#) p. 105

¹⁵ [ESIG Redefining Resource Adequacy for Modern Power Systems 2021](#)

¹⁶ See [NERC FAQ August 2013](#) (providing helpful overview of FERC origins and responsibilities)

Risk Summary

NERC reliability assessments are focused on the national and regional levels. The most recent NERC Long-Term Reliability Assessment, for example, provides a detailed evaluation of their view of the evolving risks to the entire North American bulk energy system,¹⁷ including the following:

- Increasing extreme and long-duration weather events, including more frequent occurrence and wider impacts;
- Increasing peak electricity demand due to extreme temperatures and abnormal weather;
- The pace of change of the electricity generation resource mix;
- Transmission constraints slowing the interconnection of new replacement generation;
- Increasing risks to fossil-fuel supplies;
- Increasing inverter-based energy resources such as wind and solar; and
- The long-term increase in electrification and distributed generation resources, which present both opportunities and challenges.

While these evolving issues are described in detail in NERC's reliability assessments, Commerce works to understand how NERC's generalized regional assessments relate to the conditions of Minnesota's system and the regional grid it operates within. Additionally, Commerce evaluates some of Minnesota's unique attributes of having vertically integrated utilities within a highly regulated state that relies on robust planning activities to ensure reliability and mitigate risks for ratepayers.

Minnesota has its own specific electric system attributes, risks, and opportunities to address those risks as part of the broader system. In Minnesota, through proactive planning, our regulators and utilities continue to carefully monitor, evaluate, and adapt to these risks at the state level using a variety of tools, in individual dockets, as described in the following sections of the report.

While the risks of the changing resource mix are being addressed effectively in Minnesota, many of these evolving regional or national risks also affect us. Therefore, Commerce and the PUC also continue to monitor and advocate for state interests in regional and national reliability forums.

¹⁷ [NERC Long-Term Reliability Assessment Dec. 2022](#)

Electric System Reliability: Planning

The Department of Commerce has been tasked by the Legislature with ensuring Minnesota's interests are advocated for at the state, regional, and federal level in matters related to grid reliability. To fulfill many of its planning responsibilities, Commerce relies on economists, scientists, accountants, financial analysts, attorneys and policy planners in their expert capacities. Commerce engages in technical, policy and planning proceedings at the federal, regional, and state levels, and participates in reliability and planning proceedings led by the Federal Energy Regulatory Commission (FERC), Midcontinent Independent System Operator (MISO), and Minnesota Public Utilities Commission (PUC).

Commerce staff work in a variety of venues that plan for and assess the impacts of evolving generation resources, transmission constraints, interdependence between the electricity and natural gas systems, distributed generation growth and other cyber/physical security issues that impact grid reliability. While there will always be risk and evolving risk to the electric system, the strong planning practices of Minnesota's utilities and regulators have resulted in position of relative strength related to grid reliability issues.

Commerce uses approximately 80% of the grid assessment funding to support staff activities and responsibilities outlined in the following section.

State Level Planning Activities

Commerce helps address the reliability implications of resource decisions in individual dockets in front of the PUC and takes no position on the best ways to address individual risks in this report. The following section of the report, however, summarizes recent generation and transmission dockets that have addressed reliability issues, including the accelerating pace of fleet change.

Integrated Resource Planning (IRP) Analysis

The IRP function is the primary planning tool utilities use to determine the most economic system of energy supply to meet customer demand as well as ensure resource adequacy for a specific utility electric system.¹⁸ The IRP process evaluates the size, type, and timing of utility investments to meet energy and capacity requirements over a 15-year horizon. IRPs are submitted to the PUC every two to four years by all major generator owning companies.¹⁹ Major decisions about generation resources are made through this process and will impact what resources a utility acquires in the next 5-15 years.

Commerce staff perform detailed analysis of utility IRPs including an assessment of utility demand and energy forecasts, existing and forecasted energy supplies, available alternatives to the utility preferred plans, and compliance with state policies and PUC Orders. Using sophisticated modeling tools, there are a number of inputs Commerce rigorously reviews to ensure utility resource plans result in an affordable and reliable electricity system that minimizes impacts on the environment and reduces risks for consumers. With the results of the analysis, Commerce develops and submits comments with recommendations to the PUC to aid in its decision-making. Commerce staff recently performed analysis for Xcel Energy (Docket 19-368), Minnesota Power (Docket 21-33), Southern Minnesota Municipal Power Agency (Docket 21-782), and Missouri River Energy Services (Docket 21-414).

The IRP process is important to grid reliability because it ensures a utility is reasonably assessing customer demand and supply constraints over time that will guide all future resource acquisitions. IRP analysis and final decisions by the PUC provide the basis for all future resource acquisition proceedings that ensures the utility procures the right

¹⁸ <https://www.revisor.mn.gov/statutes/cite/216B.2422> and <https://www.revisor.mn.gov/rules/7843/>

¹⁹ The PUC can require Xcel, Minnesota Power, and Ottertail Power to act on its Order in IRP proceedings while the PUC gives non-binding advice to 7 cooperative and municipal generation and transmission companies.

kind of resources to supply future demand resulting in assurances for adequacy of resources. Additionally, resource adequacy rules established through NERC are inputs into the model and become minimums that all potential plans must meet further ensuring electricity system reliability requirements are accounted for by utilities.

