



A Touchstone Energy® Cooperative 

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May 18, 2023

Clean Sustainable Energy Authority
North Dakota Industrial Commission
State Capitol – 14th Floor
600 East Boulevard Ave Dept 405
Bismarck, ND 58505-0840

Subject: Project Tundra CSEA Application

Dear Clean Sustainable Energy Authority:

Minnkota Power Cooperative is pleased to submit an electronic copy of its Project Tundra Clean Sustainable Energy Authority (CSEA) application. An original and one copy of the subject proposal will also be submitted by mail.

Enclosed you will find an application for a \$150 million loan through the CSEA to support the commercialization of a transformational technology that will provide widespread benefits to the lignite industry. The Project Tundra team is committed and ready to complete the project as described in the proposal with the support of the CSEA. The goal of Project Tundra is to demonstrate post combustion carbon capture (PCCC) and storage in North Dakota, preserving the use of lignite and the associated jobs, ensuring enough reliable and dispatchable power is on our grid, and moving North Dakota closer to its carbon neutral goal.

If you have any questions, please contact me by phone at (701) 795-4204 or by email at asorbo@minnkota.com

Sincerely,

A handwritten signature in blue ink that reads "Andrew C. Sorbo". The signature is fluid and cursive, with a long, sweeping underline that extends to the right.

Andrew C. Sorbo
Minnkota Vice President of Strategic Initiatives

Minnkota has expended resources to develop the investment structure and determine its feasibility for tax equity investment and structured project finance. Because of the nature of this project and the tax credit market, other projects would gain significant value and advantage in the competitive investment markets if the structure were disclosed publicly.

5. A Description of the Efforts Used to Maintain the Secrecy of the Information.

To protect all project participant proprietary business information, Minnkota employs strict confidential policies and procedures for handling and maintaining its, or its partners', confidential, proprietary, and trade secret information. The information is not disclosed outside the project team. The information is only disclosed to those people needing the information to perform the roles and responsibilities directly leading to development of the project.

Financial structure and proprietary business information is only disclosed to a very select number of the qualified investor pool. Further, for both technical or financial proprietary and trade secret information, Minnkota requires that those few select entities and individuals receiving such information to be bound by stringent confidentiality terms and conditions.

Any deliverables (presentations, documents and reports) derived from this proposed project will only contain nonconfidential information, which will allow public review of the project without compromising confidential information.

APPLICATION CHECKLIST

Use this checklist as a tool to ensure that you have all of the components of the application package. Please note, this checklist is for your use only and does not need to be included in the package.

<input type="checkbox"/>	Application
<input type="checkbox"/>	Transmittal Letter
<input type="checkbox"/>	Tax Liability Statement
<input type="checkbox"/>	Letters of Support (If Applicable)
<input type="checkbox"/>	Confidentiality Request
<input type="checkbox"/>	Business Plan (Appendix)
<input type="checkbox"/>	Historical Financial Statements (3 years) (Appendix)
<input type="checkbox"/>	Budgeted Projections (Appendix)
<input type="checkbox"/>	Loan/Loan Guarantee Application (if Applicable, Appendix)
<input type="checkbox"/>	Other Appendices (If Applicable)

When the package is completed, send an electronic version to sustainableenergy@nd.gov and 2 hard copies by mail to:

Clean Sustainable Energy Authority
North Dakota Industrial Commission
State Capitol – 14th Floor
600 East Boulevard Ave Dept 405
Bismarck, ND 58505-0840

For more information on the application process please visit:
<http://www.nd.gov/ndic/csea-infopage.htm>

Questions can be addressed to Al Anderson (701) 595-9668.

Clean Sustainable Energy Authority

North Dakota Industrial Commission

Application

Project Title: Project Tundra

Applicant: Minnkota Power Cooperative

Date of Application: May 18, 2023

Amount of Request

Grant:

**Loan: Up to \$150,000,000 additional for
a total of \$250,000,000**

Total Amount of Proposed Project: \$1,400,000,000

Duration of Project: Construction – 4 years

Operations – 20 years

Point of Contact (POC):

**Andrew C. Sorbo, Minnkota Power Cooperative
Vice President of Strategic Initiatives**

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**POC Address: 5301 32nd Ave. South
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ABSTRACT

Objective: The goal of Project Tundra is to demonstrate post combustion carbon capture (PCCC) and carbon dioxide storage in North Dakota, preserving the use of lignite and the associated jobs, ensuring enough reliable and dispatchable power is on our grid, and moving North Dakota closer to its carbon neutral goal. Minnkota plans to transform the MRYS, a critically important dispatchable energy resource, while also maintaining the existing high-paying jobs and essential economic impact for the local communities and surrounding region as the US transitions to low-carbon energy through policy changes, regulatory requirements, or other mechanisms. MRYS has dispatched at more than a 90% average running plant capacity factor over the past five years in the competitive Midcontinent Independent System Operator (MISO) electric market, which demonstrates its favorable production cost relative to the market. MRYS operates at a predictable cost, and has performed reliably through recent market volatility, protecting the member-owners of Minnkota from financial risk and exposure to high-priced energy markets.

At a design capacity of up to 4,000,000 metric tons per year, Project Tundra will be the largest single-train PCCC in the world that will feature a “station” approach to carbon dioxide (CO₂) emissions control as opposed to the “dedicated unit” configuration being proposed by the rest of the industry. The additional commitment requested in this application coupled with the prior amount authorized will pave the way for Minnkota to raise the additional capital needed for a possible start of construction for Project Tundra by the end of Q1- Q2 2024.

Expected Results: A commitment from the Clean Sustainable Energy Authority (CSEA) for the requested additional \$150 million for a total \$250 million low-interest loan will help close the gap and demonstrate that Project Tundra is worthy of consideration by other potential investors.

Past support from the NDIC has directly funded Project Tundra research and development activities, along with grants from the U.S. Department of Energy. That support coupled with a strong CSEA commitment has enabled Minnkota Power Cooperative Inc. (Minnkota) to (a) finalize and complete the design, (b) attract private investors to fund the remaining development and commit hundreds of millions in project equity, and (c) complete all facets and details needed for the project to go into construction in Q1- Q2 of 2024.

Duration: Construction of Project Tundra is estimated to take four years to complete. The operating life thereafter is designed for at least 20 years.

Total Project Cost: Construction and commissioning costs of the PCCC and supporting balance of plant is estimated at \$1.30 billion. The adjacent CO₂ storage facility is anticipated to cost an estimated \$100 million to be ready to start receiving CO₂. See Sources and Uses within the Confidential Appendix A.

Participants: Minnkota is the project sponsor and will be a partner in the ownership of the project. We expect the U.S. Department of Energy will participate in funding capital cost of the project through direct demonstration grants.

Minnkota, with the assistance of Sargent & Lundy who will be the Owner's Engineer, will provide overall construction management on behalf of the project owners and lenders for both the PCCC and the CO₂ storage facility.

PROJECT DESCRIPTION

Objectives: Project Tundra is an initiative to build the world's largest post-combustion carbon dioxide (CO₂) capture facility at the existing Milton R. Young Station (MRYS), a lignite-based power plant in North Dakota. The proposed project is designed to capture up to 4 million metric

tons of CO₂ annually from MRYS. The captured CO₂ will be safely and permanently stored in geologic formations approximately 5,000 and 9,000 feet underground directly under the MRYS.

The proposed project is being developed by Minnkota Power Cooperative, Inc.¹ (Minnkota), a regional generation and transmission cooperative that provides wholesale power to 11 member-owner distribution cooperatives in eastern North Dakota and northwestern Minnesota. Minnkota is the operator of the two-unit MRYS. The MRYS is a valuable asset for Minnkota due to its reliable, resilient, and cost-competitive operating characteristics. MRYS has dispatched at over 90% average capacity factor over the past five years in the competitive Midcontinent Independent System Operator (MISO) electric market, which demonstrates its favorable production cost relative to the market. However, it is anticipated that the facility has the potential to face a carbon-constrained or carbon-managed future through policy changes, regulatory requirements, or other mechanisms. Project Tundra will help preserve this important power resource for Minnkota's cooperative members, while also maintaining the existing high-paying jobs and essential economic impact for the local communities and surrounding region. The MRYS and adjacent lignite mine are the largest employers in Oliver County and according to data from the North Dakota Job Service, Oliver County had the second-highest average annual wages in the state in 2022.

