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NORTH DAKOTA STATE ENERGY SECURITY AND RESILIENCY PLANS

Submitted to:

U.S. Department of Energy
National Energy Technology Laboratory

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Prepared for:

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NORTH DAKOTA STATE ENERGY SECURITY AND RESILIENCY PLANS

EXECUTIVE SUMMARY

The Energy & Environmental Research Center (EERC) has put together the following document to support the North Dakota Department of Commerce (Commerce) with the development of state energy security and energy resiliency plans compliant with U.S. Department of Energy (DOE) requirements. The goal of this document is the development of a compliant North Dakota state energy security plan (SESP) that also includes a functional grid resiliency plan as a requirement pursuant to the Infrastructure Investment and Jobs Act (IIJA) § 40108, which amends Part D of Title III of the Energy Policy and Conservation Act (EPCA, 42 U.S. Code § 6321).

This document details the procedures for the state of North Dakota's SESP, response to an energy supply disruption, and the mitigation efforts to prevent supply disruptions. It outlines the role that state government in conjunction with private industry will play in responding to an energy issue. It gives an overview of the state's energy landscape and lists key contacts responsible for energy preparedness and response. It also summarizes contingency plans for electricity and natural gas disruptions and details mitigation strategies for transportation fuel shortages. The plan also contains procedures for monitoring and tracking energy disruptions within the state.

North Dakota produces significantly more energy than is consumed, and the state is a net exporter of energy. Many risk factors in the energy supply have been identified, with severe weather conditions being the most likely cause of disruptions. Climate change-related risks are growing and causing more extreme weather-related conditions, such as increased likelihood of wildfires, and cold weather events. Overall, energy consumption has increased over the past decade, primarily through growth of the industrial sectors. However, the total electrical generation from coal-fired power plants has decreased, while wind power generation has increased. Efforts are ongoing to reduce CO_2 emissions from existing baseload power plants and other energy generation sites through capture and sequestration methods.

The transmission and distribution systems must maintain their resiliency as electric service is often most crucial during extreme weather events. A complementary study of the electrical grid resiliency plan for the state of North Dakota has been prepared for the North Dakota Transmission Authority. The Executive Summary of that document is provided as an Appendix to this SESP. One key risk identified is the increase in intermittent electricity production (primarily wind power) transforms the electrical grid and creates vulnerability to meet peak demands. North Dakota frequently sees extreme weather conditions, and significant demand increases can result in supply shortages during times of low intermittent source generation. Therefore, efforts are ongoing to maintain baseload generation capacity during peak demand conditions.

The North Dakota Department of Emergency Services (NDDES) has the responsibility for coordinating state agency response to an incident upon a governor's declaration and activation of the state emergency operations plan (SEOP). In the event of an energy incident/emergency and state unified command (UC) is stood up, it is likely Commerce will be a lead agency along with NDDES, with other state agencies in support roles.

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NORTH DAKOTA STATE ENERGY SECURITY AND RESILIENCY PLANS

1.0 INTRODUCTION/NAVIGATION

This document details the procedures of North Dakota's State Energy Security Plan (SESP) and is intended to be a working document to aid in the emergency response to an energy supply disruption. This is an update to the 2015 state of North Dakota energy emergency response plan; incorporates elements of the 2018 North Dakota Enhanced Mitigation Mission Area Operations Plan (MAOP), the 2022 North Dakota Department of Emergency Services (NDDES) Emergency Services Disaster Procedure Guide, and the recently updated 2024 North Dakota Enhanced Mitigation MAOP; and is compliant with U.S. Department of Energy (DOE) requirements.

The document is organized as follows. Section 1.0 provides an introduction and navigation information. Section 2.0 provides the North Dakota energy landscape and risk profiles, including the state energy profile and threats/vulnerabilities to the supply known at the time of printing. A detailed assessment of all electricity, liquid fuels, and natural gas infrastructure within the state is provided. Section 3.0 provides energy security and emergency response information, including relevant authorities, doctrines, and guiding statutes for energy security and emergency response activities. Section 4.0 provides the energy security planning and preparedness assessment, including State Energy Office roles and responsibilities as well as the roles of other state entities. Also included are tribal coordination planning and response activities with neighboring states and the region. Section 5.0 provides the energy emergency response plan, which includes a description of response actions/authorities for energy emergencies, listing the response cycle overview, information-gathering/situational awareness, event consequence assessment, and response actions. A comprehensive risk assessment of the energy supply is discussed. Section 6.0 provides the energy resiliency and hazard mitigation plan, which details the proactive mitigation approach. Specific reactive mitigation steps for transportation fuels, electricity, and natural gas shortages are also described. A separate report focusing on North Dakota electrical grid resiliency has also been prepared for the North Dakota Transmission Authority. Appendix A provides the executive summary of the report as well as a link to the full document. Appendix B contains a contact list for the federal, state, and industrial emergency groups responsible for coordinating energy emergency responses.

IF THIS IS AN EMERGENCY,
Refer directly to the North Dakota Department of Emergency Services Disaster Procedure Guide, available at:

www.des.nd.gov/sites/www/files/documents/20220606%20Disaster%20Procedures%20Guide%20.pdf

Detailed steps for energy supply disruption mitigation efforts are detailed in Section 6.0.

2.0 ENERGY LANDSCAPE AND RISK PROFILES

An overview of North Dakota's energy landscape is provided by examining the consumption and supply of electricity, liquid fuels, and natural gas in the state. Threats and vulnerabilities for each are discussed, including environmental and human-induced threats. The probable causes of shortages are discussed for each energy sector. Finally, an assessment of the energy sectors is provided.

2.1 State Energy Profile

North Dakota has a rich and diverse energy landscape. Oil and gas production in the Bakken shale formation has led to North Dakota being one of the largest oil-producing states. There are also significant lignite coal reserves in the western part of the state. North Dakota is an agriculture state and an ethanol producer. Most of the electricity is generated by coal-fired power plants. However, electricity generation from renewable wind power has grown rapidly over the past decade. Natural gas production is also growing in the Bakken region. Overall, North Dakota is a net exporter of energy. Figure 1 represents total annual energy consumption estimates in the state by source, with coal usage for electrical generation being the largest (U.S. Energy Information Administration, 2023b).

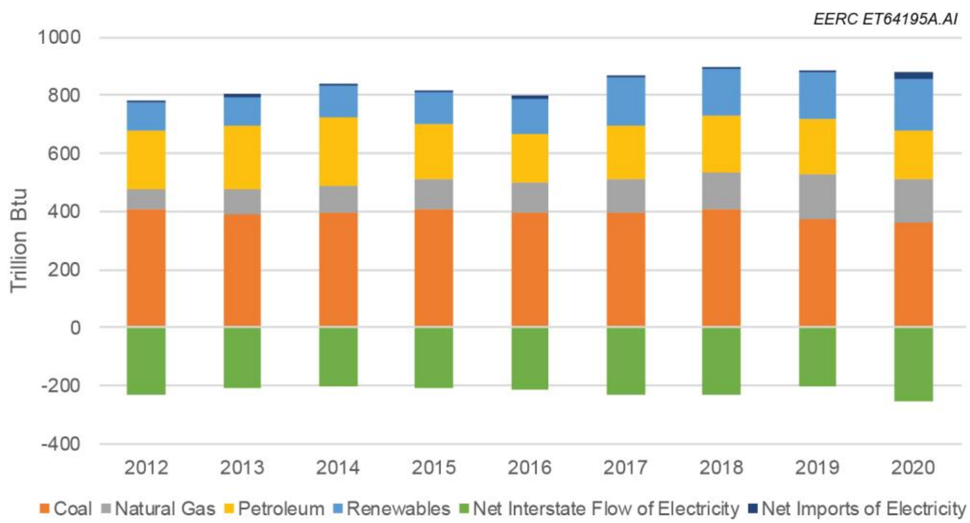

Figure 1. North Dakota total annual energy consumption estimates by source (U.S. Energy Information Administration, 2023b).

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Total annual energy consumption estimates by end use sector are depicted in Figure 2 (U.S. Energy Information Administration, 2023b). Residential, commercial, and transportation consumption have remained relatively constant over the past decade, while the industrial sector has been increasing and consumes the majority of the energy. The growth of oil and natural gas production in the state is driving the increase in energy consumption.

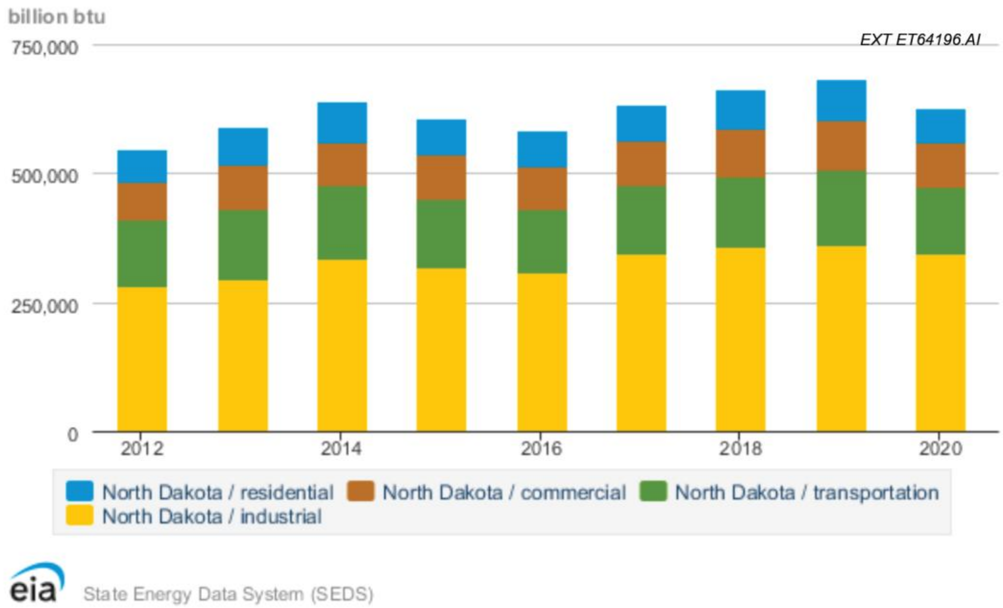

Figure 2. North Dakota total annual energy consumption estimates by end use sector (U.S. Energy Information Administration, 2023b).

North Dakota produces significantly more energy than is consumed, and the state is a net exporter of energy. Figure 3 depicts total annual energy production estimates by source (U.S. Energy Information Administration, 2023b). Production of crude oil and natural gas have grown over the past decade. The coal produced is almost entirely used internally for electrical generation, with a small amount being used in synthetic gas production. Only a small fraction of the natural gas generated is consumed in the state. North Dakota produces significant crude oil, while the consumption of motor gasoline and distillate fuel is relatively small.

Table 1 provides annual energy consumption and generation trends from 2019, as reported by DOE (U.S. Department of Energy, 2021). Electrical power generation is twice as great as consumption, indicating that nearly half of the electrical generation is distributed outside of North Dakota. Natural gas produced in the state is also primarily exported, with only ~10% consumed internally. Crude oil is primarily exported, and there is only one refinery operating in the state.

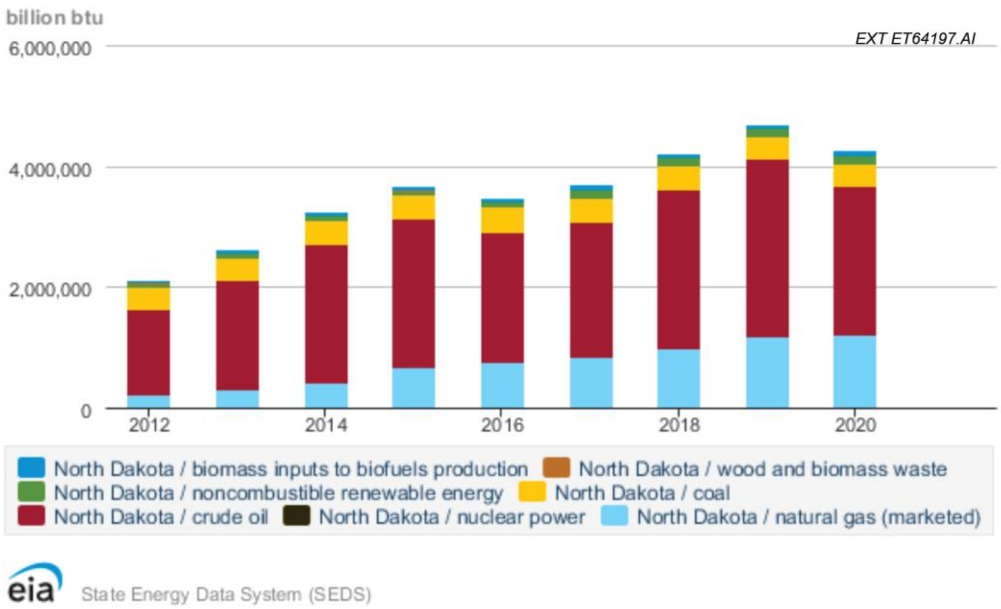

Figure 3. North Dakota total annual energy production estimates by source (U.S. Energy Information Administration, 2023b).

Table 1. Energy Profile for 2019 (U.S. Department of Energy, 2021)

Annual Energy Consumption		**Annual Energy Production**	
Electric Power	22,862 GWh	Electric Power	42,904 GWh
Coal	26,358 MSTN*	Coal	26,513 MSTN
Natural Gas	78 Bcf	Natural Gas	1060 Bcf
Petroleum	9200 Mbbl	Crude Oil	518,900 Mbbl
Distillate Fuel	18,400 Mbbl		

* Thousand short tons.

North Dakota is the fifth largest coal-producing state. Its lignite coal reserves are second only to Australia as the largest known reserve. Lignite coal has the lowest heating value of all coal types and is currently used to generate electricity. North Dakota generates most electricity through mine-to-mouth (minemouth) coal-fired power plants in the western part of the state. Table 1 indicates that North Dakota consumed almost all of the coal that it mined internally.

A small amount of coal is used to produce synthetic natural gas. The Dakota Gasification Company's Great Plains Synfuels Plant is the only commercial coal gasification plant in the United States that operates on lignite coal. The plant uses 18,000 tons of lignite coal a day, and the synthetic natural gas produced is shipped via pipeline to existing markets.

Figure 4 depicts an overview of current generation and energy resources. Oil production and natural gas processing are done primarily in the Bakken shale formation in the western part of the state. The west-central part of the state is where most of the lignite mines and coal-based electrical generation are located. Wind farms are more broadly distributed across the state. A significant amount of ethanol is produced in North Dakota, with six plants located throughout the state. North Dakota also has one biodiesel production facility in Velva.

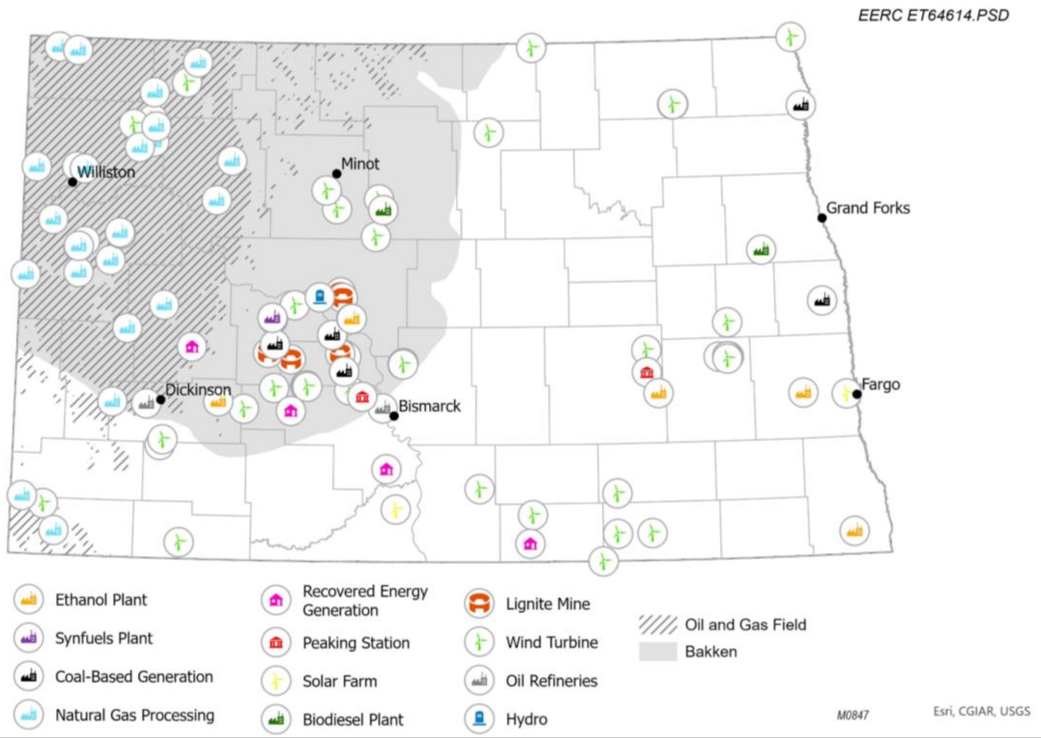

Figure 4. Current generation and energy resources in North Dakota.

The state energy profile is discussed for each sector as follows. Electrical power generation and consumption are discussed first as they are the most critical in terms of emergency response. Liquid fuels and natural gas are addressed subsequently.

2.1.1 Electricity

2.1.1.1 Electricity Consumption

North Dakota has historically been an electricity exporter, and the generation method has primarily been coal-fired power plants. Several high-voltage transmission lines connect North Dakota to Minnesota, South Dakota, Montana, and Canada. Wind generation has grown over the past decade and currently accounts for ~30% of electrical generation. Additional demand from the oil-producing regions of western North Dakota accounts for much of the growth in the total generation capacity from ~31,000 MWh in 2006 to ~46,000 MWh in 2023. The amount of electrical sales exported has been relatively stable for the past decade but internal consumption has grown, accounting for overall growth. Figure 5 depicts monthly retail sales of electricity in North Dakota over the past decade, with growth primarily from the industrial sector (U.S. Energy Information Administration, 2023b).

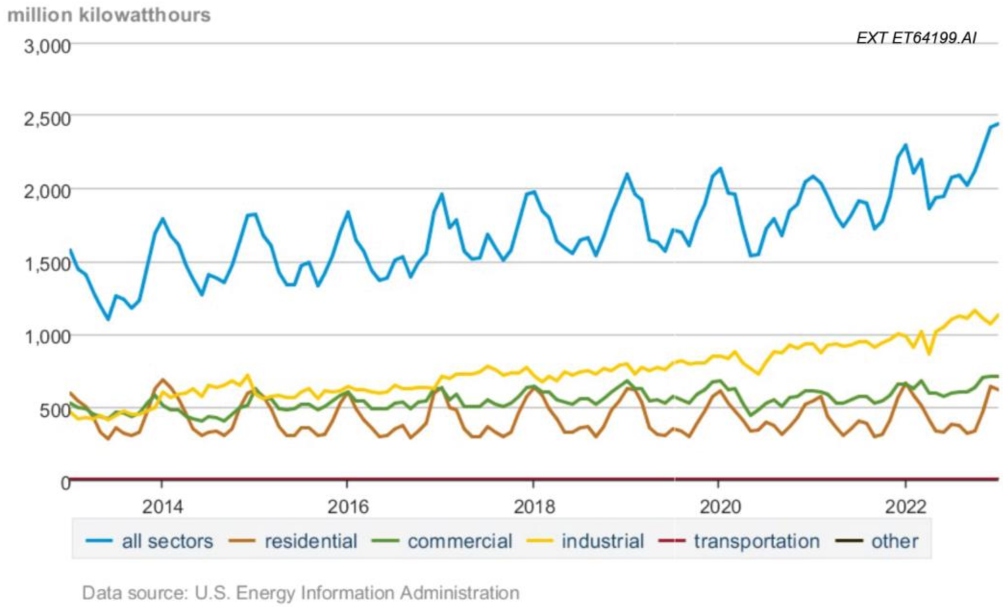

Figure 5. Monthly retail sales of electricity in North Dakota over the last decade (U.S. Energy Information Administration, 2023b).

Total electrical generation from coal-fired power plants has decreased over the past two decades, dropping from ~29,000 MWh in 2006 to ~24,000 MWh in 2021. Electrical power generation from wind has grown from <1000 MWh in 2006 to ~14,000 MWh in 2021. Natural gas and hydroelectric power accounted for ~5000 MWh of electrical power generation in 2021. Figure 6 represents an overview of total annual electrical generation and the contribution from each source (U.S. Energy Information Administration, 2023b). The trends show that overall generation has increased, while the use of coal as the source has decreased. In 2006, over 90% of electrical generation was due to coal-fired power plants. Over the past decade, wind generation of electricity has grown and the state is not as reliant on coal for electrical power. Efforts are ongoing to reduce CO2 emissions from existing power plants through sequestration. North Dakota is leading the nation’s large-scale carbon capture and sequestration demonstrations to mitigate the effects of climate change.

The transmission and distribution systems must maintain their resiliency as electric service is often most crucial during extreme weather events. The increase in intermittent electricity production transforms the electrical grid and creates vulnerability to meet peak demands. North Dakota frequently sees extreme weather conditions, and significant demand increases can result in supply shortages during times of low intermittent source generation. Therefore, efforts are ongoing to maintain baseload generation capacity during peak demand conditions.

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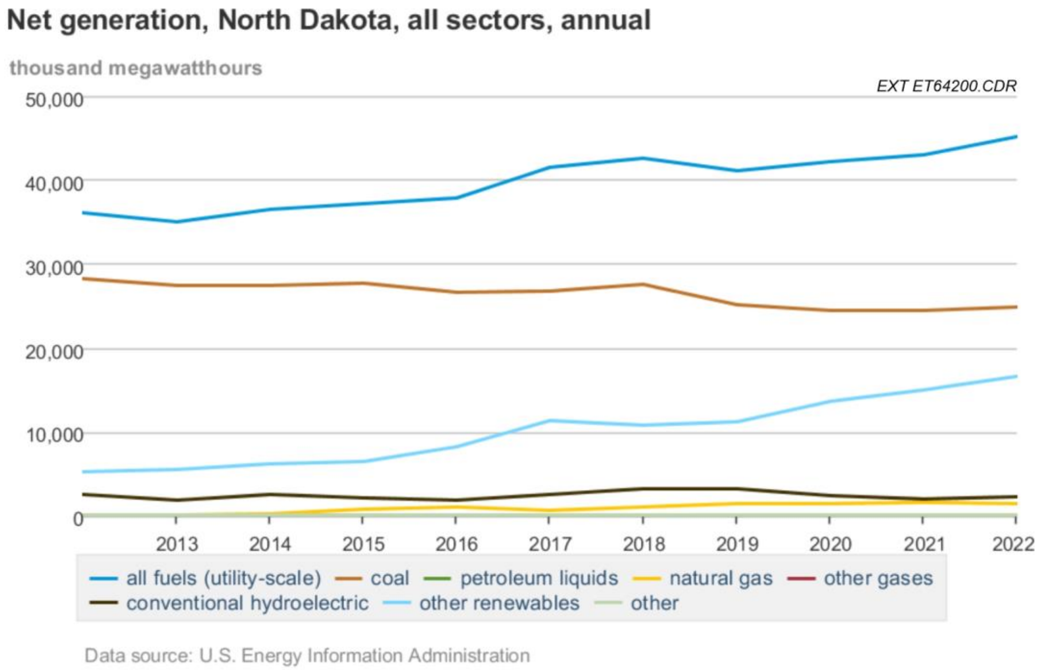

Figure 6. Net annual electricity generation in North Dakota by source (U.S. Energy Information Administration, 2023b).

Electricity distribution cooperatives in North Dakota are depicted in Figure 7. Table 2 lists the top ten major utilities along with ownership type, number of customers, and total retail sales. The percentage of customers is also listed which indicates that many of the utilities have a small share of the customer base. These are generally supplying industrial rather than residential users.

Table 3 lists electrical end users and consumption by each group (U.S. Department of Energy, 2021). Residential customers comprise 82% yet only consume 25% of the delivered electricity. The industrial sector comprises only 2% but consumes 42% of electricity generated.

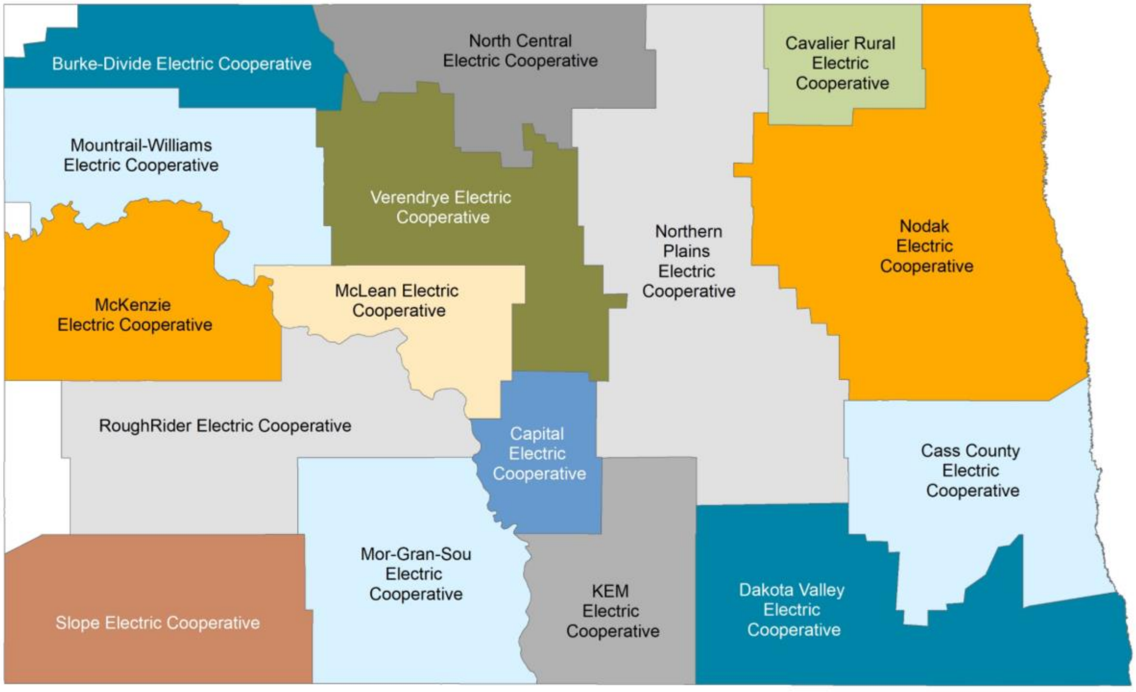

Figure 7. Electricity distribution cooperatives in North Dakota.

Table 2. Major Utilities

Utility Name	Ownership Type	Total Customer Count	% of State's Customers	Total Sales, MWh
McKenzie Electric Cooperative, Inc.	Cooperative	13,239	2.8	5,163,446
Mountrail–Williams Electric Cooperative	Cooperative	21,055	4.4	3,724,477
Northern States Power Company – Minnesota	Investor-owned	94,869	19.9	2,132,532
Montana–Dakota Utilities Co.	Investor-owned	93,484	19.6	2,091,702
Otter Tail Power Company	Investor-owned	59,259	12.4	1,692,681
Cass County Electric Cooperative	Cooperative	55,199	11.6	1,306,173
Nodak Electric Cooperative, Inc.	Cooperative	20,567	4.3	1,147,903
Basin Electric Power Cooperative	Cooperative	1	0.0	1,098,737
Roughrider Electric Cooperative, Inc.	Cooperative	14,909	3.1	716,149
Dakota Valley Electric Cooperative	Cooperative	6743	1.4	670,227

Table 3. Electrical Customers and Consumption by Sector in 2018 (U.S. Department of Energy, 2021)

	Electricity	
Sector	**Customers**	**Consumption**
Residential	82%	25%
Commercial	16%	33%
Industrial	2%	42%
Transportation	<1%	<1%

2.1.1.2 Electricity Supply

Figure 8 is a map of the key electrical generation sites in the state and types of generation and transmission lines, which indicates that the largest generation sources are coal-fired power plants in the western part of the state. Table 4 lists the largest electrical generators by capacity, annual generation, and percentage of state consumption.

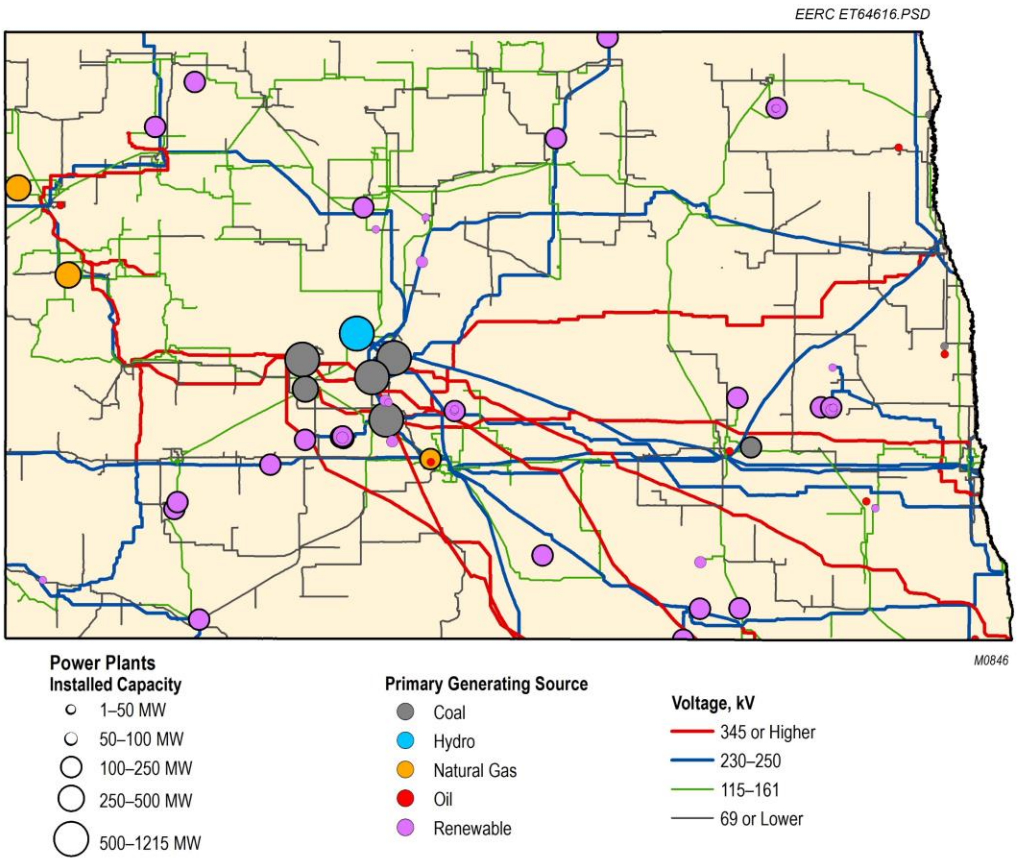

Figure 8. Map of electrical generating sites in North Dakota.

Table 4. Largest Electric Generators by Capacity

Generator Name	Owner	County	Summer Net Capacity, MW	Type
Coal Creek	Great River Energy	McLean	1152.2	Coal
Antelope Valley	Basin Electric Power Cooperative	Mercer	900	Coal
Milton R. Young	Minnkota Power Cooperative	Oliver	684	Coal
Leland Olds	Basin Electric Power Cooperative	Mercer	666	Coal
Garrison	Usace–Omaha	Mercer	510	Hydroelectricity
Coyote	Otter Tail Power Company	Mercer	429	Coal
Pioneer Generating Station	Basin Electric Power Cooperative	Williams	232.8	Natural gas
Bison 4 Wind Energy Center	Allete, Inc.	Morton	205	Wind
Lonesome Creek Station	Basin Electric Power Cooperative	McKenzie	200	Natural gas
Emmons–Logan Wind, LLC	Emmons–Logan Wind, LLC	Emmons	200	Wind

Coal-fired power plants continue to be the largest electrical generation type, as depicted in Figure 9. However, significant amounts of wind generation have been brought online in the last decade. North Dakota has one site for hydroelectric generation at Garrison Dam. A small amount of electricity is generated by natural gas. This is primarily used for peak power supply and only when required.

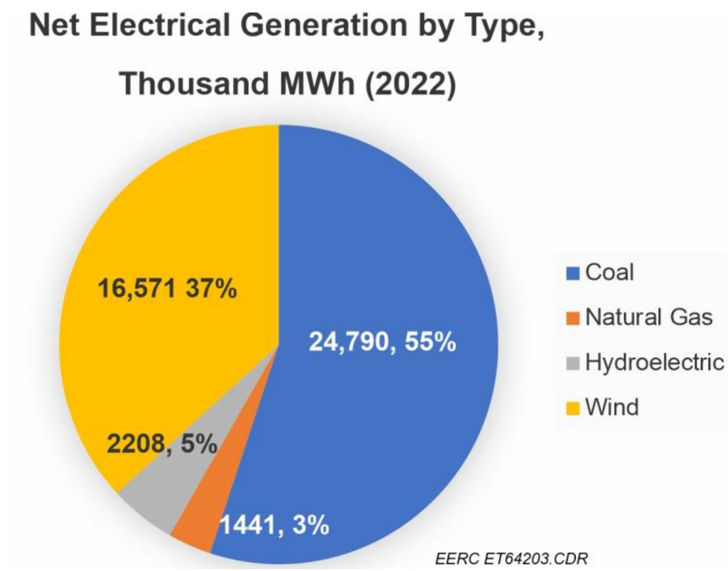

Figure 9. Electrical generation sources in North Dakota.

The combined total of all types of utility-scale generation is approximately 9508 MW. The 4250 MW of wind generation receives a reduced capacity accreditation by Independent System Operators (ISO) of approximately 700 MW since it is intermittent.

2.1.1.3 Electricity Generation by Source

North Dakota is an exporter of electricity. Table 1 indicates that, in 2019, electric power production was 41,100 GWh, while consumption was only 20,670 GWh, so approximately one-half of the electrical energy was exported. Below is a summary of electrical generation sources (North Dakota Transmission Authority, 2022).

Thermal Coal Generation

Coal-powered generation accounts for the majority of electricity generated in the state. North Dakota currently has thermal coal generation in service at six locations, with a total of ten generating units. The combined capacity of the units is approximately 4048 MW. The capacity factors for 2021 ranged from 65% to 91%.

Rainbow Energy closed on a transaction to buy Coal Creek Station and the direct current (DC) transmission line on May 1, 2022. Its plans are to continue operation of the plant in a similar manner and move forward with the CO_2 capture assessment started by Great River Energy. In addition, approximately 400 MW of wind generation is planned for that area of McLean County to utilize the capacity that will be available on the DC line. Table 5 lists the locations of the coal generation sites.

Table 5. Coal-Powered Electrical Generation Sites (Bismarck State College, 2021)

Plant	Operating Company	Capacity, MW
Coal Creek Station	Rainbow Energy Marketing Corporation	1146
Antelope Valley Station	Basin Electric Power Cooperative	900
Milton R. Young Station	Minnkota Power Cooperative	705
Leland Olds Station	Basin Electric Power Cooperative	666
Coyote Station	Otter Tail Power Company	432
Spiritwood Station	Great River Energy	99

Coal-fired power plants provide the baseload of the electrical power in the state. Peaking stations are used to bring on additional electrical capacity at times of high demand. However, these are generally petroleum- or natural gas-powered.

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Wind Generation

North Dakota has 4250 MW of wind generation in service. The average capacity factor for wind in 2021 was 39%. Table 6 lists wind farms and their locations and capacities across the state.

Table 6. Electrical Wind Generation Sites (Bismarck State College, 2021)

Name	Location	Capacity, MW
Ashtabula Wind Farm (I–III)	Barnes County Griggs County Steele County	378
Aurora Wind Farm	Williams County Mountrail County	299
Baldwin Wind Farm (I and II)	Burleigh County	100
Bison Wind Energy Center (I–IV)	Morton County	497
Border Winds Wind Farm	Rolette County	150
Brady Wind Farm (I and II)	Stark County	300
Cedar Hills Wind Farm	Bowman County	20
Courtenay Wind Farm	Stutsman County	200
Emmons–Logan Wind Farm	Emmons County Logan County	216
Foxtrail Wind	Dickey County	150
Glen Ullin Energy Center	Morton County Mercer County	107
Langdon Wind Energy Center	Cavalier County	200
Lindahl Wind Farm	Williams County	150
Luverne Wind Farm	Steele County	49.5
Merricourt Wind Project	Dickey County	150
New Frontier Wind	McHenry County	100
North Dakota Wind (I and II)	LaMoure County	61
Northern Divide (Burke) Wind Project	Divide County	198
Oliver Wind Energy Center (I–III)	Burke County Oliver County	199
Prairie Winds Wind Farm (I and II)	Ward County	123
Rugby Wind Farm	Pierce County	149
Sunflower Wind Farm	Morton County	104
Tatanka Wind Farm	Dickey County McIntosh County	90
Thunder Spirit Wind Farm (I and II)	Adams County	155
Velva Wind Farm	McHenry County	12

Solar Generation

North Dakota does not currently have any utility-scale solar generation facilities in service, although some are in the Midwest Independent System Operator (MISO) and Southwest Power Pool (SPP) queues. While conditions are moderate for solar adoption, North Dakota is one of only three states in the United States without any utility-scale solar generation facilities. Consideration for solar in the state is occurring. The North Dakota Public Service Commission (PSC) is holding a hearing on Notice of Opportunity for an area of Eastern North Dakota.