Resource Acquisition Analysis

After a utility completes its IRP, they begin the resource acquisition process. For rate-regulated utilities, this means additional regulatory proceedings such as a certificate of need petition or approval of a power purchase agreement (PPA) to ensure adequate infrastructure is built or resources acquired that strengthen and support grid reliability for Minnesotans. Examples of projects Minnesota utilities have undertaken include installing back-up fuel for their natural-gas fired generators, building significant high-voltage transmission to help move power into and out of the region when needed, retiring older, unreliable coal and natural gas fired generation and installing or seeking regulatory approval to install new natural gas fired generation and wind and solar generation to replace retiring coal plants as needed.

Commerce staff actively participate in and provide analysis for numerous dockets for specific generation resources, high-voltage transmission projects and initiatives that help ensure Minnesota’s utilities maintain long-term resource adequacy in the region. Commerce analysis includes reviewing a utility’s petition to the PUC, performing discovery, analyzing assumptions and methodologies for reasonableness, developing comments or testimony for the official record, and giving oral arguments before the Commission. As part of the analysis for resource acquisition proceedings and as it specifically relates to grid reliability, Commerce staff often pay close attention to supply and demand forecasts and any updates that need to be made from the most recently approved IRP. Forecast analysis is critical to ensuring utilities build or procure enough supply to meet demand, therefore fulfilling its resource adequacy obligations. The following tables include partial lists of projects in which Commerce has analyzed.

In-Service Transmission: The below table includes examples of transmission projects that recently have been placed in-service and have created stronger electricity delivery system connections with neighboring states to help bolster regional grid reliability.

Project	State/Province	Date
CapX Fargo – St. Cloud Line	North Dakota	2015 in-service
CapX Brookings – Hampton Line	South Dakota	2015 in-service
CapX Rochester – La Crosse Line	Wisconsin	2016 in-service
MISO MVP Lakefield Junction – Winnebago Line	Iowa	2018 in-service
MP GNTL Grand Rapids – Winnipeg Line	Manitoba	2020 in-service

In-Service Generation: The below table includes examples of generation and load management projects that are currently in-service and provide different types of capacity to the system that helps ensure power supplies meet consumer demand.

Intermediate Capacity		
Minnesota Power – Manitoba Hydro PPA*	250 MW**	2020 in-service
Xcel – Manitoba Hydro PPA	125 MW (expansion)	2021 in-service
Missouri River Energy Services – Red Rock Hydro	55 MW	2021 in-service
Peaking Capacity		
Otter Tail Power – Astoria Station (combined cycle gas)	250 MW	2021 in-service
Xcel Energy – Load Management	400 MW (partial procurement)	2019-2022 in-service
Minnesota Power – Load Management “Product	100-200 MW	2022 in-service

C''		
Wind Capacity		
Great River Energy – Deuel Harvest Wind (buy in 2023)	200 MW	2019 in-service
Great River Energy – Emmons-Logan Wind	200 MW	2019 in-service
SMMPA – Stoneray Wind	100 MW	2020 in-service
Minnesota Power – Nobles 2 Wind	250 MW	2020 in-service
Otter Tail Power – Merricourt Wind	150 MW	2020 in-service
Xcel Energy – Dakota Range Wind	300 MW	2021 in-service
Xcel Energy – Heartland Divide Wind II	200 MW	2022 in-service
Solar Capacity		
Xcel Energy Solar Gardens (numerous small projects)	600 MW+	Separate, continuous

*Power Purchase Agreement (PPA)

** Megawatt (MW)

The above projects are currently in-service and providing capacity to the bulk electricity delivery system; however, there are many additional projects that have either received regulatory approval or are currently under regulatory review. These resources provide a mix of different sizes and types of generation to the system that ensure resource adequacy, and therefore, aid in a reliable electricity delivery system.

Approved Generation: The below table includes examples of generation projects that were analyzed by Commerce and approved by the PUC. These projects are anticipated to be in-service over the next 5 years providing natural gas, wind, solar, and load management capacity to the system.

Intermediate Capacity		
Minnesota Power – Nemadji Trail (combined cycle gas)	600 MW	2027 anticipated in-service
Peaking Capacity		
Xcel Energy – Load Management	400 MW (partial, remainder)	2023 anticipated in-service
Wind Capacity		
Great River Energy – Buffalo Ridge Wind	105 MW	2022 anticipated in-service
Great River Energy – Deuel Harvest Wind	200 MW	2023 anticipated in-service
Great River Energy – Three Waters Wind	280 MW	2024 anticipated in-service
Solar Capacity		
Ottertail Power – Hoot Lake Solar	50 MW	2023 anticipated in-service
Xcel Energy – Sherco Solar	460 MW	2024 anticipated in-service

Transmission Projects Currently Under Regulatory Review: The below table includes examples of transmission projects that have been studied and approved by MISO and will require state level regulatory review by Commerce and approval from the PUC.

Sherco Gen-tie line	Re-use Sherco interconnect	2028 estimated in-service
Wilmarth— Rochester— Tremval	LRTP Portfolio 1 Project	2028 estimated in-service
Big Stone South— Alexandria— Cassie's Corner	LRTP Portfolio 1 Project	2030 estimated in-service
Iron Range— Benton— Cassie's Corner	LRTP Portfolio 1 Project	2030 estimated in-service

Generation Projects Currently Under Regulatory Review: The below table includes examples of generation projects that are currently under review by Commerce and will require PUC approval.