Methodology

The economics of the proposed project are based on:

- The Internal Revenue Service Section 45Q federal tax credit program, which will provide a tax credit of \$85/tonne of CO₂ captured and permanently sequestered in secure geologic

¹ www.minnkota.com

storage. The period during which tax credits can be claimed is 12 years from the start of commercial operation and the value of the credits is indexed to inflation, which in the project's model increases the credits to over \$100/tonne at the end the 12-year period. The law also provides for not-for-profits like electric cooperatives to receive "direct pay" payments from the IRS instead of tax credits on a 1:1 basis. For-profit companies may also receive direct pay for the first 5 years of operations and then for the remaining 7 years it reverts to tax credits;

- Under our equity structure, Minnkota's partners will not only be able to monetize their share of the 45Q tax credits (after the direct pay period), but they will also monetize Minnkota's share of other tax attributes. Together, the direct pay and the monetized value of the other tax attributes create a strong and very creditworthy revenue stream for the project participants that would underpin repayment of a CSEA-backed loan. A more detailed live cash flow model showing revenue streams using multiple base-case runs will be discussed within the confidential Appendix A. The actual live cash flow model will be provided to the Bank of North Dakota directly in conjunction with this application.

StorageCo will be owned by a joint venture company which in turn is owned by Minnkota and its partner(s).

The \$1.40 billion in costs for CaptureCo and StorageCo will be funded by equity contributions from Minnkota and its partner(s), potential DOE grants, and a loan through CSEA. The CSEA funds play a critical role within the project's overall capital stack. Project Tundra holds three main risks for investors: technology, storage, and capital. The technology risk is covered by the chosen technology vendor. The storage risk is mitigated by the State of North Dakota's leadership in holding primacy over required permitting, leading Minnkota to now hold the nation's largest Class

VI Storage permit and an approved Environmental Protection Agency (EPA) Monitoring, Reporting and Verification (MRV) plan. These projects, while promising, still require enormous federal and state support on financing to attract the necessary private capital investment. Even with the enhancement of 45Q, inflation and scale-up risk still necessitate state support to offset capital risk. The capital risk of a project of this magnitude will only be mitigated by decreased capital spend, as the potential returns are driven off performance, not investment levels. This reduced capital spend takes several forms: an acceptable Engineering, Procurement, and Construction (EPC) cost, DOE funds, private funds raised by Minnkota, and CSEA funds.

In the base case, \$3.8 billion in total direct pay and tax credits plus \$700 million in monetized other tax attributes combine for \$4.5 billion in cash available during the first 12 years of operations. During those years that cash will be used for:

- \$2.3 billion to pay for operating costs
- \$2.2 billion in distributions to pay back the \$1.40 billion investment, cover interest payments and provide a return to investors.

After the first 12 years of operations during which the CSEA loan will be repaid and equity investors will achieve their target returns, the project owners will evaluate the market conditions to determine how to operate the facility in the then-current environment.

To complete the remaining development work needed to close on the financing described above and begin construction, the project development team will need to complete the following by December 2023: **1)** the final construction-ready design for the CO₂ capture plant and the short on-site CO₂ pipeline; **2)** final, firm contract offers for the CO₂ capture plant, CO₂ pipeline, and

the CO₂ geologic storage facility; **3)** have a firm budget for the operating costs for all project components, and **4)** have all permits in hand, including the Class VI drilling and storage permits.

ANTICIPATED RESULTS

CO₂ Capture Plant:

Unique features of the proposed CO₂ capture plant include:

- The Technology Provider's most advanced capture technology, which brings much needed commercial-ready technology to the carbon capture industry.
- Demonstrating CCS on coal-fired flue gas at full utility-scale with an increase of 2.5X compared to the largest existing similar project, Petra Nova.
- The proposed project will capture and store up to 4 million tonnes per year of CO₂.
- The first time CCS technology will be applied on lignite coal flue gas demonstrating methods to mitigate challenges unique to lignite (in particular North Dakota lignite), including ultrafine particulate produced during lignite combustion.
- The project will demonstrate construction and operation methods for the North Dakota climate with design strategies to mitigate the impact of cold weather on a process and piping that runs with large volumes of water.
- A steam supply source extracted from multiple units simultaneously.
- The project will demonstrate a "station" approach to carbon capture by simultaneously drawing flue gas from two lignite boilers into one carbon capture system showing that CCS technology is capable of decarbonizing the power production of multiple units at one station.

CO₂ Geologic Storage Facility:

As with the CO₂ capture plant/technology, Project Tundra includes unique, new, and innovative features in the geologic storage component. These are summarized below:

- An estimated 4X increase, in terms of volume of CO₂ injected, over the next largest existing saline formation geologic storage project in the U.S. (ADM Decatur project).
- First multi-million tonne per annum commercial geologic storage project in North Dakota.
- Use of “stacked storage” that involves the injection and storage of CO₂ into multiple geologic horizons. This design optimization minimizes the aerial extent of the CO₂ pool in the subsurface.

Facilities

Minnkota is a regional generation and transmission cooperative headquartered in Grand Forks, ND, providing wholesale power to 11 member-owner rural electric distribution cooperatives.

Minnkota is also affiliated with Northern Municipal Power Agency (NMPA), which serves the electric needs of 12 municipalities in the same geographic region as the Minnkota member-owners. Minnkota serves as the operating agent of NMPA. Figure 1 provides a map showing the Minnkota and NMPA service territory.

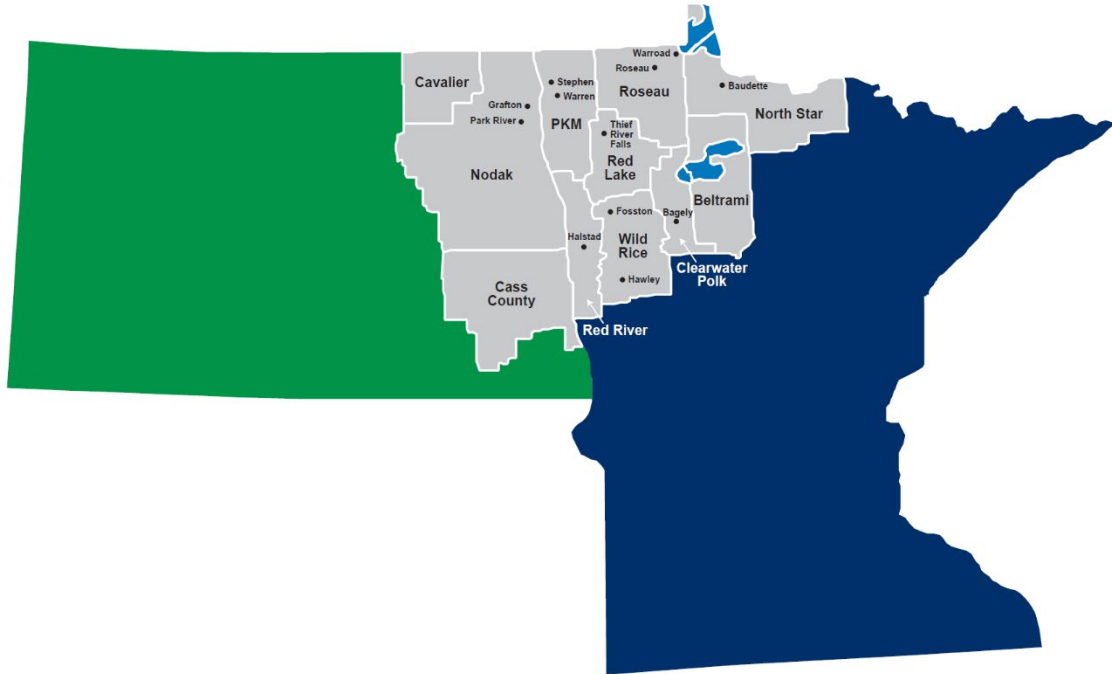


Figure 1. Minnkota-NMPA Service Territory

Minnkota’s primary firm and dispatchable generating resource is the two-unit Milton R. Young Station (MRYS), a lignite coal-fired power plant in North Dakota and the host plant for the proposed carbon dioxide (CO₂) capture and geologic storage project. Unit 1 at MRYS is owned and operated by Minnkota. Unit 2 at MRYS is owned by Square Butte Electric Cooperative (Square Butte) and as Square Butte’s operating agent, Minnkota operates Unit 2. Square Butte has the same 11 member-owners as Minnkota (but has a separate set of individuals from the 11 member-owners sitting on the board of directors) and only has one employee, the General Manager, who is also the President & CEO of Minnkota.

Resources

A. Amount of Expected Equity Investments

The Borrower (Minnkota) expects that in order to raise equity for the project a sponsor equity contribution is needed from Minnkota. The balance of the \$1.40 billion capital

needed for the PCCC system plus the capital needed for the CO₂ storage facility will be sourced from other equity sponsors with large tax capacities and from demonstration grants from the U.S. Department of Energy.

B. Preliminary Funding Plan for Guaranteed Obligation

The Guaranteed Obligation will be a loan in the amount of \$250 million (\$100 million CSEA commitment made in the 2021-23 biennium, plus the \$150 million CSEA commitment we are seeking in the 2023-2025 biennium) made to the project company, which will be the owner of the PCCC system. Minnkota, and the ultimate project company, will work closely with the Bank of North Dakota to provide an appropriate collateral package. Potential structures are predominantly driven off developing the most tax efficient structure to prevent leakage.