Hydrogeneration

North Dakota has one hydrogeneration site at Garrison Dam comprising five units with a total capacity of ~600 MW (depending on annual precipitation levels), as listed in Table 7. The dam was commissioned in the 1950s to reduce the occurrence of significant flooding in the state. The average capacity factor declined and in 2021 was approximately 43%. The volume of water flowing in the river has been a limiting factor in hydrogeneration during drought years.

Table 7. Hydrogeneration Site (Bismarck State College, 2021)

Name	Location	Capacity, MW
Garrison Hydropower Plant	Mercer County	583

Natural Gas and Petroleum Generation

Table 8 lists North Dakota's natural gas and petroleum generation sites. North Dakota's three natural gas electrical generation sites comprise 21 generating units with a total capacity of 596.3 MW. These units include reciprocating engines and gas turbines. Total natural gas electrical generation in North Dakota for 2021 was 1.445 GWh, a rate that has remained steady for the past 5 years. There is also a limited number of petroleum electrical generation locations. The use of natural gas and petroleum for electrical generation is generally to add capacity during peak demand times.

Table 8. Natural Gas and Petroleum Electrical Generation Sites (Bismarck State College, 2021)

Name	Location	Capacity, MW
Lonesome Creek Station	McKenzie County	270
Pioneer Generating Station	Williams County	242
Haskett 3	Mandan County	88
Otter Tail Power Company	Stutsman County	45

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2.1.1.4 Key Balancing Authorities

The generation grid in North Dakota is managed by two ISOs: MISO, located in Carmel, Indiana, and SPP, located in Little Rock, Arkansas. These systems both operate the transmission grid in their area of responsibility and conduct market operations to select the lowest cost and operationally appropriate generating units to serve the grid each day. They monitor the grid continuously and make adjustments to correct the day-ahead planning to the reality of the day. Since there are very few available options to store electricity, these operations must match the generation with the demand continually.

Many North Dakota regional transmission organizations (RTOs) have long been participants in MISO and SPP. The RTOs oversee the reliable operation of the transmission grid. MISO and SPP also operate the power markets in their respective territories, as depicted in Figure 10 (Federal Energy Regulatory Commission, 2022). Both MISO and SPP are in the planning process to accommodate future electrical demand as well as the growth of renewable generation (North Dakota Transmission Authority, 2022).

ISOs are responsible for the reliability of the grid, but they state very clearly that they are fuel-agnostic and do not dictate the choice of generation resources attached to the grid, which is defined as a state responsibility. The role of ISOs is to have market designs and tariffs that encourage the right mix of resources. Both MISO and SPP are in the process of changing market designs to provide more financial incentives to keep dispatchable resources on the grid to facilitate a more predictable and manageable transition of the grid without compromising reliability.

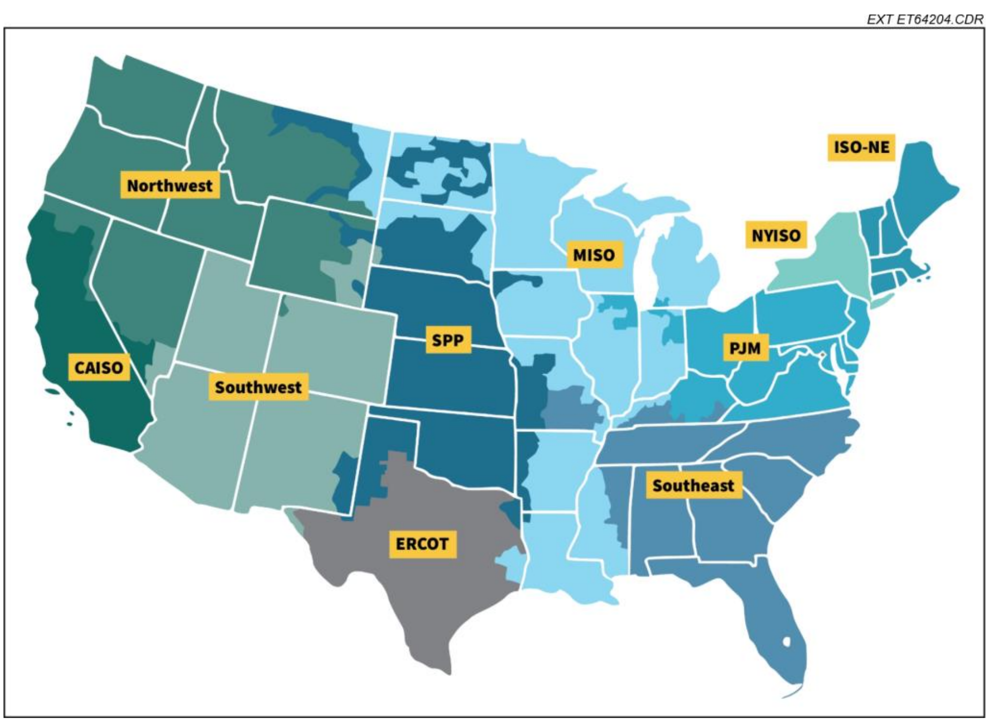

Figure 10. Federal Energy Regulatory Commission (FERC)-recognized RTOs and ISOs (Federal Energy Regulatory Commission, 2022).

Figure 11 is a map of North Dakota's electrical interconnections, indicating that most of the generation occurs in the central and western parts of the state.

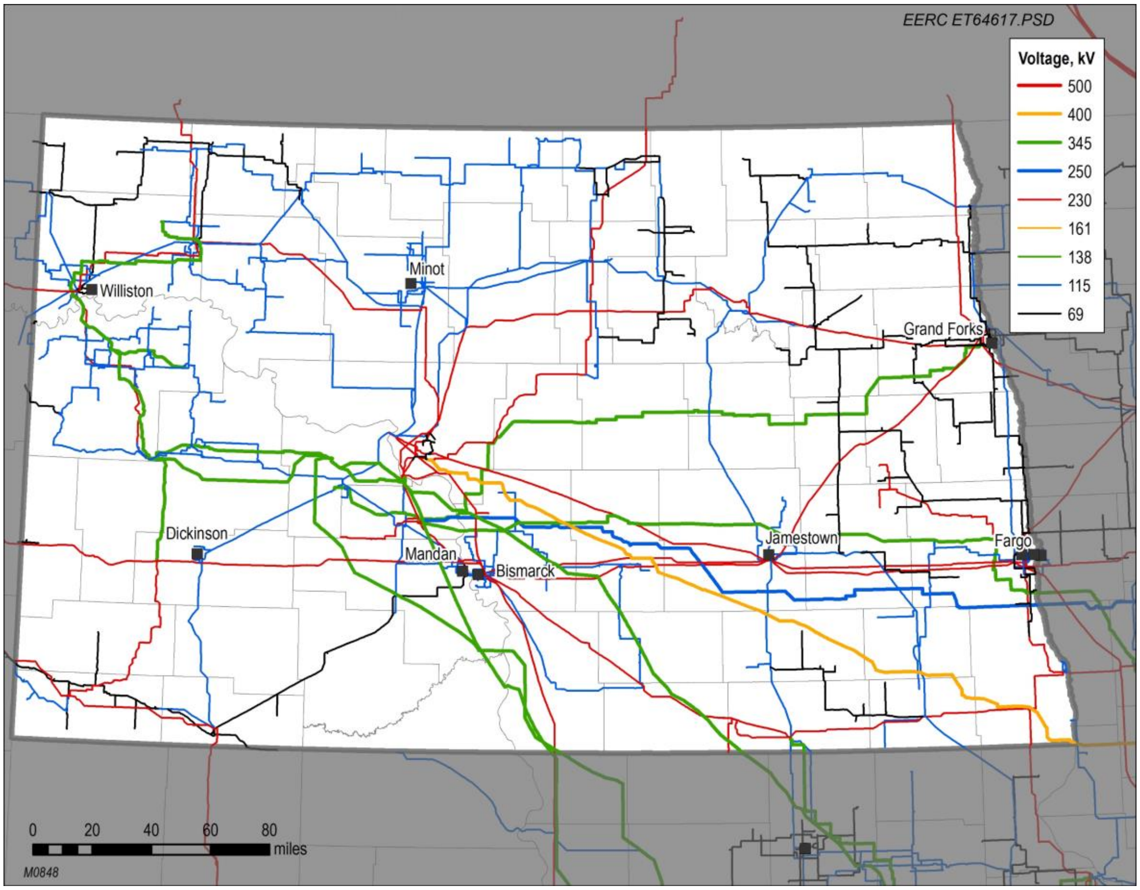

Figure 11. Electrical interconnections across North Dakota.

Figure 12 is a MISO overview of balancing authorities depicting electrical demand, forecast demand, net generation, and total interchange for a 1-year period (U.S. Energy Information Administration, 2023b). It should be noted that this is not specific to North Dakota but rather the entire region MISO serves. Figure 13 depicts MISO net generation by source for a 1-year period (U.S. Energy Information Administration, 2023b).

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Figure 12. MISO electricity overview (demand, forecast demand, net generation, and total interchange) – May 3, 2022 – May 2, 2023 (U.S. Energy Information Administration, 2023b).

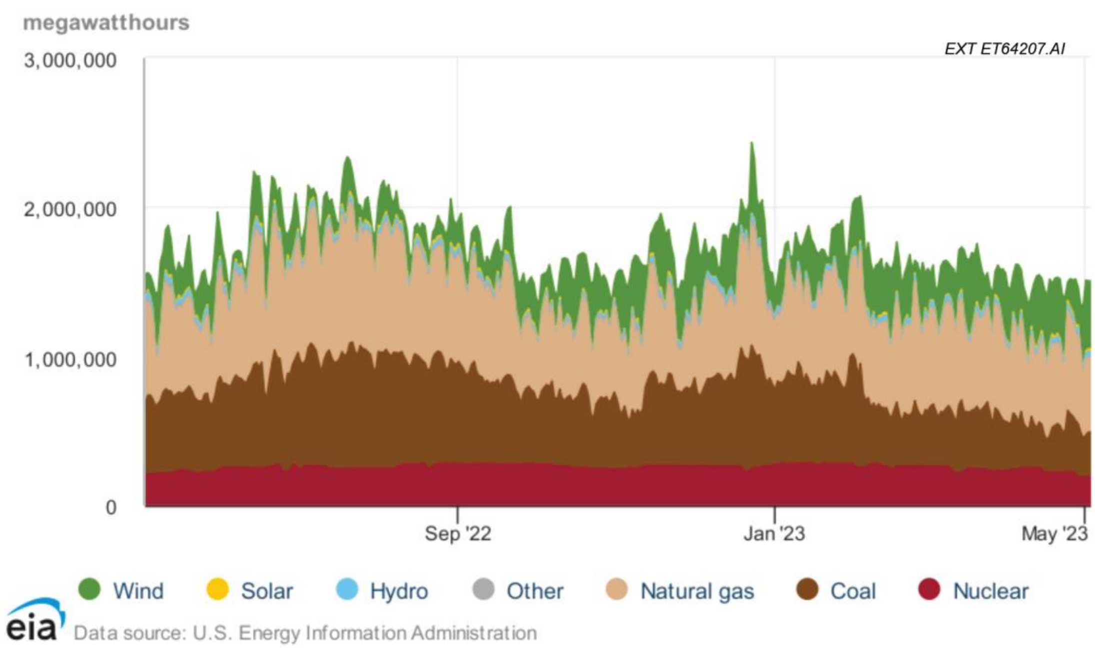

Figure 13. MISO electricity generation by energy source – May 3, 2022 – May 2, 2023 (U.S. Energy Information Administration, 2023b).

Figure 14 is an SPP overview of balancing authorities depicting electrical demand, forecast demand, net generation, and total interchange for a 1-year period (U.S. Energy Information Administration, 2023b). It should be noted that this is not specific to North Dakota but rather the entire region SPP serves. Figure 15 shows SPP net generation by source for a 1-year period (U.S. Energy Information Administration, 2023b).

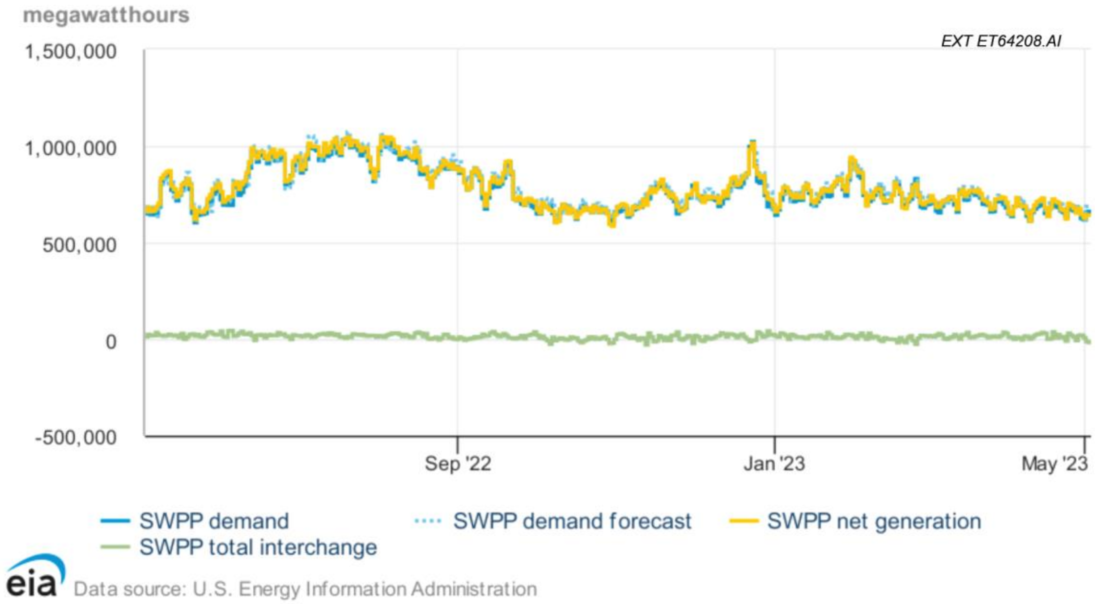

Figure 14. SPP electricity overview (demand, forecast demand, net generation, and total interchange) – May 3, 2022 – May 2, 2023 (U.S. Energy Information Administration, 2023b).

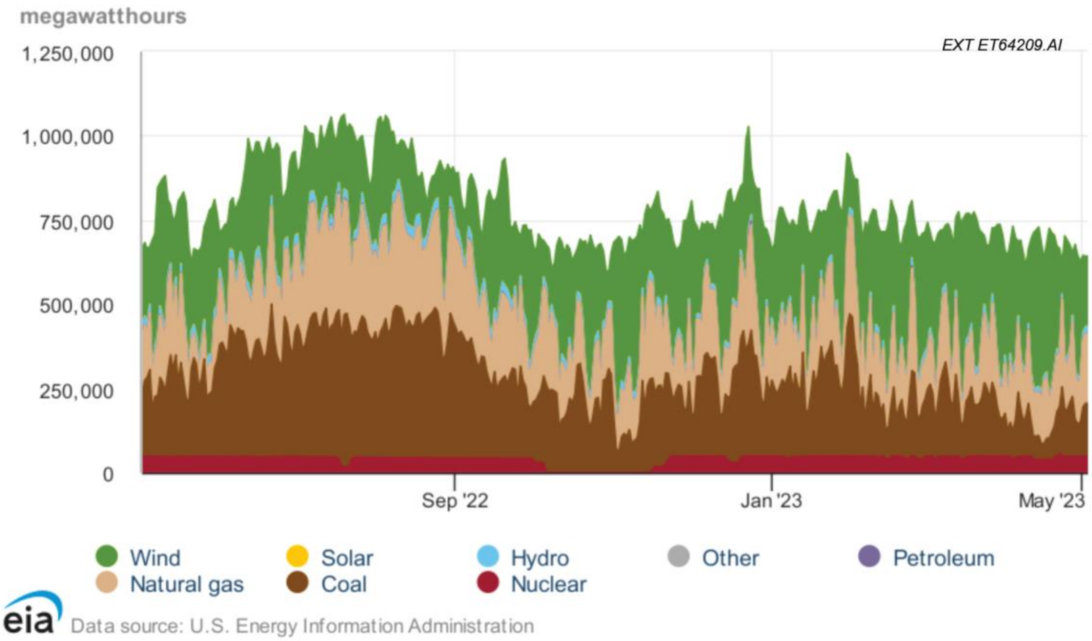

Figure 15. SPP electricity generation by energy source – May 3, 2022 – May 2, 2023 (U.S. Energy Information Administration, 2023b).

2.1.2 Liquid Fuels

2.1.2.1 Petroleum Product Consumption

North Dakota's petroleum consumption per capita is among the top five in the nation. Conventional motor gasoline without ethanol is allowed to be sold statewide, but most gasoline is blended with 15% ethanol. Also available at certain fueling stations is E85, a blend of 85% ethanol and 15% motor gasoline. North Dakota has no fuel specifications more stringent than U.S. Environmental Protection Agency (EPA)-required specifications. Fuel oil, propane, and kerosene are used in about 16% of households for home heating (U.S. Energy Information Administration, 2022c). Petroleum product demand is depicted in Figure 16, including information on gasoline, distillate, kerosene, and propane consumption. Stock builds of liquid fuels are depicted in Figure 17.

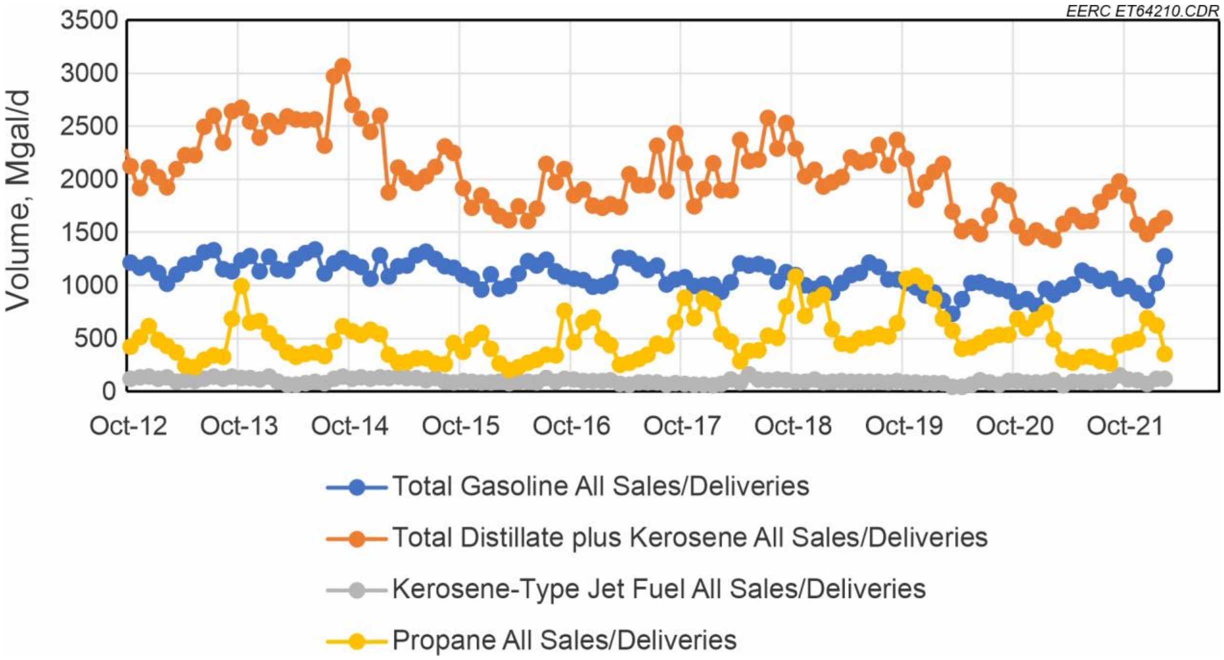

Figure 16. Petroleum product demand (U.S. Energy Information Administration, 2022c).

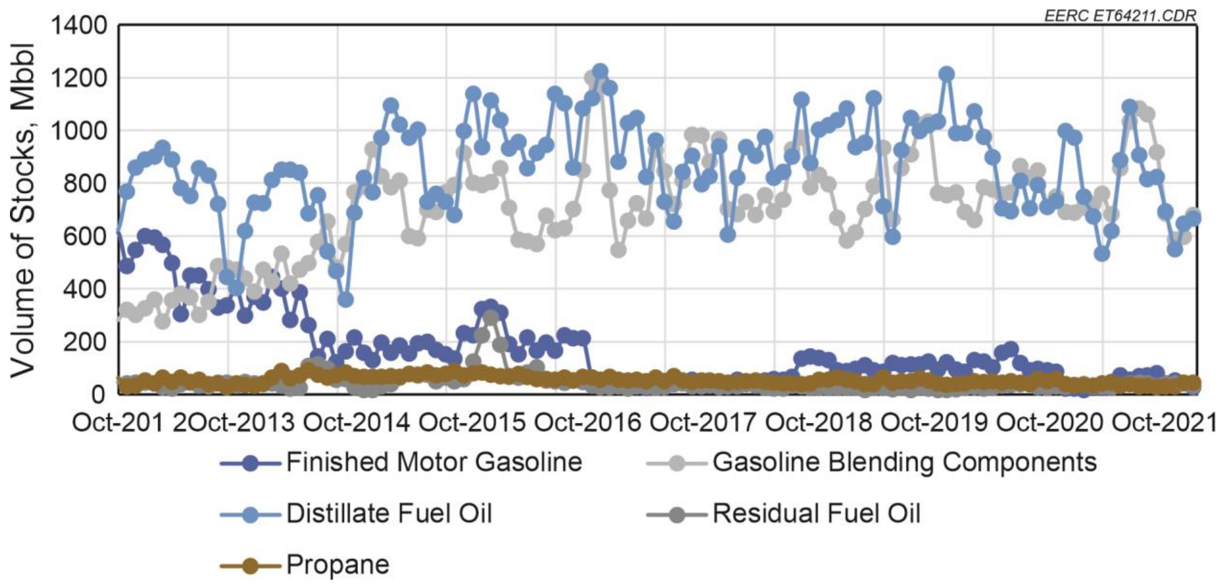

Figure 17. Liquid fuel stocks (U.S. Energy Information Administration, 2023a).

2.1.2.2 Petroleum Product Supply

U.S. Petroleum Administration for Defense Districts (PADDs) are depicted in Figure 18 (U.S. Energy Information Administration, 2023b). North Dakota is part of the PADD 2 Midwest district. Figure 19 further breaks down the Midwest district, with North Dakota grouped with South Dakota, Minnesota, and Wisconsin in PADD 2 Northern Midwest (U.S. Energy Information Administration, 2023b).

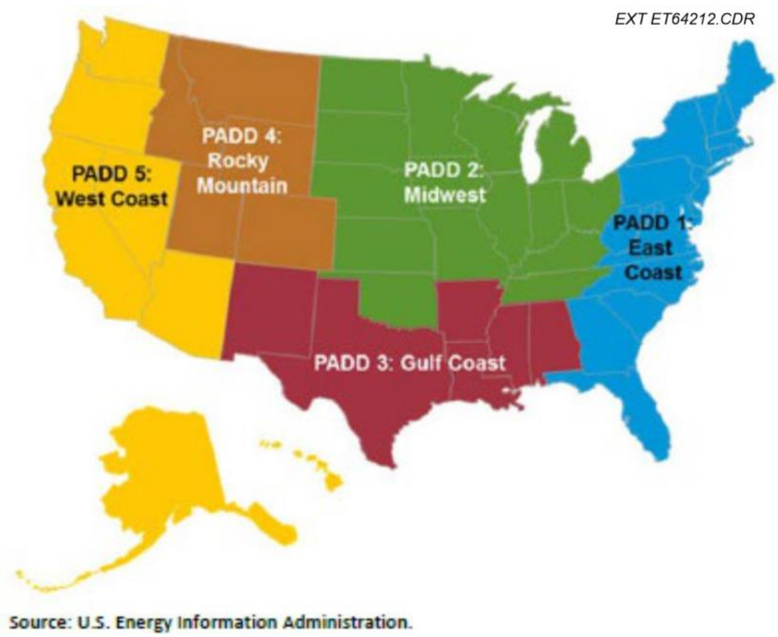

Figure 18. U.S. PADDs (U.S. Energy Information Administration, 2023b).

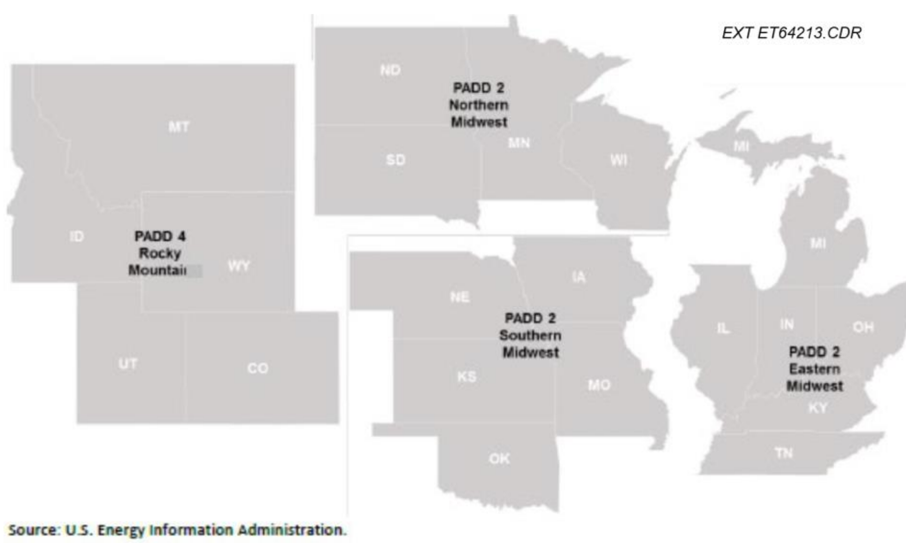

Figure 19. U.S. sub-PADD regions (U.S. Energy Information Administration, 2023b).

Only one petroleum refinery is currently operating in North Dakota, as listed in Table 9. A smaller refinery in Dickinson was shut down in 2020 and is being converted to a biodiesel plant (U.S. Energy Information Administration, 2022b). The crude oil-refining capacity is only 10% of the production. Most of the crude oil is exported by pipeline to refining centers in Oklahoma and on the Gulf Coast.

Table 9. Operating Petroleum Refinery

Owner	Location	Crude Oil Capacity, b/cd	Crude Pipelines Feeding	Product Takeaway Pipelines
Tesoro Refining & Marketing Company LLC	Mandan	71,000	High Plains Crude Oil Pipeline	North Products Pipeline

Figure 20 is a map of the transportation fuel infrastructure in North Dakota, with the refinery and key pipelines depicted. Pipeline infrastructure has grown over the past decade, and most of the crude oil is moved by pipeline rather than railcar. Pipelines also carry crude oil from Canada to refineries in the southern United States. Figure 21 is a map of the petroleum infrastructure in the Northern Midwest PADD region.

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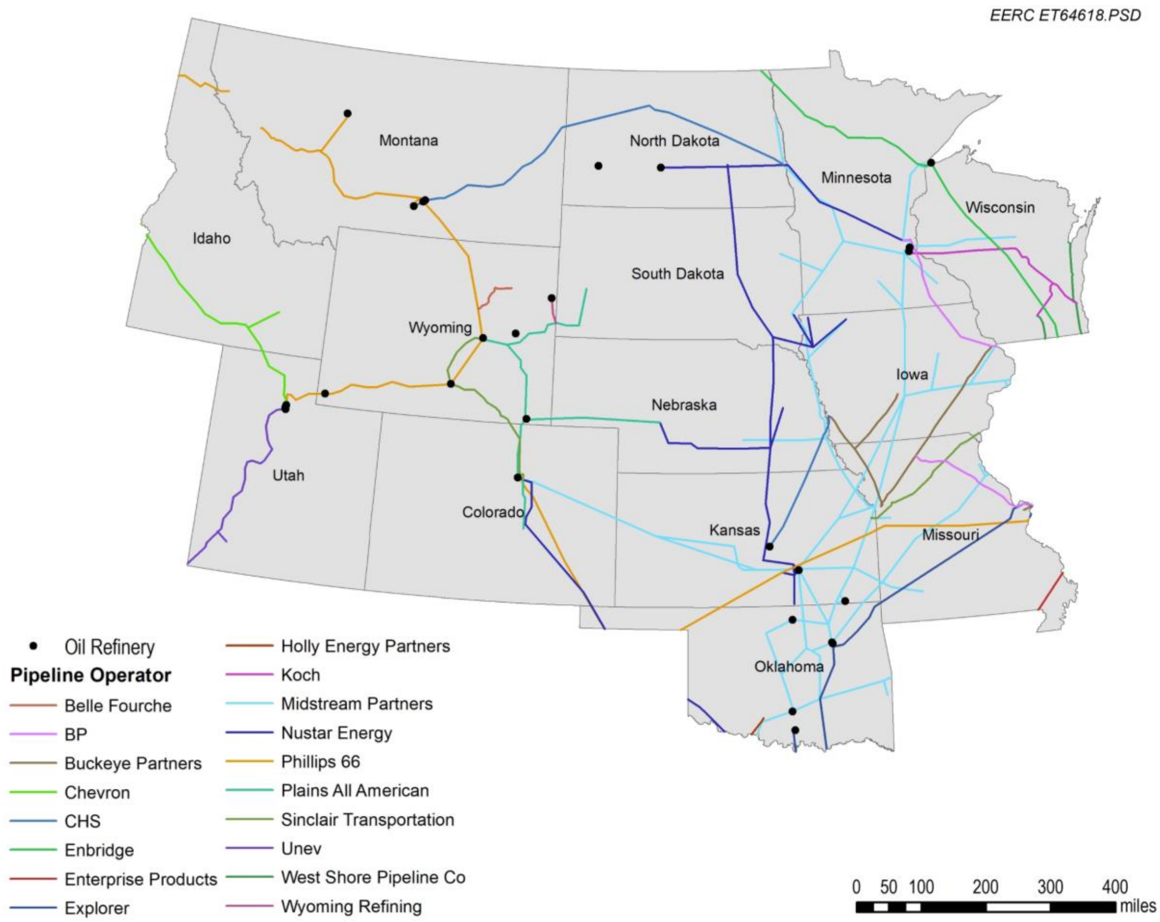

Figure 20. Generalized Midwest and Rocky Mountain key refinery hubs and product flows.

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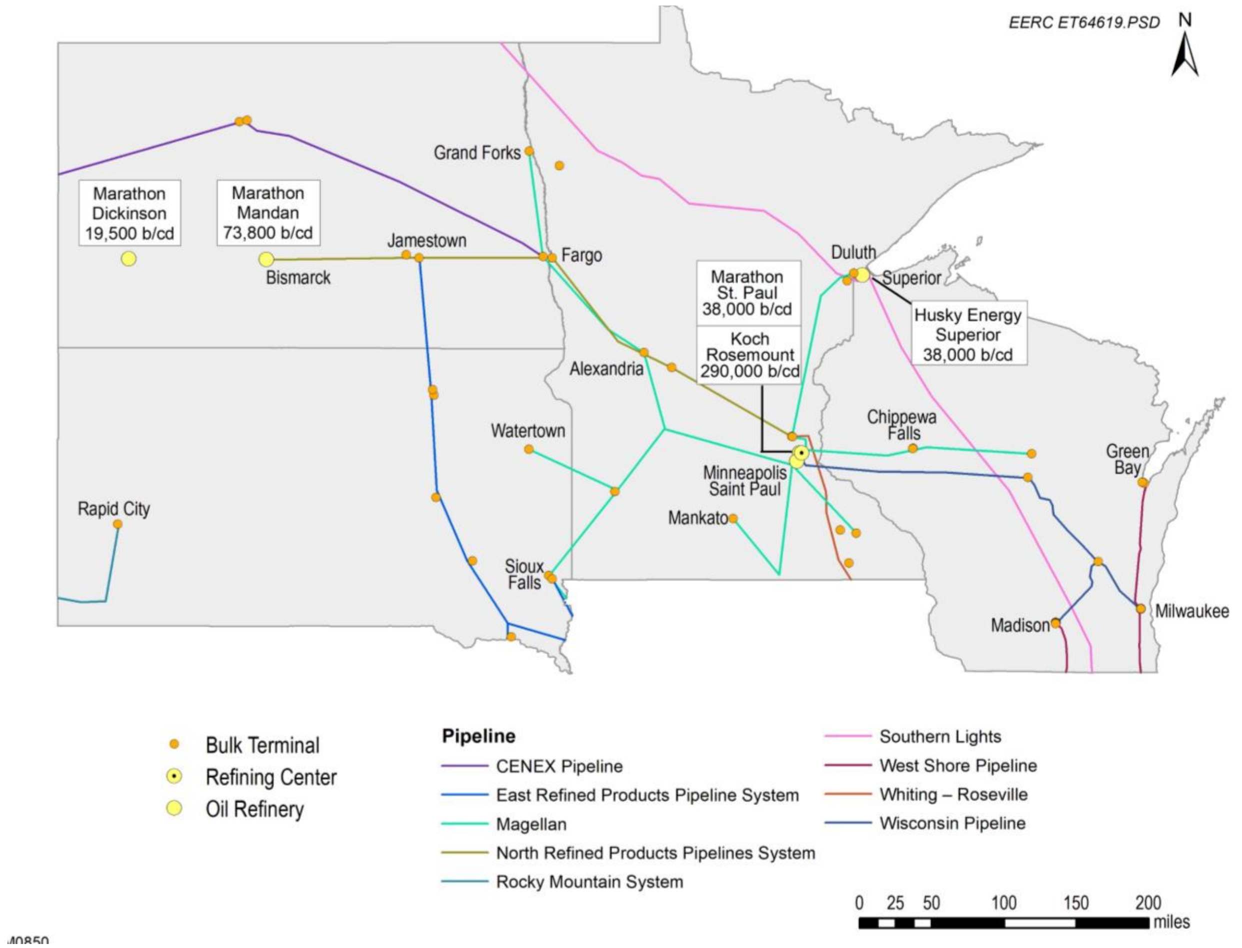

Figure 21. Northern Midwest PADD region refined petroleum infrastructure.

2.1.2.3 Crude Oil

North Dakota is currently the third largest crude oil-producing state behind Texas and New Mexico. Distillation capacity is limited, and most of the crude oil is exported. Figure 22 depicts North Dakota production and refinery capacity since 2017. Figure 23 is a map of crude oil pipelines, wells, and refineries. It should be noted that the Dakota Prairie Refinery was purchased by Marathon Petroleum Corporation in 2021 and is being converted to a biodiesel refinery.

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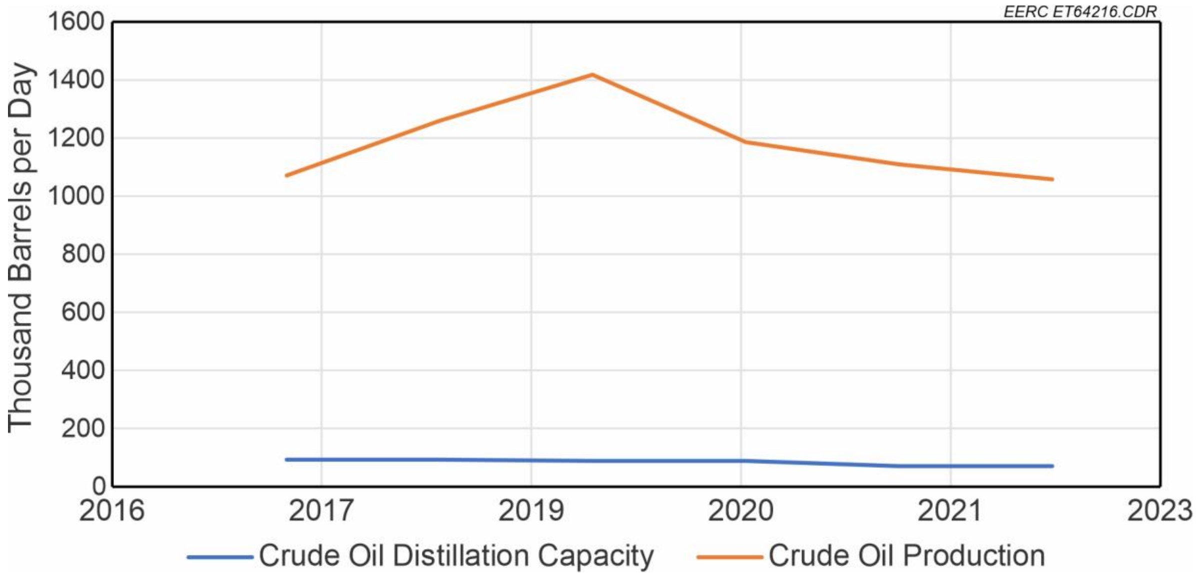

Figure 22. Production and refinery capacity for crude oil.