Baseload Capacity		
Xcel Energy Monticello Nuclear (10 year extension)	670 MW	2030 estimated in-service
Peaking Capacity		
Great River Energy Cambridge CT Dual Fuel	170 MW	2023 estimated in-service
Ottertail Power Astoria CT Dual Fuel	250 MW	2026 estimated in-service
Wind Capacity		
Great River Energy Three Waters Wind	200 MW	2024 estimated in-service
Great River Energy Dodge County Wind	260 MW	2024 estimated in-service
Xcel Energy Border Wind Repowering	165 MW	2025 estimated in-service
Xcel Energy Pleasant Valley Wind Repowering	220 MW	2025 estimated in-service
Solar Capacity		
Xcel Energy Solar Request for Proposals (RFP)	900 MW	2025 estimated in-service

State Energy Security Planning

On November 15, 2021, President Biden signed into law the bipartisan Infrastructure Investment and Jobs Act (IIJA). In section 40108 of the IIJA, detailed energy security planning requirements were established as a condition for states to receive and participate in certain funding opportunities under IIJA.²⁰ The purpose of state energy security planning is to ensure a reliable and resilient supply of energy through identification, assessment, and mitigation of risks to energy infrastructure. Additionally, according to DOE security planning guidance, state energy security plan requirements include detailed planning, response, and recovery mechanisms from events that disrupt energy supply.²¹

Commerce staff, in compliance with the new federal law, developed an energy security plan for the state of Minnesota that includes the following information:

- a summary of Minnesota’s energy sources and energy providers,
- a state energy profile of energy production, transmission, distribution, and end-uses
- an assessment of hazards to statewide energy systems
- a risk assessment of energy infrastructure and cross-sector interdependencies
- an overview of risk mitigation activities
- a summary of energy emergency coordination in planning and response

Energy security is important to grid reliability because it provides a holistic assessment of the state of Minnesota’s electricity system, threats to and vulnerabilities of the system, direction for mitigating risks that could impact reliability, and dedicated planning for how various state actors respond to the effects of a reliability event. This function of Commerce expands on historic energy assurance planning and allows for identification of concern related to grid reliability and a venue in which solutions can be identified and pursued. Commerce staff created an initial state energy security plan and submitted to the DOE on September 29, 2022. This plan will continue to build and be submitted on an annual basis to the U.S. Department of Energy.

²⁰ [State Energy Security Plan Administrative and Legal Requirements Document](#)

²¹ [State Energy Security Plan Framework and Guidance](#)

Inflation Reduction Act

On August 16, 2022, President Biden signed into law the Inflation Reduction Act (IRA).²² There are many provisions in the IRA designed to lower energy costs, build a clean energy economy, and reduce greenhouse gas emissions that contribute to climate change. Many aspects of the IRA are likely to impact the energy industry in Minnesota. Some of the provisions will impact investments utilities make in critical infrastructure which intersects with grid reliability issues. Commerce staff are currently reviewing the details of the IRA including funding for programs that provide direct incentives to consumers as well as tax incentives for utilities that will impact infrastructure investments in the near-term.²³ The PUC, with Commerce, also initiated a joint investigation (Docket CI-22-624) to better understand how the IRA will benefit Minnesotans and explore any actions that should be taken to ensure the benefits are maximized for ratepayers.²⁴ The primary purpose of this docket is to gather information.

Commerce staff, for the purpose of the grid assessment and electric system reliability, will review responses from utilities and other parties to determine if the IRA will impact the reliability of Minnesota’s electricity system. Specific areas for review include, but are not limited to, the following:

- Impacts on short- and long-term planning that will be reflected in current, ongoing, or planned IRPs
- Impacts on supply and demand forecasting related to distributed energy resources or electrification activities
- Impacts to utility resource procurement plans
- Anticipated new investments or infrastructure improvements
- Use of IRA incentives to build transmission infrastructure

The PUC and Commerce are anticipating comments for review on January 30, 2023. This information will be important in the context of grid reliability to ensure a full understanding of the impacts of the IRA on resource adequacy and operational reliability. Additionally, Commerce staff will review stakeholder responses in this docket for overlap with IJIA investments and any gaps that may need to be addressed at the state, regional, or national level. This planning function will help Commerce and PUC respond to any known grid reliability impacts.

Regional Level Planning Activities

Before the late 1970s, individual utilities owned and operated their own generation, transmission, and distribution facilities. Starting in 1978, however, the U.S. Congress passed several new laws that were aimed at encouraging non-utility generators to compete in the wholesale electricity markets. By 1996, FERC recognized the new laws were doing little to encourage wholesale competition, in part because high-voltage transmission lines—the highways needed to deliver electricity—were largely controlled by incumbent utilities.

Therefore in 1996, FERC issued Order 888 requiring transmission owners to file tariffs requiring utilities to provide other transmission customers access to their transmission on the same basis the transmission owners used for their own generators. Then, in 1999, FERC issued Order 2000, encouraging (but not requiring) transmission owning utilities to form and join “regional transmission organizations” or RTOs. RTOs (such as MISO) have the contractual authority and obligation to operate its member utility transmission systems to provide fair access, but they do not actually own the transmission.