C. Timing of Equity Contributions and Debt Funding

The Borrower contemplates there will either be a construction loan facility with a guaranteed take-out commitment (upon final commercial operation of the project) from construction lenders or the entire construction funding will come from equity partners, called upon pro-rata to equity positions during the construction period.

D. Timing of Debt Repayment

The Borrower expects the term of the debt to be 12 years from the time the project commences commercial operations. The payments are expected to be “sculpted” over the term to maintain agreed coverage ratios while considering variations in free cash flow due to operations and maintenance cycles of the capture system and MRYS. A potential model describing debt structure and repayment of the CSEA loan is further described within the confidential Appendix A.

E. Federal Support

To date the project has received several grants, including approximately \$33 million (\$16.9M-CarbonSAFE, \$9.8M-DOE-NETL for the FEED Study and \$6M for Project Carbon 1 and 2, Pre-FEED and Pilot Test) in direct federal Department of Energy grants to advance this project to construction. The bipartisan effort to pass §45Q tax credit reform recognizes the important role carbon capture will play in the nation and world. Carbon capture projects are capital intensive, and there is a recognition that early movers of projects, such as this one, will require enhanced support to get to construction as evidenced by not only raising the value of §45Q but also the authorization of large demonstration grants enacted by Congress. In the alternative of not receiving a large grant through the infrastructure package, an existing loan guarantee program through the DOE serves as a further opportunity to raise capital through low-cost financing. Minnkota has explored the application process for this loan program and has passed the first phase of the DOE's diligence in an effort to keep all capital stack options open. These programs are not additive, thus, if the project receives a grant from the DOE, the proposed project would not be eligible for a federal loan guarantee or vice versa. In either case, these programs are needed to improve the economics of the project and there is much optimism about the proposed project's competitive edge to capture one of the large federal demonstration grants or qualify for the loan guarantee program. Additionally, the Inflation Reduction Act created a new voluntary \$9.7 billion grant and loan program designed specifically for electric cooperatives that purchase or build new clean energy systems, which includes carbon capture technology. On May 15, 2023, USDA published the Notice of Funding Opportunity Announcement in the Federal Register, starting a

short timeline for interested co-ops to pursue these funds. Minnkota will explore opportunities through this program, but it is currently considered a second option behind the Department of Energy grant.

F. Other Non-federal Support/Incentives

At this time, there are no other non-federal government-direct financial incentives available for the construction of the proposed project or during operations other than the CSEA loan program. There are, however, several indirect forms of financial support from North Dakota, such as tax incentives, that will benefit the project. These are listed in Table 1 along with their citations to the North Dakota Century Code. Note that some of these incentives are only applicable to enhanced oil recovery (EOR) projects. EOR is not currently part of the proposed project but may represent an opportunity in the future.

Table 1. *ND tax incentives for CCUS (ND Century Code Chapters 57-39.2, 57-40.2, 57-51.1, 57-60)*

-
- Sales and use tax exemption for CO₂ equipment to compress, gather, collect, store, transport, or inject CO₂.
 - CO₂ capture equipment on a coal (or other) facility is considered personal property, exempt from property tax.
 - Oil extraction tax exemptions for incremental production from a secondary or tertiary recovery project.
 - Sales and use tax exemption for CO₂ used for EOR.
 - CO₂ equipment at a wellsite is considered personal property, exempt from property tax.
 - CO₂ capture system exemption from ad valorem and coal conversion facilities privilege tax.
 - Sales and use tax exemption for environmental upgrade materials used in power plants and processing plants.
 - Property tax exemption for pipeline property and associated transportation and storage equipment used for EOR.
 - Coal conversion facilities privilege tax credit for CO₂ capture.
-

Techniques to be used, their availability and capability:

This section of the application provides the detailed technical information for the proposed project.

Description of Project Design

There are three major components to the proposed project: 1) the PCCC or CO₂ capture plant, 2) the 0.25 mile CO₂ pipeline, and 3) the CO₂ geologic storage facility. This section will provide information on the basic processes involved in the design of each.

CO₂ Capture Plant

Figure 2 provides a simplified block flow diagram of the major processes involved in the CO₂ capture plant and how they are integrated with the existing MRYS. As shown, both Unit 1 and Unit 2 are available to provide flue gas to the capture plant. Normal operation involves 100% of Unit 2 and 20% of Unit 1 flue gas being routed to the capture plant with the balance being routed to its existing chimney. During Unit 2 outages, 100% of Unit 1 will be available to feed the capture plant. Unit 2 flue gas can also be routed to its existing chimney during startup/shutdown or during capture plant outages. Flexibility in the design will also allow 100% of the Unit 1 flue gas to be routed to the capture plant with the remaining coming from Unit 2 to utilize the full capacity of the facility.

The capture plant requires a significant quantity of steam for solvent regeneration. This will be provided by extracting steam from the Unit 1 and 2 steam turbines. A unique feature of the proposed project, as described previously, is that flue gas from both coal-fired units along with extracted steam from both units will be routed to the capture system simultaneously.

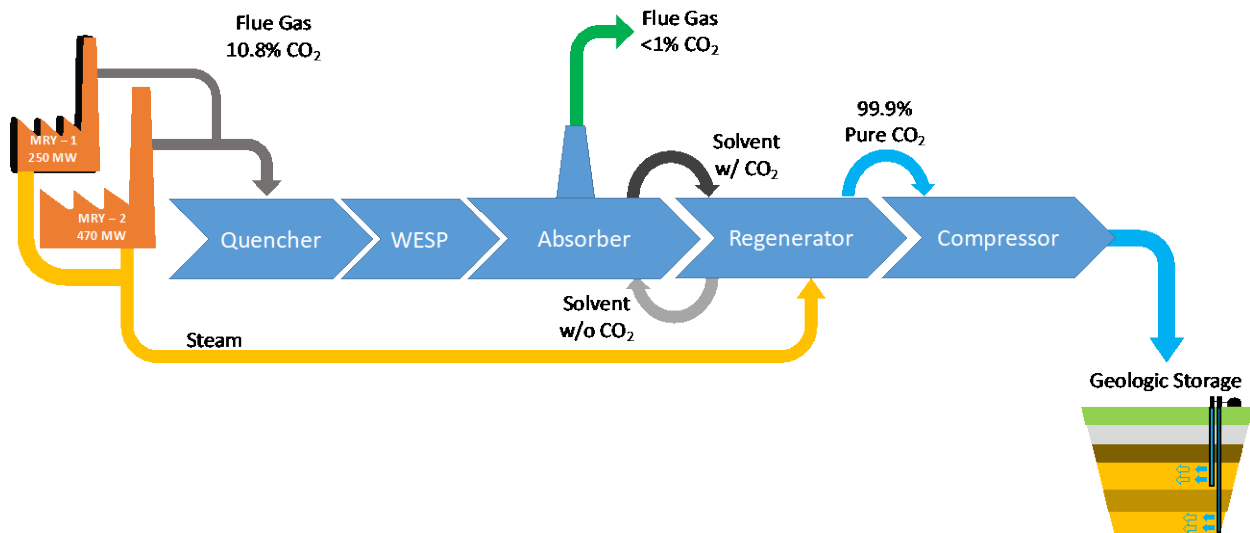


Figure 2. Block flow diagram for the CO₂ capture plant and its integration with the existing MRYS. During normal operation, 100% of Unit 2 flue gas and 20% of Unit 1 flue gas is routed to the capture plant. Unit 1 flue gas is available to feed the capture plant during Unit 2 outages. Both units will provide steam required for the amine solvent regeneration and provide flue gas that feeds the capture system.

Summary of Carbon Capture Process:

The technology (generalized schematic in Figure 3) is an advanced amine-based process specialized for removal of CO₂ from low pressure, oxygen-containing flue gas. The basic plant configuration consists of: **1)** a 2-stage Direct Contact Cooler (DCC) for flue gas cooling and SO₂ removal, **2)** an Absorber for CO₂ separation, **3)** a Regenerator for solvent regeneration and the release of pure CO₂, and **4)** a compression and dehydration system to supply pipeline-ready CO₂ at the fence line. The process begins in the DCC for flue gas conditioning. Then, as the conditioned flue gas flows up the Absorber, CO₂ is chemically absorbed into a circulating solvent stream flowing down the column.