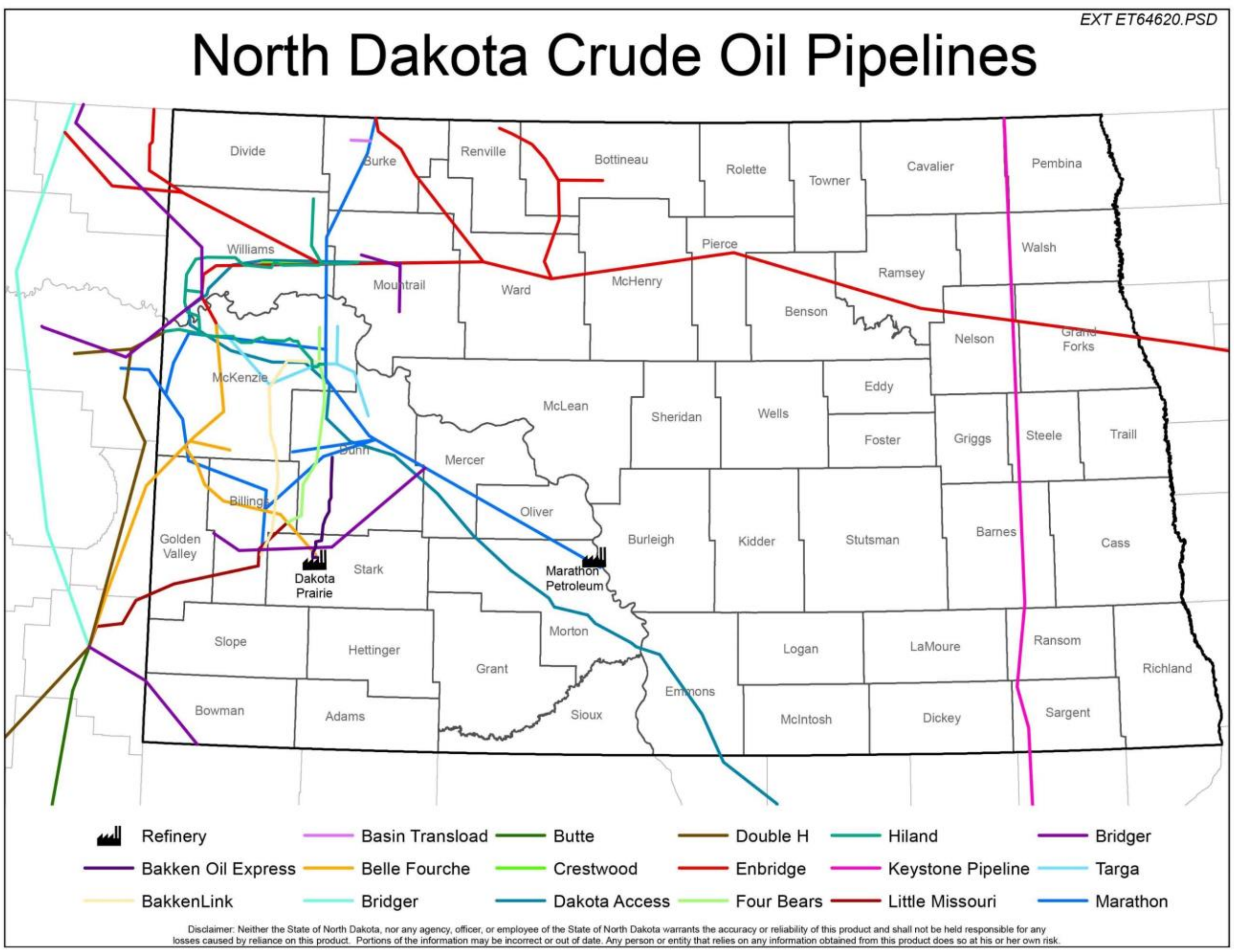

Figure 23. North Dakota crude oil pipelines (2019).

2.1.2.3 Biofuels

North Dakota is in the top ten states for ethanol production, with the capacity to produce 550 million gallons per year. Five ethanol distilleries use corn as the primary feedstock; one facility uses sugar beet tailings and potato waste (North Dakota Ethanol Council, 2016). The state also has biodiesel production. Figure 24 is a map of the locations of ethanol and biodiesel production facilities. Table 10 lists ethanol and biodiesel production plants in North Dakota.

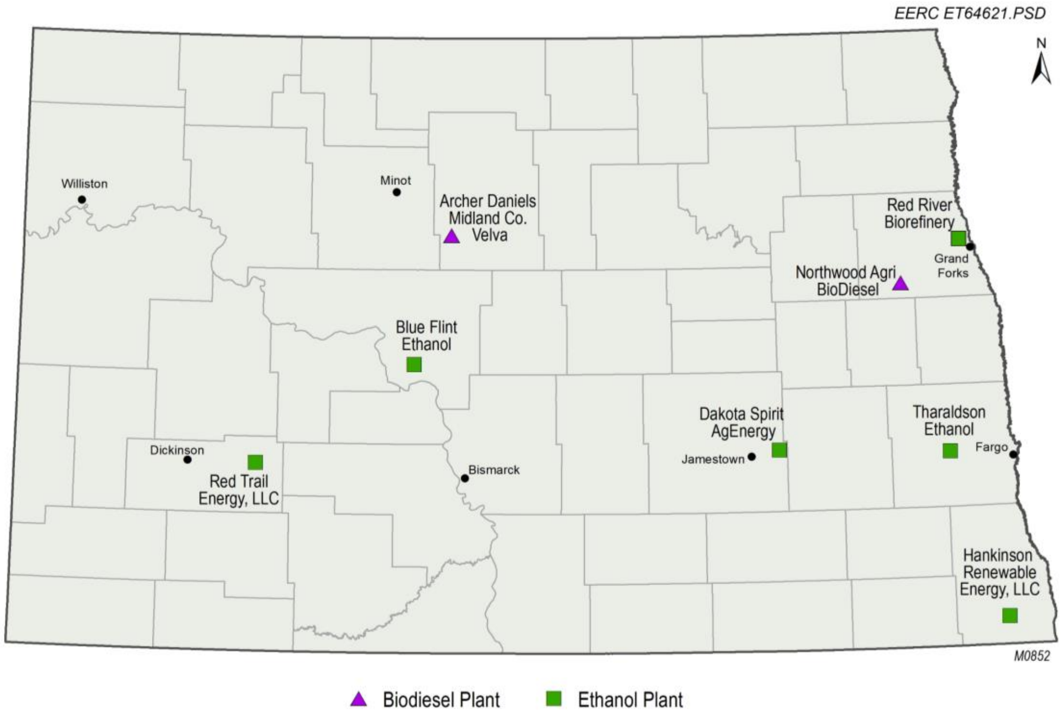

Figure 24. Map of ethanol and biodiesel production facilities.

Table 10. Ethanol and Biodiesel Production Plants

Company Name	Site	Capacity, million gallons/year	Type
Blue Flint	Underwood	70	Ethanol
Dakota Spirit	Spiritwood	75	Ethanol
Hankinson Renewable Energy	Hankinson	154	Ethanol
Red Trail Energy	Richardton	63	Ethanol
Tharaldson Ethanol	Casselton	175	Ethanol
Red River Biorefinery	Grand Forks	16.5	Ethanol
ADM Company	Velva	85	Biodiesel

2.1.3 Natural Gas

2.1.3.1 Natural Gas Consumption

North Dakota is an exporter of natural gas. Referring back to Table 1, natural gas production was 1060 Bcf, while its consumption was only 78 Bcf. Natural gas production is also growing in the Bakken region of North Dakota. While some of the natural gas has been utilized for electrical generation, more is distributed for residential heating. Nearly two-fifths of households use natural gas for heating. The following is an overview of natural gas resources (U.S. Energy Information Administration, 2022b). North Dakota has been a natural gas producer since 1892 in low volumes. However, output increased rapidly with the development of shale oil resources in 2008. In 2021, North Dakota's total natural gas production increased as natural gas prices rose and output again surpassed 1 trillion cubic feet. Production capacity exceeds pipeline capacity; however, new processing plants and pipelines are coming online. Excess natural gas was once flared, but now greater than 90% is captured. The North Dakota Industrial Commission (NDIC) set a 91% capture rate target and has authority to issue permits for underground storage sites to store either in gaseous or liquid form.

Natural gas consumption by end use since 2014 is depicted in Figure 25. The overall trend is increasing and is driven by higher lease fuel and plant fuel consumption. This represents the usage of natural gas in well, field, and lease operations as well as natural gas-processing plants. Figure 26 depicts the breakdown of natural gas sales to residential, commercial, electrical, and industrial customers.

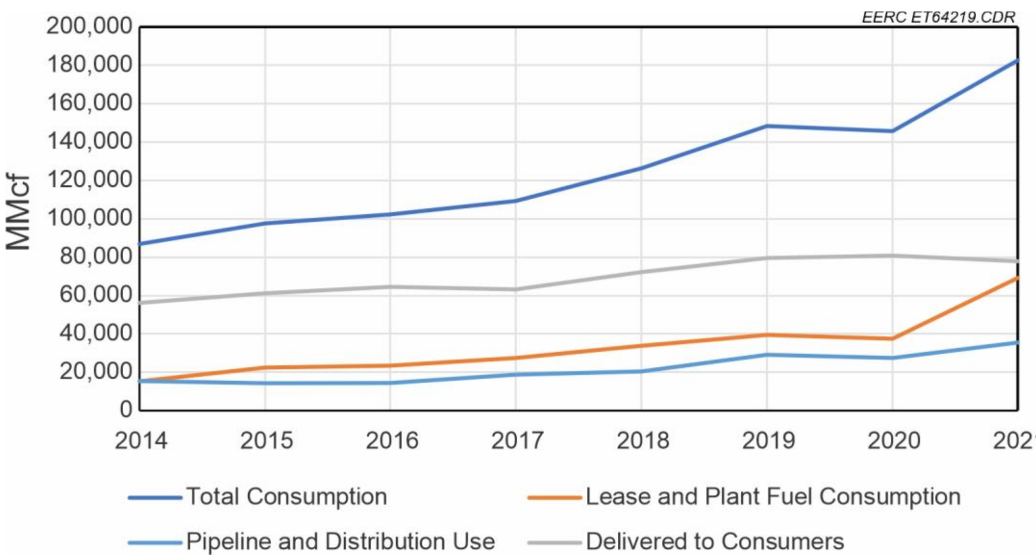

Figure 25. Natural gas consumption by end use.

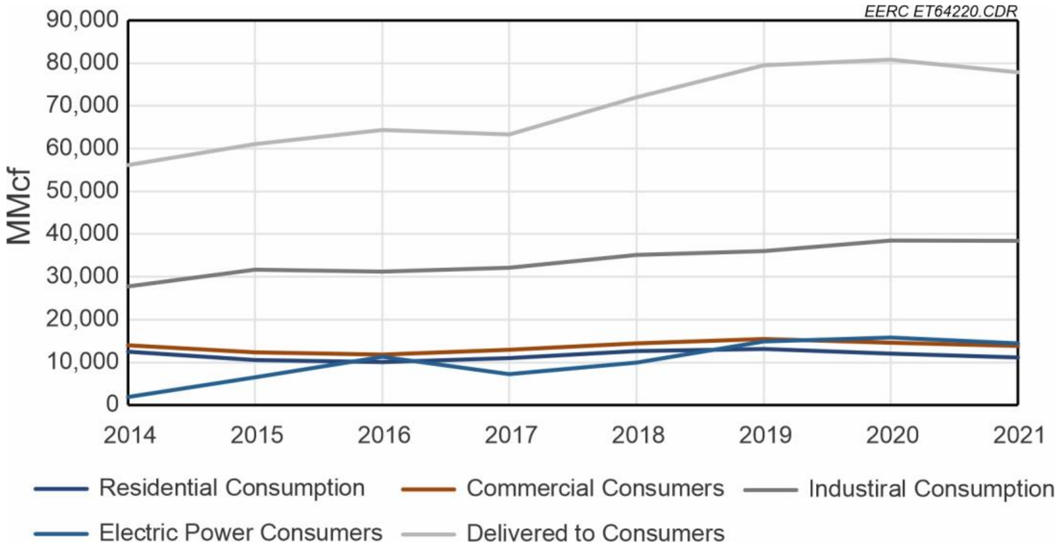

Figure 26. Natural gas delivered to customers.

Natural gas end users and consumption by group are listed in Table 11. Electrical power generation consumes 13% of natural gas usage, typically used under peak load conditions. Residential customers are the largest end user but only account for 18% of natural gas usage. The industrial sector accounts for 49% of natural gas usage. Similar to electrical consumption, the industrial sector is the largest consumer and smallest percentage of total customers for natural gas.

Table 11. Natural Gas Customers and Consumption by Sector in 2018 (U.S. Energy Information Administration, 2022a)

	Natural Gas	
Sector	**Customers**	**Consumption**
Residential	86%	18%
Commercial	13%	20%
Industrial	<1%	49%
Transportation	<1%	<1%
Electric Power	<1%	13%
Other	<1%	<1%

Figure 27 is a map of natural gas distribution company territories. A list of natural gas distribution companies and their delivery volumes is given in Table 12.

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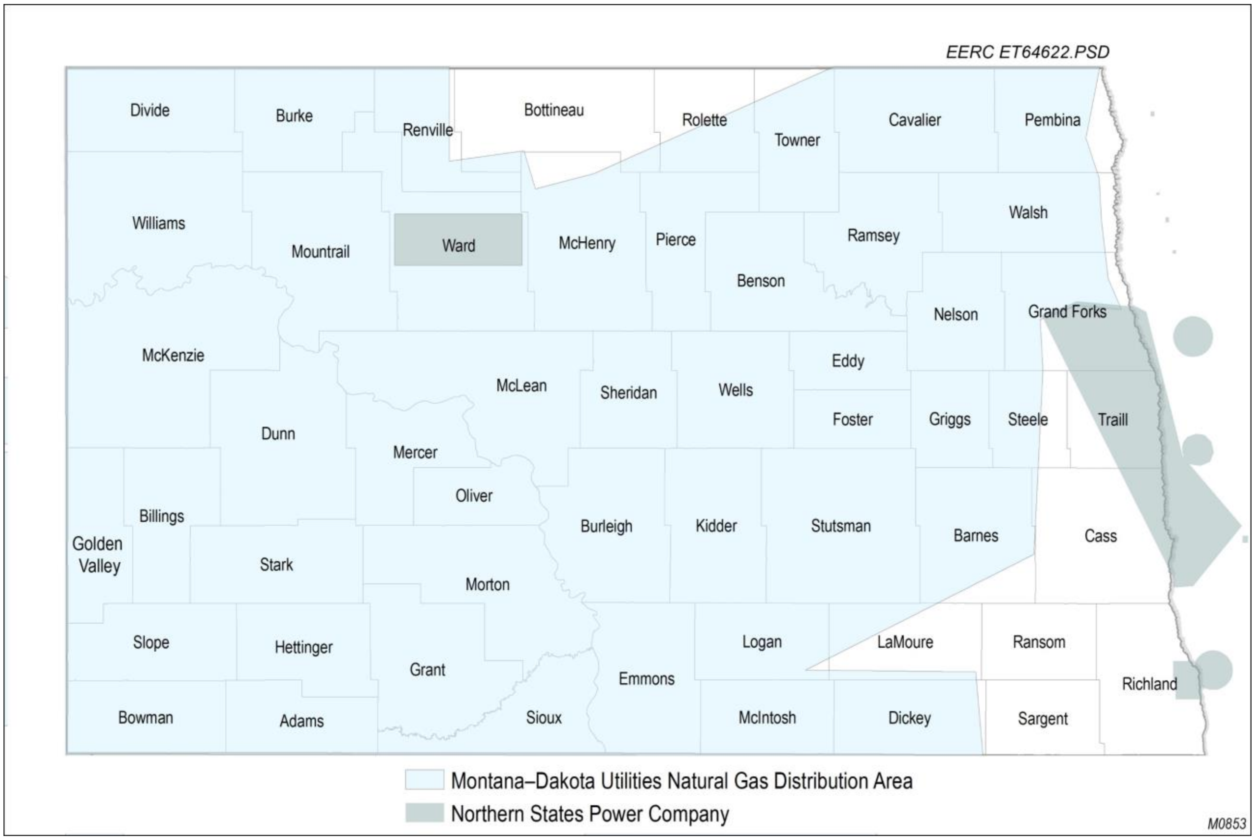

Figure 27. Map of natural gas distribution company territories.

Table 12. Natural Gas Production Sites (Bismarck State College, 2021)

Owner Company	Facility	County	Capacity, MMcfd
1804 Ltd	Spring Brook	Williams	70
Andeavor	Robinson Lake	Mountrail	150
Andeavor	Belfield	Stark	35
Arrow Field Services	Arrow	McKenzie	150
Aux Sable – Chicago, IL	Prairie Rose	Mountrail	126
Caliber Midstream	Hay Butte	McKenzie	10
Hess	Tioga	Williams	415
Kinder Morgan	Norse	Divide	25
Kinder Morgan	Badlands	Bowman	40
Kinder Morgan	Roosevelt	McKenzie	200
Kinder Morgan	Watford City	McKenzie	90
Liberty Midstream Solutions	County Line	Williams	30
Oasis	Wild Basin	McKenzie	320
ONEOK	Lonesome Creek	McKenzie	240

Continued . . .

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Table 12. Natural Gas Production Sites (Bismarck State College, 2021) (continued)

Owner Company	Facility	County	Capacity, MMcfd
ONEOK	Stateline I	Williams	120
ONEOK	Stateline II	Williams	120
ONEOK	Garden Creek I	McKenzie	120
ONEOK	Garden Creek II	McKenzie	120
ONEOK	Garden Creek III	McKenzie	120
ONEOK	Grasslands	McKenzie	90
ONEOK	Bear Creek	Dunn	130
ONEOK	Bear Creek II	Dunn	200
ONEOK	Demicks Lake	McKenzie	200
ONEOK	Demicks Lake II	McKenzie	200
ONEOK	Demicks Lake III	McKenzie	0
Outrigger Energy II	Williston Basin Midstream	Williams	250
Petro Hunt	Little Knife	Billings	27
Steel Reef	Lignite	Burke	6
Targa/Hess JV	LM4	McKenzie	200
Targa Resources	Badlands	McKenzie	90
True Oil	Red Wing Creek	McKenzie	15
USG Midstream Bakken	DeWitt	Divide	3
Whiting Oil & Gas	Ray	Williams	25
XTO – Nesson	Ray	Williams	100
Total			**4037**

North Dakota is a natural gas pass-through for producers in Canada and Montana, and most of it continues on to South Dakota and Minnesota. Still, nearly twice as much natural gas leaves the state than enters it due to production in the Bakken region. Almost 1.2 trillion cubic feet of natural gas was shipped out of North Dakota in 2020, while natural gas shipments into the state totaled 630 billion cubic feet. About half of the natural gas consumed in North Dakota in 2020 went to electrical power generation, exceeding commercial and residential usage for the first time. Natural gas usage for electrical power generation has more than doubled since 2017. The commercial sector uses ~20% of the delivered natural gas and the residential sector about 15%.

2.1.3.2 Natural Gas Supply

Figure 28 depicts natural gas gross withdrawals and production versus consumption in North Dakota. There has been a significant increase in production since 2010, coinciding with the development of oil and gas production in the western part of the state. North Dakota is a net exporter of natural gas, as the amount consumed is only a small fraction of that produced.

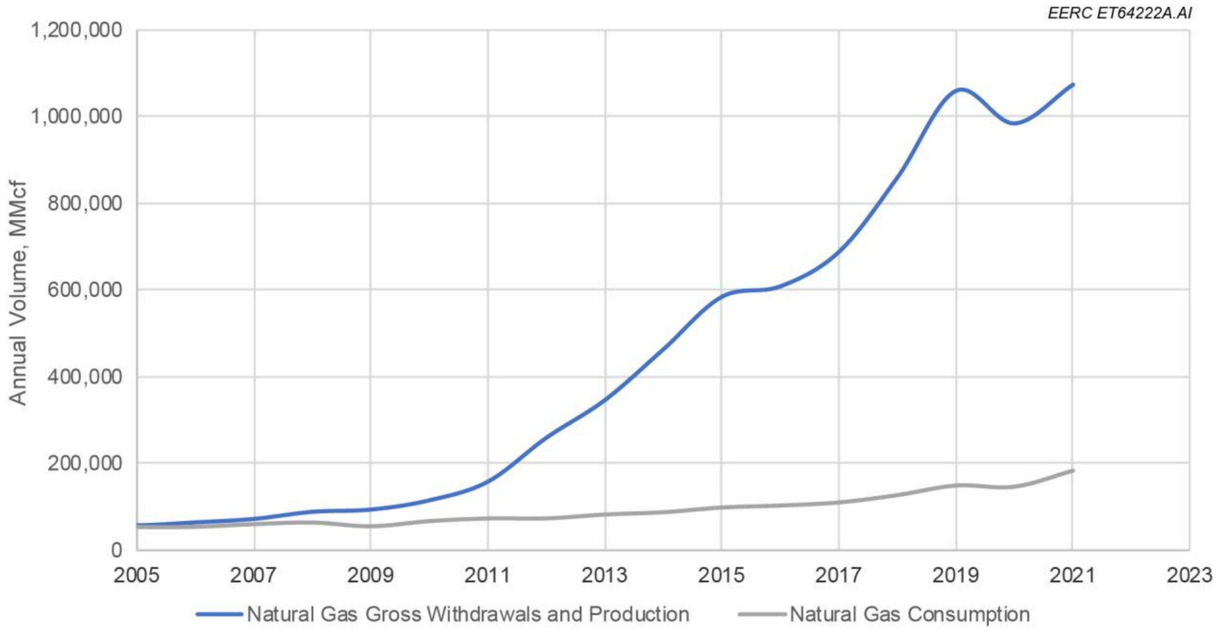

Figure 28. Natural gas production and consumption.

Figure 29 is a map of natural gas pipelines, gas-fired power plants, storage, liquefied natural gas (LNG) facilities, and processing plants. The natural gas production sites are located in the western part of the state. Table 13 lists all the major pipelines in the state along with their capacities.

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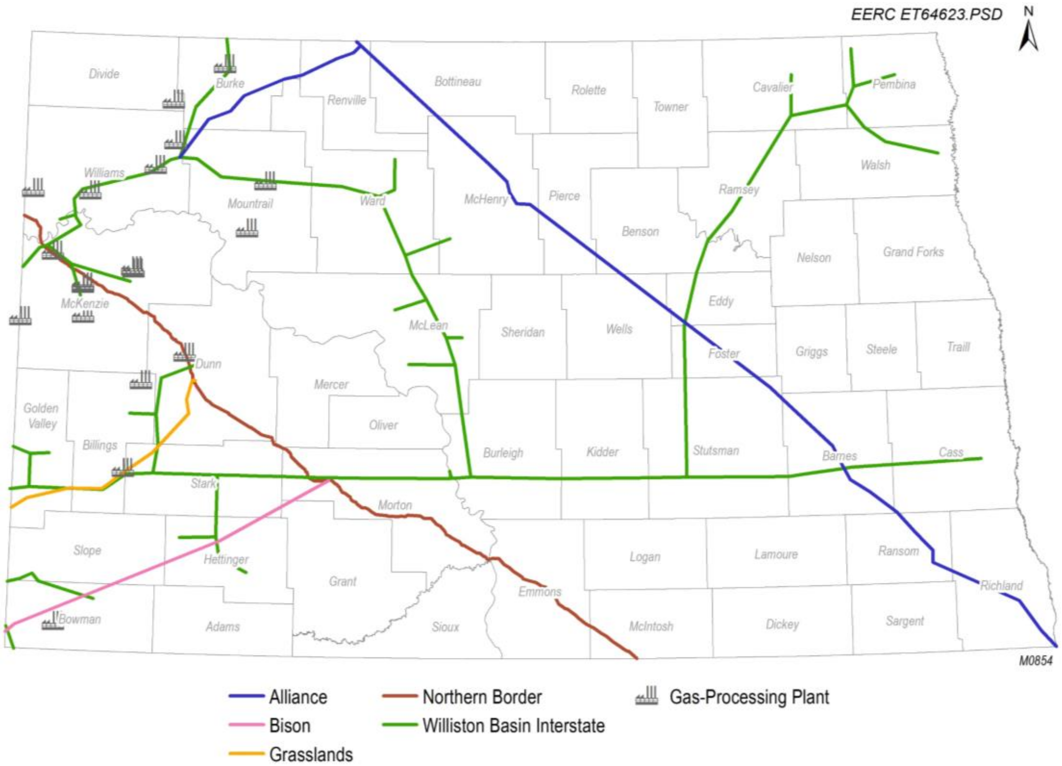

Figure 29. Natural gas pipelines and related facilities.

Table 13. Major Natural Gas Pipelines

Pipeline	Capacity, MMcfd	Description
Alliance	1875	Saskatchewan to North Dakota – M1
Alliance	1875	North Dakota to Minnesota – M2
Northern Border Pipeline Company	2180	Montana to North Dakota – M2
Northern Border Pipeline Company	2375	North Dakota to South Dakota – M3
Viking Gas Transmission Company	101	Minnesota to North Dakota – L1
WBI Energy Transmission	542	Montana to North Dakota – M3
WBI Energy Transmission	46	Saskatchewan to North Dakota – M4
WBI Energy Transmission	54	North Dakota to South Dakota – M5
WBI Energy Transmission	53	South Dakota to North Dakota – M5 back
WBI Energy Transmission	268	North Dakota to Montana – M3 back

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North Dakota does not currently have any underground storage facilities. NDIC has recently begun to issue permits for underground storage of produced oil or gas. LNG is stored in barrels. Table 14 lists the processing plants along with natural gas capacity and liquid storage capacity.

Table 14. Natural Gas-Processing Plants and Capacities

Plant Name	Owner	County	Plant Capacity, MMcfd	Liquid Storage Capacity, barrels
Aux Sable Midstream, LLC	Enbridge	Mountrail	80	6429
Badlands Gas Plant	Hiland Partners Holdings LLC	Bowman	52	6667
Bear Creek Natural Gas Processing Plant	ONEOK	Dunn	80	
Belfield Gas Plant	Andeavor Field Services LLC	Stark	40	16,600
County Line Plant	Liberty Midstream Solutions, LLC	Williams	25	6500
Garden Creek Natural Gas Processing Plant	ONEOK	McKenzie	300	28,100
Grasslands Natural Gas-Processing Plant	ONEOK	McKenzie	85	31,738
Hay Butte	Caliber North Dakota LLC	McKenzie	10	5000
Lignite Natural Gas-Processing Plant	ONEOK	Burke	10	8571
Little Knife Gas Plant	Petro Hunt LLC	Billings	25	12,530
Lonesome Creek Natural Gas-Processing Plant	ONEOK	McKenzie	200	8571
Nesson Plant	Nesson Gathering System LLC	Williams	35	10,119
Norse Gas Plant	Kinder Morgan	Divide	25	6123
Red Wing Creek Gas Plant II	True Oil LLC	McKenzie	12	9143
Robinson Lake Gas Plant	Andeavor Field Services LLC	Mountrail	140	29,050
Springbrook Gas Plant	1804 LTD	Williams		
Stateline Natural Gas-Processing Plant	ONEOK	Williams	220	17,358
Watford City Gas Plant	Hiland Partners Holdings LLC	McKenzie	85	61,429
Wild Basin	Oasis Petroleum	McKenzie	79	17,143

2.2 Risk Profile

The risk assessment evaluates the scale of risks typically faced by North Dakota's energy infrastructure, comparing them to the potential impacts. It identifies both natural and anthropogenic hazards capable of disrupting the energy infrastructure. This quantitative risk assessment comprises data collection from various federal and state sources, their analysis, and quantitative risk ratings.

The objective of this document is to provide insight into energy sector risks in North Dakota, which can be powerful decision-making tools for comparing risks and evaluating the benefits of risk mitigation measures. The risk profile emphasizes considerations of risks associated with electric, petroleum, and natural gas infrastructures, aiming to increase awareness of potential risks to these energy systems and assets.

The primary goal of the risk assessment is to develop the risk mitigation approach, which outlines a strategy to enhance the reliability and resilience of energy assets in the state of North Dakota. This risk assessment can also inform emergency preparedness, including energy emergency exercises and energy emergency response plans. A high-level overview of the state's risk profile is presented here. This includes a general countywise natural risk assessment based on the Federal Emergency Management Agency (FEMA) database. Then DOE's Energy Sector Risk Profile for North Dakota is provided.

2.3 Objectives

The objective of the Energy Sector Risk Profile for North Dakota is to provide a comprehensive assessment of the risks and vulnerabilities affecting the state's energy infrastructure and operations. This profile aims to:

1. **Identify key risks:** Systematically identify and analyze the primary risks and potential threats to the stability, reliability, and sustainability of North Dakota's energy sector, encompassing both traditional and renewable energy sources.

2. **Evaluate impact:** Assess the potential impact of identified risks on energy production, distribution networks, market dynamics statewide and federal, and energy affordability within the state.

3. **Inform decision-making:** Clarify the implications of these risks for various stakeholders, including investors, policymakers, regulators, and the public. Highlight how this information can guide decision-making related to investment strategies, policy formulation, regulatory frameworks, and emergency preparedness.

4. **Enhance resilience:** Provide recommendations and strategies to enhance the resilience of North Dakota's energy sector against identified risks, fostering a more robust and adaptable energy infrastructure that can withstand and recover from disruptions.

5. **Support long-term planning:** Serve as a foundational document for long-term planning aimed at promoting sustainable energy practices, reducing environmental impacts, and ensuring reliable energy access for all residents of North Dakota.

By achieving these objectives, the Energy Sector Risk Profile for North Dakota aims to facilitate informed dialogue, strategic planning, and proactive measures that contribute to the overall resilience and sustainability of the state's energy sector in the face of evolving challenges and opportunities.

2.4 Scope of the Energy Sector

North Dakota's energy sector is characterized by its diversity, encompassing both traditional fossil fuels and rapidly growing renewable energy sources. Understanding the scope of risks within each segment is crucial for assessing the state's energy landscape.

Fossil Fuels

- **Oil production:** Assess risks related to oil extraction, including drilling operations, oil prices, and market volatility. Factors such as geopolitical tensions, global demand shifts, and technological advancements in extraction methods are critical considerations.

- **Natural gas production:** Evaluate risks associated with natural gas exploration, production, and market conditions. This includes factors such as regulatory changes affecting production, pipeline infrastructure integrity, and pricing fluctuations influenced by regional and national demand.

- **Coal production:** Analyze risks associated with coal mining, production, and utilization within North Dakota. Considerations include regulatory impacts, market demand fluctuations, technological advancements in federal mining and emissions control, and environmental policies affecting coal-fired power generation.

Renewable Energy

- **Wind energy:** Analyze risks related to wind farm operations, including turbine maintenance, variability in wind patterns, and integration into the electricity grid. Considerations also include technological advancements in wind turbine efficiency and the impact of federal and state policies supporting renewable energy.

- **Hydropower:** Assess risks associated with hydroelectric projects, such as technological advancements in hydroelectric efficiency, economic feasibility under varying market conditions, and policy support for renewable energy incentives. Consider the variability of water flows and their impact on energy generation.

Distribution Networks

- **Electricity grid:** Evaluate risks in the transmission and distribution of electricity, focusing on grid reliability, cybersecurity threats, and infrastructure maintenance. Consider the resilience of the grid against natural disasters and cyberattacks, as well as regulatory compliance regarding grid modernization.

- **Crude oil transportation:** Analyze risks associated with crude oil transportation networks, including pipeline safety, environmental impacts, regulatory compliance, and the resilience of infrastructure against accidents or external threats.

- **Natural gas distribution:** Assess risks in the distribution of natural gas, including pipeline integrity, supply disruptions due to environmental factors or regulatory changes, and compliance with safety standards. Evaluate the impact of infrastructure aging and technological innovations in pipeline monitoring.

Environmental and Regulatory Factors

- **Environmental risks:** Consider risks related to environmental regulations, emissions controls, and compliance with state and federal laws. Evaluate potential impacts of stricter regulations on operational costs and strategic planning for environmental stewardship.

- **Regulatory risks:** Analyze risks associated with changes in energy policies, regulatory frameworks, and governmental interventions affecting the energy sector. This includes monitoring legislative developments at both state and federal levels that could impact operational practices and market dynamics.

Economic and Market Risks

- **Market fluctuations:** Evaluate risks related to commodity price fluctuations, market demand changes, and economic cycles impacting energy revenues. Assess the resilience of the energy sector to global economic trends and regional market dynamics.

- **Investment and financing:** Assess risks associated with investment in energy projects, financing challenges, and access to capital for infrastructure development. Consider the availability of funding sources, investor sentiment towards energy projects, and financial viability under different economic scenarios.

Infrastructure and Technological Risks

- **Infrastructure resilience:** Consider risks related to the resilience of energy infrastructure to natural disasters, climate change, and aging infrastructure. Evaluate the need for infrastructure upgrades and resilience measures to mitigate risks posed by extreme weather events and long-term climate trends.

- **Technological advancements:** Analyze risks associated with technological innovations in energy production, distribution, and storage. Consider opportunities and risks associated with emerging technologies such as energy storage systems, smart grid technologies, and advancements in renewable energy technologies.

Stakeholders

- **State government agencies,** including energy departments, environmental regulators, and economic development agencies.

- **Energy companies** operating within North Dakota, including fossil fuel producers, renewable energy developers, and utilities.

- **Investors and financial institutions** providing funding and investments in North Dakota's energy projects.

- **Local communities** impacted by energy sector activities, including land use, employment, and environmental concerns.

This scope outlines the key areas of focus for assessing and managing risks within North Dakota's energy sector, ensuring a thorough understanding of potential challenges and opportunities for stakeholders involved.

2.5 Overall Natural Hazard Risk for North Dakota

FEMA provides valuable data on natural hazard risks across the United States. FEMA's natural hazard risk index typically includes a range of natural hazards that threaten communities and infrastructure. Some of the key natural hazards commonly included in FEMA's risk assessments are floods, hurricanes and tropical storms, tornadoes, earthquakes, winter storms, wildfires, drought, hazardous material incidents, etc. Section 5 provides a further quantitative analysis of the energy risks for the state in greater detail.

FEMA's risk index typically considers the likelihood and potential impacts of these natural hazards on communities and infrastructure, helping to prioritize mitigation efforts and emergency preparedness measures. Figure 30 shows the countywise risk assessment indicating that Grand Forks and Cass Counties have relatively moderate risk indices for natural hazards, while all others are relatively or very low.