Now MISO is responsible for the reliable operation of the high-voltage system in fifteen states and Manitoba, and is also

²² <https://www.congress.gov/bill/117th-congress/house-bill/5376/text>

²³ IRA sections focused on utility assistance include: 50144 – Energy Infrastructure Reinvestment Financing, 50151 – Transmission Facility Financing, and 50152 – Grants to facilitate the siting of Transmission Lines

²⁴ <https://www.edockets.state.mn.us/edockets/searchDocuments.do?method=showPopup&documentId={40211185-0000-C813-BE5B-1737A98A7873}&documentTitle=202212-191308-01>

responsible for infrastructure planning, operating wholesale markets, and other issues.²⁵ Therefore, many of the critical decisions regarding bulk energy system reliability and transmission planning in Minnesota occur at the regional level, at MISO, or at the federal agency that regulates MISO—the FERC. Commerce actively participates in MISO decision-making processes on its own or as part of multi-state advocacy organizations. These activities are briefly described below.

MISO Committee Participation

In addition to quarterly meetings of the MISO Board of Directors, MISO regularly convenes over fifteen policy and technical committees periodically throughout the year.²⁶ All major policy issues are introduced to the stakeholders for debate prior to final decisions and implementation. Commerce and PUC staff work together to regularly participate in many of these debates, both as representatives of Minnesota ratepayers and as members of multi-state advocacy organization “sectors,” described in the next section.

Organization of MISO States and Consumer Advocate Participation at MISO

Organization of MISO States (OMS) was established to represent the collective interests of state and local utility regulators in the MISO region and facilitate informed and efficient participation in related issues. Members collaborate to share information and resources, debate, and exchange ideas on policy issues, and communicate their viewpoints. While the OMS strives for agreement, each member retains autonomy to express its unique positions and be heard through OMS comments and filings. The OMS consists of 17 members across 15 states and the Canadian province of Manitoba.²⁷ The Minnesota’s PUC is an active member of the OMS, regularly serving in leadership roles. Commerce is an associate member of OMS, and actively participates in all OMS discussions of major issues and joins formal OMS comments to MISO and at the FERC when appropriate.²⁸

Commerce is also an active member of and participant in the “Public Consumer Group” sector at MISO policy meetings, with a staff person representing that sector at the MISO Planning Advisory Committee and as an alternate on the Advisory Committee.

Many of the issues addressed in these policy and technical committees at MISO are focused on the long-term reliability of the high-voltage transmission system, including the changing approaches to monitoring and assessing resource adequacy in our region.

MISO Long-Range Transmission Planning Advocacy and Status

As summarized above, MISO is primarily responsible for planning high-voltage transmission system in our region. Additional transmission capacity in Minnesota will be needed to maintain reliability in our region.²⁹ Therefore, because of the evolving generation mix, emerging transmission constraint problems, and the long lead time required for large new transmission projects, Commerce and the PUC continue to advocate for MISO to engage in long-range planning.

In addition to the PUC and Commerce’s advocacy on this topic, several mid-western Governor’s—including Minnesota Governor Walz—actively encouraged MISO to engage in comprehensive transmission planning over last two years. This advocacy was largely through collaboration with the Midwestern Governor’s Association.³⁰ Commerce staff advised the Governor’s Office and Midwest Governors Association on the details the letter and what was needed serve Minnesota’s best interests.

As a result of this advocacy, MISO initiated their most recent long-range planning effort in August 2020 to better assess

²⁵ <https://www.misoenergy.org/about/>

²⁶ <https://www.misoenergy.org/stakeholder-engagement/committees/>

²⁷ <https://www.misostates.org/>

²⁸ See, e.g. [OMS Comments to FERC on Seasonal Resource Adequacy Construct, Jan. 7 2022](#)

²⁹ See, e.g. [MISO Renewable Integration Impact Assessment Site](#)

³⁰ E.g. [MGA letter to Midwest RTOs](#) Sept. 8, 2020; [Letter to MISO CEO](#), Sept. 17, 2019

what upgrades over the next 20 years may be needed to maintain reliability as the resource mix changes. In July 2022, MISO approved an initial group of seventeen new regional transmission line projects to ensure the reliable and efficient operation of the transmission grid in the Upper Midwest (Tranche 1 portfolio).³¹ Three of these projects are in Minnesota. Planning for the second potential group of high-voltage transmission projects in the northern part of MISO (Tranche 2) is ongoing.

Joint MISO and SPP Transmission Interconnection Queue Proposal

Over the last several years, large wind and solar energy projects trying to interconnect into the transmission system in the western part of MISO have been triggering large, costly transmission upgrades in the neighboring Southwest Power Pool (in addition to their interconnection costs in MISO). These “affected system” transmission upgrades in SPP and the related cost uncertainty have become the single biggest bottleneck for wind and solar interconnects in Southwest Minnesota. Therefore, in December 2020 MISO and SPP began a separate, joint, transmission study and cost allocation process to evaluate potential joint transmission projects that would reduce these “affected system” transmission upgrade costs.

This joint MISO/SPP process is called the Joint Transmission Interconnection Queue process—or JTIQ. The most recent summary of the JTIQ projects and potential cost allocation approaches was summarized at a MISO Planning Advisory Committee meeting in November 2022.³² Commerce and the PUC staff have been actively involved in the planning and cost allocation discussion of this project since it began two years ago. Commerce is currently participating in a potential application to the U.S. Department of Energy for an infrastructure grant that would provide up to half the funds for this portfolio of transmission projects.