The CO₂-loaded solvent is then pumped from the bottom of the Absorber, through a heat recovery exchanger where it is heated against hot CO₂-lean solvent, and into the top of the Regenerator. As the solvent flows down the Regenerator, it is contacted by steam, which strips the CO₂ from the solvent, producing an overhead mixture of steam and CO₂. The steam/CO₂

product is cooled and the steam is condensed and separated from the CO₂ product. Hot CO₂-lean solvent from the bottom of the Regenerator is pumped back through the heat recovery exchanger where it is cooled against the cold CO₂-loaded solvent before being returned to the top of the Absorber. Although not part of the standard flow sheet, for the Tundra project a wet electrostatic precipitator (WESP) is also included in the process design (see Figure 2). This is due to challenges unique to the application of the proposed project on North Dakota lignite flue gas.

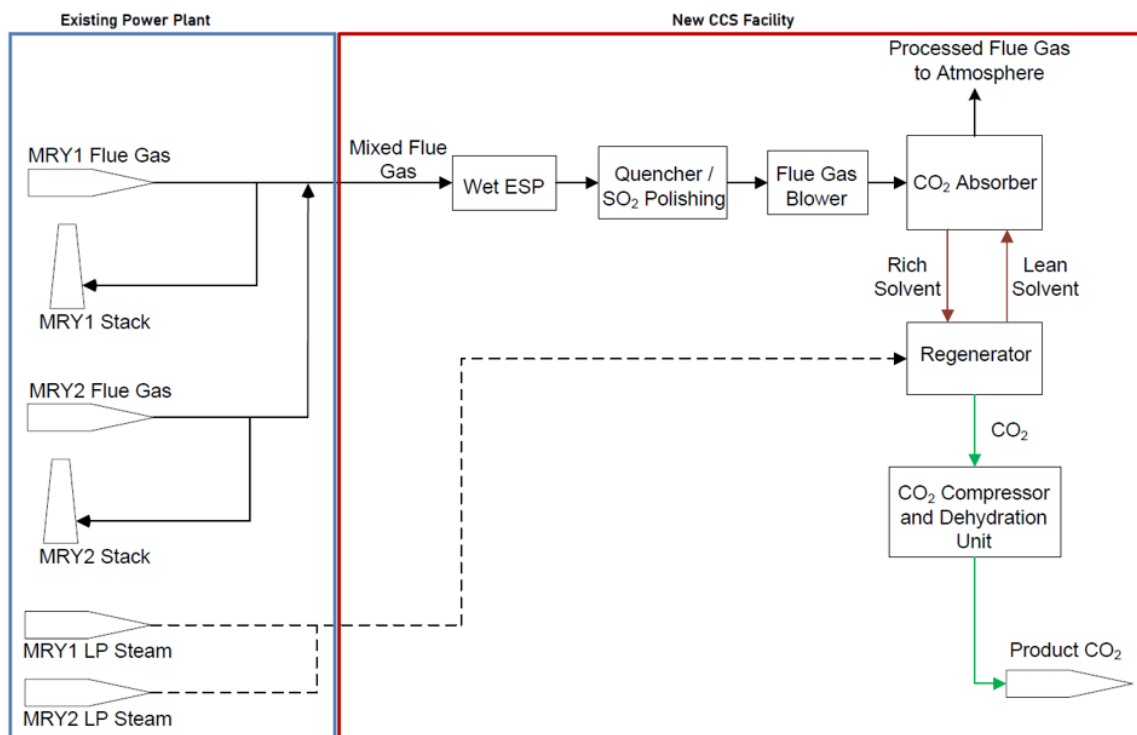


Figure 3. Generalized schematic of the Project Tundra CO₂ capture technology

CO₂ Pipeline

In 2021, Burns & McDonnell completed a Front-End Engineering and Design (FEED) study for the CO₂ pipeline. Building on this FEED study, Minnkota has been assisted by Sargent & Lundy and Baker Hughes, who are currently in the process of design and engineering for the CO₂ pipeline. The proposed project currently contemplates one CO₂ injection well pad, which would

contain up to three injection wells. The well pad is located 0.25 miles to the south of MRYS. The CO₂ pipeline and its associated infrastructure and instrumentation will enable transport and metering of the captured and compressed CO₂ from the capture plant to the injection wells.

A common metering station will be located at the boundary limit of the CO₂ capture plant and one 16-inch (OD) underground pipeline will transport the CO₂ in a dense phase to the well pad location.

The well pad will include its own metering station. No pump stations or mainline valves are expected to be required; the CO₂ compressor located at the CO₂ capture plant is being designed to provide all of the pressure needed to accommodate the pipeline pressure drop and the hydrostatic injection pressure for the Broom Creek geologic formation where the majority of the CO₂ is planned to be stored. If needed, an injection booster pump will be installed to enable injection in the Deadwood formation, the deeper formation with higher pressure of the two target formations.

Although the proposed project does not contemplate selling CO₂ for enhanced oil recovery (EOR), a tie-in point will be included in the design in the event a market for CO₂-EOR develops in the future.

CO₂ Geologic Storage Facility

The proposed project targets dedicated CO₂ geologic storage in multiple saline formations beneath the MRYS and the adjacent lignite mine. Dedicated storage is possible in sedimentary basins where there are layers of porous and permeable rocks (i.e., sandstone) that are sealed above and below by impermeable caprocks (i.e., shale). The proposed project overlies the Williston Basin and there are multiple suitable layers for dedicated geologic storage. Figure 4

provides the stratigraphic column underlying the proposed project area and notes the lowest underground source of drinking water (USDW) and three geologic horizons that are currently being characterized by the project team for injection and storage of the captured CO₂.

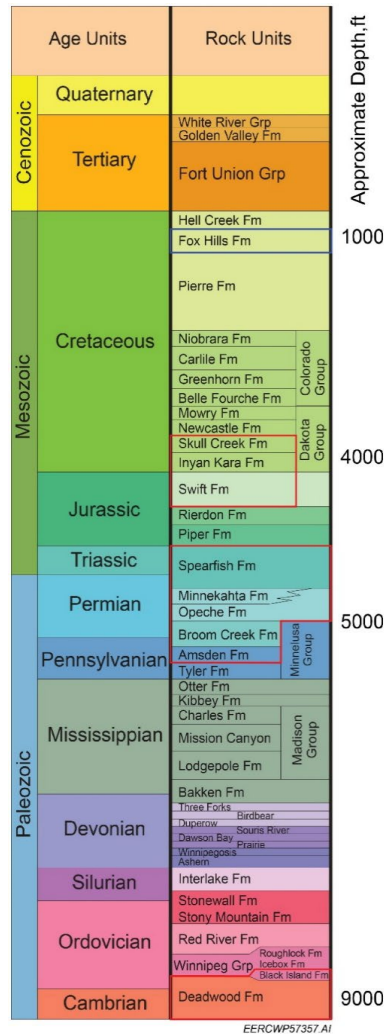


Figure 4. Stratigraphic column underlying the area near the proposed project. The lowest USDW (Fox Hills) and the three target formations (Inyan Kara, Broom Creek, Deadwood) and their overlying and underlying cap rocks are highlighted.

Minnkota worked with the Energy & Environmental Research Center (EERC) in developing the proposed plan for the Project Tundra storage site (Tundra SGS). The storage facility permit and Class VI drilling permit were issued by the North Dakota Industrial Commission on January 21, 2022, NDIC Order No. 31583-31588. The proposed storage development consists of two phases

beginning with Phase 1 CO₂ storage operations in the Broom Creek Formation. Two wells are proposed for Phase 1 into the Broom Creek Formation. Upon construction and operation of those two wells, an assessment will be made of their operational capabilities to determine whether there is a need for additional capacity. If needed, Phase 2 of development would commence, which includes the construction and operation of one additional well and the booster pump for injection into the Black Island–Deadwood Formation. There are a number of contingency options available for fine-tuning injection operations such as a possible construction of a third injection well into the Broom Creek if needed.

Environmental and Economic Impacts while Project is Underway

Impact on Environment/Greenhouse Gas Emissions

The proposed project is a post-combustion CO₂ capture and storage project that will capture and geologically store up to 4 million tonnes/year of CO₂. There are two sources of CO₂ for this project. The design specification is that more than 90% of the CO₂ in the Unit 2 and Unit 1 flue gas entering the capture plant will be captured during normal operation (Unit 2 at 100% of its total flue gas flow while 20% of Unit 1's total flue gas flow) and only 100% of either Unit 1 or Unit 2 when one is in an outage.

When considering planned outages on each of the units (3-5 short cleaning outages per year and one major maintenance outage every 3 years), provided below is the maximum total contribution of captured CO₂ from each of the sources.