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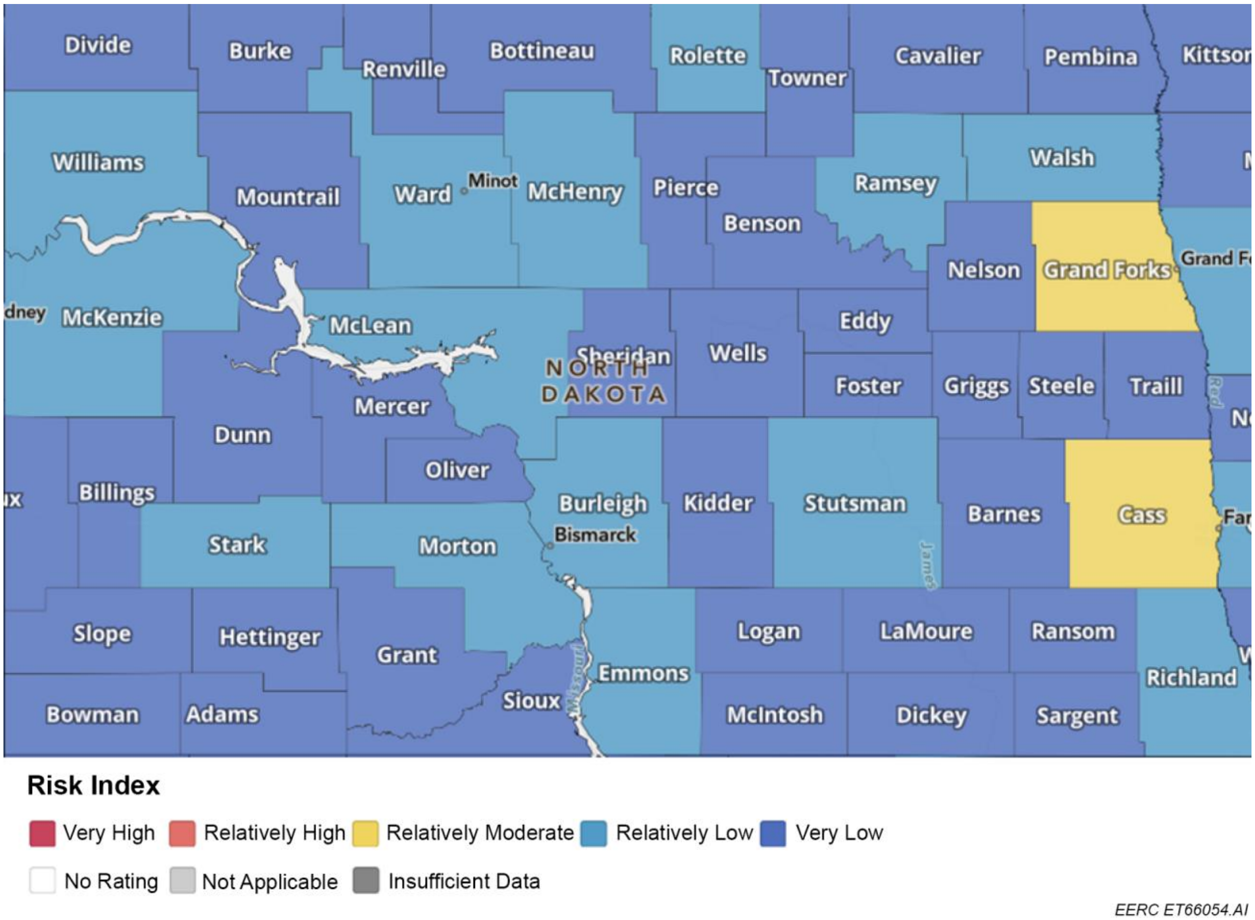

Figure 30. North Dakota – overall risk index for natural hazards.

The natural hazard risk index for North Dakota counties indicates a generally low level of risk. However, proactive risk mitigation measures are essential to enhance energy security and ensure the resilience of the state's energy infrastructure. By adopting a comprehensive approach encompassing infrastructure resilience, emergency preparedness, public education, land-use planning, environmental conservation, technological solutions, collaboration, and continual improvement, North Dakota can mitigate natural hazard risks and safeguard its energy supply. Section 6 provides a detailed discussion of the mitigation efforts ongoing within the state.

2.5.1 Countywise Impact of Natural Hazard Risk Assessment for North Dakota

Table 15 provides the FEMA risk index for the 53 North Dakota counties, assessing various natural hazards. Each county is evaluated on a risk scale from NR (no rating) to VL (very low), RL (relatively low), RM (relatively moderate), RH (relatively high), and VH (very high for each hazard category. Here's a breakdown of what each hazard category represents:

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Table 15. Countywise Natural Hazard Risk Assessment for North Dakota

County	Winter Weather	Cold Wave	Ice Storm	Strong Wind	Hail	Riverine Flooding	Tornado	Heat Wave	Lightning	Wildfire	Landslide	Drought	Earthquake
Adams	RM	RM	VL	RL	RL	VL	VL	VL	VL	VL	RL	VL	VL
Barnes	RH	RH	RH	RM	RM	VL	RL	RL	VL	VL	RL	VL	VL
Benson	RH	RM	RH	RL	RL	RL	VL	NR	VL	RL	RL	VL	VL
Billings	RM	RM	RL	RL	RL	VL	VL	NR	VL	VL	RL	VL	VL
Bottineau	VH	RM	RH	RM	VL	VL	VL	VL	VL	RL	RL	RL	VL
Bowman	RH	RM	RL	RL	RL	VL	VL	NR	VL	VL	RL	VL	VL
Burke	RM	RM	RM	VL	VL	VL	VL	VL	VL	VL	VL	VL	VL
Burleigh	VH	RH	RH	RM	RH	RM	RM	RM	RM	RL	RL	VL	VL
Cass	VH	VH	RH	VH	RH	RH	RH	RM	RL	VL	VL	VL	VL
Cavalier	RH	RH	RM	RL	RL	VL	VL	NR	VL	VL	VL	VL	VL
Dickey	RH	RH	RL	RL	RL	VL	VL	RL	VL	VL	VL	VL	VL
Divide	RH	RH	RM	RL	RL	NR	VL	VL	VL	VL	VL	VL	VL
Dunn	RH	RH	RM	RL	RL	VL	VL	RL	VL	RL	RM	VL	VL
Eddy	RM	RL	RM	RL	RL	VL	VL	VL	VL	RL	VL	VL	VL
Emmons	VH	RH	RM	RH	RM	VL	RL	RL	VL	RM	RL	VL	VL
Foster	RH	RH	RM	RL	RL	VL	VL	RL	VL	VL	VL	VL	VL
Golden Valley	RM	RM	RL	RL	VL	VL	VL	NR	VL	VL	RL	VL	VL
Grand Forks	RH	VH	RH	RH	RH	RH	RL	RM	VL	VL	RL	VL	VL
Grant	RM	RH	RL	RL	RL	VL	VL	RL	VL	VL	RL	VL	VL
Griggs	RM	RH	RM	RL	RL	VL	VL	VL	VL	VL	RL	VL	VL
Hettinger	RH	RM	RH	RM	RM	VL	VL	VL	VL	VL	VL	VL	VL
Kidder	RH	RH	RM	RL	VL	NR	VL	VL	VL	VL	VL	VL	VL
LaMoure	RH	RH	RL	RL	RM	VL	VL	RL	VL	VL	VL	VL	VL
Logan	RH	RH	RM	RL	RL	VL	VL	VL	VL	VL	VL	VL	VL
McHenry	VH	RM	RH	RM	RL	RL	RL	RL	VL	RM	RL	VL	VL
McIntosh	RH	RH	RL	RL	RL	VL	VL	RL	VL	RL	VL	VL	VL
McKenzie	VH	RH	RH	RM	RL	RL	RL	RL	RL	RL	RM	VL	VL
McLean	VH	RH	RH	RM	RL	VL	RL	RL	RL	RL	RL	RL	VL
Mercer	RH	RH	RH	RL	RL	VL	RL	RL	VL	VL	RL	VL	VL
Morton	VH	RH	VH	RM	RM	RL	RL	RM	RL	RL	RL	VL	VL
Mountrail	VH	RH	RH	RL	RL	VL	RL	RL	VL	RL	RL	RL	VL
Nelson	RM	RH	RM	VL	RL	VL	VL	RL	VL	RL	VL	VL	VL
Oliver	RM	RM	RM	RL	RL	VL	VL	VL	VL	VL	RL	VL	VL
Pembina	RH	VH	RH	RM	RL	RM	VL	VL	VL	VL	RL	VL	VL
Pierce	RH	RM	RM	RL	RL	VL	VL	RL	VL	VL	VL	VL	VL
Ramsey	RH	RM	RH	RM	VL	RM	RL	NR	RL	RL	VL	VL	VL
Ransom	RH	RH	RM	RM	RL	VL	VL	RL	VL	VL	RL	VL	VL
Renville	RH	RM	RM	RL	VL	VL	VL	VL	VL	VL	VL	RL	VL
Richland	VH	VH	RM	RM	RL	RH	RL	RL	VL	VL	VL	VL	VL
Rolette	VH	RH	RM	RL	RL	VL	RL	RL	VL	RM	RL	VL	VL
Sargent	RM	RH	RM	RL	RL	VL	VL	RL	VL	VL	VL	VL	VL
Sheridan	RH	RL	RH	RM	RL	NR	VL	VL	VL	RL	VL	VL	VL
Sioux	RH	RH	RL	RL	RM	VL	VL	RL	VL	RL	RL	VL	VL
Slope	RL	RM	VL	VL	VL	VL	VL	NR	VL	VL	VL	VL	VL
Stark	RH	VH	RH	RM	RM	VL	RL	RL	RM	VL	RL	VL	VL
Steele	RM	RH	RM	RL	RL	VL	VL	VL	VL	VL	VL	VL	VL
Stutsman	VH	VH	VH	RM	RM	VL	RL	RL	VL	RL	RL	VL	VL
Towner	RM	RL	RM	RL	VL	VL	VL	NR	VL	VL	NR	VL	VL
Traill	RH	RH	RH	RM	RL	RL	RL	RL	VL	VL	VL	VL	VL
Walsh	VH	VH	RH	RM	RM	RL	RL	VL	VL	RL	VL	VL	VL
Ward	VH	VH	VH	RM	RL	RM	RM	RM	RM	RL	RL	RL	VL
Wells	RH	RM	RM	RL	RL	VL	VL	RL	VL	VL	RL	VL	VL
Williams	RH	VH	VH	RM	RL	VL	RL	RL	RL	RL	RL	RL	VL

NR - No Rating	VL - Very Low	RL - Relatively Low	RM - Relatively Moderate	RH - Relatively High	VH - Very High

Each county is assessed based on historical data and geographic factors to determine its vulnerability to these hazards. The levels (NR, VL, RL, RM, RH, VH) help emergency planners and policymakers prioritize mitigation efforts and allocate resources effectively based on the perceived risk level for each hazard type in each county.

The FEMA risk index data for North Dakota considers the frequency and distribution of risk levels across different hazard categories for the 53 counties. Here's a detailed analysis based on the provided table:

2.5.1.1 Most Impactful Hazards

1. Winter weather
   - **Impact**: Significant risk exists across various counties, especially in central and northern North Dakota (e.g., Bottineau, Burleigh, McLean).

   - **Geographic relevance**: These counties experience severe winter conditions because of their northern latitude and continental climate.

2. Cold wave
   - **Impact:** High vulnerability exists in many counties, particularly in central and western North Dakota (e.g., Morton, Ward, Burleigh).

   - **Geographic relevance:** These areas are prone to prolonged periods of extreme cold because of their interior continental location.

3. Ice storm
   - **Impact**: High and relative vulnerability exists across many counties.

   - **Geographic relevance**: The frequency of ice storms can vary from year to year depending on weather patterns, but generally they occur when warm, moist air overrides cold air at the surface, leading to freezing rain.

2.5.1.2 Moderately Impactful Hazards

4. Strong wind
   - **Impact**: Vulnerability varies across counties, with higher risk in some central and eastern counties (e.g., Burleigh, Cass, Grand Forks).

   - **Geographic relevance**: Vulnerability to strong winds can be influenced by terrain and proximity to thunderstorm paths.

5. Riverine flooding:
   - **Impact**: Several counties have high-to-moderate vulnerability, particularly along major rivers such as the Missouri and Red Rivers (e.g., Cass, Grand Forks, Walsh).

   - **Geographic relevance**: Riverine flooding risk is influenced by proximity to major river systems and historic flood patterns.

6. Wildfire:
   - **Impact:** Moderate risk exists primarily in western counties (e.g., McKenzie, Morton), influenced by dry conditions and vegetation types.

   - **Geographic relevance:** Western counties with grasslands and forests are more susceptible to wildfires during dry periods.

7. Heat wave
   - **Impact:** Moderate vulnerability exists in some central and eastern counties (e.g., Burleigh, Cass), less so in others.

   - **Geographic relevance:** Urban areas and central regions can experience more intense heat waves because of the urban heat island effect.

8. Landslide
   - **Impact:** Moderate vulnerability exists in a few counties (e.g., Emmons, McLean), primarily in areas with hilly terrain.

   - **Geographic relevance:** Vulnerability to landslides is higher in areas with steep slopes and loose soil.

9. Drought
   - **Impact:** Moderate vulnerability exists in western counties (e.g., McKenzie, Slope), influenced by arid climate and agricultural practices.

   - **Geographic relevance:** Western counties experience periodic droughts because of low precipitation and high evaporation rates.

2.5.1.3 Least Impactful Hazards

10. Hail, tornado, lightning
    - **Impact:** Generally low vulnerability exists across most counties, with sporadic instances of moderate risk.

    - **Geographic relevance:** Vulnerability to these hazards can vary widely depending on local weather patterns and storm tracks.

11. Earthquake:
    - **Impact:** Very low vulnerability exists across all counties.

    - **Geographic relevance:** North Dakota's stable geological conditions result in negligible earthquake risk, while ice storms are infrequent and localized.

2.5.1.4 Not Applicable Natural Hazards

North Dakota does not experience five out of the 18 FEMA-considered natural hazards, including avalanches, coastal flooding, hurricanes, tsunamis, and volcanic activity, because of its inland location far from oceans and major fault lines.

The geographic location of the counties plays a crucial role in determining these risks. For instance, western counties are more exposed to drought and wildfire because their semiarid climate, while eastern counties face higher risks of riverine flooding and tornadoes because of their proximity to major rivers and the tornado alley. Understanding these risk profiles helps in prioritizing preparedness and mitigation efforts tailored to each region's specific vulnerabilities.

This analysis highlights the varying degrees of vulnerability to different natural hazards across North Dakota. Understanding these vulnerabilities helps prioritize mitigation strategies and allocate resources effectively to mitigate the impacts of these hazards on communities and infrastructure throughout the state.

The data reveal varying levels of risk across different hazards for each county in North Dakota. Hazards assessed include winter weather, cold wave, ice storm, strong wind, hail, riverine flooding, tornado, heat wave, lightning, wildfire, landslides, drought, and earthquake. Each county is rated on a scale from very high to no rating based on its susceptibility to these hazards.

The DOE Office of Cybersecurity, Energy Security, and Emergency Response (CESER) published a series of state and regional energy risk profiles, developed in collaboration with Argonne National Laboratory (ANL), to support state energy security planning. The updated and streamlined profiles examine the causes, frequency, and history of energy disruptions for the 50 U.S. states and the District of Columbia. The regional profiles provide a multistate view and were restructured to align with the ten regions defined by FEMA.

The profiles include state energy facts, an overview of hazards and economic property loss, and key energy infrastructure trends and impacts across the electric, petroleum, and natural gas sectors. They enable states to better prepare for any potential energy infrastructure risks or disruptions.

State and regional energy risk profiles are a critical component of CESER's State Local, Tribal, and Territorial (SLTT) Program, advancing SLTT government officials' risk awareness and informing policy and investment decisions as well as mitigation strategies. Governors, state energy office directors, public utility commissioners, and emergency managers have utilized past profile data in their state energy security plans, stakeholder presentations, and tabletop exercises.

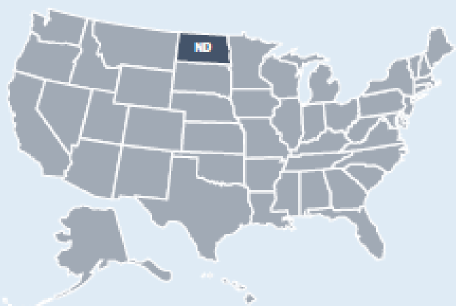
State and regional energy risk profiles can be found on DOE's website or via this link:

www.energy.gov/ceser/state-and-regional-energy-risk-profiles

2.5.2 *North Dakota Risk Profile (U.S. Department of Energy, 2021)*

U.S. DEPARTMENT OF ENERGY
Cybersecurity, Energy Security, and Emergency Response

State of North Dakota
ENERGY SECTOR RISK PROFILE



North Dakota State Facts

POPULATION	HOUSING UNITS	BUSINESS ESTABLISHMENTS
0.76 M	0.38 M	0.02 M

ENERGY EMPLOYMENT: 36,392 jobs
PUBLIC UTILITY COMMISSION: North Dakota Public Service Commission
STATE ENERGY OFFICE: North Dakota Department of Commerce Division of Community Services
EMERGENCY MANAGEMENT AGENCY: North Dakota Department of Emergency Services
AVERAGE ELECTRICITY TARIFF: 8.91 cents/kWh
ENERGY EXPENDITURES: $7,087/capita
ENERGY CONSUMPTION PER CAPITA: 836 MMBtu
(3rd highest out of 50 states and Washington, D.C.)
GDP: $56.1 billion

Data from 2020 or most recent year available.
For more information, see the Data Sources document.

ANNUAL ENERGY CONSUMPTION

ELECTRIC POWER: 20,670 GWh
COAL: 29,800 MSTN
NATURAL GAS: 78 Bcf
MOTOR GASOLINE: 9,200 Mbbl
DISTILLATE FUEL: 18,400 Mbbl

ANNUAL ENERGY PRODUCTION

ELECTRIC POWER GENERATION: 60 plants, 41.1 TWh, *9.1 GW total capacity*
- **Coal:** 8 plants, 25.2 TWh, *4.1 GW total capacity*
- **Hydro:** 1 plant, 3.2 TWh, *0.6 GW total capacity*
- **Natural Gas:** 4 plants, 1.5 TWh, *0.8 GW total capacity*
- **Nuclear:** 0 plants
- **Petroleum:** 8 plants, 0.0 TWh, *0.1 GW total capacity*
- **Wind & Solar:** 36 plants, 11.2 TWh, *3.5 GW total capacity*
- **Other sources:** 3 plants, 0.1 TWh, *0.0 GW total capacity*

COAL: 28,800 MSTN
NATURAL GAS: 1,060 Bcf
CRUDE OIL: 518,900 Mbbl
ETHANOL: 11,600 Mbbl

Data from EIA (2018, 2019).

This State Energy Risk Profile examines the relative magnitude of the risks that the state of North Dakota's energy infrastructure routinely encounters in comparison with the probable impacts. Natural and man-made hazards with the potential to cause disruption of the energy infrastructure are identified. Certain natural and adversarial threats, such as cybersecurity, electromagnetic pulse, geomagnetic disturbance, pandemics, or impacts caused by infrastructure interdependencies, are ill-suited to location-based probabilistic risk assessment as they may not adhere to geographic boundaries, have limited occurrence, or have limited historic data. Cybersecurity and other threats not included in these profiles are ever present and should be included in state energy security planning. A complete list of data sources and national level comparisons can be found in the Data Sources document.

North Dakota Risks and Hazards Overview

- The natural hazard that caused the greatest overall property loss between 2009 and 2019 was **Flooding** at $22 million per year *(leading cause nationwide at $12 billion per year).*
- North Dakota had 86 Major Disaster Declarations, 6 Emergency Declarations, and 0 Fire Management Assistance Declarations for 8 events between 2013 and 2019.
- North Dakota registered 5% greater Heating Degree Days and 7% fewer Cooling Degree Days than average in 2019.
- There is 1 Fusion Center located in Bismarck.

Annualized Frequency of and Property Damage Due to Natural Hazards, 2009 – 2019

	HAZARD FREQUENCY – Annualized	PROPERTY DAMAGE – Annualized ($Million per year)
Drought	1	$0
Earthquake (≥ 3.5 M)	0	$0
Extreme Heat	<1	$0
Flood	14	$22
Hurricane	0	$0
Landslide	0	$0
Thunderstorm & Lightning	68	$16
Tornado	20	$5
Wildfire	1	$1
Winter Storm & Extreme Cold	24	$7

Data Sources: NOAA and USGS

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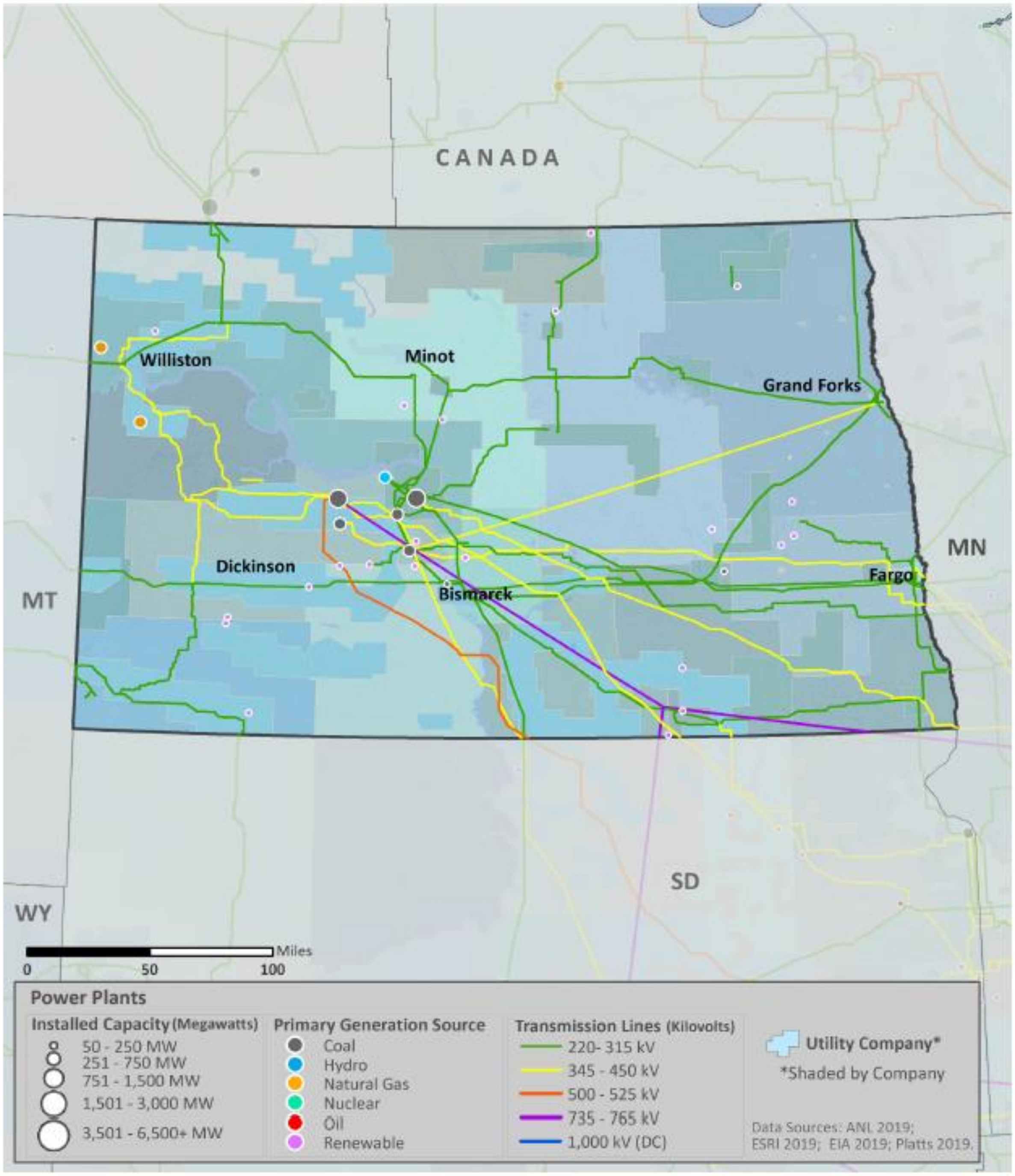
ELECTRIC



Electric Infrastructure

- North Dakota has 32 electric utilities:
  - *1 Investor owned*
  - *19 Cooperative*
  - *11 Municipal*
  - *1 Other utility*
- Plant retirements scheduled by 2025: 2 electric generating units totaling 115 MW of installed capacity.

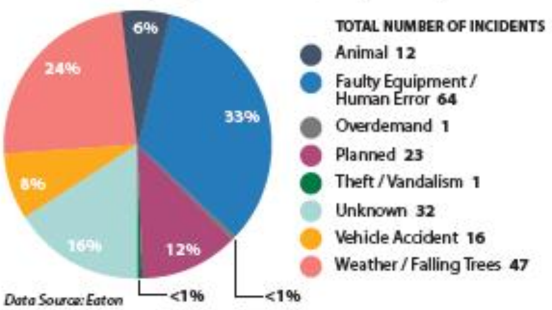
- In 2018, the average North Dakota electric customer experienced 0.9 service interruptions that lasted an average of 1.6 hours.
- In North Dakota, between 2008 and 2017:
  - *The greatest number of electric outages occurred in* ***August*** *(3rd for outages nationwide)*
  - *The leading cause of electric outages was* ***Faulty Equipment or Human Error*** *(2nd leading cause nationwide)*
  - *Electric outages affected 40,861 customers on average*

Electric Customers and Consumption by Sector, 2018

	CUSTOMERS	CONSUMPTION
Residential	82%	25%
Commercial	16%	33%
Industrial	2%	42%
Transportation	<1%	<1%

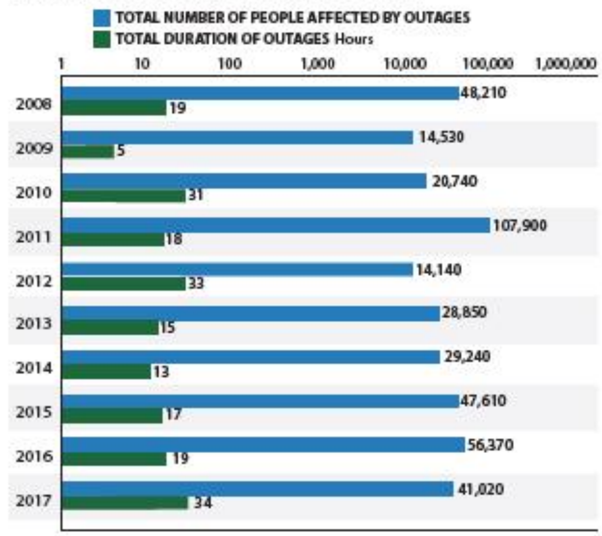
Data Source: EIA

Electric Utility-Reported Outages by Cause, 2008 – 2017



Data Source: Eaton

Electric Utility Outage Data, 2008 – 2017



Note: This chart uses a logarithmic scale to display a very wide range of values.
Data Source: Eaton

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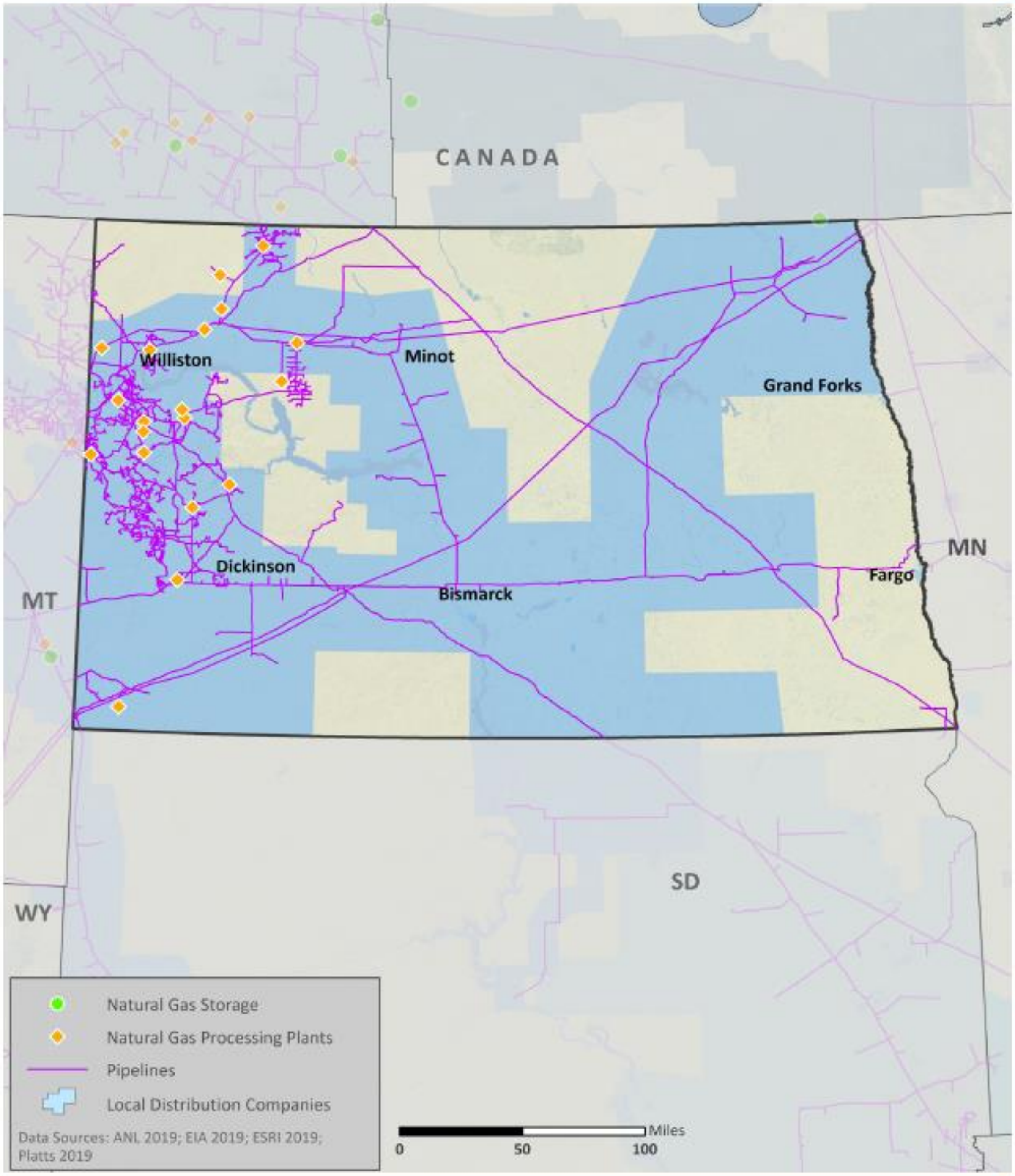
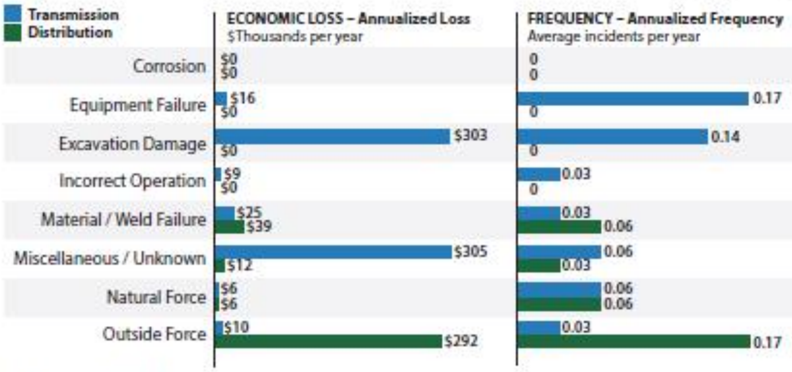
NATURAL GAS



Natural Gas Transport

Top Events Affecting Natural Gas Transmission and Distribution, 1984 – 2019



Data Source: DOT PHMSA

- As of 2018, North Dakota had:
  - *2,514 miles of natural gas transmission pipelines*
  - *3,772 miles of natural gas distribution pipelines*
- 19% of North Dakota's natural gas transmission system and 26% of the distribution system were constructed prior to 1970 or in an unknown year.
- Between 1984 and 2019, North Dakota's natural gas supply was most impacted by:
  - ***Miscellaneous or Unknown*** *events when transported by transmission pipelines (5th leading cause nationwide at $16.77M per year)*
  - ***Outside Forces*** *when transported by distribution pipelines (leading cause nationwide at $76.59M per year)*

Natural Gas Processing and Liquefied Natural Gas

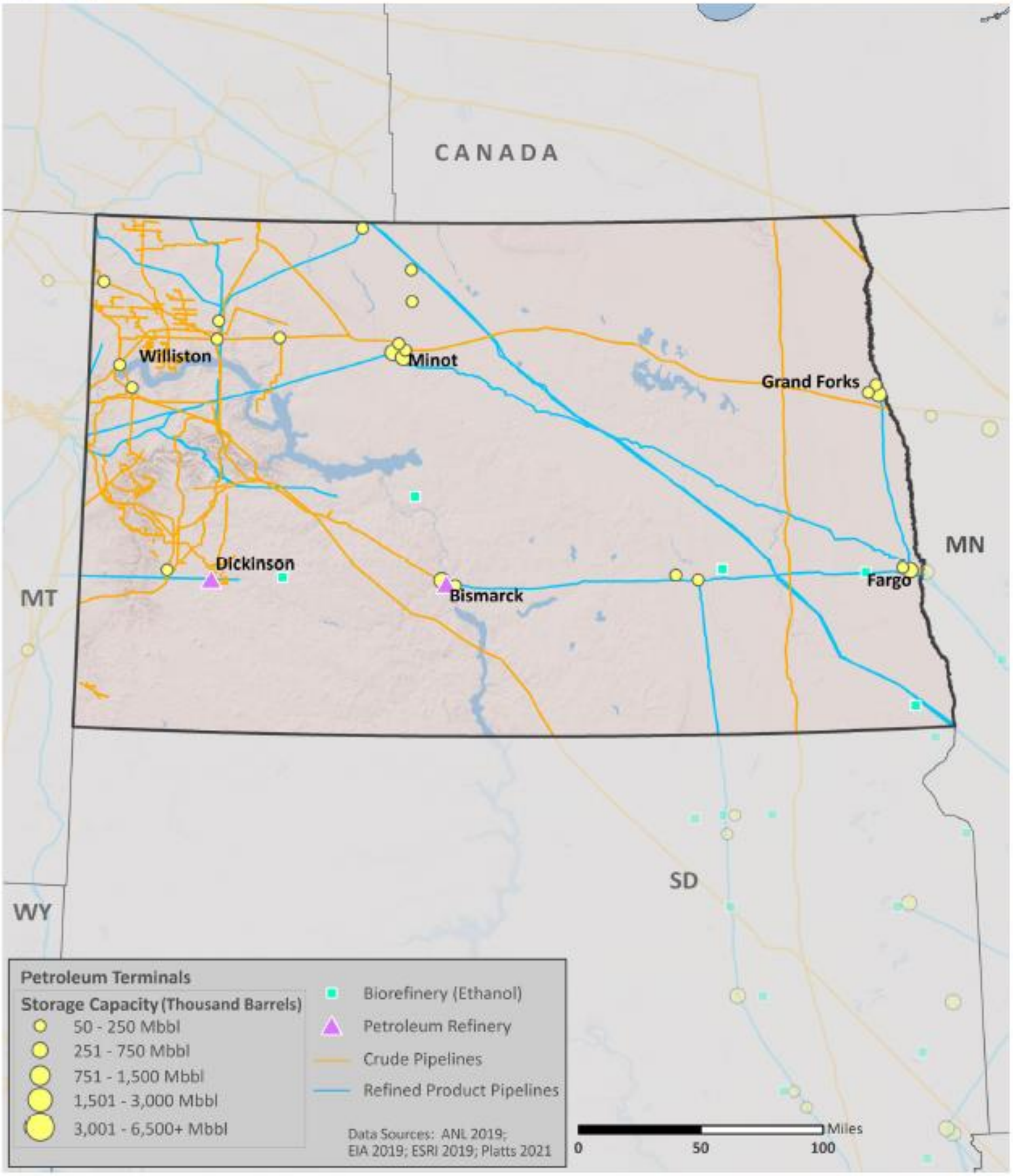
Natural Gas Customers and Consumption by Sector, 2018

	CUSTOMERS	CONSUMPTION
Residential	86%	18%
Commercial	13%	20%
Industrial	<1%	49%
Transportation	<1%	<1%
Electric Power	<1%	13%
Other	<1%	<1%

Data Source: EIA

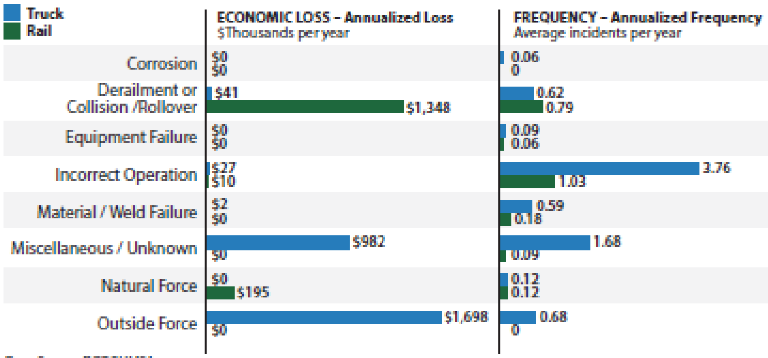
- North Dakota has 19 natural gas processing facilities with a total capacity of 1,503 MMcf/d.
- North Dakota has 0 liquefied natural gas (LNG) facilities with a total storage capacity of 0 barrels.