National Level Planning Activities

In addition to participating at FERC in individual cases and rulemaking dockets as part of the OMS, Commerce and the PUC at times separately or jointly intervene at FERC on major national policy decisions. For example, Commerce and the PUC have over the last year actively participated in an ongoing FERC rulemaking regarding changes to high-voltage transmission planning processes.

Federal Regulatory Commission Transmission Planning Participation

On July 15, 2021, FERC issued an “Advance Notice of Proposed Rulemaking” or ANOPR that potentially sets in motion a new federal rulemaking process that may change the rules governing planning and expansion of the nation’s electric transmission system.³² The ANOPR expressed concern that the current rules for planning, cost allocation and interconnection of generation, all of which were adopted a decade or more ago, are no longer resulting in economically efficient transmission expansion that reflects the need to add large amounts of renewable generation to the grid in the next two decades. The ANOPR received over three hundred initial comments totaling thousands of pages. Commerce filed initial comments in the docket in October 2021.³³

In April 2022, FERC issued its Notice of Proposed Rulemaking—its draft rule—for public comment.³⁴ FERC specifically mentioned the Minnesota PUC and Commerce’s comments in their explanation of the proposed rule. Commerce and the PUC filed joint comments on the proposed rule (NOPR) on August 16, 2022.³⁵ The final rule is expected sometime in 2023.

³¹ <https://www.misoenergy.org/planning/transmission-planning/long-range-transmission-planning/>

³² [November 2022 LRTP Update to PAC](#)

³³ [Minnesota Department ANOPR Comments 10.12.21](#)

³⁴ [FERC Transmission Planning NOPR, April 21, 2022](#)

³⁵ [Commerce and PUC joint comments on FERC Transmission NOPR August 2022](#)

Department of Energy Transmission Studies

As part of the 2021 Federal Infrastructure Act, the U.S. Department of Energy is tasked with two major transmission studies.³⁶ Commerce and the PUC are actively following and participating in these studies, providing formal and informal comments when requested.

³⁶ [DOE National Planning Study](#); and [DOE National Transmission Needs Study](#)

Electric System Reliability: Preparedness

Electricity system reliability preparedness means ensuring that the State of Minnesota is prepared to respond to grid reliability related events as necessary, either through undertaking activities that prepare for reliability events or energy related emergencies or undertaking activities that bolster grid resilience in the face of a reliability event. As stated earlier in the report, it would be cost prohibitive to have a 100% reliable high voltage electric system therefore there is some tolerance for and understanding that grid reliability events may occur. To ensure the effects of those events are mitigated to the extent practical, Commerce undertakes several activities to plan and prepare for grid reliability events.

The following section outlines the responsibilities of Commerce to ensure preparedness for any impacts to grid reliability. Commerce uses approximately 15% of the grid assessment funding to support staff activities and responsibilities outlined in the following section.

State Level Preparedness Activities

Real-Time Monitoring

Monitoring real-time grid reliability issues is a critical part of ensuring preparedness for any grid reliability events or increased threats to the system that potentially require a response at the state level. Data and reports from the Energy Information Administration (EIA)³⁷, MISO emergency operations procedures³⁸, the National Oceanic and Atmospheric Administration (NOAA)³⁹, EAGLE-I™ geographic systems, State Heating Oil and Propane (SHOPP) reports⁴⁰ and direct utility communications provide insight into real-time threats or vulnerabilities that could impact system reliability.

Staff monitor these sources routinely, either as information becomes available in the moment or through regularly scheduled reports. This monitoring function allows Commerce staff to evaluate real-time potential impacts to Minnesotans, triage actions as necessary, mobilize internal communications functions, adequate staff the Energy Information Center, communicate to sister agencies that may also be impacted by system disruptions and identify other potential needs so that real-time decisions can be made to deploy resources to respond to reliability events if needed.

To ensure full preparedness for any potential incidents, staff meet on a biweekly basis to review fuel inventories, electric system reliability concerns, energy price fluctuations, energy storage constraints and any mitigating measures that can be deployed to reduce the impacts of areas of concern. This information, including any elevated concerns, are then communicated to the Governor's Office for situational awareness.

Maximum Generation Event Reporting

MISO has established operating procedures for electricity generators to ensure reliability of the bulk electricity system. These procedures ensure the grid operator can effectively send signals and commands to generators as operating conditions of the grid change. Changing operating conditions can include a need to respond to extreme weather events, unplanned outages or other technological or naturally occurring events that can affect the balance of electricity supply and demand on the transmission system.⁴¹

³⁷ <https://www.eia.gov/outlooks/steo/#:~:text=We%20expect%20the%20combination%20of,in%202023%20compared%20with%202022.>

³⁸ <https://www.misoenergy.org/markets-and-operations/notifications-overview/>

³⁹ <https://www.noaa.gov/>

⁴⁰ https://www.eia.gov/dnav/pet/pet_sum_sndw_dcus_nus_w.htm

⁴¹ https://legacy-assets.eenews.net/open_files/assets/2014/09/19/document_gw_04.pdf

Commerce monitors emergency operation alerts as they are issued by MISO; however, regulated owners of generation in Minnesota (Xcel Energy, Minnesota Power, and Otter Tail Power) that supply the MISO market report to the PUC and Commerce when MISO has called for certain emergency operation procedures, specifically what is known as a “Max Gen Event.” Max Gen Events can result in utilities taking such actions as public appeals to conserve electricity, curtailing interruptible demand from end-use customers, and potentially even ordering voltage reductions (also known as “brown-outs”) or calling for a load shed event (also known as rotating blackouts).