- Unit 2 at MRYS (455 MW) – 3.20 million tonnes/year
- Unit 1 at MRYS (250 MW) – 0.80 million tonnes/year
- Total CO₂ captured and sequestered – 4.0 million tonnes/year

Ultimate Technological and Economic Impacts

Economic Impacts

One of the primary motivating factors for Minnkota's pursuit of the proposed project is preserving the MRYS in the face of a likely carbon-managed future and the availability now of federal and state programs to offset the cost of installation and operation. The MRYS today employs approximately 170 people and the associated Center Mine employs approximately 180 more. The average salary for employees of the MRYS and Center Mine is more than \$100,000, significantly higher than the state average of \$60,215.² If the MRYS and the Center Mine (MRYS is its only customer) were forced to retire early (years ahead of their useful lives), as with numerous other coal plants and mines in the U.S., the negative economic impact on Oliver County and the State of North Dakota would be tremendous.² Additionally, the cost of an early facility closure has a complex impact to Minnkota, including likely having to raise electric rates for tens of thousands of North Dakotans and Minnesotans served by Minnkota's member-owners. Minnkota and its members serve a diverse consumer base, including agricultural centers, rural areas and many low-income communities. Conversely, Minnkota's service territory also includes the growing areas of Fargo and Grand Forks, where the price of electricity is directly tied to their economic competitiveness regionally and nationally.

Why the Project is Needed

One of the key drivers for the proposed project is the continued utilization of the MRYS in the face of a likely carbon managed future. MRYS is a valuable asset for Minnkota providing low-cost, reliable baseload power that has proven to be dependable and resilient – no matter if it is

² https://www.ndlmi.com/admin/gsipub/htmlarea/uploads/lmi_empwagesind2022.pdf

100 degrees or 30-below-zero Fahrenheit. The proposed project will also preserve the high-paying jobs and essential economic impact in the local communities and surrounding region. MRYS has dispatched at over 90% average capacity factor over the past five years in the MISO electric market, which demonstrates its competitive production cost and important role the electric market.

STANDARDS OF SUCCESS

The standards by which the success of the project is to be measured.

A. Emissions reduction

The proposed project will capture and geologically store up to 4 million tons/year of CO₂, and achieve an additional reduction of approximately 200 tons/year of particulate and approximately 2,000 tons/year of SO₂ that would otherwise be emitted to the atmosphere.

B. Increased energy sustainability

The project provides a low-carbon source of dispatchable, reliable electric capacity that provides grid stability, particularly with an increasingly strained grid.

C. Value to North Dakota

North Dakota has the opportunity to lead the region, nation and world on not only reducing carbon emissions, but also in developing new carbon markets. Project Tundra represents an enormous advancement of technology to capture and safely store emissions. Preservation of reliable electric baseload assets is of tantamount importance in this project, but also represents potential future opportunity of enhanced oil recovery, greenhouse development and other utilization opportunities in the state.

D. Explanation of how the public and private sector will make use of the project's results, and when and in what way

The learnings and confidence gained from a successful demonstration of this project will help make follow-on projects more successful and give capital markets more confidence to invest in this space.

E. The potential commercialization of the project's results

This project can help serve as a blueprint for carbon capture technology on other coal-fired power plants, gas-fired plants and other industrial processes. The potential advancement of this technology will require multiple vendors and will benefit from competition.

F. How the project will enhance the research, development and technologies that reduce environmental impacts and increase sustainability of energy production and delivery of North Dakota's energy resources

The project will be the largest postcombustion carbon capture project in the world and will demonstrate that coal has a place in the low-carbon energy market the industry is transitioning toward. Further, the availability of large volumes of CO₂ for future EOR activities in North Dakota's oil fields (including possibly the Bakken) sets the stage for the state's produced oil to be certified with a lower carbon intensity than most oil on the market today.

G. How it will preserve existing jobs and create new ones

The proposed project is expected not only to preserve the high paying jobs for the 350 direct employees of the MRYS and Center Mine (not to mention the many indirect jobs that support ND's lignite industry), it is expected to add up to 600 additional high-paying

construction (temporary) and 20-30 new permanent jobs. Minnkota is presently working with the Bank of North Dakota and FTI Consulting to develop a Regional Economic Models, Inc. (REMI) model to identify the deeper positive economic impacts of Project Tundra.

H. How it will otherwise satisfy the purposes established in the mission of the Program

The outlined purpose of the CSEA program is to support research, development and technological advancements through partnerships and financial support for projects ready for commercialization that reduce environmental impacts. Project Tundra brings together each part of that mission, for all the reasons previously stated in this application. If constructed, this project would play a critical role in current and future energy production, natural resource development, environmental stewardship, while also preserving and enhancing jobs in the state.

BACKGROUND/QUALIFICATIONS

*Please provide a summary of prior work related to the project conducted by the applicant and other participants as well as by other organizations. **This should also include summary of the experience and qualifications pertinent to the project of the applicant, key personnel, and other participants in the project.***

Project Sponsor Capabilities and Qualifications

The Project Sponsor, Minnkota, has the experience, expertise, and wherewithal to develop, finance, construct, and operate this project successfully. Minnkota owns and operates MRYS Unit 1, while also operating Unit 2 on behalf of its owner Square Butte Electric Cooperative, which is owned by the same 11 distribution member cooperatives that own Minnkota.

Minnkota's generation portfolio also includes energy purchased from three North Dakota wind

farms and hydroelectricity purchased from the Garrison Dam in central North Dakota. Minnkota operates and maintains a robust set of electric transmission infrastructure, including more than 3,350 miles of transmission line and 260 substations.

As the project developer, Minnkota is coordinating all aspects of the project development and has dedicated staff in place for project management, engineering & design, environmental/permitting, legal, and financing. As the operator of MRYS, Minnkota has unique knowledge that is necessary for the integration of the CO₂ capture plant. Minnkota also has more than 50 years of experience in coal-fired generation and the use of lignite fuel and its unique characteristics. Minnkota has hosted and managed several major construction projects at MRYS, with the most recent being \$425 million in environmental upgrades completed in 2007-2011 (described in more detail below).

In addition to construction projects at MRYS, Minnkota's Power Delivery division manages a portfolio of construction and maintenance projects ranging from \$35-50 million annually. The capital budget from 2023-2025 totals \$100 million with approximately half of that being associated with 69 kV transmission line projects. The remaining amount was used on distribution substation upgrades and maintenance, high voltage substation/line work and telecommunication and demand response system upgrades. Projects are scoped and scheduled in-house and utilize both in-house and contracted labor. One of the largest transmission projects in Minnkota's history, the \$350 million Center to Grand Forks 345 kV line, was completed in 2014 (described in more detail below).

Experience in the Fossil Sector

Prior to describing two specific examples that demonstrate Minnkota's experience on similar

large construction projects, this section will first describe Minnkota's significant experience in the fossil sector.

Minnkota's Joint System has interests in three coal units, which represent approximately 55% of the Minnkota Joint System's generation capacity and 67% of the energy production. The three coal units are all located in North Dakota and fire North Dakota lignite coal:

- MRYS, Unit 1: Owned and operated by Minnkota, Unit 1 has nominal rating of 250 MW_{net} and was placed in service in 1970. It is a single wall cyclone-fired unit that is equipped with the following controls: advanced separated over-fire air (SOFA) and selective non-catalytic reduction (SNCR) for nitrogen oxide (NO_x) control, wet lime flue gas desulfurization (WFGD) scrubber for sulfur dioxide (SO₂) control, an electrostatic precipitator (ESP) for particulate matter (PM) control, and a halide and post-combustion activated carbon injection for mercury control.
- MRYS, Unit 2: Owned by Square Butte and operated by Minnkota, Unit 2 has a nominal rating of 455 MW_{net} and was placed in service in 1977. It is an opposed wall cyclone-fired unit that is equipped with the following controls: SOFA and SNCR for NO_x control, WFGD for SO₂ control, ESP for PM control, and halide and post combustion activated carbon injection for mercury control.
- Coyote Station: NMPA owns 30% of Coyote and Minnkota is the operating agent for NMPA (Otter Tail Power operates Coyote). Coyote is a single unit, with a nominal rating of 427 MW and was placed in service in 1981. Coyote has a cyclone-fired boiler and is equipped with the following controls: SOFA for NO_x control, dry flue gas desulfurization and fabric filter baghouse for SO₂ and PM control, and uses activated carbon injection for mercury control.

Minnkota continues to pursue and foster fossil energy technology, as evidenced by Minnkota's current and past involvement in cost share and engineering support for a number of DOE-funded research projects, including: 1) demonstration of multi-gamma based sensor technology for as-fired coal property measurement (DE-FE00031750), 2) mitigation of aerosol impacts on ash deposition and emissions from coal combustion (DE-FE00031756), 3) rare earth element extraction and concentration at pilot-scale from North Dakota coal-related feedstocks (DE-FE00031835), 4) novel concepts of the utilization of carbon dioxide from utility and industrial sources (DE-FE00031916), 5) energy storage for fossil power generation. Minnkota and EERC also previously completed a FEED study for Project Tundra with Fluor (DE-FE0031845) and a CarbonSAFE project for their storage complex (DE-FE0031889) and 6) recovery and refining of rare earth elements for lignite mine wastes (DE-FE0002618). This demonstrated, strong commitment to advancing fossil energy technology, combined with more than 70 years of experience operating and maintaining fossil fuel conversion plants, positions Minnkota well to execute on Project Tundra.