PETROLEUM


CANADA
Williston
Minot
Grand Forks
Dickinson
Bismarck
Fargo
MN
MT
SD
WY
Petroleum Terminals
Storage Capacity (Thousand Barrels)
50 - 250 Mbbl
251 - 750 Mbbl
751 - 1,500 Mbbl
1,501 - 3,000 Mbbl
3,001 - 6,500+ Mbbl
Biorefinery (Ethanol)
Petroleum Refinery
Crude Pipelines
Refined Product Pipelines
Data Sources: ANL 2019; EIA 2019; ESRI 2019; Platts 2021
0
50
100
Miles

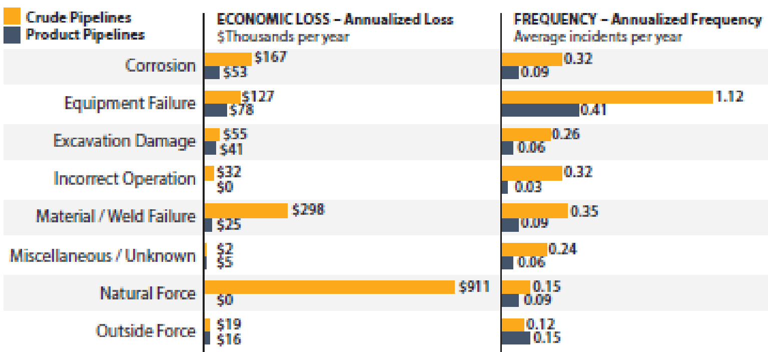
Petroleum Transport

Top Events Affecting Petroleum Transport by Truck and Rail, 1986 – 2019



Data Source: DOT PHMSA

Top Events Affecting Crude Oil and Refined Product Pipelines, 1986 – 2019



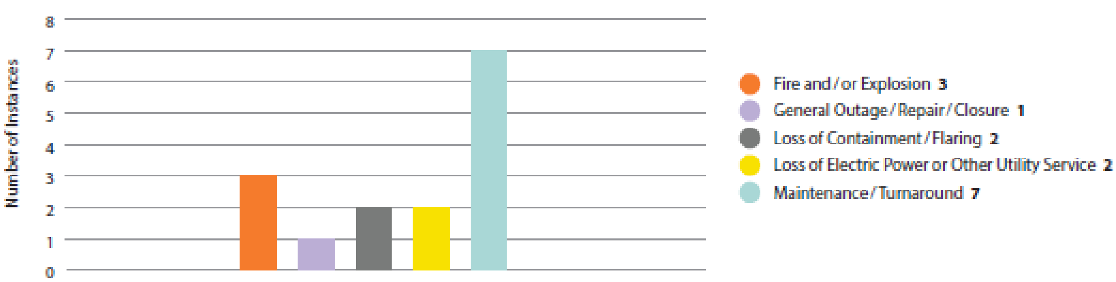
Data Source: DOT PHMSA

- As of 2018, North Dakota had:
  - *3,828 miles of crude oil pipelines*
  - *781 miles of refined product pipelines*
  - *0 miles of biofuels pipelines*
- 26% of North Dakota's petroleum pipeline systems were constructed prior to 1970 or in an unknown year.
- Between 1986 and 2019, North Dakota's petroleum supply was most impacted by:
  - ***Outside Forces*** *events when transported by truck (2nd leading cause nationwide at $60.45M per year)*
  - ***Derailments, Collisions, or Rollovers*** *when transported by rail (leading cause nationwide at $19.71M per year)*
  - ***Natural Forces*** *when transported by crude pipelines (2nd leading cause nationwide at $15.24M per year)*
  - ***Equipment Failures*** *when transported by product pipelines (6th leading cause nationwide at $4.66M per year)*
- Disruptions in other states may impact supply.

Petroleum Refineries

- North Dakota has 2 petroleum refineries with a total operable capacity of 90 Mb/d.
- Between 2009 and 2019, the leading cause of petroleum refinery disruptions in North Dakota was:
  - ***Maintenance*** *(2nd leading cause nationwide)*

Causes and Frequency of Petroleum Refinery Disruptions, 2009 – 2019



Data Source: Hydrocarbon Publishing

2.6 Threats and Vulnerabilities Assessment

Threats and vulnerabilities to state energy security arise from a number of sources, including natural hazards, supply chain disruption, labor shortages, cybersecurity threats, and national security threats. North Dakota is unique in many of these aspects because of geography, natural resources, and population. DOE's risk profile in the previous section gave a high-level overview of the threats and vulnerabilities in the state. A highly detailed enhanced mitigation mission area operations plan (MAOP) for North Dakota has also been developed by the state that incorporates energy supply emergency responses (North Dakota Department of Emergency Services, 2018). All of the hazards or threats identified for the state are listed in Table 16 with their corresponding rank based on the frequency of the event and the likelihood of occurrence. It should be noted that the list includes all emergency events rather than energy-specific disruptions. The discussion that follows focuses on energy-related threats. A quantitative risk assessment of specific threats on the energy supply chain is provided in Section 5.

Table 16. Local Plan Hazard Ranking Summary (North Dakota Department of Emergency Services, 2024)

High	Moderate	Low
Flood	Dam failure	Cyberattack
Wildfire/Urban Fire	Hazardous material release	Criminal attack
Drought	Transportation incident	Civil disturbance
Severe Winter Weather		Terrorist or nation-state attacks
Severe Summer Weather		
Infectious Disease and Pest Infestation		
Space Weather		
Geologic Hazards		

2.6.1 Environmental Threats

Natural hazards are the most likely events to cause energy supply issues. There are 18 specific hazard types identified by FEMA, but many do not apply to North Dakota. Natural hazards can hinder the ability to produce energy or to distribute it effectively. For example, strong thunderstorms or tornados can affect transmission and distribution lines, causing local area outages. Other situations could be icing during cold weather that affects generating power plants. Table 17 lists the most common natural hazards, frequency of occurrence, and associated property damage in North Dakota from 2009 to 2019 (U.S. Department of Energy, 2021). Thunderstorms and lightning are the most common occurrences followed by winter storms and tornadoes. Earthquakes are unlikely to occur based on geological and seismological studies.

Table 17. Natural Hazard Annualized Frequency (North Dakota Department of Emergency Services, 2018)

Thunderstorm and Lightning	68
Winter Storm and Extreme Cold	24
Tornado	20
Flood	14
Drought	1

Weather or falling trees was the second largest cause of electric utility outages between 2009 and 2017 in North Dakota. Of the identified hazards, avalanche, coastal flooding, earthquake, hurricane, landslide, tsunami, and volcanic activity are not applicable to North Dakota.

2.6.2 Human-Induced Threats

2.6.2.1 Cybersecurity

The past decade has seen a dramatic increase in cybersecurity events across the nation. Ransomware attacks on infrastructure are a major concern. The energy sector is one of the most common targets of hackers.

2.6.2.2 Terrorism

Sabotage could possibly affect electrical supply or the ability to deliver power to consumers. Attacks on the electrical distribution grid have become more common in the past decade. These involve the destruction of large-scale electrical substations, often by extremist groups. These risks are not unique to North Dakota.

2.6.2.3 Supply Chain Disruption

The loss of fuel supply could include coal mine failures where there is minemouth electric generation. The loss of gas supply to generators can also affect the amount of electricity available for consumers.

2.6.2.4 Labor Shortages

Labor reductions or strikes are always a risk to energy security. Labor shortages due to a supply/demand imbalance or a supply reduction for economic or political reasons are potential risks.

2.6.2.5 Faulty Equipment/Human Error

Human error and equipment failure were the largest source of electric utility outages between 2009 and 2017 in North Dakota. Generation equipment failure could affect the ability to generate power to be delivered to consumers. This can include various situations that could result from component failure or degradation. Transmission equipment failure can affect the ability to deliver imported electricity to supply various areas of the state. Distribution equipment failures can affect the ability to serve local areas that are part of the distribution system.

2.6.3 Vulnerabilities

2.6.3.1 Fuel Shortage

A transportation fuel shortage could occur from a disruption in the supply system due to any number of the following:

- Electric power outage
- Labor strike
- Embargo
- Natural disaster
- National security
- Planned refinery maintenance
- Supply disruption

Because the transportation sector is nearly entirely dependent on petroleum, contingency and mitigation planning should focus heavily on the needs of motorists and meeting transportation requirements.

2.6.3.2 Coal Supply

Most of the power plants that rely on coal are minemouth facilities and therefore not dependent on rail or other third-party transportation. However, the coal supply is vulnerable to labor reductions/strikes.

2.6.3.3 Natural Gas Supply

Loss of gas supply to generators can also affect the amount of electricity available for consumers. Natural gas is not used extensively for baseline generation. However, natural gas is used for electrical generation in plants to bring on capacity in times of high demand. Also, since two-fifths of North Dakota households use natural gas for heating, a complete interruption to the supply of natural gas could result in a significantly higher demand for electricity as a substitute heating source.

While North Dakota has significant supply and natural gas processing within the state, it is still vulnerable to disruptions due to the following factors:

- Pipeline disruption, either intra- or interstate
- Labor shortage
- Supply/demand imbalance
- Supply reduction for economic or political reasons

2.6.3.4 Electricity Supply

A partial or complete bulk electrical system collapse would affect the ability to deliver power to sections of the state. System restoration would be required to establish transmission, distribution, and generation interconnections for reestablishing power to customers. The electrical grid is susceptible to a wide array of potential disruptions resulting from either human-induced or environmental threats.

2.6.3.5 Out-of-State Resource Limitations and Regulatory Requirements

North Dakota is a net energy exporter, and demand from other states may strain the ability to provide service. Regulatory requirements dictated by other government agencies such as FERC may impose license restrictions on river flows, reservoir levels, or water quality that may limit generation production. Regulations may limit thermal unit production in order to comply with EPA regulations.

A further discussion of the risk assessment for North Dakota is provided in Section 5.3. Energy interdependencies are then discussed in Section 5.4.

3.0 ENERGY SECURITY AND EMERGENCY RESPONSE AUTHORITIES

The purpose of this plan is to provide timely and coordinated notification to state government, private entities, media, and residents in the event of an energy emergency. It also provides appropriate actions to be taken to include, if necessary, enactment of regulations, rules, and laws by the state.

Managing an energy emergency helps mitigate the occurrence and impact of a shortage of any vital resource due to the interruption or reduced supply of electricity, transportation fuels, natural gas, or any resource used to generate electricity. When averting an emergency or crisis is not possible, it is imperative to take the actions necessary to ensure the health, safety, and welfare of the residents of the state. Vital resources are defined as food for domestic use; water for domestic, agricultural, and industrial use; and all forms of energy.

The plan describes a framework for actions in the event of an energy shortage. It covers transportation fuels (petroleum), electricity, and natural gas and has been developed to coordinate with the plans and activities of private industry as well as federal, state, and local emergency organizations.

The plan focuses on addressing the following goals during an energy emergency:

- Ensuring essential services continue to be provided during an energy shortage
- Preparing/designing responses to reduce consumption and demand
- Working with private industry to ensure inequities in distribution of energy are minimized
- Responding effectively to specific energy disruption conditions
- Restoring a balance of energy products as quickly as possible

- Assisting in mitigating economic hardships caused by an energy disruption
- Soliciting and obtaining public support and participation in the plan
- Delivering timely and accurate information to both industry and citizens as appropriate
- Creating and enacting programs, steps, and regulations to address the causes of energy emergencies within the state

NDDES falls under the supervision of the Office of the Adjutant General and includes the Division of Homeland Security and the Division of State Radio Communications. NDDES along with Commerce will direct all activities in response to an energy emergency, ensuring a coordinated response.

3.1 Guiding Statutes for Energy Security and Emergency Response Activities

The North Dakota SESP provides information, guidelines, and strategies that may be implemented by the state in case of an energy emergency. By definition, an "energy emergency" is either an actual or expected shortage or reduction of energy resources that impacts necessary services; the protection of public health, safety, and welfare; or the normal transactions of a sound economy are negatively impacted within a geographical portion of the state.

The state of North Dakota is required to meet DOE's SESP requirement pursuant to the Infrastructure Investment and Jobs Act (IIJA) § 40108, which amends Part D of Title III of the Energy Policy and Conservation Act (EPCA, 42 U.S. Code [USC] § 6321).

SESPs are due to DOE by September 30 of each year (the end of the federal government's fiscal year) beginning in 2022 and until 2025, as this requirement sunsets on October 31, 2025. It is required that the plan be maintained and strengthened each year. In accordance with the Consolidated Appropriations Act of 2022 and subsequent guidance in State Energy Program (SEP) Program Notice 22-02, effective April 6, 2022, SEP appropriations for fiscal year (FY) 2022 are exempt from the state energy security plan requirement. However, the state energy security plan requirement applies to all future distributions of SEP funds.

NDDES is responsible for the coordination of all state agencies during a disaster. The director of North Dakota Homeland Security shall be the state coordinating office (SCO) unless otherwise directed by the governor. The authority for the state emergency operations plan SEOP comes from the governor's vested statutory authority to issue executive orders, minimize, or avert the effects of a disaster or emergency pursuant to Chapter 37-17.1 of the North Dakota Century Code (NDCC).

3.2 Federal Authority for Energy Security and Emergency Response Activities

Federal authority for energy resilience is provided as follows:

- Federal Authority for the Governor's Office of Energy – ESF-12 Energy Annex www.fema.gov/sites/default/files/2020-07/fema_ESF_12_Energy-Annex.pdf

- Homeland Security Presidential Directive (HSPD) – 5 www.dhs.gov/publication/homeland-security-presidential-directive-5

- Presidential Policy Directive (PPD) – 21
  https://www.cisa.gov/resources-tools/resources/presidential-policy-directive-ppd-21-critical-infrastructure-security-and

- 6 USC § 101
  www.govinfo.gov/content/pkg/USCODE-2021-title6/pdf/USCODE-2021-title6-chap1-sec101.pdf

- 42 USC § 5195c(e)
  www.govinfo.gov/app/details/USCODE-2021-title42/USCODE-2021-title42-chap68-subchapIV-B-sec5195c

- PL-117-58, § 40108
  www.congress.gov/117/plaws/publ58/PLAW-117publ58.pdf

NDDES coordinates with FEMA and the Department of Homeland Security. Coordination between the state/local, federal/state, regional, and national emergency response is depicted in Figure 31 (Federal Emergency Management Agency, 2023). The response and recovery federal interagency operational plan can be found at:

www.fema.gov/sites/default/files/documents/fema_response-recovery-fiop.pdf

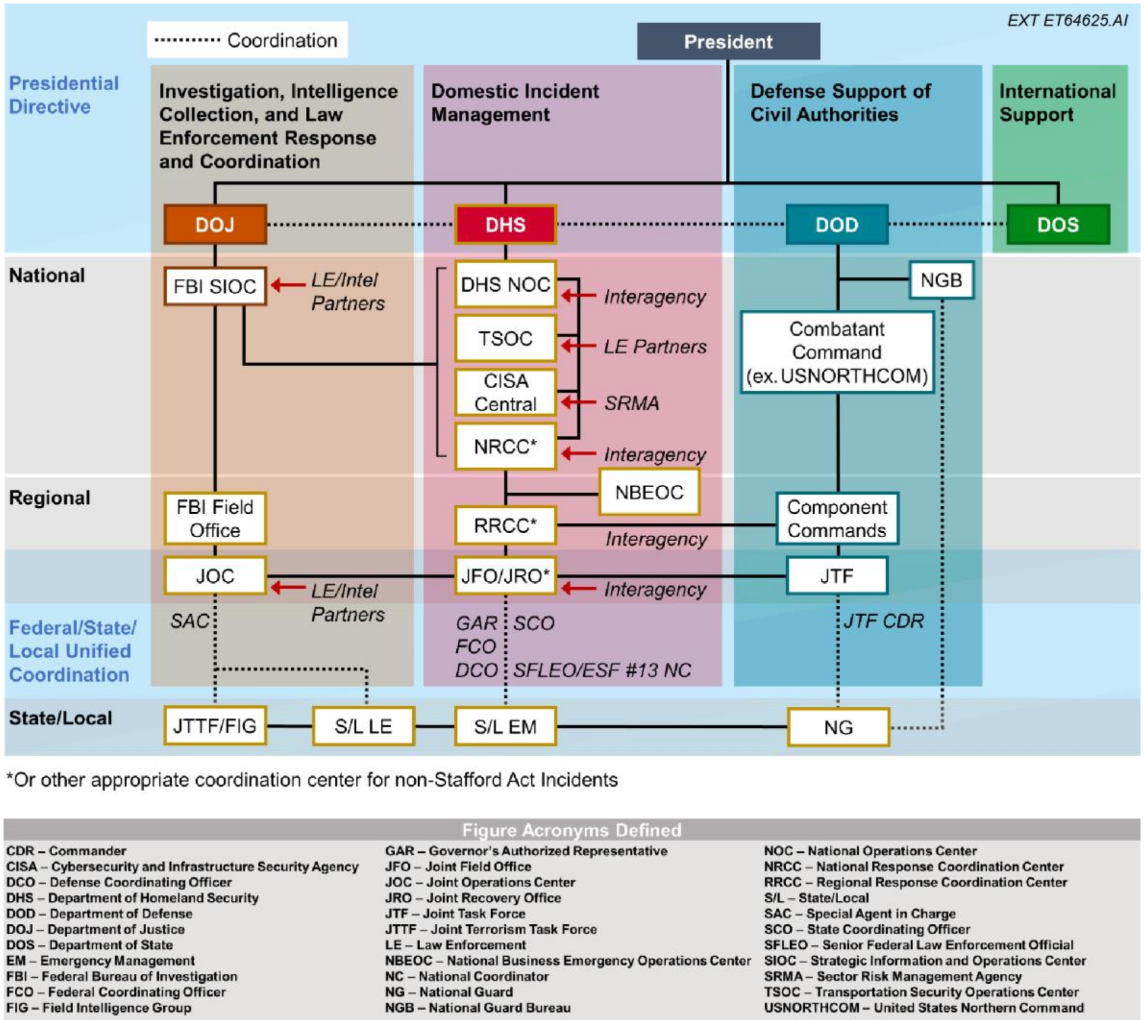


Figure 31. Coordination between federal, regional, and state/local level response (Federal Emergency Management Agency, 2023).

NDDES has the responsibility for coordinating state agency response to an incident upon a governor's declaration and activation of the SEOP. In the event of an energy incident/emergency and state UC is stood up, it is likely Commerce will be a lead agency along with NDDES, with other state agencies in support roles.

DOE provides drop-in slides which help the state in the coordination with the federal response to an energy emergency (U.S. Department of Energy, 2022). A brief summary is provided in the following material. The original document can be found at:

www.energy.gov/sites/default/files/2022-06/DOE%20CESER%20SESP%20Drop-In_Federal%20Authorities_FINAL_508.pdf

Department or Agency		Sector	Preparedness & Response	Situational Awareness	Standards & Regulations
White House		Electricity, Liquid Fuel, Natural Gas, Cyber and physical security	✓	✓	
DHS	FEMA	Electricity, Liquid Fuel, Natural Gas	✓	✓	
DHS	CISA	Cyber and physical security	✓	✓	
DHS	Coast Guard	Liquid Fuel, Natural Gas	✓		✓
DHS	TSA	Liquid Fuel, Natural Gas, Cyber and physical security	✓		✓
DHS	CBP	Electricity, Liquid Fuel, Natural Gas			✓
DOE	CESER	Electricity, Liquid Fuel, Natural Gas, Cyber and physical security	✓	✓	
DOE	OE	Electricity		✓	✓
DOE	EIA	Electricity, Liquid Fuel, Natural Gas		✓	
DOE	FERC	Electricity, Liquid Fuel, Natural Gas			✓
DOT	FMCSA	Electricity, Liquid Fuel			✓
DOT	PHMSA	Liquid Fuel, Natural Gas	✓		✓
EPA		Electricity, Liquid Fuel, Natural Gas			✓
IRS		Liquid Fuel			✓
DOD	USACE	Electricity, Liquid Fuel, Natural Gas	✓		✓
NRC		Electricity	✓	✓	✓
DOJ	FBI	Cyber and physical security	✓		
DOI	DOI BSEE	Liquid Fuel, Natural Gas		✓	✓

Electricity | Liquid Fuel | Natural Gas | Cyber and physical security

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DESCRIPTIONS OF FEDERAL ENERGY SECURITY & EMERGENCY RESPONSE ROLES

Department or Agency		Energy Security/Emergency Response Role
White House		The White House—particularly the National Security Council—participates in public briefings and interagency situational awareness activities. The President also has the authority to declare a national state of emergency.
Department of Homeland Security (DHS)	Federal Emergency Management Agency (FEMA)	FEMA coordinates federal incident response and recovery activities. FEMA's duties during an event include assisting the President in carrying out the Stafford Act, operating the National Response Coordination Center (NRCC), supporting all Emergency Support Functions (ESFs) and Recovery Support Functions (RSFs). FEMA mission assigns the Defense Logistics Agency (DLA) to provide fuel support to federal responders and, if requested, SLTT responders and critical infrastructure. FEMA funds Public Assistance (PA) disaster funds, hazard mitigation projects through the Building Resilient Infrastructure and Communities (BRIC) Program, Hazard Mitigation Grant Program (HMGP), and others.
	Cybersecurity and Infrastructure Agency (CISA)	CISA leads the national effort to understand, manage, and reduce risk to cyber and physical infrastructure. CISA manages the Pipeline Cybersecurity Initiative, leveraging expertise from government and private partners to identify and address cybersecurity risks to pipeline infrastructure. CISA publishes best practices for cybersecurity protection. During a cyber incident, CISA assists impacted infrastructure, helps investigate the responsible actors, and coordinates the national response to significant cyber events.
	U.S. Coast Guard	The U.S. Coast Guard is the principal federal agency responsible for maritime safety, security, and environmental stewardship in U.S. ports and inland waterways used for the movement of energy products, including petroleum, natural gas, and coal. The Coast Guard reviews and approves security assessments and security plans developed by vessel owners and terminal operators, and inspects terminals for compliance with security requirements. The Coast Guard's role is particularly important during hurricanes and other severe weather that can disrupt energy supplies (primarily liquid fuels) into and out of U.S. ports.

Department or Agency		Energy Security/Emergency Response Role
	Transportation Security Administration (TSA)	TSA oversees the physical security and cybersecurity of all U.S. pipelines. TSA issues directives for owners and operators of pipelines to better secure pipelines against cyberattacks. TSA also oversees security at marine ports, where oil and gas marine terminals, petroleum refineries, and other energy infrastructure may be located. TSA conducts background checks and issues federal identification cards (called TWIC® cards) to workers accessing secure areas within port boundaries, including fuel truck drivers, refinery workers, and other energy industry workers. TSA may waive TWIC requirements during energy emergencies to facilitate energy restoration and response activities.
	U.S. Customs & Border Protection (CBP)	CBP is the primary federal agency tasked with ensuring the security of the nation's borders. CBP is responsible for enforcing and administering laws and regulations to control and oversee vessel movements in to, out of, and between U.S. ports. CBP enforces the Merchant Marine Act of 1920, also called the Jones Act, which generally prohibits the transportation of merchandise between two U.S. ports in any vessel not built in, documented under the laws of, and owned by citizens of the United States. Applications may be made to CBP for the Secretary of Homeland Security to grant a Jones Act waiver, which can help facilitate the delivery of fuel and equipment during energy shortages.
U.S. Department of Energy	Office of Cybersecurity, Energy Security, and Emergency Response (CESER)	CESER's mission is to enhance the security of U.S. critical energy infrastructure to all hazards, mitigate the impacts of disruptive events and risk to the sector overall through preparedness and innovation, and respond to and facilitate recovery from energy disruptions in collaboration with other federal agencies, the private sector, and State, local, tribal, and territory governments. CESER's preparedness and response activities include SLTT capacity building, energy security and resilience planning, hosting energy emergency exercises and deploying ESF-12 responders to impacted regions during emergencies. CESER facilitates interagency coordination, shares situational awareness products, and provides emergency response support to SLTT governments. CESER also advances research, development, and deployment of technologies, tools, and techniques to reduce risks to the Nation's critical energy infrastructure posed by cyber and other emerging threats.

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Department or Agency		Energy Security/Emergency Response Role
		CESER administers programs that can be used to mitigate impacts to energy infrastructure and energy supply, and to provide resources during energy emergencies: • The Federal Power Act Section 202(c) grants DOE the power to temporarily order connections of facilities, and generation, delivery, interchange, or transmission of electricity during grid emergencies. • The Strategic Petroleum Reserve is a federally owned emergency supply of crude oil. Volumes can be released to mitigate the impact of crude supply disruptions. • The Northeast Home Heating Oil Reserve and Northeast Gasoline Supply Reserve provide emergency supplies of heating oil and gasoline, respectively.
	Office of Electricity (OE)	OE provides national leadership to ensure that the Nation's energy delivery system is secure, resilient and reliable. Through research and development, OE develops new technologies to improve electric infrastructure. OE also oversees the Federal and state electricity policies and programs that shape electricity system planning and market operations.
	Office of Enterprise Assessments	The Office of Enterprise Assessments oversees four federal Power Marketing Administrations (PMAs) - Bonneville Power Administration (BPA), Southeastern Power Administration (SEPA), Southwestern Power Administration (SWPA) and Western Area Power Administration (WAPA) – that operate electric systems and sell the electrical output of federally owned and operated hydroelectric dams in 34 states.
	U.S. Energy Information Administration (EIA)	EIA collects, analyzes, and disseminates independent and impartial energy information to promote sound policymaking, efficient markets, and public understanding of energy and its interaction with the economy and the environment. EIA's data can be used in energy security planning and energy emergency response activities. EIA publishes state energy profiles, data products related to energy supply, demand, infrastructure, and prices, as well as GIS maps.
	Federal Energy Regulatory Commission (FERC)	FERC is an independent agency that regulates the interstate transmission of electricity, natural gas, and oil. FERC's role includes oversight of the transmission and wholesale sale of electricity in interstate commerce, transportation of oil by pipeline in interstate commerce, and proposals to build liquefied natural gas (LNG) terminals and interstate natural gas pipelines as well as licensing hydropower projects. During energy emergencies, FERC also has emergency authority

Department or Agency		Energy Security/Emergency Response Role
		under the Interstate Commerce Act to direct companies to provide preference or priority in transportation, embargoes, or movement of traffic. This authority can be used to direct interstate pipeline operators to prioritize shipments of specific fuels to address shortages.
U.S. Department of Transportation	Federal Motor Carrier Safety Administration (FMCSA)	FMCSA sets safety requirements for interstate commercial drivers, such as hours of service requirements limiting how long drivers can be on the road before a mandatory break. During energy shortages, FMCSA can waive these requirements to facilitate the delivery of specific energy products, most often liquid fuels, or to facilitate the movement of utility crews, trucks, and other resources involved in the restoration of electric power.
	Pipeline and Hazardous Materials Safety Administration (PHMSA)	PHMSA regulates pipelines and rail tank cars to advance the safe transportation of petroleum, natural gas, and other hazardous materials. The agency establishes national policy, sets and enforces standards, educates, and conducts research to prevent incidents. The agency also prepares the public and first responders to reduce consequences if an incident does occur. During pipeline incidents (explosions or spills), PHMSA investigates and issues corrective action orders to pipeline operators before pipeline service can resume. During energy shortages, PHMSA can issue emergency special permits and waivers of certain regulations to facilitate the pipeline supply of fuel to the affected region. PHMSA also regulates rail tank cars that carry petroleum, biofuels, or liquefied natural gas.
U.S. Environmental Protection Agency (EPA)		EPA sets standards for certain fuels, including regulating the vapor pressure of gasoline, requiring reformulated gasoline in certain markets, and specifying the sulfur content in diesel fuel. These fuel specifications can be waived during emergencies to facilitate the supply of fuel into the affected region, or to provide fungibility of available supply within the affected region. EPA also regulates air emissions from energy infrastructure, including power generating facilities and fuel storage terminals. During events, EPA may choose not to enforce these regulations to facilitate power supply and fuel supply in the affected region.
Internal Revenue Service (IRS)		IRS collects federal motor taxes on diesel fuel used for on-highway transportation. Diesel used for off-highway purposes (heavy machinery, generators, farm equipment, etc.) is not subject to tax and is dyed red. In coordination with EPA, the

Department or Agency		Energy Security/Emergency Response Role
		IRS can choose to not collect the penalty typically imposed on using non-highway diesel in on-road vehicles (although the IRS still collects tax on this fuel).
Department of Defense (DOD)	U.S. Army Corps of Engineers (USACE)	USACE assists FEMA during disaster response, including installing generators and delivering generator fuels in communities through its Temporary Emergency Power Mission and sending responders to assist in disasters and provide situational awareness.
U.S. Nuclear Regulatory Commission (NRC)		The NRC is involved in emergency preparedness and response involving nuclear facilities or materials. The NRC also publishes a daily status report on all nuclear power reactors.
U.S. Department of Justice (DOJ)	Federal Bureau of Investigation (FBI)	The FBI leads investigations into cyber attacks and intrusions. The FBI collects and shares intelligence and engages with victims while working to unmask those committing malicious cyber activities.
U.S. Department of the Interior (DOI)	Bureau of Safety and Environmental Enforcement (BSEE)	BSEE has responsibility for the safety of the environment and conservation of offshore resources. BSEE administers the Oil Spill Preparedness Program and provides support for oil spill response efforts. During hurricanes and other inclement weather in the Gulf of Mexico, BSEE publishes data on the offshore oil and gas rigs that have been evacuated, as well as the amount of production that has been temporarily shut in. BSEE also leads the development of workplace safety and environmental compliance strategies for offshore renewable energy projects on the Federal Outer Continental Shelf.

3.3 Local Authorities for Energy Security and Emergency Response Activities

The relevant North Dakota authorities are coordinated through NDDES and the State Emergency Response Commission (SERC), statutorily provided in NDCC § 37-17.1-07.1(a). During an energy emergency the SEOP will be enacted and coordinated through the state. Further information on the NDDES emergency response system can be found in the state's disaster procedures guide at its website (www.des.nd.gov/).

The state coordinating structure defines those lead and support agencies that are directly responsible for successfully accomplishing key requirements. Employment of state coordinating structures to deliver core capabilities to local/tribal authorities occurs based on the construct outlined in the concept of operations outline in the MOAP and listed in Table 18.

Table 18. State Coordinating Structure for Emergency Response

Core Capability & Definition	Core Capability Target(s)	Key Requirements Summary	State Coordinating Structure (Lead in **BOLD**)
Infrastructure Systems Stabilize critical infrastructure functions, minimize health and safety threats, and efficiently restore and revitalize systems and services to support a viable, resilient community	Within operational need timelines (24 hours for life safety, and one week for other needs), decrease and stabilize/assist with the reduction and stabilization of immediate infrastructure impacts on all critical sectors to the affected population and populations at risk from cascading effects; stabilize critical infrastructure functions of all critical sectors, minimize health and safety threats, and efficiently restore and revitalize systems and services of all critical sectors to support a viable, resilient community ; with sufficient backup capability to overcome loss of cyber and power connectivity. Within 6 months, develop/assist with development of plans and timelines for redeveloping community infrastructures to contribute to resiliency, accessibility, and sustainability; with sufficient backup capability to overcome loss of cyber and power connectivity. Support whole community stakeholders in similar endeavors.	Protect and restore basic functionality to public safety, cellular, landline cable, broadcast, and weather radio communications systems	**NDDES-SR** NDDOT NDPSC NDIT NDDES-HLS
		Protect and restore basic functionality to dams	**NDDWR**
		Protect and restore basic functionality to food production and distribution nodes	**NDDA** NDHHS
		Protect and restore basic functionality to essential government facilities	NDNG NDFM NDSC NDIT NDDPI NDUS (Subsector dependent)
		Protect and restore heat and the heating fuel supply chain	**COMMERCE** NDPSC NDPA NDOGD
		Protect and restore basic functionality to medical facilities	**NDHHS**
		Assess 16 Critical Infrastructure Sectors for impacts from hazards and threats	**All** (Sector dependent)
		Determine specific key dependencies and interdependencies between sectors/sector operators	**NDDES-HLS** NDSLIC
		Protect and restore the power supply chain	**COMMERCE** NDPSC NDOGD NDSEB
		Protect and restore basic functionality to water treatment and the water supply chain	**NDDEQ** NDDWR
		Protect and restore basic functionality to the transportation network	**NDDOT** **NDAC** **NDPSC** (subsector dependent) NDHP NDNG NDCAP NDOGD NDPA

4.0 ENERGY SECURITY PLANNING AND PREPAREDNESS

Managing an energy emergency helps mitigate the occurrence and impact of a shortage of any energy resource due to interruption in the supply. When it is not possible to avert these occurrences, it is imperative to take actions necessary to ensure the health and safety of the residents of the state. The following energy resources should be monitored for signs of an energy supply disruption.

4.1 State Energy Office Roles and Responsibilities

NDDES has the responsibility for coordinating state agency response to an incident upon a governor's declaration and activation of the SEOP. The effectiveness of this plan relies on several factors to ensure operational readiness. Applicable Commerce staff must continually monitor events throughout the world that could have a potential impact on energy supply. Strategies should be considered to adapt to dynamic conditions. Finally, personnel should exercise and train the plan to develop competency in implementation during an energy emergency. To maintain and achieve operational readiness of the plan, North Dakota Office of Renewable Energy and Energy Efficiency (NDOREEE) personnel are responsible for the following:

- Monitoring international and domestic events for impact on North Dakota energy prices and supplies.
- Review and update the plan as needed to ensure that the response strategies mirror current conditions in the energy industry.
- Conduct periodic training with NDDES and applicable state and private agencies to identify roles and responsibilities during an energy emergency.
- Update and maintain a list of contacts for state, local, and private industry.

NDDES also manages the State Emergency Operations Center (SEOC) to coordinate responses to emergencies and disasters. NDDES prepares for, responds to, and recovers from emergency events while coordinating with local tribal, state, and federal agencies to aid in public safety.

NDDES coordinates responses with both the federal and local emergency response agencies. The Energy Emergency Assurance Coordinators (EEAC) Program is a cooperative effort between DOE CESER, the National Association of State Energy Officials (NASEO), the National Association of Regulatory Utility Commissioners (NARUC), the National Governors Association (NGA), and the National Emergency Management Association (NEMA).

The EEAC Program provides states with a means of sharing and receiving credible, accurate, and timely information with other states and DOE leading up to and during energy emergencies. Structured communications are essential for understanding the severity, magnitude, and consequences of energy disruptions regardless of the causes.

Commerce follows the SEOP in the event of an energy emergency.

4.2 Monitoring of Energy Markets and Mitigation of Potential Supply Disruptions

4.2.1 Monitoring Sites

A variety of incident and energy-monitoring sites are available on the federal level to help in coordination. FEMA has a national incident management system at:

www.fema.gov/emergency-managers/nims

DOE has a number of programs in place to help monitor and assist in energy supply disruptions. These include the EEAC Program. States designate government representatives to be the coordinator. Further information on the EEAC Program can be found at:

www.energy.gov/ceser/energy-emergency-assurance-coordinators-eeac-program

States are responsible for updating and maintaining the EEAC contacts through the ISERnet system. Information on the ISERnet system can be found by requesting an account at:

www.oe.netl.doe.gov/ISERNET/login.aspx

Further information on the EEAC and ISERnet Programs can be found at:

www.naseo.org/Data/Sites/1/(clean)-guidance-for-the-review-and-updating-energy-emergency-assurance-....pdf

DOE also has the Environment for Analysis of Geo-Located Energy Information (EAGLE-I) system. It is DOE's interactive geographic information system that allows users to view and map the nation's energy infrastructure and obtain near-real-time informational updates concerning the electric, oil, and natural gas sectors within one visualization platform. The EAGLE-I login location is found at:

https://eagle-i.doe.gov/login

DOE CESER posts public situation reports on its website during significant energy emergencies. On this site, one can find links to the Energy Security Planning Resource Hub, the SLTT Program Resource Library, the Energy Waivers Library, and emergency authorities:

www.energy.gov/ceser/office-cybersecurity-energy-security-and-emergency-response

Another DOE resource for energy security planning is found at:

www.energy.gov/ceser/energy-security-planning-resource-hub

The U.S. Energy Information Administration (EIA) provides tracking of petroleum, coal, and natural gas markets. The EIA website provides information such as the monthly petroleum energy reports, production and inventories level, and energy outlooks found at:

www.eia.gov/

Transportation fuel prices for the state can be tracked at:

www.fueleconomy.gov/feg/gasprices/states/ND.shtml

4.2.2 Mitigation Sites

Mitigation steps for the energy sector are constantly evolving. DOE provides a list of recommended mitigation steps in the following document:

www.energy.gov/sites/default/files/2022-06/DOE%20CESER%20SESP%20Drop-in_Risk%20Mitigation%20Measures_FINAL_508.pdf

The Department of Homeland Security and the National Renewable Energy Laboratory also have resilience plans found, respectively, at:

www.dhs.gov/sites/default/files/publications/dhs_resilience_framework_july_2018_508.pdf and www.nrel.gov/docs/fy20osti/74983.pdf

North Dakota recently completed a statewide electrical grid study to identify electrical infrastructure that could be at risk from natural hazards. That study is an appendix within the state of North Dakota's enhanced statewide multi-hazard mitigation plan, which is a part of the SEOP. Many similar energy mitigation plans can be found which are primarily published by government agencies or national laboratories. However, North Dakota recently published and enhanced MAOP. This document functions as the SEOP, which incorporates energy emergencies in its scope. A detailed risk analysis is provided which assesses the state's hazards and threats along with the mitigation strategy. The document can be found at:

https://www.des.nd.gov/sites/www/files/documents/reports-plans/2024-29_EnhancedMitigation_MAOP.pdf

4.3 SEOC Coordination

In the event of an energy emergency, initial state response will be based on incident parameters and policies and procedures outlined in the SEOP.