This function is important to grid reliability because it allows Commerce to determine the likelihood of a reliability event occurring and mobilize internal and external actors as needed if an incident does occur. It allows Commerce to escalate issues to the executive office, develop communications materials for the broader public, alert public safety officials, coordinate with utilities as needed, or other activities to ensure Minnesotans are protected from the effects of a disruption to service. The most recent example of Commerce staff’s efforts for this work occurred on December 23, 2022, when MISO called a Max Gen event and began implementing voluntary conservative operations measures.

Executive Order 22-20: Directing State Agencies to Implement Cybersecurity Measures to Protect Critical Infrastructure in Minnesota⁴²

This order recognizes the importance of critical infrastructure to the health and safety of all Minnesotans and the increasing risk of cyber-attacks. The effects of cyber threats and attacks can create greater risk for a reliable electric system. The purpose of the order, in part, increases the state’s preparedness for potential cyber-attacks that can impact critical infrastructure operations.

With Commerce’s existing regulatory authority, staff inform and assist critical infrastructure owners and operators by providing contacts to the Minnesota Fusion Center, developing criteria for provider cybersecurity self-assessments, participating in a tabletop exercise that responds to a cyber-attack impacting critical infrastructure, and identify opportunities to improve Minnesota’s tools and posture to defend against cyber threats and respond to cyber-attacks that could impact critical infrastructure. Recent efforts by Commerce include hosting joint meetings with the PUC to elevate the discussion of cyber threats with critical infrastructure operators, advising MN.IT on issues related to regulated and unregulated utility practices and participating in a tabletop exercise to identify gaps in communication related to certain cyber threat/attack scenarios.

This effort is important to grid reliability given the increasing threats for cyber-attacks on critical infrastructure. This allows for Commerce to play a critical role in coordinating across utilities and other state agencies to ensure any elevated risks are responded to and prepared for by all actors involved. Commerce staff participated in a tabletop exercise organized by the Department of Public Safety Division of Homeland Security Emergency Management and MN.IT Services on December 15, 2022, to ensure agency preparedness in the event of elevated cyber threats and cyber-attacks.

Infrastructure, Investment and Jobs Act (IIJA)

On November 15, 2021, President Biden signed into law the \$1.2 trillion IIJA. The IIJA includes approximately \$27 billion in new spending over five years on the nation’s energy grid. Most of the funding targets updating and improving the existing grid, with some targeted towards new transmission lines which can improve grid reliability. Many of the key provisions provide an opportunity for Minnesota to build a stronger, more resilient grid that can withstand grid reliability associated risks, including but not limited to, the following:

- Directing the U.S. Department of Energy (DOE) to establish a \$5 billion grant program for grid hardening and

⁴² <https://www.lrl.mn.gov/archive/execorders/22-20.pdf>

- weatherization to help reduce the impacts of extreme weather events on the grid.
- Authorizing \$6 billion toward grid reliability and resilience research, development, and demonstration, including \$1 billion specifically for rural areas.
- Establishing a \$2.5 billion Transmission Facilitation Fund and a Transmission Facilitation Program, positioning DOE to leverage federal funding to reduce the overall risks of transmission projects.
- Authorizing \$350 million to develop advanced cybersecurity technologies for the energy sector.

Commerce staff, in partnership and collaboration with various stakeholders, are evaluating the potential for some of the IIJA provisions to aid in mitigating grid vulnerabilities that could impact reliability but also the provisions that add to system resilience to help withstand reliability events.⁴³ Staff are currently evaluating these opportunities in the context of NERC's long-term risk assessment relating to distributed generation growth and the implications for grid reliability. As described above, Commerce is also currently participating in a potential application to the U.S. Department of Energy for an infrastructure grant that would provide up to half the funds for the MISO/SPP Joint Transmission Interconnection Queue Portfolio of transmission projects. Building resilience into the grid can help ensure preparedness in case there is a grid reliability event and allow for the grid to better withstand disruptions to the bulk electricity delivery system.

Regional Level Preparedness Activities

Preparedness Exercises

Commerce either participates in or acts as an observer in preparedness exercises organized at the national, regional, or state level. Examples of preparedness exercises Commerce staff have participated in include, but are not limited to, the following:

- Shattered Cheddar – The Wisconsin Public Service Commission, in coordination with the US DOE, organized a regional tabletop exercise that included national, regional, state, tribal, and local public and private organizations to identify gaps in state energy security and emergency response plans relating to regional coordination, fuels coordination, and cybersecurity issues. Commerce staff attended and participated in this exercise in June 2022 and participated in a follow-up after-action report review to determine any necessary improvements for regional coordination in an energy related emergency.
- Grid X – NERC holds a biennial grid security exercise that provides the electricity industry, government agencies, and other relevant organizations the opportunity to exercise emergency response and recovery plans using simulated cyber or physical security attacks or other contingencies that may affect grid reliability. Commerce staff, along with utility and PUC counterparts, participate in or observe aspects of these exercises to prepare for events or identify any gaps in response that necessitate remedy before an event occurs.⁴⁴ The most recent Grid X exercise Commerce staff attended occurred in November 2021.
- Viking Shadow – Periodic regional workshops are organized by various national, regional, and state actors. In July 2018, Commerce participated in Viking Shadow, a Midwest regional workshop organized by the US Department of Energy Office of Cybersecurity, Energy Security, and Emergency Response as well as the National Association of State Energy Officials (NASEO). Commerce staff participated in this regional exercise to practice a multi-day emergency response scenario including elements of an extreme weather situation and cyber-attack.⁴⁵