MRYS Environmental Upgrades

Background:

From 2007 to 2011, approximately \$425 million was invested in MRYS to install a series of air quality control system upgrades on each of the two units to modernize the facility and ensure compliance with environmental regulations. New controls and associated infrastructure were installed for SO₂ and NO_x, with each of the major sub-projects for both units further described below.

The Unit 1 projects consisted of the following five major components:

1. Electrical upgrade of the unit (\$51 million) – Construction of the Unit 1 electrical upgrades were necessary to provide fault protection of the existing aging electrical system, and to provide capacity for load additions from the air quality control upgrades. The project included new Unit 1 auxiliary transformers; a replacement generator breaker; an electrical building to house medium and low voltage switchgear, motor control centers and distributed control system equipment; isolated phase bus modifications, a new backup diesel generator, a fuel handling electrical upgrade and substation, and duct banks.
2. Installation of a new WFGD scrubber (\$113 million) – Construction of a single module wet lime open-spray SO₂ scrubber. The scope included connecting ductwork and structural steel from the boiler exit to the refurbished chimney, two replacement induced-draft fans, all associated foundations, dampers and control devices, buildings, electrical, HVAC and other utility services, and the distributed control system.
3. Upgrade of the former Unit 2 dry chimney to a wet chimney for Unit 1's use (\$12 million) – Construction to retrofit the 564-foot “dry” chimney to a chimney suitable for wet service with the new wet scrubber. The chimney was wallpapered by installing 316L stainless over the existing mild steel and Corten metals of the dry chimney.
4. Installation of over-fire air and selective non-catalytic reduction systems on the boiler (\$16 million) – Construction included installation of a complete separated over-fire air (SOFA) system and selective non-catalytic reduction system (SNCR) for NO_x control on the Unit 1 boiler. The SOFA system components included SOFA piping, nozzles, dampers, control drives, as well as significant modifications to the existing cyclone boiler lignite drying system. The SNCR system involved installation of systems to support urea

injection in multiple zones in the boiler. Supporting systems included metering and dilution water modules, storage tanks and supporting systems, and expanding the plant's water treatment system.

5. Installation of a joint new lime reagent preparation system to serve Unit 1 and Unit 2 (\$42 million) – Construction to install two new vertical ball mill slakers and associated pumps, tanks, and distribution systems. The project included two bolted, 3,000-ton lime storage silos.

The Unit 2 projects consisted of the following four major components:

1. Electrical upgrade of the unit (\$76 million) – Construction of the Unit 2 electrical upgrades were necessary to provide fault protection of the existing aging electrical system, and to provide capacity for load additions from the air pollution control upgrades. The project included new Unit 2 auxiliary transformers; a replacement generator breaker; an electrical building to house medium and low voltage switchgear, motor control centers and distributed control system equipment; isolated phase bus modifications, a new backup diesel generator, a fuel handling electrical upgrade and substation, and duct banks.
2. Upgrade of the existing WFGD scrubber on Unit 2 (\$2 million) – Included assessment for duty of two existing open spray tower absorbers, and installation of minor efficiency improvements, replacement demister panels, and replacement of the outlet ducts from the modules to the new chimney.
3. Installation of new wet chimney (\$67 million) – Construction included installation of a 6,425 cubic yard continuous-pour concrete slab-on-grade chimney foundation, and a 550-foot concrete chimney with fiberglass-reinforced plastic flue gas liner.

4. Installation of separated over-fire air (SOFA) and selective non-catalytic reduction systems on the boiler (\$18 million) – Construction included installation of a complete SOFA system and SNCR system for NO_x control on the Unit 2 boiler. The SOFA system components included SOFA piping, nozzles, dampers, control drives, as well as significant modifications to the existing cyclone boiler lignite drying system. The SNCR system involved installation of systems to support urea injection in multiple zones in the boiler. Supporting systems included metering and dilution water modules, storage tanks and supporting systems, and expanding the plant’s water treatment system.

Project Management:

Minnkota and the project engineering consultant Burns & McDonnell evaluated options to pursue these projects on an EPC basis or on a “multi-contract” basis. Minnkota selected the multi-contract approach, and utilized plant project managers and Minnkota’s procurement department to issue all contracts related to the projects. Burns & McDonnell provided project schedules, design, plans and specifications, bidding assistance, and review of vendor submittals. Burns & McDonnell also provided construction observation, however overall construction management was Minnkota’s responsibility. Minnkota did not add personnel to complete the projects.

Operation and Maintenance:

As the operator of both Units 1 and 2, Minnkota is responsible for the operation and maintenance of the facilities’ equipment/infrastructure. With the completion of the final work in 2011, the projects were all in service. The projects have all been in service for at least 12 years and have

performed as expected, while additional efficiencies have been gained through operating and maintenance experience. Maintenance is performed using both in-house and contracted labor.

Center to Grand Forks 345 kV Transmission Line

Background:

In 2009, it was determined that Minnkota would construct a \$350 million, 250-mile-long 345 kilovolt (kV) transmission line in North Dakota between the Center 345 kV Substation (northeast of the Milton R. Young Generation Station, near Center, North Dakota) and the Prairie Substation (west of Grand Forks, North Dakota). The Center to Grand Forks 345 kV Transmission Line Project (CGF Project) was constructed to deliver existing baseload generation to Minnkota's cooperative members in North Dakota and Minnesota.

This project helped provide much needed transmission capacity in North Dakota as new resources are brought on to the grid.

The CGF Project consisted of the following six major components:

1. 345 kV High Voltage Transmission Line – Construction of 250 miles of a new, high-voltage transmission line. The line is constructed with single-pole steel structures approximately 150-feet-high and placed approximately 1,000-feet apart. The typical right-of-way (ROW) is 150-feet-wide. Conductor is 959.6 kcmil Suwanee trapezoidal wire (TW) type aluminum conductor steel reinforced (ACSR) cables and two shield wires – one a fiber-optic static line and the other an extra high strength (EHS) steel cable.
2. Center 345 kV Substation Upgrades – Installation of 345 kV circuit breakers, 345 kV dead-end structures, a new 345/230 kV transformer and associated bus work, new 345 kV

switches and associated foundations, steel structures, and control panels. A line reactor was also added to the north end of the substation.

3. Additional 230 kV Tie Line – Construction of a 1,500-foot-long 230 kV tie line paralleling the existing tie line on Minnkota-owned property to complete a transmission-to-transmission interconnection with the Square Butte 230 kV Substation.
4. Square Butte 230 kV Substation Upgrades – Installation of 230 kV circuit breakers and line terminal equipment to the new 345 kV interconnect.
5. Prairie 230/345 kV Substation Upgrades – Installation of new 345 kV circuit breakers, 345 kV dead-end structures, two new 345/230 kV transformers and associated bus work, new 345 kV switches and associated foundations, steel structures, and control panels. Addition of 230 kV circuit breakers to accommodate interconnecting with the existing 230 kV ring bus.
6. Fiber Optic Regeneration Stations – Construction of four fiber optic regeneration stations along the transmission line route to re-amplify the protection and control signals carried in the optical ground wire (OPGW). Each station has a small control building to house the electronic equipment in a fenced-in area.

Minnkota was able to coordinate all federal, state and local permitting and environmental requirements and met all applicable guidelines. The project schedule required Minnkota to parallel the design and the route permitting to meet the in-service date. This required engineering, procurement and environmental work to be done simultaneously, something that is typically not done. The extremely short schedule (four years) required a concerted effort in multiple areas, including these primary phases:

- Route application and permitting – This process included determining the 250-mile transmission line route and conducting multiple public hearings across the 11 impacted counties in North Dakota.
- Complete Environmental Assessment (EA) – this included an alternative evaluation study (AES), a macro-corridor study (MCS), a biological assessment (BA), and a Class III Intensive Archaeological Resources Inventory in compliance with Section 106.
- Equipment procurement, manufacture and delivery – To meet the in-service date, Minnkota ordered long lead-time items early in the process to allow for delivery and construction on schedule. Due to the expedited nature of the project, this was done before the permitting process was completed.
- Construction – this included simultaneous work on 250 miles of line, two high voltage substation rebuilds, modifications to an existing substation and construction of four repeater stations.

Project Management:

Minnkota supported the Project with a project manager (PM) to coordinate all project activities, schedule and budget. Minnkota also provided all of the material procurement from internal resources. Additional contracted labor was required for the following: **1)** line and substation design, **2)** construction management, **3)** environmental and permitting, and **4)** right of way easements. The construction of the 250-mile line was done by contracted labor in addition to the substation civil work. However, Minnkota crews did a majority of the electrical work within the substations and in-house support and guidance was provided by environmental, engineering, operations, legal, finance and various other groups.