No single agency will, in all cases, have the necessary resources or authority to carry out all necessary response and recovery activities. A state UC arising from an energy emergency will be located in the SEOC located at Fraine Barracks in Bismarck, North Dakota. The SEOC serves as a focal point by maintaining situational awareness via a common operational picture (COP), prioritization of resource, serving as a centralized communications and coordination note, and providing command and control platform to ensure seamless coordination across jurisdictions and infrastructure sectors in support of common objectives.

State agencies are represented in the SEOC during activation. Other state, federal, voluntary, and private sector partners not specifically designated in the SEOP may have authorities, resources, capabilities, or expertise required to support operations. Figure 32 depicts the local and tribal entities for the state. Agencies may be requested to participate in response and recovery operations and, depending on the situation, may be asked to designate staff to function as liaison officers and provide other support.

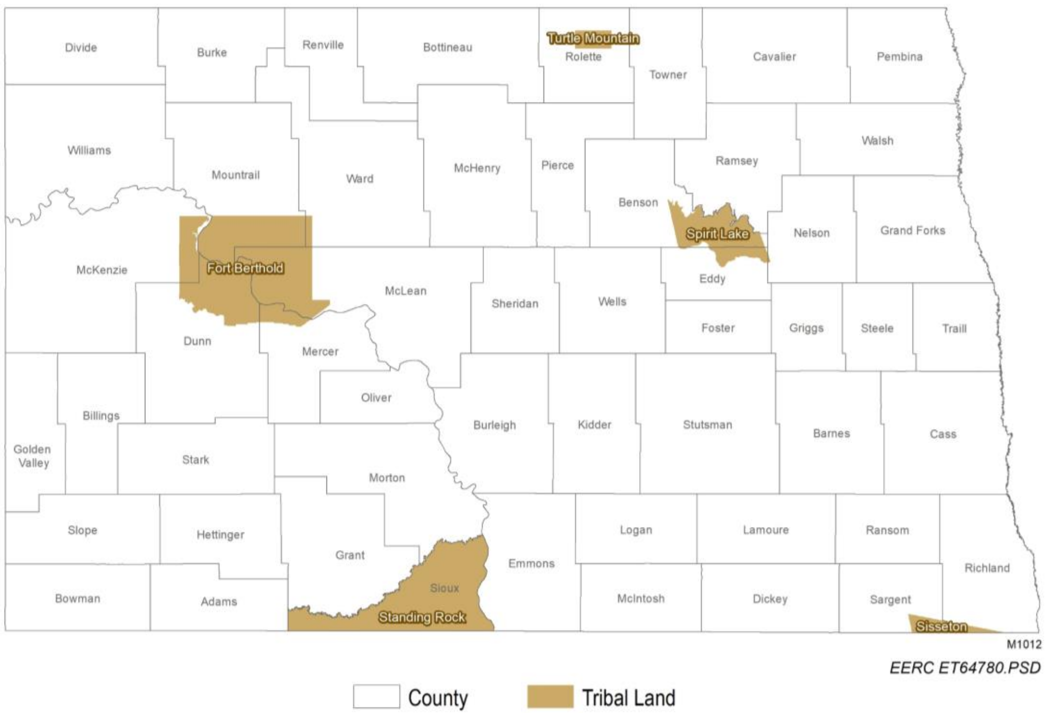

Figure 32. Local and tribal entities in North Dakota.

A full listing of the contacts for all of these can be found at:

www.des.nd.gov/countytribal-resources

NDDES provides a variety of training and emergency exercise programs for first responders, emergency managers, healthcare providers, and other response staff. NDDES continues to provide and participate in multiagency and multistate emergency response exercises. Exercises are designed to progress from discussion to operational demonstration of capabilities. An annual report from NDDES highlights these training and outreach programs and can be found at:

www.des.nd.gov/sites/www/files/documents/NDDES%202021%20Report.pdf

North Dakota uses WebEOC, a web-based incident management tool, used by state agencies and local/tribal emergency managers to report, track, and coordinate response efforts. WebEOC provides agencies with real-time situational awareness and a common operating picture of ongoing incidents throughout the state. The system is maintained by NDDES and can be found at:

www.des.nd.gov/response-section/webeoc

4.4 State Emergency Operations Levels

North Dakota uses a response-level system ranging from Level 3, normal daily operations, to Level 1, full-scale activation of emergency resources, as defined in the mission area operations plan and depicted in Figure 32. The SEOC activation levels change based on a variety of factors. Complexities that may trigger activation level escalation include but are not limited to the following:

- Enhanced development and maintenance of a common operating picture (i.e., Incident Summaries, mapping).
- A written incident action plan (IAP) is required.
- Multiple state resources are requested, activated and/or deployed.
- Large-scale movement and deployment of resources.
- Anticipated support will require extensive coordination or response by the state.
- Activation of NDDES staff beyond the duty officer to support operations.
- Events/situations affecting large geographic areas.
- Escalation of events occurs.
- There is a need for outside assistance (i.e., federal, EMAC, NEMAC).
- Statewide initial damage assessment is required.
- Numerous or expanded operational periods are anticipated.
- Multiple or simultaneous events requiring 24/7 response and coordination.
- An adversarial event or credible threat of an adversarial event within the state.
- Program and/or functional area expertise is requested at all times in the SEOC.

The state of North Dakota has established three SEOC activation levels, as noted in Figure 33. All levels provide for 24/7/365 monitoring of incidents throughout North Dakota, maintaining a common operating picture, and supporting local/tribal jurisdictions and partners as needed. Each activation level represents an increased need for situational awareness and coordination of state response activities and resources. The figure reflects considerations for each level and will be driven by operational tempo and complexity of the event.

SEOC Condition	Green	Amber	Red
Activation Levels	3	2	1
Condition Description	Daily/Monitoring	Partial	Full
SEOC Type	Virtual	In Person or Hybrid	In Person or Hybrid
Days and Hours of Operation	* Normal Business Days/Hours * 24/7 Duty Officer After Hours	* Extended Hours Possible * 24/7 Duty Officer After Hours	* Extended Hours Possible * 24/7 Duty Officer After Hours
Command Structure	• Duty Officer • Response Section Chief	Unified Command ○ Lead Agency Staff ○ NDDES-HLS Director	Unified Command ○ NDDES Director ○ Lead Agency Staff
SEOC Staffing	* 24/7 Duty Officer * Potential additional staffing from Response and Planning Sections	* Core EOC Staff * Potential additional staffing from key lead and/or support agencies	* Core EOC Staff * Additional staffing from key lead and/or support agencies
Battle Rhythm	• Morning Intel Reports • Duty Officer Shift Change Brief • CIR Key Leadership Notification • Web EOC monitoring • Senior Leader Brief • Pre-Incident Coordination Meetings	• Previous Level Briefings • Limited/Full State Unified Command and General Staff Meetings • Operational Synch Meetings with Lead/Key Agencies • Incident Summary Reports	• Previous Level Briefings • Full State Unified Command and General Staff Meetings
IAP Documents	None	* ICS 203 - Organizational Assignment/Contact List * ICS 202/204 - Incident Objectives/Assignments List * ICS 207 - Organizational Chart * ICS 230 - Meeting Schedule/Battle Rhythm	Full IAP

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Figure 33. SEOC conditions and activation levels as defined in the MAOP.

Upon activation of the SEOC, the NDDES response chief, or designee, will ensure coordination with the appropriate NDDES staff and agency representatives (Liaisons – LNOs) to staff the SEOC. Notifications will be accomplished in the most expedient manner utilizing phone, email or a mass notification system. NDDES staff and agency liaison officers (LNOs) are required to respond to the SEOC immediately upon receiving notification of the activation.

In the event of an energy incident/emergency and state UC is stood up, it is likely Commerce will be a lead agency along with NDDES, with other state agencies in support roles. Table 19 lists the standard operating phases and key state activities.

The state of North Dakota has established standardized operational phases for use regardless of event type or mission area. These should not be confused with the response levels detailed previously, as operational phasing applies only to state support and crosses over all five mission areas. Response levels transcend levels of government involved in a response effort and focus only on the response mission area. They should also not be confused with SEOC activation levels.

To eliminate confusion, numbers are not used to delineate operational phases.

Table 19. Standardized Operating Phasing

Phase	Begins	Key State Activities	Ends
Pre-Incident/Normal Ops	Always ongoing	• 24/7/365 SA and COP • Prevention, Protection, and Mitigation Operations • Planning, Organizing, Equipping, Training, and Exercising Activities • Small-event response of limited duration, impact, and with little to no recovery required • General alerting and actual pre-positioning of resources in anticipation of support to local and tribal authorities	Notice events: Known or near certain time to impact No-notice events: Event occurs
Incident Onset	Notice events: Known or near certain time to impact No-notice events: Event occurs	• SA and COP development/maintenance/ enhancement • IAP Development and Execution • Mobilize, deploy and/or employ Core Capabilities to break and/or slow down the event chain at the earliest point possible • Life saving and sustaining operations • Protection/recovery of key systems	Expansion of Response-centric Operations past Life Saving/Sustaining and Protection of key systems
Sustained Operations/Short Term Recovery-centric Operations	Expansion of Response-centric Operations past Life Saving/Sustaining and Protection of key systems	• SA and COP maintenance/refinement • Sustained Response-centric operations • Restore CI/KR to basic capabilities • Organize and establish coordinating structures for long-term recovery • Demobilization planning for Response-centric resources • Intermediate recovery and mitigation actions	Demobilization of Response-centric resources
Long Term Recovery and Post-Incident Mitigation-centric Operations	Demobilization of Response-centric resources	• SA and COP maintenance/refinement • Transition to Recovery/Mitigation-centric Operations • Long-Term Recovery Operations • Rebuild CI/KR • Implement mitigation strategies	Demobilize Recovery and Mitigation-centric Resources

5.0 ENERGY EMERGENCY RESPONSE

Managing an energy emergency helps mitigate the occurrence and impact of a shortage of any energy resource due to interruption in the supply. When it is not possible to avert these occurrences, it is imperative to take actions necessary to ensure the health and safety of the residents of the state. This plan describes the framework for actions in the event of a shortage, covering transportation fuels, electricity, and natural gas supplies. It has been developed to coordinate the plans and activities of federal, state, and local emergency organizations as well as private industry. This is followed by a quantitative risk assessment for the energy sector and a discussion on the energy supply interdependencies.

5.1 Response Actions and Authorities for Energy Emergencies

The most likely potential causes for energy emergencies have been identified and are summarized in Table 20. These fall into three general types. The first is physical damage or destruction of the production or distribution systems. This can be caused by storms, floods, sabotage, equipment failure, and others. The second is through a larger market disruption such as a shortage in oil supply or national emergency that leads to a reduction in energy supplies and causes a sharp increase in energy costs. The third is a dramatic increase in energy demand due to infrastructure growth, severe weather, or national security issues. Severe weather and/or natural disasters are growing concerns. Geopolitical events such as an oil embargo or national security event can disrupt the energy supply. Such events would not be localized to North Dakota. Events such as terrorism, sabotage, or cybersecurity threats can be targeted to specific North Dakota sites. The available labor force is also a potential threat, as a major work stoppage can impede the availability of energy supplies.

Table 20. Potential Causes of an Energy Supply Emergency

Severe Weather	Extreme low/high temperatures, ice, wind
Natural Disaster	Reduced/disrupted supply, increase in demand for alternative fuels
Oil Embargo	Reduced supply of petroleum products, increased demand in coal, electricity, and alternative energy supplies
Labor	Major work stoppage reducing available energy supplies
National Security/Terrorism/Sabotage	Reduction in supply due to interruptions of overall supply and/or geopolitical considerations
Cybersecurity	Disruption of communications and control systems in electrical transmission or pipeline distributions

In the event of an energy emergency, the intent of this plan is to ensure that essential services continue to be provided. The responses are designed to reduce consumption and demand. By responding effectively to energy disruption, a balance of energy products can be restored as quickly as possible. The state's role is to deliver timely and accurate information to the public while also enacting programs to address the causes of energy emergencies within the state.

The energy shortage conditions are defined in Table 21. Under normal conditions the state's role is to monitor and alert of any probable upcoming events. A variety of governmental tools help to monitor the energy supply markets. Shortage levels range from mild to severe depending on the length of the outage.

Table 21. Energy Shortage Conditions*

Normal Conditions Level 1 *Monitor and Alert*	− No discernable shortages − Possible shortages elsewhere
Shortage Level 2 *Mild Shortage*	− 5%–10% reductions in petroleum supply for a week or more, estimated by the days a port or terminal is closed or the number of substitutions of truck deliveries instead of normal pipeline supply. − 5%–10% reductions in natural gas nominations on interstate pipelines or pipelines on allocation for up to 2 weeks. − Localized storm damage causing short-term electric transmission/distribution loss.
Shortage Level 3 *Moderate Shortage*	− 10%–15% reductions in petroleum products for 3 weeks or more. − 10%–15% reductions in natural gas supply nominations on interstate pipelines. − Curtailments by local gas distributions for 2 weeks or more.
Shortage Level 4 *Severe Shortage*	− Greater than 15% reduction in availability of petroleum products and/or natural gas for more than 2 weeks. − Natural gas nominations fall severely due to weather, interstate pipeline failure, or production problems. − Electricity outages extend for several weeks.

* Percentage reductions are illustrative only; energy outage severity is often based on the number of affected customers.

5.2 Response and Recovery from Energy Disruptions

The state's response to an energy emergency can be detailed in four phases.

Phase 1 – Monitor and Alert (readiness)

In this phase, energy conditions are normal and no disruptions or shortages are expected. Commerce will monitor energy supply, demand, and pricing. The monitoring tools were described in detail in Section 4.0 of this report.

Phase 2 – Assess and Determine Action

Once early signs of what might become an energy emergency have been identified, applicable agencies should increase monitoring and information gathering. These data are assessed for potential outcomes and courses of action. The specific items that are implemented during an energy emergency are given in Section 6.0.

Phase 3 – Actions and Feedback

After assessing that state action is needed to assure the health, welfare, and safety of citizens and the economy of the state, Phase 3 activity is initiated. Specific actions are listed in Section 6.0 of this plan; however, some examples are as follows:

- Implementing steps to conserve energy usage in both the public and private sectors.
- Request for federal assistance.
- Declaration of a “state of emergency.”
- Waiver of U.S. Department of Transportation (DOT) driver hours and weight standards.

Phase 4 – Review Lessons Learned

As an energy emergency dissipates, affected state agencies should start to evaluate actions taken and chronicle those responses. These actions should also be reviewed for effectiveness for future planning purposes.

5.3 Quantitative Energy Risk Assessment

The NDDES’s 2024 *Enhanced mitigation, mission area operations plan* provides a broad assessment of the various hazards facing the state. A Priority Risk Index (PRI) approach was taken, which includes the probability, impact, spatial extent, warning time, and duration of each hazard into a formula to quantify the specific risk. Here, a similar approach is used, but the specific risk scenarios are detailed for the impact on energy security. That is to say, winter weather may be the broad risk that results in specific risk scenarios such as ice accumulation on power lines or cold weather-related failures at power generation sites. Rather than using the PRI formulation, the DOE-recommended formulation of ranking threat, vulnerability, and consequence is used. These are rated on a scale of 1–5 and then multiplied to get a risk number. A review of the various NDDES mitigation and emergency response plans, along with discussions with Commerce and the North Dakota Transmission Authority, helped provide the basis for the Threat, Vulnerability, and Consequence rankings.

1. Winter Weather, Cold Wave, and Ice Storm Risk Assessment

North Dakota faces challenges in distinguishing among the impacts of winter weather, cold waves, and ice storms on energy security because of their overlapping effects. These severe winter weather events, which include snow accumulation, ice formation, and extreme cold, collectively strain energy infrastructure, causing power outages and increased energy demands. As a result, this plan will treat all these events under the umbrella of "severe winter weather" to assess their combined impact on energy security in North Dakota rather than evaluating them separately.
North Dakota experiences some of the harshest winter weather in the United States, with frequent blizzards, heavy snowfall, and extreme cold events. These conditions pose substantial risks to the state's energy security, particularly affecting natural gas distribution, power lines, and electric substations.

Frequency and Probability

There is a high frequency of severe winter weather events in North Dakota:

Blizzard: 95.0 events per year
Winter storm: 67.8 events per year
Extreme cold/windchill: 64.8 events per year
Heavy snow: 48.9 events per year
Ice storm: 4.6 events per year

Impact on the Energy Sector

With severe winter weather events occurring almost every year, the probability of such incidents is high. These events have both direct and indirect consequences, including loss of power, heating, and critical services, thereby highlighting the need for comprehensive mitigation strategies to ensure energy security and resilience in North Dakota.

Winter Weather Risk Scenario	**Threat**	**Vulnerability**	**Consequence**	**Risk**
Ice Accumulation on Power Lines	4	4	4	64
Cold-Related Equipment Failure at Power Plants	4	3	2	24
Pipeline Freeze and Blockage	4	3	4	48
Operational Failure at Oil Well Sites	4	2	3	24
Frozen Wellhead Equipment	4	3	4	48
Instrumentation Failure in Gas Processing Plants	4	3	4	48

2. Strong Wind Risk Assessment

North Dakota experiences frequent strong wind events that pose significant risks to the state's energy security. These winds can damage critical energy infrastructure, including electric transmission and distribution networks, wind energy facilities, and fuel supply chains. The state's energy security plan must address these vulnerabilities through strategic mitigation measures, such as reinforcing overhead power lines, upgrading wind turbines, and ensuring alternative fuel supply routes. Historical data indicate that strong winds have caused substantial disruptions, highlighting the need for a robust and resilient energy infrastructure to mitigate the impacts of future wind events.

Strong Wind Risk Scenario	**Threat**	**Vulnerability**	**Consequence**	**Risk**
Wind Impacting Electrical Transmission and Distribution Network	4	4	3	48
Wind Causing Damage to Wind Energy Facilities	4	3	2	24
Wind Leading to Fuel Supply Chain Disruptions	4	3	3	36

3. Hail Risk Assessment

Hailstorms pose a significant threat to North Dakota's energy infrastructure. Historically, the state has experienced several severe hail events, each causing extensive damage to energy systems, including power transmission lines, wind turbines, and natural gas infrastructure. These events disrupt the energy supply, affecting both immediate and long-term energy security.

Key risk scenarios include the following:

1. **Hail damage to power transmission lines**: Frequent hailstorms can damage aboveground power lines, leading to widespread power outages.

2. **Hail impact on wind turbines**: Large hail can reduce the efficiency of wind energy production by damaging turbine blades.

3. **Hail disruption of natural gas infrastructure**: Severe hail can impact pipelines and processing facilities, causing operational interruptions.

Probability

Given the historical data, the probability of significant hail events impacting energy security in North Dakota can be considered moderate to high.

Frequency and Impact of Hail Events in North Dakota

Below are several instances of significant hail events in North Dakota, with detailed descriptions of their impacts:

- **August 1995 hailstorm**: Damaged 59,000 acres of cropland, caused power loss to the 4 Bears Casino & Lodge, and led to extensive damage to buildings and vehicles.

- **June 2001 hailstorm**: Caused $260 million in damages in Mandan and Bismarck, with a large number of insurance claims filed.

- **June 2005 hailstorm**: Baseball-size hail and strong winds damaged businesses, homes, and high-voltage transmission lines.

- **June 2010 hailstorm**: Caused significant damage in southern North Dakota, including power structure damage in Logan and Richland counties.

- **June 2016 hailstorm**: Hail up to 3 in. in diameter, with damage to power lines and infrastructure in McKenzie and Logan counties.

From these documented events, at least five hailstorms have directly affected energy infrastructure, indicating a high frequency of impactful hail events.

Hail Risk Scenario	Threat	Vulnerability	Consequence	Risk
Damage to Power Transmission Lines	4	3	3	36
Hail Impact on Wind Turbines	4	3	3	36

Hail Disruption of Natural Gas Infrastructure	4	2	3	24

4. Riverine Flooding Risk Assessment

North Dakota faces significant flood risks because of its large basins and extensive low-lying areas. The most flood-prone regions are along the Red River and Missouri River Basins, with riverine, closed basin, and flash floods all contributing to the hazard. The state's flood risk index score is high, reflecting the high probability and catastrophic impact of flood events. Floods in North Dakota often have warning times greater than 24 hours and durations extending beyond a week, exacerbating the potential damage.

The state has experienced over 1000 flood events since 1996, with 32 receiving presidential disaster declarations. These floods have led to oil well shutdowns, damage to power infrastructure, and disruptions in energy distribution, highlighting the need for robust mitigation strategies.

Impact on the Energy Sector

Flooding can severely impact the energy sector through the following:

1. **Oil and gas production:** Floodwaters can inundate oil fields, leading to shutdowns and potential oil spills, causing environmental contamination and disrupting operations.

2. **Electrical infrastructure:** Power stations, substations, and transmission lines are vulnerable to flood damage, leading to power outages and interruptions in service.

3. **Critical services:** Floods can compromise the delivery of essential services, including fuel supply, affecting the overall energy distribution network.

Economic and Operational Consequences

The economic impact of flooding on the energy sector is significant. Damage to infrastructure and interruptions in energy production and distribution can lead to substantial financial losses. The state's increasing development, particularly in oil-rich western regions, places more infrastructure at risk, emphasizing the need for effective flood management and mitigation efforts.

Riverine Flooding Risk Scenario	Threat	Vulnerability	Consequence	Risk
Riverine Flooding Impacting Power Plants	5	3	4	60
Flash Floods Disrupting Fuel Supply Chains	4	3	3	36
Ice Jams Damaging Electrical Grid	3	3	3	27

5. Tornado Risk Assessment

North Dakota frequently experiences tornadoes, posing significant risks to the state's energy infrastructure. Tornadoes in North Dakota are characterized by high winds and flying debris, which can cause substantial damage to critical energy infrastructure components. The primary vulnerabilities include the following:

Power substations: Tornadoes can damage substations, leading to extensive power outages.

Transmission lines: High winds can down transmission lines, disrupting energy distribution.

Natural gas pipelines: Tornado-induced ground movement and debris can damage pipelines, leading to leaks and supply interruptions.

Tornado Risk Scenario	Threat	Vulnerability	Consequence	Risk
Damages Electricity Power Substations	4	3	4	48
Damages Transmission Lines	4	4	2	32
Impacts Natural Gas Pipelines	4	3	3	36

6. Heat Wave Risk Assessment

North Dakota faces significant energy security risks during heat waves, which are expected to increase in frequency and intensity because of climate change. The primary risks include the overloading of electric power substations, failure of the electric transmission and distribution network, and reduction in power generation capacity due to cooling system failures at power plants. Each of these risks has the potential to cause widespread power outages, affecting residential, commercial, and industrial sectors and leading to substantial economic and social impacts.

Probability and impact on energy security: While the overall probability of heat waves in North Dakota is relatively low to medium, their impact on energy security can be severe, particularly in areas with higher population densities.

Heat Wave Risk Scenario	Threat	Vulnerability	Consequence	Risk
Overloading of Electric Power Substations	3	4	4	48
Failure of Electric Transmission and Distribution Network	3	3	4	36
Reduced Power Generation, Cooling Failures	4	3	3	36

7. Lightning Risk Assessment

Lightning poses a significant threat to North Dakota's energy security infrastructure. With lightning being a common phenomenon, it can lead to severe consequences such as power outages, damage to critical facilities, and economic losses. The National Centers for Environmental Information database has recorded lightning activity since 1996, and recent data indicate an increase in the severity and impact of lightning-related incidents. For instance, during 2018–2022 period, there were two notable lightning incidents—a fatality and a house fire.

The state's energy infrastructure, including electric power substations, transmission lines, and oil and gas facilities, is vulnerable to lightning strikes. These incidents can cause direct damage to equipment and ignite fires, leading to significant disruptions in energy supply. Consequently, implementing robust mitigation strategies is crucial. Recommendations include installing advanced lightning protection systems, maintaining vegetation clearances around transmission lines, using fire-resistant materials, and conducting regular safety audits and equipment upgrades.

Lightning Risk Scenario	**Threat**	**Vulnerability**	**Consequence**	**Risk**
Lightning Strikes Oil and Gas Facilities	4	3	3	36
Lightning Strikes Power Substations	4	3	3	36
Lightning Causes Fires by Energy Infrastructure	3	3	3	27

8. Wildfire Risk Assessment

- North Dakota faces significant wildfire risks that threaten its energy sector. Wildfires, exacerbated by climate change, endanger critical infrastructure, disrupt oil production, and cause long-term ecological damage. In North Dakota wildfire incidents have surged annually, and the state must prioritize mitigation efforts.
- Number of Wildfire Incidents (2017–2020): 250
- Wildfire incidents in 2021: 472 (a surge year due to drought and heat wave)
- Average annual wildfires (2018–2022): 15,430 acres burned per year
- Wildfires affecting energy sector: Not explicitly, but wildfires threaten the oil and gas sectors

Wildfire Risk Scenario	**Threat**	**Vulnerability**	**Consequence**	**Risk**
Damaging Energy Infrastructure	3	4	4	48
Disrupting Energy Production in Oil Fields	3	4	3	36
Causing Long-Term Ecological Damages	3	2	3	18

9. Landslide Risk Assessment

Landslides occur constantly in North Dakota but usually affect lightly populated pastureland or recreational land. The probability of a landslide of consequence is minimal, with an annual occurrence rate ranging from 0.01 to 0.09 events per year. Most of these events have limited impact, primarily affecting landowners and infrastructure within landslide-prone areas. As of the latest data, no significant landslides have directly affected the state's energy security infrastructure.

Landslide Risk Scenario	Threat	Vulnerability	Consequence	Risk
Impact on Electrical Transmission Lines	2	3	4	24
Disruption of Natural Gas Pipelines	2	3	4	24
Landslide Blocking Access to Energy Facilities	2	2	3	12

10. Drought Risk Assessment

North Dakota experiences frequent drought conditions, which can severely impact energy infrastructure. The primary concerns include reduced hydroelectric power generation due to low water levels, strained natural gas production and distribution from increased water demand, and overloaded electrical grids during heat waves. The assessment emphasizes the high probability and significant consequences of these risks, underscoring the need for robust mitigation strategies.

Number of Droughts in North Dakota and Their Impact on Energy Security

Total droughts: Multiple instances exist of drought impacting North Dakota, including various levels of severity (ranging from level D0 [abnormally dry] to D4 [exceptional drought] and specific years with significant drought conditions.

Droughts directly affecting energy security: Drought has moderately impacted energy infrastructure, particularly in relation to hydroelectric power, natural gas production, and electrical grid stability.

Drought Risk Scenario	Threat	Vulnerability	Consequence	Risk
Drought Affecting Hydropower Generation	4	4	2	32
Extreme Heat Increasing Energy Demand	4	4	3	48
Wildfires Threatening Transmission Lines	4	3	3	36

11. Earthquake Risk Assessment

North Dakota has a relatively low seismic activity compared to other regions in the United States. Historical records indicate only a few minor earthquakes with limited impacts on the state's energy infrastructure. The most significant event was a tremor in 1905 from the Yellowstone area in Montana, felt in North Dakota but causing no notable damage. Despite this, the potential threat of seismic activity must be acknowledged because of the critical nature of the state's energy infrastructure. The probability of significant seismic events affecting energy security is low, but preparedness and mitigation measures are essential.

Earthquake Occurrences in North Dakota

- **Total number of earthquakes:** Minor earthquakes have been felt in North Dakota.

- **Earthquakes directly affecting energy security:** No recorded earthquakes have directly impacted North Dakota's energy infrastructure.

Probability of Earthquake Impact

- The probability of significant seismic events in North Dakota is low because of the region's stable geological conditions.

Earthquake Risk Scenario	Threat	Vulnerability	Consequence	Risk
Affecting Oil and Gas Pipelines	1	4	4	16
Impacting Electric Power Substations	1	4	3	12
Disrupting Natural Gas Storage Facilities	1	4	3	12

Overall Anthropogenic Hazard Risk for North Dakota

North Dakota's energy security faces significant threats from various human-made, or anthropogenic, hazards. The Bakken oil boom has resulted in substantial increases in construction, traffic, and overall land-use changes, necessitating heightened infrastructure regulation and maintenance. The state's remote energy infrastructure, particularly in the oil and agriculture sectors, presents enticing targets for potential adversarial attacks, including those from terrorist or nation-state actors. The urban areas of Fargo, Grand Forks, Bismarck, and Williston, expected to grow by 24.6% by 2040, could become more appealing targets for such attacks because of increased population and events.

Additionally, the presence of military bases and missiles in Minot and Grand Forks adds to the state's vulnerability. Ensuring the resilience and security of North Dakota's energy infrastructure against these threats is crucial for maintaining reliable energy services.

As a border state to Canada, North Dakota's energy security is also influenced by cross-border energy trade and infrastructure, necessitating robust security measures to safeguard against potential disruptions.

The major anthropogenic hazard risks for North Dakota's energy security include the following:

<u>Cybersecurity threats</u>: As energy infrastructure increasingly relies on digital systems, the risk of cyberattacks grows. These can disrupt power grids, oil and gas operations, and other critical energy infrastructure.

<u>Terrorist and nation-state attacks</u>: Risk exists for attacks from both terrorist groups and nation-states targeting North Dakota’s energy facilities given their strategic importance.

Civil disturbances: Civil disturbances, such as public protests, counterprotests, and organized criminal mischief, are potential threats to energy security. These disturbances can escalate into violence, requiring state or federal resources to maintain public safety.

12. Cyberattack Risk Assessment

Based on the information provided in North Dakota's 2024–2029 Enhanced Mitigation Plan, there is a significant emphasis on the vulnerability of North Dakota's infrastructure, including the energy sector, to cyber threats. The analysis underscores the potential consequences of cyberattacks on critical infrastructure, economic stability, and public services.

While specific counts of cyberattacks in North Dakota, especially targeting the energy sector, are not provided, the discussions illustrate various scenarios where different sectors are vulnerable to cyber intrusions. Accessing state-level cybersecurity reports or industry data would be necessary for specific statistics on cyber incidents affecting North Dakota and its energy infrastructure.

Following are the three major risk scenarios in North Dakota during a cyberattack on energy security:

Cyberattack Risk Scenario	Threat	Vulnerability	Consequence	Risk
On Electricity Production and Distribution	3	3	4	36
On Crude Oil Production and Distribution	3	3	4	36
On Natural Gas Production and Distribution	3	3	4	36

13. Terrorist Attack Risk Assessment

Based on the comprehensive review of North Dakota's 2024–2029 Enhanced Mitigation Plan, no documented instances or records exist of terrorist attacks occurring in North Dakota during the period covered. The focus of these chapters primarily centers on evaluating vulnerabilities, risks, and potential consequences related to various sectors, particularly the energy sector. Key points include the following:

Terrorist attacks: No specific incidents of terrorist attacks were reported or detailed in North Dakota.

Energy sector risks: The analysis underscores vulnerabilities such as the remote locations of critical infrastructure (electric substations, pipelines) and limited security measures at energy facilities. Potential consequences of attacks on energy infrastructure include economic losses, environmental damage, and public safety risks. Mitigation strategies emphasize enhancing security, improving surveillance capabilities, and strengthening emergency response protocols.

Given the absence of documented terrorist incidents, this risk assessment primarily focuses on preemptive risk assessment and proactive measures to safeguard critical infrastructure rather than reactive responses to actual attacks.

Following are the three major risk scenarios in North Dakota during terrorist attacks on energy security:

Terrorist Attack Risk Scenario	Threat	Vulnerability	Consequence	Risk
On Electricity Production and Distribution	1	4	3	12
On Crude Oil Production and Distribution	1	4	3	12
On Natural Gas Production and Distribution	1	4	3	12

14. Civil Disturbance Risk Assessment

Based on North Dakota's 2024–2029 Enhanced Mitigation Plan, the analysis of civil disturbances in North Dakota and their impact on the energy sector reveals several key points regarding the following:

Civil disturbances in North Dakota: The chapters discuss the Dakota Access Pipeline protests and the Fargo civil unrest in 2020 as notable examples of civil disturbances in the state. However, the exact number of distinct civil disturbances is not specified.

Impact on the energy sector: The Dakota Access Pipeline protests are highlighted for their direct impact on crude oil transportation via pipelines. The broader discussions underscore the vulnerability of energy infrastructure—including electricity production, crude oil production and distribution, and natural gas production and distribution—to civil disturbances.

Although specific incident data beyond the Dakota Access Pipeline protests are lacking, the chapters emphasize vulnerabilities and potential consequences related to energy security during civil disturbances. Detailed incident-specific data would enhance future assessments aimed at providing a more comprehensive analysis of civil disturbance risks to energy infrastructure in North Dakota.

Following are the three major risk scenarios in North Dakota during civil disturbances to energy security:

Civil Disturbance Risk Scenario	Threat	Vulnerability	Consequence	Risk
At Electricity Production and Distribution	2	3	2	12
At Crude Oil Production and Distribution	2	3	2	12
At Natural Gas Production and Distribution	2	3	2	12

15. Climate Change and Baseload Power Generation Risk Assessment

Climate change has led to more extreme weather patterns, extended wildfires seasons, and increases in the frequency and magnitude of hurricanes. Many states are shifting their power generation away from fossil fuel based-methods toward renewables. However, doing so brings on a new risk of baseload generation not being able to handle peak demand periods. Growth has been steadily increasing in energy consumption in North Dakota over the past decade, driven primarily from industrial consumption. Electricity generation from coal-fired power plants has been reduced over the past decade while the overall generation has grown, particularly in renewable wind capacity (refer back to Figure 6).

Demand for electricity is projected to increase in the next 20 years. This is driven by further industrial consumption as well as an increase in data centers in the state. As the energy mix changes toward increasing renewables, the accredited capacity is reduced. Figure 34 shows the MISO projected capacity growth along with the accredited capacity.

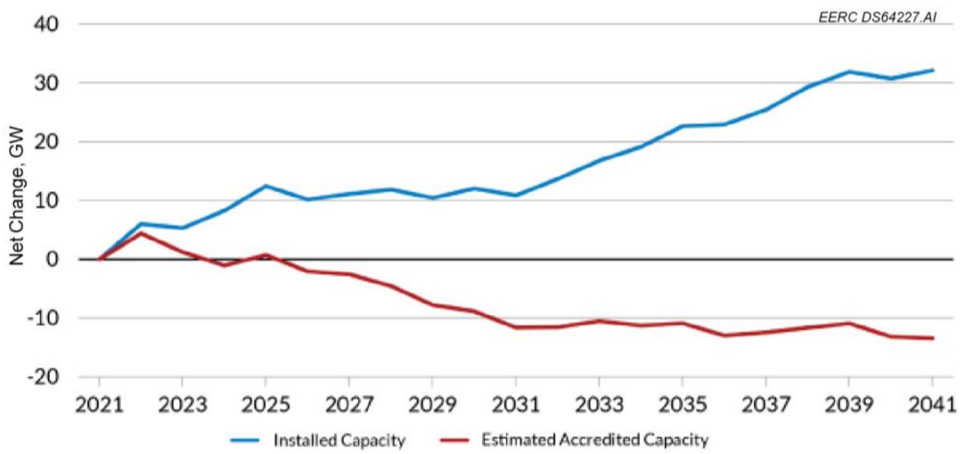

Figure 34. MISO projected electrical capacity changes (North Dakota Transmission Authority, 2023).

A shift away from baseload coal generation and toward a renewable portfolio of wind generation presents a risk to the stable electricity supply. The reliability of these sources is not as high as traditional fossil fuels, and the accredited capacity is then reduced. While this shift is essential to the national carbon reduction goals, the transition to these new resources presents challenges to the resource mix and the ability to handle peak loads. Historically, the peak loads would occur at the hottest and coldest times of the year. This is not always the case today, and a more careful evaluation of the load and resource mix is needed to ensure the reliability of the electrical grid. This means that the conventional method of establishing capacity based on the nameplate value is no longer applicable. Rather, the expected capacity and energy available from resources are now required. This is particularly important during periods of high supply risk.