Participating in preparedness exercises is important to grid reliability because they not only help build partnerships and

⁴³ <https://mn.gov/commerce/industries/energy/policy/federal-bipartisan-infrastructure-law.jsp>

⁴⁴ <https://www.eisac.com/s/gridex>

⁴⁵ <https://www.naseo.org/Data/Sites/1/viking-shadow-after-action-report-final.pdf>

relationship that are critically important in the event of an energy related emergency, but also can help identify gaps or improvements that could be made to mitigate against a reliability event occurring in the first place. Staff bring lessons from these exercises back to Commerce to ensure any internal or external protocols for response are effective while also working with other industry partners to plan for events are addressed as needed.

National Level Preparedness Activities

Non-Government Trade Organizations

Commerce actively participates in multiple national organizations that intersect with electric system reliability planning, preparedness, and response issues. Commerce staff participate in numerous committees, provide technical expertise to topical reports, coordinate with counterparts in other states on specific topics, and attend various in-person meetings or webinars that help advance knowledge and expertise in matters relating to grid reliability. The primary organizations Commerce holds membership with include, but are not limited to, the following:

- National Association of State Energy Officials (NASEO)⁴⁶ – NASEO helps advance national and state energy goals by assisting states in ensuring the energy system is reliable, affordable, and secure. NASEO provides policy and program expertise while also leveraging and facilitating expertise from its members. As it relates to electric system reliability, NASEO provides resources to states for energy assurance planning, energy emergency assurance coordination, hazard mitigation planning, cybersecurity information, and training and education resources. Commerce staff routinely participates in and provides expertise to information sharing exercises and the committee work NASEO facilitates that advance energy assurance and security practices. As part of the energy security planning process, Minnesota is actively involved with the NASEO Board of Directors, receiving regular updates from key Department of Energy staff and leadership, including U.S. Department of Energy's Office of Cybersecurity, Energy Security, and Emergency Response.
- National Association of Regulated Utility Commissions (NARUC)⁴⁷ – NARUC represents the interests of state public utility commissions in various venues at the federal level, including the three branches of federal government as well as independent federal agencies. NARUC facilitates policy and advocacy work, partnerships and innovation in the regulatory space, and federal government collaboratives that help improve the quality and effectiveness of public utility regulation. Commerce staff participate in some of the committees, but more heavily rely on topical reports developed by NARUC staff to inform some of the regulatory policies and practices in Minnesota, specifically related to issues that affect grid reliability.
- National Association of State Utility Consumer Advocates (NASUCA)⁴⁸ – NASUCA is an association of consumer advocates that represent the interests of utility consumers before state and federal regulators and in the courts. NASUCA provides a venue to facilitate information sharing and development of advocacy positions for its members. Commerce staff participate in a variety of committees including the electricity and gas committees as well as the accounting/tax and consumer protection committees. NASUCA has, with some support from Commerce, developed resolutions relating to consumer protections for transmission and distribution planning, model corporate governance for RTOs, and others.

Participation in these national organizations is important to electric system grid reliability because they facilitate national level knowledge building and pool expertise from multiple states and territories. It allows Minnesota to glean insights and experience from counterparts in other states so that learnings from various experiences can be applied without having to make the same or similar mistakes, depending on the situation. Participation also allows Commerce to track trends or

⁴⁶ <https://www.naseo.org/>

⁴⁷ <https://www.naruc.org/>

⁴⁸ <https://www.nasuca.org/>

events that could impact grid reliability and build response capabilities based on what other states are experiencing. Specific areas Commerce staff track across these three national organizations include, but are not limited to, transmission and distribution planning, regional energy/capacity market constructs, energy security issues, federal funding for IJIA and IRA, cyber and physical security concerns, and others.

Electric System Reliability: Response

A reliability event is when extreme or otherwise unanticipated conditions result in a resource shortfall, system operators (in Minnesota's case, MISO or SPP) potentially take controlling actions or implement procedures that maintain a continual balance between supply and demand within a balancing area. This can result in a disruption to electricity supply to distribution utilities and ultimately utility customers. Other natural or technological disasters can also impact reliability causing service disruptions in the high voltage electricity system.

While grid reliability events in Minnesota are rare, it is important to have a framework and plans in place to respond to reliability events that could cause temporary or prolonged outages for Minnesotans. This is true especially as risks to the high voltage electric system are evolving. Commerce places greater emphasis on planning and preparedness when performing analysis or assessing grid reliability issues, but the response function is critical to ensuring Minnesotans are protected and the state can respond effectively to events as needed.

Commerce plays a supporting role to many others at the state, regional, and federal level who are charged with emergency preparedness, management, and response. These responsibilities are defined in state statute and executive order. Commerce uses approximately 5% of the grid assessment funding to support staff activities and responsibilities outlined in the following section.