Operation and Maintenance:

The CGF Project was energized in 2014 and at that time doubled Minnkota's existing 345 kV transmission line assets. The Project is part of the bulk electric system (BES) and therefore meets specified North American Electric Reliability Corporation (NERC) requirements. All 345 kV transmission is included in the high voltage maintenance program and is patrolled annually by helicopter, fixed wing aircraft and ground patrol. Regular vegetation management is conducted and maintenance is done as needed.

The expansion of both the Center and Prairie 345 kV substations added additional assets to the electrical operation's maintenance program and are included in the standard rotation for equipment inspections. Both sites are included in the BES and meet all NERC requirements.

The addition of four repeater stations expanded the telecommunication assets and are regularly inspected and maintained.

Minnkota conducted the design and construction of the Project without adding any additional personnel. Contracted labor was used during construction but ongoing maintenance is done by Minnkota personnel.

Financing of the MRYS Environmental Upgrades and CGF Project

Minnkota's portion of the \$425 million Environmental Upgrade Projects and the \$350 million CGF Project were funded by loans from the Rural Utilities Service (RUS), an operating unit of the United States Department of Agriculture, via RUS Guarantees made to the Federal Financing Bank (FFB). As a rural electric cooperative, Minnkota has had tremendous success utilizing the low interest, long amortization loans offered through the RUS. Minnkota's utilization of RUS

financing coincides with the preferred industry practice of financing long-term assets with appropriately amortized funds, ensuring intergenerational equity is achieved on large capital projects. Minnkota secures outstanding debt under an Indenture, with U.S. Bank acting as Trustee. The Indenture secures certain obligations of Minnkota equally and ratably by a first priority lien on substantially all of Minnkota's tangible assets and certain of its intangible assets, whether now owned or acquired in the future. Square Butte's portion of the \$425 million Environmental Upgrade Projects was financed half through RUS and half through CoBank, ACB, and similarly secured using Square Butte's Indenture.

Principal Participants Capabilities and Qualifications

This subsection of the Application will focus on and describe the capabilities of the team Minnkota has put together to develop and bring the proposed project to commercial operation. Minnkota has a fully integrated team in place including all of the technical, legal and financial pieces necessary. The following sections highlight the key team members, their role(s) on the project, and a description of the capabilities that each member brings to the proposed project.

Technology Provider – See Confidential Appendix A

Owners Engineer

A-6 Owners Engineer

Sargent & Lundy

As Owner's Engineer S&L is providing engineering and technical support to Minnkota in managing the technology providers portion of the project scope as well as engineering and execution planning for Minnkota's portion of the balance of plant which will be construction and commissioned by Minnkota using various contractors.

S&L is one of the longest-standing and most experienced full-service architect engineering firms in the world. Founded in 1891, the firm is a global leader in power and energy with expertise in grid modernization, renewable energy, energy storage, nuclear power, and fossil-fueled power plants. S&L has been involved in numerous first-of-a-kind projects and concepts throughout our more than 130-year history. Our identity is rooted in a culture of innovation and quality. We have been at the forefront of new design throughout this time, often on initiatives for new technologies or concepts within the power generation markets.

S&L has extensive experience conducting technical evaluations for CO₂ capture projects over the last decade, including feasibility, Pre-FEED, and FEED studies for clients which included preliminary system engineering, project layout, preliminary design, and cost estimates. S&L has completed 45 projects with an additional 25 active projects currently on-going, for nearly 40 clients involving 15+ technologies since 2007.

Among the most notable projects for S&L was the Petra Nova Carbon Capture Project, which was awarded the Best Project of Merit award from Engineering News Record (ENR). S&L's work on the Petra Nova project included multiple FEED studies, Owner's Engineer services during project implementation, and detailed design of the 240 MW equivalent (MWe) slipstream carbon capture unit onto NRG's W.A. Parish Unit 8. The Owner's Engineering services included both design oversight and the detailed design of critical systems that tied into the host site, such as the flue gas ductwork supply and wastewater treatment.

Construction Management – See Confidential Appendix A

Constructor – See Confidential Appendix A

David Greeson Consulting (Proven Project Development Group)³

David Greeson is a consultant to the carbon capture and power generation industries. He was the developer (from inception through commissioning) of the \$1 billion Petra Nova CO₂ Capture and Enhanced Oil Recovery Project in Texas and is currently working with multiple clients in various stages of development of CCUS projects. Mr. Greeson has been working with Minnkota for about the last three years, focusing on the business development and financing aspects of the proposed project.

Hunt International Energy Services (HIES)

Marion Cole is a principal with HIES, an independent energy industry consulting firm established in 1999. Mr. Cole has 40 years of experience in power systems engineering, operations and consulting, with expertise focused on power and pipeline sectors with both U.S. and international clients. Mr. Cole was a key member of the engineering team that developed the Petra Nova project and he supported both the CO₂ capture plant and the 81-mile CO₂ pipeline that transported the captured CO₂ to the enhanced oil recovery fields. Mr. Cole is a consultant to Minnkota focused on the engineering, design and construction aspects of the CO₂ capture plant and the CO₂ pipeline and he is actively engaged currently on both FEED studies.

Global Structured Finance (GSF)⁴

Minnkota has retained the advisory services of GSF to support the full capital stack raise for the proposed project. GSF, founded in 2005, is a structured finance advisor, providing strategic advice and innovative financing solutions to meet its clients' capital raising, investment, tax and

³ <https://www.davidgreeson.com/>

⁴ <https://www.gsfadvisors.com/>

accounting needs. More specifically, GSF is engaged in providing advisory services to clients in connection with the financing of assets with significant tax benefits (principally tax credits, as well as depreciation and interests deductions).

GSF also provides placement services and has closed transactions and maintains relationships with all major tax-motivated investors.

The GSF Advisors energy team recently left a major European Bank where they conducted business as Capstar Partners and were responsible for tax equity advisory and investments. Capstar Partners was an independent firm founded in 1990 providing investment banking services to clients in the tax advantaged asset finance market. It was acquired by a European bank in 2001. The team is led by Phil Mintun, who was the founder and head of the Capstar renewable energy tax equity team, and François-Xavier (“FiX”) Terrasse, who was responsible for the bank’s tax equity investments and led the most highly structured transactions.

Since 2005, the team has raised \$20.7 billion from 19 tax equity investors to finance over 25GW of renewable energy facilities – 114 wind farms, 37 utility scale solar plants, 4 geothermal facilities, 4 distributed generation solar portfolio as well as 1 fuel cell portfolio and 1 biomass plant. In addition, the team has been active advising clients on carbon capture and sequestration projects over the past several years.

Holland & Knight LLP

Holland & Knight has been retained as Project Counsel and has significant experience in energy and infrastructure development and financings.

Holland & Knight's Energy & Natural Resources Industry Sector Group brings together a cross-practice and experienced group of more than 225 lawyers and professionals, in 34 offices, to represent and advise a wide array of stakeholders across the energy and natural resources value chain. Furthermore, more than 50% of the firm's energy team members are diverse.

The firm's attorneys have represented energy industry clients for more than 120 years, in all 50 states as well as more than 80 countries around the globe. As a result, Holland & Knight not only provides integrated service through the collaboration of attorneys across a broad range of practice areas, but these attorneys also truly understand the industry and have a pulse on recent market trends as well as insight into how to best navigate an increasingly complex regulatory environment.

Holland & Knight is ranked among the top global firms for Energy & Natural Resources by *Chambers Global 2023* as well as among the top U.S. firms for Energy: Renewable / Alternative Power by *The Legal 500 United States 2022*.

The firm's history of excellence in serving the regulatory, compliance and policy needs of clients in addition to commercial, financial and operational experience uniquely positions their team to provide legal counsel on increasingly complex transactions. This well-established experience combined with a team of well-regarded, high-profile litigators, makes Holland & Knight's energy practice well positioned to provide the full range of legal services to Project Tundra.

For more than four decades, Holland & Knight has been privileged to provide services to the electric cooperative industry in the U.S. They have the leading electric cooperative practice in the country, a key component of which is assisting their clients with the development of major projects and obtaining necessary financing. Their lawyers understand the electric cooperative

business, and the breadth and depth of their practice experience brings extra value to electric cooperative clients such as Minnkota.

The firm's lawyers have extensive experience guiding clients through all phases of EPC contracts, each based on individual client and client industry needs offering guidance from design concept, property acquisition and contract negotiations to risk management, contract compliance, claims management, alternative dispute resolution and litigation. Holland & Knight is experienced at resolving disputes arising from EPC and design/build agreements (both through litigation, as well as via arbitration, mediation, negotiation and other forms of alternative dispute resolution).