North Dakota is aware of the balance needed here, where the increased energy risks associated with climate change presents an unpredictable future risk. However, there is also a risk of the energy transition coming too quickly without a full understanding how this will impact the grid loading. Further discussions on the grid resiliency for North Dakota can be found elsewhere (North Dakota Transmission Authority, 2024).

5.4 Interdependencies

Energy sources, supplies, and suppliers do not exist as standalone entities but depend on each other and other resources such as communications, transportation (infrastructure and vehicles), food and water, and medical services. The concept of infrastructure interdependency is based on connectivity between the various elements of an infrastructure. It means that a disruption in one element can affect the functioning of numerous systems that depend on that element, possibly causing a cycle of infrastructure disruption.

The energy sector, comprising electricity, liquid fuels, natural gas, and renewable energy assets, is interconnected through extensive networks. These networks are crucial for personal activities, economic development, government operations, and essential services. Transportation and communication systems depend heavily on a steady energy supply to function properly. Conversely, energy supplies depend on these infrastructures to deliver reliable energy sources. Without dependable energy sources like electricity and fuels, essential functions such as financial services, safe drinking water, and emergency services like firefighting or generator cooling would be compromised.

The Department of Homeland Security identifies energy as one of 16 critical infrastructure sectors. All other sectors rely on energy for their operations. Any disruption in energy services can directly impact the security and resilience of multiple sectors. Additionally, the energy sector itself depends on other sectors to deliver its services, creating further interdependencies. Understanding these relationships helps mitigate potential vulnerabilities and ensures the economy can continue to function during crises.

Following are the key dependencies and interdependencies between the energy sector (electricity, natural gas, liquid fuels) and other critical infrastructure sectors.

5.4.1 North Dakota Power Outage Interdependencies

Considering the unique climate and infrastructure of North Dakota, especially with harsh winters, understanding the cascading effects of power outages in North Dakota, from immediate communication disruptions to broader societal and economic impacts, highlights the critical need for robust contingency plans and infrastructure resilience.

This sequence outlines how a power outage in North Dakota, particularly in winter, can have severe and far-reaching effects, necessitating robust contingency plans and emergency responses.

Cascading Sequence of Events for Electrical Power Outage

Immediate effects: Direct and swift impacts such as loss of heat and communication disruptions

1. **Communications disruption**: Loss of communication networks
2. **Traffic signal failure**: Traffic management issues
3. **Disruption to other critical infrastructure**: Impact on essential services and facilities
4. **Alarm system disruption**: Security and emergency systems failure
5. **Loss of heat**: Critical in winter months, leading to severe indoor temperature drops

6. **Loss of cooling**: Essential during summer, particularly for elderly and vulnerable populations
7. **Failure of medical equipment**: Life-threatening consequences for those relying on medical devices
8. **Trapped persons**: People stuck in elevators or buildings without power

Secondary effects: Consequential impacts affecting health, safety, and infrastructure
1. **Injury**: Increased risk of accidents and injuries
2. **Fire**: Higher likelihood of fires due to alternative heating methods
3. **Impeded emergency response**: Difficulty for emergency services to operate
4. **Impeded private sector response**: Businesses unable to function properly
5. **Fuel production disruption**: Issues in the extraction and production of fuel
6. **Water systems disruption**: Problems with water supply and sanitation

Tertiary effects: Broader societal and economic impacts
1. **Increased demand for emergency services**: Overload on emergency responders
2. **Increased demand for mortuary services**: In the case of extreme events, such as winter storms
3. **Decrease in fuel supply**: Shortages in heating fuel and gasoline
4. **Food production disruption**: Impact on agricultural output and food processing
5. **Water contamination**: Risk of contamination due to system failures
6. **Decrease in water pressure**: Issues with water distribution
7. **Poor sanitation**: Health risks due to inadequate sanitation
8. **Loss of potable water**: Reduced access to safe drinking water

Quaternary effects: Indirect and systemic issues affecting public health and mobility
1. **Exposure to bacteria**: Health risks from compromised water and sanitation systems
2. **Transportation disruption**: Inability to move goods and people efficiently
3. **Service disruption**: Interruptions in public and private services

Quinary effects: Long-term and widespread disruptions
1. **Stranded persons**: People unable to travel due to disrupted transport
2. **Supply chain disruption**: Issues with the delivery of goods and services
3. **Inability to travel**: Restricted mobility for residents and businesses

Systemic impacts: Overall economic and structural consequences
1. **Systemic economic impacts**: Broad economic downturn due to widespread disruptions
2. **Loss of revenue**: Businesses and the government are losing income
3. **Critical infrastructure and key resources failure**: Failure of critical infrastructure and key resources

Seasonal Considerations

Winter
- **Loss of heat**: Severe risk of hypothermia, frostbite, and fatalities
- **Impeded emergency response**: Difficulty in reaching remote or snow-covered areas
- **Fuel supply issues**: Increased demand for heating fuels
- **Water systems disruption**: Potential for frozen pipes and water main breaks

- **Transportation disruption**: Snow and ice making roads impassable

Summer
- **Loss of cooling**: Risk of heatstroke, especially among vulnerable populations
- **Water systems disruption**: Increased demand for water
- **Fire risk**: Dry conditions leading to higher fire hazards

5.4.2 North Dakota Fuel–Electricity Interdependencies

The reliance of electricity generation on fuel sources like natural gas and coal underscores vulnerabilities in North Dakota's energy security. Similarly, the loss of electrical power impacts the ability to produce and transport liquid fuels and natural gas. Interruptions in fuel supply impact power generation, necessitating strategic planning and diversified energy sources for resilience.

Cascading Sequence of Events for Power Disruption on Other Energy Sources

Immediate effects: Direct impacts due to interruptions or failures in fuel supply to power generation facilities

1. **Fuel supply disruption**: Interruptions in fuel delivery (e.g., natural gas pipelines, coal transportation) directly impact electricity generation capabilities.
2. **Generator shutdowns**: Inability to procure sufficient fuel leads to shutdowns of power plants, affecting grid stability and reliability.
3. **Safety and monitoring equipment failure**: Critical equipment in fuel processing and transportation (e.g., compressor stations, pumps) ceases to operate without electricity, potentially leading to safety hazards and operational disruptions.

Secondary effects: Consequential impacts affecting both the energy sector and broader socio-economic aspects

1. **Transportation disruptions**: Inadequate fuel supply impacts transportation networks essential for fuel delivery and personnel movement critical to electricity infrastructure operations.
2. **Fuel price volatility**: Shortages or disruptions can lead to price spikes in fuel markets, affecting consumer costs and economic stability.
3. **Energy storage challenges**: Dependence on electricity for fuel extraction and processing limits operational resilience during power outages or supply constraints.

Tertiary effects: Broader systemic impacts affecting critical infrastructure and key resources

1. **Systemic economic impact**: Reduced electricity availability affects industrial production, commercial activities, and overall economic output.
2. **Critical infrastructure vulnerabilities**: Failure of control systems and communication networks due to electricity interruptions impairs operational efficiency across the energy sector.

Seasonal Considerations

Winter: Increased demand for heating fuels like natural gas and propane exacerbates vulnerabilities during power disruptions.

Summer: Demand spikes for cooling-related electricity highlight the need for stable fuel sources to maintain grid reliability.

5.4.3 North Dakota Energy–Water Interdependencies

Essential to North Dakota's energy sectors, water is crucial for electricity generation, mining, and fuel processing. Scarcity or disruption of water supply can severely affect operations, highlighting the need for integrated water management and sustainable resource practices. Understanding the crucial relationship between water resources and energy sectors in North Dakota is vital for assessing energy security.

Cascading Sequence of Events for Energy–Water Disruptions

Immediate effects: Direct impacts due to interruptions or scarcity of water affecting operational capabilities in energy sectors

1. **Cooling and steam generation disruption**: Thermoelectric power plants heavily rely on water for cooling and steam generation; interruptions can lead to reduced electricity generation capacity.
2. **Mining and fuel processing limitations**: Water shortages affect mining operations (e.g., coal extraction) and fuel processing (e.g., oil refining), disrupting production and processing activities.

Secondary effects: Consequential impacts affecting environmental sustainability and economic activities

1. **Environmental impact**: Reduced water availability impacts aquatic ecosystems and water quality because of altered flow regimes and increased pollution risks.
2. **Regulatory and compliance challenges**: Heightened regulatory scrutiny on water usage and discharge standards impacts operational flexibility and compliance costs.

Tertiary effects: Broader systemic impacts affecting water availability and quality

1. **Economic implications**: Decreased energy production and increased operational costs because of alternative water sourcing or treatment processes.

2. **Community and stakeholder concerns**: Public perception and community relations affected by water usage practices and environmental stewardship.

Seasonal Considerations

- **Winter**: Increased demand for water-intensive activities (e.g., heating system operations) alongside potential challenges in water accessibility due to freezing conditions.

- **Summer**: Elevated water demand for cooling purposes exacerbates strain on water resources during peak energy consumption periods.

6.0 ENERGY RESILENCY AND HAZARD MITIGATION

NDDES is responsible for coordinating with Commerce and other state agencies to address energy emergencies within the state of North Dakota. NDOREEE within Commerce is tasked with monitoring applicable events and weather that may impact the state's energy supplies and pricing. Section 5 identified various risk assessments through a quantified analysis of the threats, vulnerabilities, and consequences on the energy supply. Here the rationale behind these risks is discussed along with a mitigation strategy. Possible actions for mitigating energy supply disruptions are listed in the following sections, focusing on transportation fuel, electricity, and natural gas supplies. These often address multiple hazards. Reactive measures to mitigate supply shortages are then given. These are measures that the state will implement in the event of shortages to transportation fuels, electricity, or natural gas supplies. Finally, the state's efforts to mitigate the causes of climate change are discussed. These involve carbon capture and sequestration efforts at the generation site. This can be done at the coal-power generation location or at other fuel production locations, such as an ethanol refinery or syngas plant. North Dakota is also looking at a direct air capture facility that will remove legacy carbon emissions in the atmosphere. Other proactive mitigation measures to prevent energy disruptions are discussed with a select listing of existing mitigation programs ongoing in the state.

6.1 Proactive Mitigation Approaches to Identified Risks

Following the assessment identified in the previous section, a discussion of the various risk scenarios and mitigation steps are provided.

1. Winter Weather, Cold Wave, and Ice Storm Risk Mitigation

North Dakota experiences a wide range and regular frequency of cold weather-related hazards that can begin early in the fall and extend into the spring. Severe winter weather can be experienced anywhere in the state, with excessive cold temperatures being more common in the northern part and blizzards being more common in the eastern part. The need for a resilient electric grid is demonstrated by the frequent accumulation of ice causing millions of dollars in damage to power lines and electrical structures. High winds and falling limbs can also damage these infrastructures, which can lead to lengthy power outages in times of bitter cold in the state. Most energy industries and structures are weatherized for the conditions, but the harshest of conditions can cause problems with wind turbines, natural gas lines, and the safety of employees getting to oil patch work sites.

RISK SCENARIO 1.3: PIPELINE FREEZE AND BLOCKAGE	
Threat	Subzero temperatures pose a threat by potentially freezing crude oil within pipelines, leading to blockages and operational disruptions. Severe cold waves can solidify crude oil, obstructing pipeline flow and compromising transportation efficiency.
Vulnerability	Insufficient pipeline insulation for heating systems increases vulnerability to freezing during prolonged cold periods. Many pipelines may lack adequate insulation or heating mechanisms, increasing the risk of blockages.
Consequence	Disruption of crude oil flow can impact refinery operations and supply chains, leading to economic losses and delays. Operational downtime may affect refinery output and disrupt supply chains, impacting energy markets.
Risk	The risk is high for pipeline blockages in operational downtime during severe cold waves, necessitating robust cold weather preparedness and maintenance protocols.
Mitigation	Implementing effective insulation upgrades and heating systems can mitigate risk associated with pipeline freeze and blockage scenarios.

RISK SCENARIO 1.4: COLD-RELATED OPERATIONAL CONSTRAINTS AT OIL WELL SITES	
Threat	Cold weather poses a threat by potentially restricting operations at crude oil well sites, affecting production capabilities. Extreme cold spells can freeze equipment and fluids, hindering normal operations at oil well sites.
Vulnerability	Inadequate cold weather protocols for wellhead operations increased vulnerability to production slowdowns during winter months. Well sites may lack proper insulation, heating, or operational procedures tailored for extreme cold conditions.
Consequence	Crude oil production rates can fall, impacting overall output and operational efficiency. Cold-related operational constraints may temporarily slow production, affecting oil well productivity.
Risk	The risk of temporary production slowdowns is low at individual well sites during extreme cold spells, allowing time for robust winterization measures and contingency planning.
Mitigation	Implementing comprehensive cold weather protocols and equipment maintenance can mitigate risk associated with cold-related operational constraints at well sites.

RISK SCENARIO 1.5: FROZEN WELLHEAD EQUIPMENT	
Threat	Subzero temperatures pose a threat by potentially freezing wellhead equipment, thereby hindering natural gas extraction operations. Extreme cold snaps can cause critical components of wellhead equipment to freeze, impeding the extraction of natural gas.
Vulnerability	Insufficient wellhead insulation or heating systems increase vulnerability to equipment freezing during prolonged cold periods. Many wellheads may lack adequate insulation or heating mechanisms, making them susceptible to freezing temperatures.
Consequence	Reduced natural gas supply can occur impacting heating and industrial processes that rely on constant gas availability. Production interruption may lead to supply shortages, affecting residential heating and industrial operations.
Risk	The risk is high for production interruptions and supply shortages during severe cold snaps, necessitating robust winterization efforts and contingency plans.
Mitigation	Implementing effective insulation upgrades and heating systems at wellheads can mitigate risk associated with frozen wellhead equipment and ensure reliable natural gas supply during extreme cold.

RISK SCENARIO 1.6: COLD-RELATED INSTRUMENTATION FAILURES IN GAS-PROCESSING PLANTS	
Threat	Cold temperatures pose a threat by potentially causing instrumentation failures in gas-processing plants during prolonged cold spells. Extended periods of cold weather can lead to the malfunctioning of critical instrumentation used for process monitoring and control in gas-processing plants.
Vulnerability	Inadequate cold weather protection for plant equipment increases vulnerability to instrumentation failures. Insufficient insulation or heating systems for sensitive instrumentation may heighten the risk of cold-related failures in gas-processing facilities.
Consequence	Impaired process monitoring and control can occur, affecting operational efficiency and safety. Cold-related failures in instrumentation may impair the ability to monitor and control processes effectively, potentially impacting plant operations and safety protocols.
Risk	Operational inefficiencies are a low risk in gas-processing facilities during prolonged cold spells, allowing time for enhanced cold weather preparedness and monitoring protocols.
Mitigation	Implementing robust cold weather protection measures and conducting regular maintenance of critical instrumentation can mitigate risk associated with cold-related failures in gas-processing plants, ensuring continuous operational efficiency during prolonged cold spells.

2. Strong Wind Risk Mitigation

Strong winds and straight-line winds can cause significant damage without needing the spin of a tornado. Damaging winds are those exceeding 50 miles per hour. These strong winds are often observed in the leading edge of a thunderstorm. High wind, strong wind, and thunderstorm wind are frequent in the state and have the potential to disrupt electricity distribution by downing power lines, impacting wind turbine operation, and disrupting fuel transportation.

RISK SCENARIO 2.1: STRONG WIND IMPACTING ELECTRIC TRANSMISSION AND DISTRIBUTION NETWORK	
Threat	Strong winds can physically damage overhead power lines, potentially causing them to snap or collapse.
Vulnerability	North Dakota’s flat terrain exposes overhead power lines, making them susceptible to high wind velocities.
Consequence	Consequences include loss of electricity supplied to households and businesses, disrupting daily activities and critical services.
Risk	The risk is highly likely during severe weather events, leading to a significant likelihood for electrical supply disruptions.
Mitigation	Implementing underground power lines and reinforcing existing overhead lines with stronger materials will enhance resilience against wind damage.

RISK SCENARIO 2.2: STRONG WIND DAMAGING WIND ENERGY FACILITIES	
Threat	High wind speeds exceeding the design limits of wind turbines can cause structural damage or operational failure.
Vulnerability	Some older wind turbine models are not designed to withstand extreme wind conditions prevalent in the region.
Consequence	Reduced renewable energy production capacity will impact North Dakota's energy grid reliability and renewable energy goals.
Risk	Occurrences are moderately probable but will significantly impact energy supply and economic sustainability.
Mitigation	Mitigation includes upgrading wind turbines with newer, more robust designs and conducting regular maintenance to ensure they can withstand high wind speeds effectively.

RISK SCENARIO 2.3: STRONG WIND LEADING TO FUEL SUPPLY CHAIN DISRUPTIONS	
Threat	Strong winds can disrupt transportation routes crucial for fuel delivery.
Vulnerability	Our exposure extends from our dependence on the timely delivery of fuel supplies for continuous operations.
Consequence	Shortages of fuel supply can affect various sectors and daily activities.
Risk	Such disruptions are moderately probable with moderate impacts on fuel availability and economic stability.
Mitigation	Establishing alternative routes for field transportation and increasing on-site fuel shortage capacities can mitigate delays and shortages during wind-related disruptions.

3. Hail Risk Mitigation

As effects of climate change increase in North Dakota, more frequent, larger, and longer duration storms with more intense rain and flooding are expected, as is an increase in large hail. This expectation includes a higher frequency of large hail events and a longer hail season that is coupled with more frequent and intense lightning and damaging downburst winds, which are tied to hail production.

RISK SCENARIO 3.1: HAIL DAMAGE TO POWER TRANSMISSION LINES	
Threat	Hailstorms pose a significant threat to aboveground power transmission lines by potentially causing physical damage, such as power line fractures, leading to outages.
Vulnerability	Aboveground power transmission lines are susceptible to hail damage, potentially causing outages.
Consequence	Direct consequences include power outages, impacting critical services and economic activities.
Risk	Probability is high because of frequent hail events. Consequences could be significant because of widespread impact.
Mitigation	Mitigation involves upgrading to more resilient materials, varying power lines when feasible, and enhancing real-time monitoring systems for early detection and response to hail threats.

RISK SCENARIO 3.2: HAIL IMPACT ON WIND TURBINES	
Threat	Large hailstones during hailstorms can impact wind turbine blades and structures, potentially causing physical damage and reducing energy production efficiency.
Vulnerability	Wind turbine blades and structures can be damaged by large hail, leading to reduced energy production.
Consequence	A direct consequence is decreased electricity generation from wind, potentially increasing resilience and nonrenewable sources.
Risk	The risk's probability and consequence are moderate given wind energies importance in North Dakota's energy mix.
Mitigation	Strategies include using hail-resistant materials for turbine blades, regular maintenance and inspection protocols, and strategic placement of wind farms to minimize hail exposure.

RISK SCENARIO 3.3: HAIL DISRUPTION OF NATURAL GAS INFRASTRUCTURE	
Threat	Severe hailstorms pose a threat to natural gas pipelines and processing facilities by potentially causing physical damage, leading to operational disruptions.
Vulnerability	Severe hail can impact natural gas pipelines and facilities, causing interruptions in supply.
Consequence	Direct impact includes disruptions in natural gas supply for heating and industrial processes.
Risk	While probability is low, the potential consequence is high because of the state's heavy reliance on natural gas.
Mitigation	Mitigation involves implementing protective structures for critical infrastructure, enhancing early warning systems, and developing robust emergency response plans to mitigate hail-related disruptions.

4. Riverine Flooding Risk Mitigation

North Dakota faces significant risk from riverine, ice jam, flash, levee failure, high dam release, and other types of flooding. Flooding has historically had extensive impacts on communities, property, infrastructure, and the economy. Future climate conditions are expected to increase precipitation across North Dakota, with winter and early spring precipitation expected to see the greatest increase, along with an increased risk of rainfall during the traditional spring snowmelt. Increased rainfall rates typically result in increased runoff rates and an increase in flash flooding, overland flooding, and/or riverine flooding in any season. However, rain occurring when the ground is frozen produces even more and faster runoff and is most likely to exacerbate the flood threat. Flooding can impact power plant operations, the electrical distribution system, and fuel transportation within the state.

RISK SCENARIO 4.1: RIVERINE FLOODING IMPACTING POWER PLANTS	
Threat	Severe riverine flooding in North Dakota can inundate power plants, rendering them inoperable and disrupting energy supply.
Vulnerability	Power plants located in flood-prone areas, partially those near the Missouri and Red Rivers, are highly susceptible to flooding.
Consequence	Flooding of power plants can lead to prolonged power outages, affecting residential, commercial, and critical infrastructure, potentially resulting in economic losses and safety hazards.
Risk	The combination of high flood frequency and critical energy infrastructure's location in vulnerable areas increases the risk of significant energy supply disruption during riverine flooding.
Mitigation	Implement flood barriers and elevation strategies for power plants, enhance early warning systems, and develop robust flood response plans to minimize operational disruptions.

RISK SCENARIO 4.2: FLASH FLOODS DISRUPTING FUEL SUPPLY CHAINS	
Threat	Flash floods in eastern North Dakota can rapidly inundate transportation routes, disrupting fuel supply chains and causing shortages.
Vulnerability	Fuel storage facilities and transportation infrastructure such as roads and bridges are vulnerable to flash floods, particularly in counties like Benson, Nelson, and Walsh.
Consequence	Disruption of fuel supply chains can lead to shortages, increased fuel prices, and challenges in emergency response efforts, impacting overall energy security and economic stability.
Risk	The unpredictable nature of flash floods, combined with the critical dependence on continuous fuel supply, heightens the risk of severe disruptions in energy availability.
Mitigation	Strengthen flood defense around key fuel storage sites, improve flood prediction and early warning systems, and establish alternative supply routes to ensure continuity during flood events.

RISK SCENARIO 4.3: ICE JAMS DAMAGING ELECTRICAL GRID	
Threat	Ice jams on rivers, particularly the Missouri and red rivers, can cause sudden flooding, damage electrical infrastructure and leading to widespread outages.
Vulnerability	Electrical grid components, including substations and transmission lines near rivers, are vulnerable to ice jam-related flooding and associated debris impact.
Consequence	Damage to the electrical grid from ice jam-induced flooding can result in extended power outages, affecting thousands of residents and critical services, with significant repair costs and economic impact.
Risk	The frequent occurrence of ice jams and the proximity of critical electrical infrastructure to vulnerable rivers sections increase the likelihood of severe grid disruption during ice jams.
Mitigation	Relocate critical electrical infrastructure away from high-risk areas, enhanced structural defense against ice and debris impacts, and develop emergency response plans for rapid repair and restoration services.

5. Tornado Risk Mitigation

Increasing summer temperatures can increase a variety of storms, including tornadoes. Tornados are most likely in the southern and eastern parts of the state. They most frequently occur in the late summer months when temperatures are the highest. They are often observed alongside other severe storms, such as thunderstorms and hailstorms. Much of the electrical power distribution network is above ground with limited protection against tornado damage, which can lead to extended power outages.

RISK SCENARIO 5.1: TORNADO DAMAGES POWER SUBSTATION AND DISRUPTS ELECTRICITY SUPPLY	
Threat	Tornadoes bring high winds and debris that cause significant structural damage to power substations, leading to their failure.
Vulnerability	Power substations are typically above ground and have minimal structural protection against extreme weather events like tornadoes. Their critical components can be easily damaged, leading to operational failures.
Consequence	The failure of substation can result in widespread and prolonged power outages, affecting residential, commercial, and industrial users. This disruption leads to increased repair costs, economic losses, and potential health and safety risks.
Risk	The threat is highly probably because of North Dakota's frequent tornadoes. The impacts are severe because of the critical role substations play in the energy supply chain.
Mitigation	Implement structural reinforcement for substations, deploy advanced monitoring systems for early detection of damage, and develop comprehensive emergency response protocols to minimize outage duration and impact.

RISK SCENARIO 5.2: TORNADO DESTROYS TRANSMISSION LINES, INTERRUPTING ENERGY DISTRIBUTION	
Threat	Tornadoes with high winds and flying debris can cause extensive physical damage to overhead transmission lines, leading to their collapse or failure.
Vulnerability	Transmission lines are typically exposed and lack adequate shielding against high wind speeds and debris impact. The failure of these lines can disrupt the entire energy distribution network.
Consequence	Destruction of transmission lines can result in significant power outages, impacting large geographic areas. Repair and replacement of these lines are costly and time consuming, leading to prolonged service disruptions.
Risk	The risk is elevated because of exposed transmission lines and the high frequency of tornadoes in the region. The economic and operational consequences are substantial, affecting both urban and rural areas.
Mitigation	Bury transmission lines where feasible to protect them from winds and debris, strengthen the existing infrastructure with advanced materials, and establish rapid repair and maintenance teams to quickly address damage.

RISK SCENARIO 5.3: TORNADO IMPACTS NATURAL GAS PIPELINES, COMPROMISING SUPPLY	
Threat	Tornadoes can cause ground shifts and structural damage to natural gas pipelines, leading to leaks or ruptures, and consequently supply interruptions.
Vulnerability	Pipelines, though buried, are susceptible to damage from tornado-induced ground movement and flying debris, many pipelines may lack advanced monitoring and protect measures to prevent damage.
Consequence	Damage to natural gas pipelines results in supply disruptions, potential leaks, and significant safety hazards, including risk of fires or explosions. The economic impact includes repair costs and losses from interrupted supply chains.
Risk	The risk is moderate to high because of the critical nature of natural gas infrastructure and the significant safety and supply chain implications. Tornadoes can cause widespread and severe damage to the natural gas delivery network.
Mitigation	Enhance pipeline integrity with advanced construction materials and techniques, improve monitoring systems for early leak detection, and develop robust emergency response plans to manage and mitigate the effects of pipeline damage.

6. Heat Wave Risk Mitigation

Heat waves are often associated with droughts and wildfires. The southern and eastern parts of the state have shown the highest frequency of heat waves events. Here the focus is on how extreme heat will impact the energy supply. High temperatures increase the demand for electricity for air conditioning but also can negatively impact the cooling ability during thermoelectric power generation where steam that has passed through a turbine must be cooled back into water before it can be reused to produce more electricity.

RISK SCENARIO 6.1: OVERLOADING OF ELECTRICAL POWER SUBSTATIONS	
Threat	Extreme heat can increase demand for electricity, leading to overloading and potential failure of substations.
Vulnerability	Many substations may not be equipped with sufficient cooling systems or have aging infrastructure that cannot handle peak loads during extreme heat.
Consequence	Power outages affecting residential, commercial, and industrial areas lead to economic losses and disruption of essential services.
Risk	The risk is high risk because of the high probability of heat waves and significant consequences of power outages.
Mitigation	Upgrade and maintain cooling systems of substations, conduct regular maintenance, and improve load management strategies to prevent overloading during peak demands.

RISK SCENARIO 6.2: FAILURE OF ELECTRIC TRANSMISSION AND DISTRIBUTION NETWORK	
Threat	High temperatures may cause physical damage to transmission lines, transformers, and other distribution components.
Vulnerability	Existing infrastructure may have limited capacity to withstand extreme temperatures, especially older components that are more susceptible to heat damage.
Consequence	Extended power outages may occur across large areas, impacting critical infrastructure, including hospitals, water supply systems, and emergency services.
Risk	Moderate risk exists because of moderately probable widespread impact.
Mitigation	Replace aging infrastructure with heat-resistant materials, implement advanced monitoring systems to detect early signs of failure, and enhance group resilience.

RISK SCENARIO 6.3: REDUCTION IN POWER GENERATION CAPACITY DUE TO COOLING SYSTEM FAILURES AT PLANTS	
Threat	High temperatures causing cooling systems at power plants to fail, leading to reduced power generation capacity.
Vulnerability	Power plants may not have redundant cooling systems or backup generators, making them vulnerable to failures during heat waves.
Consequence	Reduced power generation capacity leading to potential blackouts or brownouts, affecting all sectors and leading to significant economic and social impacts.
Risk	High risk due to direct impact on power supply and high probability of occurrence during prolonged heat waves.
Mitigation	Implement redundant cooling systems, regular maintenance of existing systems, and develop emergency response plans to quickly restore cooling capacity.

7. Lightning Risk Mitigation

Lightning strikes have a high potential to impact the energy supply and are often coupled with other heat wave events. Lightning strikes can lead to an increase in wildfires, particularly when it strikes an active electrical line. Lightning strikes are most frequently observed in the southern and eastern parts of the state. Often lighting strike are observed during thunderstorms with moderate or heavy rain. However, dry lightning also can occur and lead to wildfire. Public power shutdowns are becoming more common in states that are highly susceptible to wildfires when lightning strikes are forecast but are not common in North Dakota.

RISK SCENARIO 7.1: LIGHTNING STRIKES OIL AND GAS FACILITIES	
Threat	Lightning strikes can ignite flammable substances and vapors, causing explosions and fires.
Vulnerability	Fiberglass construction of tanks increases the likelihood of fire or explosions because of higher electrical resistance.
Consequence	Consequences include explosions, fires, equipment damage, spills, and shutdowns, leading to loss of energy production and significant financial loss.
Risk	Risk is high because of the frequency of lightning and the critical nature of the oil and gas infrastructure.
Mitigation	Improve grounding systems, install lightning rods, and use fire-resistant materials for tank construction.

RISK SCENARIO 7.2: LIGHTNING STRIKES POWER SUBSTATIONS	
Threat	Direct lightning strikes can damage transformers and switch gears in power substations.
Vulnerability	Older infrastructure with inadequate surge protection and grounding systems is more susceptible to damage.
Consequence	Extended power outages can affect residential, commercial, and industrial consumers, disrupting daily life and economic activities.
Risk	Risk is high because of the potential widespread impact on the power supply network.
Mitigation	Upgrade surge protection, enhance grounding systems, and conduct regular maintenance and inspections.

RISK SCENARIO 7.3: LIGHTNING-INDUCED WILDFIRES NEAR ENERGY INFRASTRUCTURE	
Threat	Lightning strikes can ignite wildfires, especially in dry conditions, threatening nearby energy infrastructure.
Vulnerability	Energy infrastructure in wildfire-prone areas with limited fire breaks and vegetation management is at greater risk.
Consequence	Consequences include destruction of energy infrastructure, causing prolonged outages and costly repairs, along with environmental damage.
Risk	Rish is high because of the potential for rapid wildfire spread in significant damage to critical energy assets.
Mitigation	Implement vegetation management, create firebreaks, and develop rapid response plans for wildfire incidents.

8. Wildfire Risk Mitigation

Wildfires tend to occur along with other summer weather events such as extreme heat or drought. North Dakota has a long history of wildfire events. Smoke from neighboring states or Canada can also impact the conditions in North Dakota. Lightning strikes and human causes are the most common sources of wildfires. Wildfire events have surged in the past decade. While heat waves and lightning strikes are more common in the southern and eastern parts of the state, wildfires are more common in the western part of the state. The western part is where most of the oil and gas production occurs. Protecting the oil and gas infrastructure from wildfires and avoiding disruption to production is critical for the overall energy security of the state. Climate change has led to longer wildfire seasons that now can begin in the spring and extend into the fall, further straining mitigation efforts. Proactive mitigation options for protecting resources from wildfire hazards include healthy ecosystems, fuel management (i.e., clearing and thinning debris or applying planned burns), and building regulations with ignition-resistant materials.

RISK SCENARIO 8.1: WILDFIRES DAMAGING ENERGY INFRASTRUCTURE	
Threat	Wildfires can damage to critical energy infrastructure, including power lines, substations, and facilities.
Vulnerability	Vulnerabilities include aging infrastructure prone to faults, proximity to dense and flammable vegetation, and insufficient local firefighting capabilities.
Consequence	Potential consequences entail prolonged loss of energy supply to communities, extensive repair costs for damaged infrastructure, and significant economic disruption due to halted operations.
Risk	The risk level is assessed as high due because of combination of frequent wildfires in the region and the criticality of the energy infrastructure.
Mitigation	Mitigation strategies involve creating defensible perimeters around infrastructure, upgrading aging components to be more resilient to fire, and allocating additional resources for fire suppression and rapid response capabilities.

RISK SCENARIO 8.2: WILDFIRES DISRUPTING ENERGY PRODUCTION AND OIL FIELDS	
Threat	Wildfires pose a significant threat to oil fields by potentially halting operations, damaging critical equipment, and causing extensive damage to wells.
Vulnerability	Vulnerabilities include expansive oil fields containing flammable materials, which require continuous operation for extraction and processing.
Consequence	This scenario could lead to reduced energy production, substantial economic losses for energy companies, and increased fuel prices impacting consumers and industries.
Risk	This risk is evaluated as high because of the combustible nature of oil fields and the severe consequence of disrupting production.
Mitigation	Mitigation efforts involve implementing firebreaks around oilfield perimeters, ensuring robust emergency response capabilities, and using fire-resistant construction materials in infrastructure.

RISK SCENARIO 8.3: WILDFIRES CAUSING LONG-TERM ECOLOGICAL DAMAGE IMPACTING ENERGY RESOURCES	
Threat	Wildfires threaten to destroy vegetation and soil, potentially impacting hydropower generation and bioenergy resources dependent on biomass.
Vulnerability	Wildfires of high severity can hinder the recovery of the ecosystem and impact the long-term biodiversity of the region.
Consequence	Potential consequences include depletion of renewable energy sources like hydropower and bioenergy, along with long-term environmental degradation affecting ecosystems.
Risk	This risk is assessed as moderate because of the significant ecological and energy resource impacts. But immediate economic losses are lower compared to other scenarios.
Mitigation	Mitigation strategies involve implementing sustainable land management practices, promoting reforestation efforts to restore affected areas, and closely monitoring and adapting to climate changes affecting fire risks.

9. Landslide Risk Mitigation

Landslides can be grouped into a broad range of geologic hazards that include riverbank collapse and sink hole formation. In the western part of the state, the oil industry is expanding into new areas, and the potential for these geologic events increase. These undeveloped areas mean that the transportation network is not as mature and have a higher hazard risk of landslides primarily caused by flooding. North Dakota is expected to have more frequent, larger, and more intense geologic hazards. Drought and flooding events are projected to occur more frequently, resulting in higher potential for landslides.

RISK SCENARIO 9.1: LANDSLIDE IMPACT ON ELECTRIC TRANSMISSION LINES	
Threat	Landslides can disrupt power lines.
Vulnerability	Transmission lines in landslide-prone areas are vulnerable.
Consequence	Power outages may affect large areas and critical infrastructure.
Risk	The risk is high because of potential wide-scale disruption.
Mitigation	Relocate or reinforce transmission lines, implement monitoring systems, and maintain vegetation management programs.

RISK SCENARIO 9.2: LANDSLIDE DISRUPTION OF NATURAL GAS PIPELINES	
Threat	Landslides may damage gas pipelines.
Vulnerability	Pipelines crossing unstable slopes are vulnerable.
Consequence	Gas supply interruptions and potential explosions may result.
Risk	The risk is moderate because of safety hazards and supply disruption.
Mitigation	Install flexible pipeline materials, conduct regular geotechnical assessments, and reroute pipelines away from high-risk areas.

RISK SCENARIO 9.3: LANDSLIDE BLOCKING ACCESS TO ENERGY FACILITIES	
Threat	Landslides can obstruct roads.
Vulnerability	Energy facilities in remote or hilly regions are at risk.
Consequence	Delays in maintenance and emergency response can affect energy production.
Risk	The risk is low to moderate because of localized impact but consequences are critical for operations.
Mitigation	Improve road infrastructure, establish alternate access routes, and enhance early warning systems.

10. Drought Risk Mitigation

Drought conditions are a hazard that has occurred statewide, yet they have occurred more frequently in the western and northwestern areas of the state. Larger and more intense droughts can be expected, with increasing frequency and/or longer duration. Drought has cascading effects that can occur along with heat waves and wildfire events. Drought significantly impacts the agriculture industry and municipal systems. However, oil and gas production also requires significant water resources. Similarly, electrical power from conventional thermoelectric sources relies on water for cooling. Mitigation steps include agriculture management to be more resilient to drought periods and implementing water storage capabilities. Mitigation also includes the adoption of a more diverse electrical generation network that relies more heavily on renewables.

RISK SCENARIO 10.1: PROLONGED DROUGHT AFFECTING HYDROPOWER GENERATION	
Threat	Drought reduces water levels in reservoirs, impacting hydroelectric power generation capacity.
Vulnerability	North Dakota's resilience on water resources for hydropower, coupled with limited alternative energy sources, make the system vulnerable during droughts.
Consequence	Reduced electricity supply leads to increased energy costs, potential blackouts, and economic strain on households and businesses.
Risk	Recurring droughts are highly probable; the impact is significant on energy availability, economic stability, and community well-being.
Mitigation	Diversify energy sources by investing in wind and solar, implement advanced water conservation technologies, and enhance water storage capabilities to ensure a stable supply.