State Level Response Activities

Executive Order 19-22 (formerly 15-13): Assigning Emergency Responsibilities to State Agencies

This Order contemplates that the state may experience technological or natural disaster that result in the need for emergency planning, preparedness, and response.⁴⁹ The effects of these incidents can cause temporary impacts to the electricity delivery system causing reliability events.

The Department of Commerce assigns the responsibilities of this Order within the Division of Energy Resources (DER). Staff within DER provide coordinating services to the Division of Homeland Security and Emergency Management (HSEM) at Minnesota Department of Public Safety (DPS) if there is an emergency. Staff provide resources for hazard-mitigation planning which includes ensuring and advocating for a reliable electric system to mitigate against any reliability related emergencies. Additionally, Commerce staff have collectively taken over 250 hours of emergency management training through HSEM with some achieving and maintaining emergency manager certifications.

This Executive Order is important to grid reliability because it gives specific direction with defined roles and responsibilities for state agencies in the event of an emergency. An emergency could be something that causes a grid reliability event or a grid reliability event in and of itself. Additionally, this Order provides specific direction for agencies with a role in emergency management to participate in developing hazard mitigation strategies to reduce or eliminate vulnerabilities of the effects of an emergency or disaster. Planning for grid reliability is also planning for hazard mitigation. A reliable electricity system can help reduce the effects and impacts to Minnesotans in the event of an emergency or disaster.

⁴⁹ <https://www.lrl.mn.gov/archive/execorders/19-22.pdf>

Minnesota Emergency Operations Plan

The Minnesota Emergency Operations Plan (MEOP), developed by the Minnesota Department of Public Safety (DPS) division of Homeland Security and Emergency Management (HSEM) in coordination with multiple state agencies, provides the basis for a multi-state agency response to a major disaster or emergency.⁵⁰ The MEOP is typically reviewed every year and updated as necessary. Additionally, the MEOP demonstrates the interface between the National Response Framework (NRF) and federally designated Emergency Support Functions (ESF) and state agencies. Commerce's functionality aligns with the ESF #12 Annex relating to Energy.⁵¹

In the MEOP, the Department of Commerce has multiple defined roles including a supporting role for incident management, accident and damage assessment, and resource management. Commerce has a primary role relating to public works and utilities restoration. In the latter role, Commerce serves as the primary conduit of reliable information between private sector energy partners and the State of Minnesota while recognizing most of the authority and responsibility is placed on private sector energy providers for continued service during energy related emergencies.

Additional responsibilities include, but are not limited to, coordination with state agencies to support utility restoration, assisting vulnerable individuals and families through Commerce administered programs during and after an event, developing and maintaining a list of utility contacts, monitoring transmission grids for functionality, coordinating with utilities to assure the development of essential service restoration plans, and maintaining a state energy emergency plan in compliance with DOE requirements.

The MEOP is important to grid reliability because it outlines defined roles and responsibilities for response in the rare instance that there is an energy supply emergency or a reliability event. It provides actionable items for a coordinated effort to ensure utility services are quickly restored for not only essential services that need electricity to fulfill their functions in responding to an emergency, but for all Minnesotans that depend on a reliable grid. Commerce staff participate in and advise HSEM in the annual update of the MEOP to ensure coordinated understanding of responsibilities and to provide the most up-to-date information available.

An example of Commerce's work on response issues related to electric system reliability was during the pandemic when Governor Walz declared a peace time emergency and issued a variety of emergency executive orders that impacted owners and operators of critical infrastructure. Commerce staff advised the Governor's Office, Department of Health, and the State Emergency Operations Center on issues such as K-12 school closure impact on utility employees, COVID testing and vaccination policies for critical infrastructure employees, access to personal protective equipment necessary for frontline utility workers, coordination with the PUC and utilities to ensure real-time situational awareness and providing input to MISO on the status of Minnesota's response to pandemic related emergencies that could affect employees and operations located in Minnesota. While the pandemic was disruptive to workforces across all industries, it was important to ensure utility employees charged with maintaining operational reliability were able to continue to provide service.

Regional and National Response Activities

The Department does not use grid assessment funding for any regional or national related grid reliability emergency response activities.

⁵⁰ The content of the Minnesota Emergency Operations Plan is not considered public data and distribution of the document is restricted in accordance with the Minnesota Data Practices Act.

⁵¹ https://www.fema.gov/sites/default/files/2020-07/fema_ESF_12_Energy-Annex.pdf

Conclusion

Under Minnesota Statutes 216A.07, subdivision 3a, the Department of Commerce is responsible for representing the interests of Minnesota residents, businesses, and governments before bodies and agencies outside the state that implement or regulate regional, national, and international energy policy, planning or infrastructure development. The authority to assess utilities up to \$1,00,000 annually was initially established to ensure Commerce can adequately provide staffing resources to conduct analysis that assesses energy grid reliability at state, regional, and national levels. For Commerce to have an ongoing dedicated staff to provide analysis, technical assistance, comprehensive planning, preparedness, and response, sustainable funding will be necessary.

Grid assessment funding is critical to ensuring the interests of Minnesotans are represented at the regional and national level and that Commerce staff can assess grid reliability issues that affect the state and region. Minnesota's residents, businesses, and governments depend on a reliable electric system. Through the work of Commerce, the PUC, utilities, regional transmission operators, and many other authorities, Minnesotans have had the benefit of having reliable electric service over the years. As the energy transition continues and there is increasing focus on preserving grid reliability, Commerce will continue to be diligent in this aspect of its service to the public.