Holland & Knight's experience in cooperative finance includes structuring and negotiating an array of financing transactions, including traditional interim (construction) and permanent debt financing, tax exempt bond financing, non- and limited-recourse project financing, leveraged and synthetic leases and other structured vehicles. Both inside and outside the cooperative industry, Holland & Knight represents developers, utilities and their subsidiaries, investors and financial institutions in the sourcing and negotiation of senior, mezzanine and subordinated project loans, corporate credit financings, domestic and international private placements, Rule 144A offerings, public bond offerings, lease financings, construction and term loan financings, bridge financing and operating lines of credit.

Holland & Knight lawyers are well-versed and able to handle all relevant types of financing documentation, project documentation and the coordination of the two (negotiating and drafting project documentation to be financeable). The firm's broad experience includes the Department of Energy and Department of Agriculture federal loan guarantees and various tax and tax-equity

advantaged structures involving monetizing tax credits, cash grants, production tax credits and clean renewable energy bonds (CREBs).

Additionally, Holland & Knight has significant experience representing cooperatives, alternative energy project developers, cash equity sponsors and tax equity investors in tax equity transactions including partnership flips, sale-leasebacks and inverted leases involving wind, solar, hydropower, geothermal, biomass and landfill gas facilities. Given the significant tax benefits associated with alternative energy projects, their team ensures compliance with the requirements to claim federal tax credits (including production and investment tax credits), as well as any available state tax incentives. Their representation of clients in IRS controversies at the IRS administrative level and in trial and appellate level courts provides great insight in properly structuring a transaction to avoid or withstand IRS scrutiny.

MANAGEMENT

*A description of **how** the applicant will manage and oversee the project to ensure it is being carried out on schedule and in a manner that best ensures its objectives will be met, **and a description of the evaluation points to be used** during the course of the project.*

Since the proposed project is currently in development, this section will provide the key staff and summary of roles for Minnkota's development of the proposed project. Once the project reaches the construction phase, this list of key staff will change. Further, each of the key staff listed below are full-time Minnkota employees. Information about Minnkota's external resources (consultants, engineering, permitting, legal, financing) that have been engaged to develop the proposed project can be viewed in the previous section.

Key Minnkota staff are considered the Project Manager and the component leads (Engineering, Geologic Storage, Legal, Financing) and are listed below. The key staff are supported by the CEO, CFO and General Counsel, who are also listed below.

- Robert “Mac” N. McLennan, President & CEO: Overall project oversight and direction.
- Kay L. Schraeder, Vice President & CFO: Overall financial oversight and direction.
- Gerad C. Paul, Vice President & General Counsel: Overall legal oversight and direction.
- Craig Bleth, Vice President of Project Development: Project Manager
- Shannon R. Mikula, Special Projects Counsel: Geologic Storage Facility Lead, Environmental Manager, and In-house Project Counsel
- Andrew C. Sorbo, Vice President – Strategic Initiatives: Commercial & Financing Lead

In addition to the above-named key staff, Minnkota has dedicated (full or in part) several additional staff to this project development. Further, as detailed above, Minnkota’s key staff and their expertise are strongly augmented by the external experts retained to bring this project to commercial operation.

TIMETABLE

Please provide a project schedule setting forth the starting and completion dates, dates for completing major project tasks/activities, and proposed dates upon which the interim reports will be submitted.

Because of the first-of-a-kind at this scale and in this application nature of this project, Minnkota is expecting to need all permits and other regulatory approvals completed prior to financial close. To meet the target schedule of start of construction by the end of first Quarter of 2024, Minnkota has submitted permit applications on a schedule to have all approvals by the end of 2023. The storage facility permits were issued in January 21, 2022, NDIC Order No. 31583-31588. The air

permit PTC application was filed in May 2023, which should enable final approval by the end of 2023.

BUDGET

*Please use the table below to provide an **itemized list** of the project’s capital costs; direct operating costs, including salaries; and indirect costs; and an explanation of which of these costs will be supported by the financial assistance and in what amount. The budget should identify all other committed and prospective funding sources and the amount of funding from each source. **Please feel free to add columns and rows as needed.** Higher priority will be given to projects with a high degree of matching private industry investment.*

Minnkota is negotiating a capital structure that will involve equity contributions from Minnkota and its partner(s) to fund the construction of the CO₂ capture plant (“CaptureCo”) and the CO₂ pipeline and storage facility (“StorageCo”). In this structure the 45Q tax credits and NOLs (the NOLs and tax credits are referred to as “tax attributes”) will roll up to the joint venture where Minnkota and its partner will divide the tax credits and tax attributes. It is expected that Minnkota’s partner will monetize the tax attributes and uses the proceeds to pay for operating costs. Under this structure, the project would need \$1.40 billion in capital and that would come from a DOE grant and sponsor equity from Minnkota and its partner(s), and a CSEA loan.

As noted above, the FEED study will produce a final detailed engineering project price that will be reflected in a fixed-firm Engineering, Procurement and Construction (EPC) contract offer.

CapEx costs for the CO₂ geologic storage facility (StorageCo) will consist of a combination of fixed-firm and reimbursable contracts since pricing for drilling activities is not generally fixed.

Preliminary quotes for these services are included in the \$1.40 billion estimated total project cost estimate. See additional detail in the Confidential Appendix A.

Preliminary Sources and Uses during construction and at COD: Confidential – Appendix A

PATENTS/RIGHTS TO TECHNICAL DATA

Any patents or rights that the applicant wishes to reserve must be identified in the application. If this does not apply to your proposal, please note that below.

See Confidential Appendix A for listed Patent rights.

STATE PROGRAMS AND INCENTIVES

Any programs or incentives from the State that the applicant has participated in within the last five years should be listed below, along with the timeframe and value.

Project Tundra, through Minnkota as project sponsor, received great support from the North Dakota Lignite Research Council (LRC). Minnkota was awarded in 2018 grant funds for use on the feasibility engineering and design as well as the front-end engineering and design (FEED) for the capture technology retrofit to lignite coal-fired generating assets and for use on a FEED of a pipeline transport for captured CO₂ and EOR surface facility system for the legacy oilfield west of the Milton R. Young Station. The LRC grant funds were instrumental in the early and intermediary stage of research and engineering of the project to determine the applicability and feasibility of the technology design on lignite fuel gas. Additionally, Minnkota leveraged these LRC grant funds on a 1:4 ratio securing federal funds from the Department of Energy National Energy Technology Laboratory, CarbonSAFE and Office of Fossil Energy. Lastly, in February 2022 the NDIC approved an LRC grant to fund on a 50-50 basis a portion of the final engineering work needed to finance the project and move into the construction phase.



Lignite Energy Council
PO Box 2277
Bismarck, ND 58502
Tel. (701) 258-7117

May 19, 2023

Mr. Andrew Sorbo
Minnkota Power Cooperative
5301 32nd Ave S.
Grand Forks, ND 58201

Subject: Minnkota Power Cooperative Proposal for Project Tundra

This letter is to signify the Lignite Energy Council's support of Minnkota Power Cooperative in its pursuit of funding from the Clean Sustainable Energy Authority (CSEA) for Project Tundra, which will demonstrate post-combustion carbon capture (PCCC) and carbon dioxide storage in North Dakota. This project is a critical piece in the progression toward Governor Burgum's goal of carbon neutrality by 2030 by capturing up to 4 million metric tons of carbon dioxide annually, making it the largest single-train PCCC in the world. Commitment from the CSEA through a low-interest loan will help demonstrate that Project Tundra is worthy of consideration by other investors.

Minnkota Power Cooperative's Project Tundra initiative will build the PCCC capture facility at the existing Milton R. Young Station, a lignite-based power plant in North Dakota. The captured CO₂ will be safely and permanently stored in geologic formations up to 9,000 feet directly underground of the Milton R. Young Station. Participants in the project in addition to sponsor and owner Minnkota Power Cooperative include anticipated funding through the U.S. Department of Energy and overall construction management from Sargent & Lundy on behalf of the project owners.

The Milton R. Young Station is a critically important dispatchable energy resource that also sustains high-paying jobs and essential positive economic impacts for local communities and the surrounding region. The generation resource has dispatched more than a 90% average running plant capacity factor over the past five years boasting cost predictability and performing reliably despite market volatility. Project Tundra will help preserve this power resource.

The Lignite Energy Council believes Project Tundra meets the Clean Sustainable Energy Authority's mission to deploy technological advancements through partnerships and provide financial support for the large-scale development and commercialization of projects, processes, activities, and technologies that reduce environmental impacts and increase the sustainability of energy production and delivery.

Sincerely,
Jason Bohrer

A handwritten signature in black ink that reads "Jason Bohrer" with a stylized flourish at the end.

President & CEO
Lignite Energy Council