RISK SCENARIO 10.2: EXTREME HEAT DURING DROUGHT INCREASING ENERGY DEMAND	
Threat	High temperatures drive up energy demand for cooling, stressing the power grid and causing equipment failures.
Vulnerability	Aging grid infrastructure, lack of modern cooling technologies, and high-peak demand periods during heat waves make the system susceptible.
Consequence	An overloaded grid can lead to frequent outages, increase operational and maintenance costs, and reduce quality of life for residents.
Risk	The risk is elevated because of high temperatures and vulnerable grid infrastructure; the potential exists for widespread outages and significant economic losses.
Mitigation	Upgrade grid infrastructure to handle peak loads, promote energy efficiency programs to reduce demand, and implement demand response strategies to manage load during peak times.

RISK SCENARIO 10.3: DROUGHT-INDUCED WILDFIRES THREATENING TRANSMISSION LINES	
Threat	Wildfires, fueled by dry conditions, damage or destroy transmission infrastructure, causing service disruptions.
Vulnerability	Transmission lines located in fire prone areas without adequate firebreaks or protective measures are highly susceptible.
Consequence	Loss of transmission capability disrupts energy supply, causes outrages, and requires costly repairs and emergency response efforts.
Risk	The risk is moderate to high because of the prevalence of wildfires during droughts; consequences are severe for energy disruption, public safety, and economic activities.
Mitigation	Implement firebreaks and vegetation management around transmission lines, enhance monitoring and maintenance protocols, and develop rapid response plans for wildfire threats to minimize damage and ensure quick restoration.

11. Earthquake Risk Mitigation

Earthquakes can also be grouped into a broad range of geologic hazards. The Tabbernor Fault/Fold Zone presents a risk of earthquakes in the state. While there is a history of earthquakes, there is no history of large earthquakes with substantial impacts in the state. Earthquakes generally occur without warning, and the durations are not predictable. However, FEMA’s National Risk Index score for North Dakota ranks below 20 for all counties except Cass (30.7) and Williams (22.3). Overall, the risk for earthquakes in the state is very low.

RISK SCENARIO 11.1: EARTHQUAKE AFFECTING OIL AND GAS PIPELINES	
Threat	Earthquakes may damage oil and gas pipelines, potentially leading to leaks, ruptures, and disruptions in supply chains.
Vulnerability	Vulnerabilities include aging infrastructure with inadequate seismic resilience, especially in areas not historically prone to earthquakes.
Consequence	Possible consequences involve significant disruption to oil and gas supply, environmental hazards from leaks, and economic losses for energy sectors.
Risk	Although earthquakes are of low probability in North Dakota, the impact could be high because of critical infrastructure vulnerability.
Mitigation	Mitigation involves regular maintenance of pipelines, upgrades to enhance seismic resilience, and robust emergency response planning to minimize downtime and environmental impact.

RISK SCENARIO 11.2: EARTHQUAKE AFFECTING ELECTRICAL POWER SUBSTATIONS	
Threat	Earthquakes pose a threat to electrical power substations, potentially causing structural damage, equipment failures, and power outages.
Vulnerability	Substations are often not designed to withstand seismic activity, especially in regions with historically low seismicity observed in North Dakota.
Consequence	Consequences may include widespread power outages and service interruptions, particularly critical to remote or rural areas.
Risk	The risk is characterized by low probability but high impact, particularly impacting remote areas heavily reliant on single substations.
Mitigation	Mitigation efforts focus on retrofitting substations to meet seismic design standards, implementing protective measures, and ensuring backup systems for critical infrastructure.

RISK SCENARIO 11.3: EARTHQUAKE DISRUPTING NATURAL GAS STORAGE FACILITIES	
Threat	Earthquakes near natural gas storage or transmission facilities can lead to structural damage, gas leaks, fire hazards, and explosions.
Vulnerability	Volatilities include limited seismic monitoring and response capabilities, critical during periods of high natural gas demand.
Consequence	Possible consequences involve loss of natural gas supply, risks of fire or explosion, and disruptions during peak demand periods.
Risk	The risk has low probability but high impact, especially during peak demand times when interruptions could affect residential and industrial users.
Mitigation	Mitigation strategies include enhancing seismic monitoring systems, improving structural integrity of storage facilities, and conducting regular emergency drills to ensure rapid response capabilities.

12. Cyberattack Risk Mitigation

The most common types of cyberattacks use malware, phishing, and ransomware. The Cybersecurity and Infrastructure Security Agency (CISA) is the federal government's agency focused on cyberattacks. CISA coordinates with cyberattack victims to help disseminate information about vulnerabilities before attackers move on to other victims. Information sharing with CISA and securing networks are the best practices to mitigate the risk of cyberattacks.

RISK SCENARIO 12.1: CYBERATTACK ON ELECTRICITY PRODUCTION AND DISTRIBUTION	
Threat	Nation-state actors may target power grid infrastructure to disrupt electricity production and distribution.
Vulnerability	Aging infrastructure with interconnected systems are vulnerable to cyber intrusions, potentially compromising grid stability and operations.
Consequence	Widespread power outages lead to societal disruption, affecting businesses, health care, and critical services reliant on electricity.
Risk	The risk is high because of the critical nature of the electricity grid and its attractiveness to cyber adversaries.
Mitigation	Enhance grid resilience through infrastructure upgrades, robust cybersecurity measures, regular audits, and improved incident response capabilities.

RISK SCENARIO 12.2: CYBERATTACK ON CRUDE OIL PRODUCTION AND DISTRIBUTION	
Threat	Cyberattacks may aim to disrupt oil pipeline operations, potentially causing oil supply chain disruptions and economic impacts.
Vulnerability	Vulnerable industrial control systems and interconnectivity in oil infrastructure are susceptible to cyber intrusions and operational disruptions.
Consequence	Disruptions in the oil supply chain can affect regional economy, energy prices, and potentially national security interests dependent on oil resources.
Risk	The risk is moderate to high because of historical targeting and the economic importance of crude oil production and distribution.
Mitigation	Implement advanced monitoring systems, enhance cybersecurity protocols, conduct regular assessments, and improve coordination with security agencies.

RISK SCENARIO 12.3: CYBERATTACK ON NATURAL GAS PRODUCTION AND DISTRIBUTION	
Threat	Cyberattacks targeting natural gas pipelines can disrupt gas supply and impact regional heating and industrial processes.
Vulnerability	Vulnerabilities exist in industrial control systems for gas infrastructure exposed to cyber intrusions compromising operational integrity.
Consequence	Gas supply interruptions lead to heating shortages, industrial production halts, and economic impacts on regional and local economies.
Risk	The risk is moderate because of the critical role of natural gas in regional heating and industrial processes, making it a potential target for cyber threats.
Mitigation	Strengthen pipeline security, deploy robust intrusion detection systems, enhance cyber security defenses, and improve collaboration with regulatory bodies and cybersecurity experts.

13. Terrorist Attack Risk Mitigation

Terrorism can occur in many ways, including international terrorism, domestic terrorism, lone offenders, and international terrorist organizations. Domestic terrorism is the primary threat for the state. The rural nature and central location in the continent make North Dakota an unlikely target for foreign terrorist organizations and foreign nations. The agricultural and oil industries continue to draw protests and acts of vandalism. These risks include attacks on the electrical grid and fuel transportation pipelines. Mitigation efforts include enhanced security and monitoring of substations.

RISK SCENARIO 13.1: TERRORIST ATTACK ON ELECTRICITY PRODUCTION AND DISTRIBUTION	
Threat	Terrorists may target electrical substations or power plants.
Vulnerability	Many substations and power plants in North Dakota are in remote, lightly guarded areas.
Consequence	Sabotage could cause widespread power outages, impacting critical infrastructure and essential services. Attacks on electrical infrastructure can lead to significant economic losses and distributions in essential services.
Risk	The risk is low to moderate because of decentralized security, but the potential for economic losses and service disruptions remains significant.
Mitigation	Enhance physical security at substations and power plants, implement advanced monitoring systems for early threat detection, and increase redundancy in the electrical grid to minimize disruptions.

RISK SCENARIO 13.2: TERRORIST ATTACK ON CRUDE OIL PRODUCTION AND DISTRIBUTION	
Threat	A threat is sabotage of oil pipelines or production facilities.
Vulnerability	North Dakota's extensive pipeline network spans remote regions, making it difficult to monitor effectively.
Consequence	Disruptions of oil supply chains could lead to economic losses and environmental damage. Disruptions in oil production and distribution can have profound economic implications locally and nationally.
Risk	The risk is moderate because of difficult monitoring, with potential for significant economic losses and environmental harm.
Mitigation	Deploy advanced monitoring technologies along pipelines, increase security patrols, and strengthen emergency response capabilities.

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RISK SCENARIO 13.3: TERRORIST ATTACK ON NATURAL GAS PRODUCTION AND DISTRIBUTION	
Threat	Terrorists may target natural gas pipelines or storage facilities.
Vulnerability	Pipelines and storage facilities are situated in isolated areas with limited security measures.
Consequence	Attacks could result in explosions and gas leaks and endanger public safety. Attacks on natural gas infrastructure could result in serious safety hazards and environmental damage.
Risk	Targeting natural gas pipelines or storage facilities in isolated areas poses a moderate risk. Potential consequences include explosions, gas leaks, endangering public safety, and significant environmental damage.
Mitigation	Enhance surveillance capabilities along natural gas infrastructure, conduct regular vulnerability assessments, and establish robust emergency response protocols.

14. Civil Disturbance Risk Mitigation

Civil disturbances can arise for a variety of reasons and are likely in North Dakota in the future. An increase in civil disturbances has been observed in the state, and the legislature has expanded the concepts of trespassing and increased penalties to help serve as a deterrent. Social media has helped to give power to groups with grievances and increases the probability of civil disturbance. In certain scenarios, the energy supply can be disrupted by civil disturbances.

RISK SCENARIO 14.1: CIVIL DISTURBANCE AT ELECTRICITY PRODUCTION AND DISTRIBUTION	
Threat	Sabotage or disruption of power infrastructure have been seen in civil disturbances targeting critical infrastructure. Civil disturbances historically have included acts of sabotage against critical infrastructure such as power plants and transmission lines.
Vulnerability	Power infrastructure in rural areas is vulnerable because of limited security measures and extensive coverage.
Consequence	Blackouts resulting from disruptions can have severe consequences, impacting essential services and public safety.
Risk	The risk is moderately probable because potential targets are in rural settings. The impact is high given the dependence on electricity or essential services.
Mitigation	Strategies include improving security measures, conducting regular assessments of vulnerabilities, and enhancing community resilience through preparedness initiatives.

RISK SCENARIO 14.2: CIVIL DISTURBANCE AND CRUDE OIL PRODUCTION AND DISTRIBUTION	
Threat	Blockades or physical damage to pipelines and refineries may occur during civil unrest, affecting regional and national oil supply.
Vulnerability	Pipelines and refineries spread across remote and sometimes unmanned areas are susceptible to sabotage.
Consequence	Disruptions in oil supply chains can lead to economic losses and impact regional and national markets.
Risk	Direct attacks have low-to-moderate probability, but their impact’s high because of economic ramifications and criticality of oil supply.
Mitigation	Increase surveillance of critical infrastructure, implement emergency response drills, and maintain robust communication with stakeholders.

RISK SCENARIO 14.3: CIVIL DISTURBANCE AT NATURAL GAS PRODUCTION AND DISTRIBUTION	
Threat	Natural gas pipelines for storage facilities are potential targets during civil disturbances.
Vulnerability	Extensive natural gas pipeline networks are vulnerable to physical attacks, impacting heating systems and industrial operations.
Consequence	Interruptions and gas supply can affect residential consumers and industrial processes.
Risk	Direct attacks have low probability because of security measures; the impact's moderate on heating and industrial sectors.
Mitigation	Conduct regular security audits, collaborate with law enforcement for threat assessment, and ensure redundancy in gas distribution networks.

6.2 Reactive Mitigation Steps to Energy Supply Disruptions

6.2.1 Transportation Fuels

When NDOREEE predicts that conditions exist that may impact the state's transportation fuel supply and distribution system, it is responsible for providing notification in a timely manner.

A transportation fuel shortage could occur from a disruption in the supply system due to any number of reasons, such as an electric power outage, labor strikes, embargo, natural disaster, national security, planned refinery maintenance, or other supply disruptions.

In the event of a petroleum supply disruption, the state's first response should be to encourage voluntary reduction in demand. Some options that have shown to be effective are encouraging the use of mass transit and ride sharing, reducing nonessential automobile usage, changing work patterns and working remotely, and offering state employee initiatives to reduce fuel demand.

Because the transportation sector is nearly entirely dependent on petroleum, contingency and mitigation planning should focus heavily on the needs of motorists and meeting transportation requirements. The following are the phased responses to a transportation fuel shortage.

Verification Phase 1 – Transportation Fuel Shortage	Lead	Support
Verification Phase 1 is activated when supply problems of transportation fuel (gasoline and diesel) are reported by reliable sources such as fuel retailers (add more here), refineries, and/or other agencies. Concerns to be addressed are hoarding or panic buying, which could have an adverse effect on supply and price.		
Continue normal operations with monitoring of transportation fuel supply and price.	Commerce	Private industry, production facilities, industry organizations
Determine the nature, extent, and expected length of the shortage and impacts on supply. Update Governor's Office with findings.	Commerce	State agencies/ private industries
Alert and notify federal, state, and local government agencies, law enforcement, national guard, and private industries as appropriate. Commerce and NDDES will update as necessary.	Commerce	State agencies/ private industries
Begin public information campaign to promote conservation activities.	Joint Information Center (JIC)	State agencies/ private industries
Verify and update emergency contact lists.	NDDES	Commerce
Obtain lists of companies that employ large numbers of diesel-fueled vehicles to be used if needed to request voluntary reduction of operation.	Commerce	Private industries
If necessary, the governor may request owners of fleets with large diesel-fueled units to curtail usage in order to conserve fuel. Employers will be encouraged to allow employees to use accumulated vacation time.	Governor's Office	Private industries
Notification to applicable state agencies regarding reduction of speed limits and increased enforcement of speed limits.	Governor's Office	State agencies
Review procedures to suspend truck weight and size regulations to conserve diesel motor fuel. Public information announcement regarding the change.	NDDES/North Dakota Highway Patrol	Commerce
Implement state fuel conservation program.	Governor's Office	State agencies
Governor may ask DOE for assistance in securing additional supplies of transportation fuel.	Governor's Office	Commerce
If the disruption continues, Commerce and NDDES may recommend that the state move to Phase 2. Notification to all state and federal agencies.	Commerce	NDDES
If the disruption is expected to end, Commerce and NDDES will recommend moving back to normal day-to-day activity. Notification to all state and federal agencies.	Commerce	NDDES

Phase 2 – Pre-Emergency – Transportation Fuel Supply Disruption	Lead	Support
Phase 2 is activated when transportation fuel shortages increase and are expected to continue.		
The governor may request large diesel fleets to reduce operations.	Governor's Office	Private industries
Speed limit reduction and increased enforcement.	North Dakota Highway Patrol	
Public information program for mandatory conservation.	JIC	
Begin work on proposed mandatory ban on use of certain vehicles if moving to Phase 3.	Governor's Office	JIC/North Dakota Highway Patrol
Request suspension of U.S. DOT hours of service regulations. Work with adjacent states on fuel transport via truck. Request deferral of U.S. DOT vehicle inspection requirements.	Governor's Office	JIC/North Dakota Highway Patrol
Direct fuel distributors to decline new customers to prevent hoarding.	Governor's Office	Commerce
If the disruption is expected to diminish, recommend moving back to Phase 1 – Verification.	Commerce	NDDES
If the disruption is forecasted to continue, recommend moving to Phase 3 – Emergency.	Commerce	NDDES

Phase 3 – Emergency – Transportation Fuel Supply Disruption	Lead	Support
Phase 3 is activated when transportation fuel shortages exceed demand and voluntary conservation actions have not reduced demand.		
Commerce and NDDES will continue to monitor and keep contact with suppliers, distributors. and users until supply conditions have returned to normal. Commerce will need to coordinate with DOE on future transportation fuel supply.	Commerce	NDDES
Commerce will assist the SEOC public information with awareness communication to the public and continued appeals for conservation.	Commerce	JIC
Develop mandatory rules/regulations to address the shortage of transportation fuel for the governor (Fuel Set-Aside – Appendix C)	Commerce	Governor's Office
The governor may implement regulations restricting the use of certain diesel-fueled vehicles as well as a speed limit reduction statewide to 55 miles per hour.	Governor's Office	North Dakota Highway Patrol
Recommend limits for the use of vehicles by businesses and local government. Recommend state vehicle usage.	Governor's Office	State agencies
The governor may suspend truck weight and size regulations as needed.	Governor's Office	North Dakota Highway Patrol
Implement public awareness for mandatory fuel conservation as outlined below.	Governor's Office	JIC
As transportation fuel supply improves, recommend lessening restrictions on vehicle usage and move to Phase 2 activities.	Commerce	NDDES
Inform all local, state, and federal agencies when Phase 3 is terminated and normal activities are resumed.	Commerce	NDDES

6.2.2 Electricity

NDDES is responsible for coordinating with Commerce and other state agencies to address energy emergencies within the state of North Dakota. For nonemergency electricity supply issues or smart grid-related concerns, NDOREEE acts as the primary point of contact.

The Public Service Commission's (PSC's) role in this is primarily regulation. As part of the regulatory compact, utilities typically are required to have and file updated emergency response plans with the PSC. The PSC's role includes protecting the public and keeping the public prepared and aware. While there is no specific mention of a PSC role in emergency response, it would make sense for the PSC to be in the communications loop during emergencies in order to respond to constituents and higher government entities.

The utility providers in North Dakota have websites for monitoring electrical outages, listed below.

Xcel Energy:
https://nd.my.xcelenergy.com/s/outage-safety

Otter Tail Power Company:
www.otpco.com/outages/

Montana–Dakota Utilities Co.:
https://customer.montana-dakota.com/outage-map

Cass County Electric Cooperative:
https://outage.kwh.com/

North Dakota Association of Rural Electric Cooperatives:
www.ndarec.com/

Most of the power plants in North Dakota rely on coal from a minemouth facility. These are not dependent on rail or transportation issues. Natural gas is used only in peak generation systems, and supply issues are not likely. There are generally three situations related to electricity shortages, and procedures corresponding to them are detailed below.

Sudden or Unexpected Short-Term Capacity Outage – A shortage of this type is most commonly associated with a loss of a generating unit, a transmission line, or some other part of the distribution system.

Planned or Predicted Short-Term Capacity Outage – This shortage is usually caused by weather-related issues (extreme hot or extreme winter weather).

Long-Term Capacity Outage – This type of shortage can be caused by extreme disaster situations and/or intentional disruption (sabotage/terrorism).

Verification Phase 1 – Electricity Supply Shortage	Lead	Support
Verification Phase I is an early warning phase for electrical emergencies		
Make contact with public and private sector contacts to monitor local conditions in electricity supply and distribution markets.	Commerce	NDDES
Prepare to implement state government electricity emergency conservation program.	Governor's Office	JIC and state IOU's
Plan to request curtailment of building electricity use by private and public building owners.	Commerce	Governor's Office
Notify all applicable agencies and companies of the escalation to Phase 1.	Commerce	NDDES
If the disruption continues, Commerce and NDDES may recommend that the state move to Phase 2. Notification to all state and federal agencies.	Commerce	NDDES
If the disruption is expected to end, Commerce and NDDES will recommend moving back to normal day-to-day activity. Notification to all state and federal agencies.	Commerce	NDDES

Phase 2 – Pre-Emergency – Electricity Supply Disruption	Lead	Support
Pre-Emergency – Phase 2 – This phase is activated when an electricity energy emergency exists.		
Continue monitoring and analysis of electricity, consumption, and prices and maintain regular communication with electricity suppliers.	Commerce	North Dakota RECs/PSC/private industry
Depending on time of year, an electricity supply disruption may necessitate opening temporary shelters for individuals or families that have lost the ability to heat or cool their homes/apartments due to an outage.	North Dakota Department of Human Services (NDDHS)	NDDES
Implement public awareness program and inform public notices of the need for electricity conservation.	JIC	Commerce
Implement state government electricity conservation program – lower temperatures, lighting in state-owned buildings and facilities.	Governor's Office	State agencies
If the disruption continues, Commerce and NDDES may recommend that the state move to Phase 3. Notification to all state and federal agencies.	Commerce	NDDES
If the disruption is expected to end, Commerce and NDDES will recommend moving back to Phase 1. Notification to all state and federal agencies.	Commerce	NDDES

Phase 3 – Emergency – Electricity Shortage	Lead	Support
Phase 3 is activated when an electricity energy emergency exists.		
Commerce and NDDES assist the governor in determining when to issue a declaration of emergency.	NDDES	Commerce
Commerce will continue increased monitoring of electricity, consumption, and prices as well as maintaining contact with distributors on grid status.	Commerce	NDDES
Commerce recommends to the governor the open hours of businesses and local governments to include state buildings, facilities, and schools.	Commerce	Governor’s Office
During a loss of electricity during extreme heat or cold, it may be necessary to open temporary shelters for individuals or families without electricity.	Commerce	NDDES
If the disruption is expected to end, Commerce and NDDES will recommend moving back to Phase 2. Notification to all state and federal agencies.	Commerce	NDDES

6.2.3 Natural Gas

NDDES is responsible for coordinating with Commerce and other state agencies to address energy emergencies within the state of North Dakota. NDOREEE acts as a subject matter expert for natural gas-related supply concerns.

Like in the electric sector, the PSC’s role in this is primarily regulation. As part of the regulatory compact, utilities typically are required to have and file updated emergency response plans with the PSC. The PSC’s role includes protecting the public and keeping the public prepared and aware. While there is no specific mention of a PSC role in emergency response, it would make sense for the PSC to be in the communications loop during emergencies in order to respond to constituents and higher government entities.

North Dakota has significant supply and natural gas processing within the state. However, it is still vulnerable to disruptions due to factors such as pipeline disruption, either intra- or interstate, labor shortages, supply/demand imbalance, and supply reduction for economic or political reasons. Natural gas pipelines can fail for a variety of reasons and should be continually monitored to manage damage associated with earth movement, corrosion, and pipeline defects. Human error or an external attack, either physical or cyber, cannot be fully preventable.

Verification Phase 1 – Natural Gas Supply Shortage	Lead	Support
Verification Phase 1 is an early warning phase for natural gas emergencies.		
The Governor's Office will prepare to recommend reduced temperatures and operating procedures for state buildings and facilities.	Governor's Office	State agencies
The state will prepare to recommend a voluntary reduction of natural gas consumption by consumers, businesses, schools, institutions, and state building operators.	Governor's Office/JIC	Commerce
The state will prepare to request employers assist in natural gas conservation efforts.	Governor's Office	Private industry
Notify all applicable agencies and companies of the escalation to Phase 1.	Commerce	NDDES
If the disruption continues, Commerce and NDDES may recommend that the state move to Phase 2. Notification to all state and federal agencies.	Commerce	NDDES
If the disruption is expected to end, Commerce and NDDES will recommend moving back to normal day-to-day activity. Notification to all state and federal agencies.	Commerce	NDDES

Phase 2 – Pre-Emergency – Natural Gas Supply Disruption	Lead	Support
Pre-Emergency – Phase 2 – This phase is activated when a natural gas energy emergency exists.		
Commerce will increase monitoring and analysis of natural gas stocks, consumption patterns, prices, and product delivery as well as maintaining contact with suppliers and distributors of natural gas.	Commerce	Private industry
Commerce will consult with NDDES to determine if activation of the SEOC is required.	Commerce	NDDES
Implement state government electricity conservation program – lower temperatures, lighting in state-owned buildings and facilities.	Governor's Office	Commerce
If monitoring indicates a sustained shortage of natural gas, examine cause, duration, and extent as well as steps providers and distributors can take to mitigate the shortage.	Commerce	Private industry
If the disruption continues, Commerce and NDDES may recommend that the state move to Phase 3. Notification to all state and federal agencies.	Commerce	NDDES
If the disruption is expected to end, Commerce and NDDES will recommend moving back to Phase 1. Notification to all state and federal agencies.	Commerce	NDDES

Phase 3 – Emergency – Natural Gas Shortage	Lead	Support
Phase 3 is activated when a natural gas energy emergency exists.		
Commerce and NDDES assist the governor in determining when to issue a declaration of emergency.	Commerce	NDDES
Commerce will continue increased monitoring of consumption and prices as well as maintaining contact with distributors.	Commerce	NDDES
Commerce recommends to the governor the open hours of businesses and local governments to include state buildings, facilities, and schools.	Commerce	NDDES
During a prolonged shortage during extreme cold weather, it may be necessary to open temporary shelters for individuals or families without electricity.	NDDHS	NDDES
If the disruption is expected to end, Commerce and NDDES will recommend moving back to Phase 2. Notification to all state and federal agencies.	Commerce	NDDES

6.3 Climate Change Mitigation Efforts

North Dakota is leading the nation in efforts to capture and sequester carbon emissions. The geology of the state is favorable for permanent underground storage of carbon dioxide. Carbon sequestration requires a Class 6-level permit, and North Dakota was the first state to be given primacy on its injection wells. The capture technology can be applied to point sources such as coal-fired power plants or ethanol production facilities. However, legacy emissions in the atmosphere can also be removed through direct air capture. A pipeline system linking carbon dioxide transportation is being planned to connect surrounding states to the sequester locations in North Dakota. These efforts are planned to help the existing electrical generation site become carbon neutral.

Renewable energy has also come onto the electrical grid. North Dakota has favorable wind conditions, which has allowed the addition of over 3600 MW of wind generation capacity over the past decade. Solar power has not been widely adopted in the state. Recently, Cass County Electric Cooperative began installation of a 102-kW community solar garden, called Prairie Sun Community. Geothermal power generation is also being studied, and the North Dakota Departments of Commerce/Community Services were among the first state departments in the country to enter into a partnership with Geothermal Heat Pump Consortium, Inc., a national organization committed to educating the public and promoting the use of geothermal or ground source heat pump systems.

Programs that are being implemented or have been implemented that support energy resiliency and energy efficiency in the state of North Dakota include the following:

1) North Dakota Priority Climate Action Plan (https://deq.nd.gov/sustainability/)

The North Dakota Department of Environmental Quality collaborated with North Dakota residents, community leaders, and key economic sectors to produce the first state plan aimed at environmental sustainability and reducing greenhouse gas emissions. The initial stage of a multiyear planning effort, the North Dakota Priority Climate Action Plan features five implementation-ready strategies from the state's agriculture, energy, and natural lands sectors to fuel local economies, strengthen energy independence, and reduce pollution throughout North Dakota.

2) North Dakota Energy Conservation Grant program (www.commerce.nd.gov/community-services/state-energy-programs/energy-conservation-grant)

The Energy Conservation Grant, administered by Community Services, assists North Dakota political subdivisions in making energy efficiency improvements to public buildings. Energy conservation projects in nonfederal public buildings owned by political subdivisions may qualify for consideration. Awards are available for up to $100,000, and a 50% cash match is required. Projects that meet the qualifications will be awarded on a first-come, first-served basis and are subject to funding availability.

3) North Dakota will be implementing the Federal Home Efficiency Rebates, through the state energy office, www.energy.gov/scep/home-efficiency-rebateswill to provide rebates that discount the price of energy-saving retrofits in single-family and multifamily buildings. These, along with the Home Electrification and Appliance Rebates, comprise the Home Energy Rebates Programs authorized through the Inflation Reduction Act.

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APPENDIX A

NORTH DAKOTA GRID RESILIENCY PLAN

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NORTH DAKOTA GRID RESILIENCY PLAN

EXECUTIVE SUMMARY

Threats such as extreme weather events, changing fuel mix, resource inadequacy, supply chain interruptions, aging infrastructure, and physical and cyberattacks are impacting grid reliability and resiliency. Ensuring that the grid infrastructure is more resilient is critical so that communities can thrive in the face of catastrophic weather events and adapt to changing conditions (technological developments, policy-driven transitions, and grid transformation).

North Dakota's electric grid is managed by the Midcontinent Independent System Operator (MISO) and Southwest Power Pool (SPP). As part of a complex regional grid and located in the frequently harsh climate of the upper Midwest, the North Dakota grid is not exempt from problems arising from weather-related events and other issues affecting grid reliability and resiliency. Therefore, the goal of this study is to develop a grid resiliency plan for the state of North Dakota by assessing the risks that various threats pose to the North Dakota electric grid and devising mitigation strategies to address the risks specific to the state's electric grid. This grid resiliency plan complements the North Dakota State Energy Security Plan (SESP), which is in compliance with U.S. Department of Energy (DOE) requirements. The following are specific tasks carried out for this study:

- Exploring North Dakota electricity infrastructure, operational conditions, bulk and wholesale energy markets, reliability, resource adequacy, planning efforts of MISO and SPP, and other factors that impact North Dakota grid resiliency.
- Identifying the potential threats to North Dakota electric grid resilience.
- Defining the impacts and consequences of these threats.
- Assessing electric grid vulnerabilities.
- Evaluating grid resilience risks based on the likelihood and consequence of threats.
- Identifying the gaps and opportunities for improving grid resiliency.
- Providing recommendations for risk mitigation.

In this study, historical data on weather events, FEMA risk profiles, utility data/partner surveys, Midwest Reliability Organization (MRO) regional risk assessments, reliability reports from MISO and SPP, and North American Electric Reliability Corporation (NERC) assessments are used to identify potential threats to the state's electric grid resilience, evaluate their impacts and consequences, and rank the resilience risks to the North Dakota electric grid. The highest relative risks to the North Dakota grid are identified as ice/snowstorms, changing resource mix/resource adequacy, supply chain interruptions, and cyberattacks.

The changing resource mix is challenging grid resilience as there is a high penetration of variable renewable resources into the grid and a growing number of traditional baseload plants that are being prematurely retired. This is leading to increased uncertainty and reduced planning reserve margins. The poor accreditation percentages that renewables (15%–30%) are rated versus conventional thermal generation (80%–90%) are the primary cause of the decrease in planning reserve margin. The changing resource mix is replacing reliable, dispatchable thermal generation with variable energy resources like solar and wind. While the energy value of renewables may be enough to cover the thermal unit retirement, there will be a shortfall of generation capacity and dispatchability which translates into the lack of ability to cover load during peak periods. This effect is demonstrated by the forecasted depletion of the planning reserve margin.

Generation resource adequacy is a critical component of grid resiliency. This was demonstrated in February 2021 during Winter Storm Uri when a lack of generation resources in SPP resulted in directed load sheds across the SPP footprint, including North Dakota. The Electric Reliability Council of Texas (ERCOT) and PJM have also used load shedding to mitigate generation inadequacy. Forecast generation reserve margins are decreasing in both MISO and SPP. Both regional transmission organizations (RTOs) are predicted to be out of required reserve margins by 2027, and these forecasts do not account for the multiple proposed U.S. Environmental Protection Agency (EPA) rules that will result in the closure of multiple gigawatts (GWs) of coal-fired generation. For example, SPP predicts that EPA's Ozone Transport Rule will result in the loss of 9.7 GW of dispatchable generation. The CO_2 rule will require 90% CO_2 capture on all coal generation; This rule will mean an estimated cost of $1.4B for Project Tundra at the Young Station. It is not known how many coal plants can financially survive such a high cost for compliance. The coal combustion residuals rule threatens 5.8 GW in MISO, including 1.1 GW at Coal Creek Station. The fundamental issue is renewable generation is not providing adequate replacement for the dispatchable capacity provided by existing thermal generation.

North Dakota will always be in a battle with extreme weather. The utility survey confirmed that ice and snowstorms are the most severe threat facing utilities. The transmission and distribution systems must maintain their resiliency as electric service is often most crucial during extreme weather events. The recent supply chain issues are emerging as a serious threat. During a storm recovery operation, substantial replacement of storm-damaged transmission and distribution system parts is required immediately. The stressed supply chain is challenged to respond in a timely manner. Inventories are low, and production has already surged to meet normal demand.

In recent years, the Internet of Things (IoT) has significantly improved the sensing and communication capabilities of systems, but this also exposes grid infrastructure to cybersecurity vulnerabilities and attacks. Malicious attackers seek to exploit vulnerabilities in utility networks to disrupt normal operations of the bulk power system. Potential physical and cyberattacks against the bulk power system will negatively impact the resilience of grid infrastructure and compromise consumer access, public safety, business, and national security, possibly with economic implications. Cyberattacks are a constant threat demonstrated by successful attacks on critical facilities elsewhere in the country. The recent substation gunfire attack shows North Dakota is not immune to attention from terrorists.

Although aging infrastructure risks appear to be moderate, when combined with other common-mode risks, they can have a significant impact on bulk power system resiliency. For example, winter weather can increase load above forecasts, cause transmission line outages, and cause generation outages simultaneously. The age and condition of the grid can increase the likelihood of weather-induced outages, and supply chain issues can delay the repair of damaged equipment. Depending on the severity of the initial threat, this combination can propagate across large regions of the grid, as happened with Winter Storm Uri.

This study recommends various mitigation strategies that will allow generation, transmission, and distribution utilities to use risk profiles and mitigation strategies for recurring resilience assessments. Some recommendations are specifically targeted at the group or entity for leading the mitigation action, while others are more general and can apply to different entities, including utilities, regional grid operators, policymakers, and regulators. This study did not analyze the resource requirements for mitigation actions.

The full document can be found here and is currently being updated for 2024:

DS- North Dakota Grid Resiliency Plan Sept2023.pdf (nd.gov).

APPENDIX B

CONTACT LIST

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State Contacts:		
Governor's Office	600 East Boulevard Avenue Bismarck, ND 58505-0100	701-328-2200
Attorney General's Office	State Capitol 600 East Boulevard Avenue, Dept 125 Bismarck, ND 58505	701-328-2210
Department of Transportation	608 East Boulevard Avenue Bismarck, ND 58505-0700	701-328-2500
Highway Patrol	600 East Boulevard Avenue Dept 504, Bismarck, ND 58505	701-328-2455
Industrial Commission	State Capital, 14th Floor 600 East Boulevard Avenue, Dept 405 Bismark, ND 58505-0840	701-328-3722
Motor Carriers Association	1031 East Interstate Avenue #2 Bismarck, ND 58503-0552	701-223-2700
Ethanol Council	PO Box 1091, 1605 East Capital Avenue, Bismarck, ND 58502	701-355-4458
Public Service Commission	600 Easts Boulevard, Dept 408 Bismarck, ND 58505-0480	701-328-2400
Aviation Council	PO Box 5020 Bismarck, ND 58502	701-328-9650
Department of Agriculture	600 East Boulevard Avenue, Dept 602 Bismarck, ND 58505-0020	701-328-2231
North Dakota Health and Human Services (NDHHS)	600 East Boulevard Avenue Bismarck, ND 58505-0020	701-328-2372
Electrical Board	1929 North Washington Street Suite A-1, PO Box 7335 Bismarck, ND 58507-7335	701-328-9522
Rural Electric Cooperatives	PO Box 727 3201 Nygren Drive NW Mandan, ND 58554	800-234-0518
ND Department of Emergency Services	Building #35, Fraine Barracks Road Bismark, ND 58502	701-328-8100
Department of Commerce – Office of Renewable Energy and Energy Efficiency	1600 East Century Avenue, Suite 2 Bismarck, ND 58502	701-328-4137
Petroleum Marketers Association	1025 North 3rd Street, PO Box 1956 Bismarck, ND 58502	701-223-3370
Petroleum Council	120 North 3rd Street, Suite 200 Bismarck, ND 59501	701-222-0006
Public Service Commission	600 East Boulevard Avenue, Dept 408 Bismarck, ND 58505-0480	701-328-2400

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Department of Energy Office of Electricity Delivery and Energy Reliability	Infrastructure Security and Energy Restoration Division	202-586-9600
Department of Transportation	1200 New Jersey Avenue SE Washington, DC 20590	202-366-4000
Department of Agriculture	1400 Independence Avenue SW Washington, DC 20250	202-720-2791
National Petroleum Council	1625 K Street, Suite 600 Washington, DC 20006	202-393-6100
Federal Emergency Management Agency Region VIII	Building 710, Box 25267 Denver, CO 80225-0267	303-235-4800

Regional/Industrial Contacts:	
Western Area Power Administration	406-255-2800
Xcel Energy	800-895-1999
Montana– Dakota Utilities Co.	800-638-3278
Basin Electric Power Cooperative	701-223-0441
Otter Tail Power Company	800-257-4044
Tesoro Refinery	701-667-2400