

Clean Sustainable Energy Program 2025 - 2027 Report

NOVEMBER 2026

NORTH Dakota | Industrial Commission

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Background

Creation

The North Dakota Clean Sustainable Energy Authority (CSEA) was created by the 2021 Legislature's enactment of HB 1452. The purpose of CSEA was to support the research and development of large-scale projects and technologies that advance energy production while reducing environmental impacts and diversifying the state's economy.

CSEA was modeled after existing research and development programs under the North Dakota Industrial Commission (see Figure 1) and was designed to complement them.

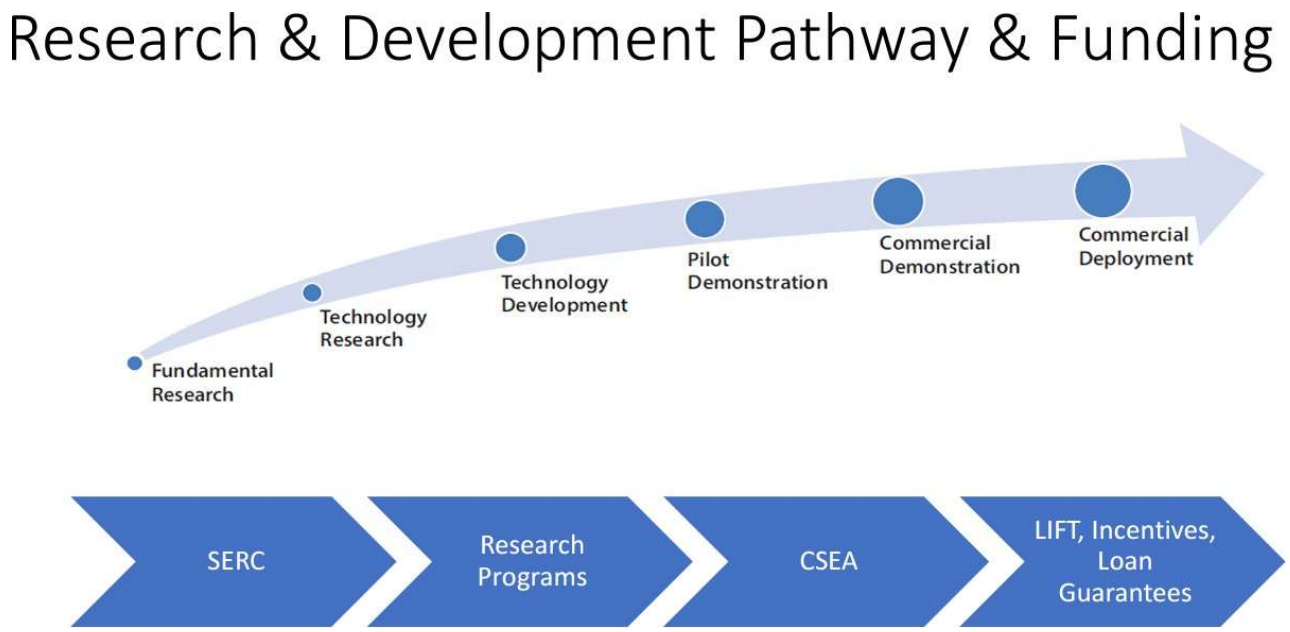


Figure 1: Research and Development Pathway, developed by Al Anderson, former CSEA Director. The State Energy Research Center (SERC), first funded in 2019, was intended to fund early-stage and on-demand research projects. Most of the Industrial Commission's existing research councils funded applied research and technology development. Commercial deployment was funded by programs such as LIFT, BND loans, etc. Funding for engineering and commercial demonstration was lacking, which is the role CSEA now plays.

At the time of CSEA's creation, topics of focus for the state included:

- Recovery from the COVID-19 pandemic and subsequent energy price shocks
- Environmental, Social, and Corporate Governance (ESG) criteria presenting significant market hurdles for agriculture and energy
- Increased frequency of electric grid emergency events, including the aftermath of 2021 Winter Storm Uri
- Protecting our state's jobs and oil and gas revenues

"Regarding the definition of sustainable, you'll see words like energy and national security, affordability, reliability and resilience…These [recent electric grid emergency] events make it clear, that as policy makers we must support developing technologies that ensure this scenario doesn't happen in North Dakota." **-Rep. Glenn Bosch, during testimony in support of HB 1452, March 19, 2021**

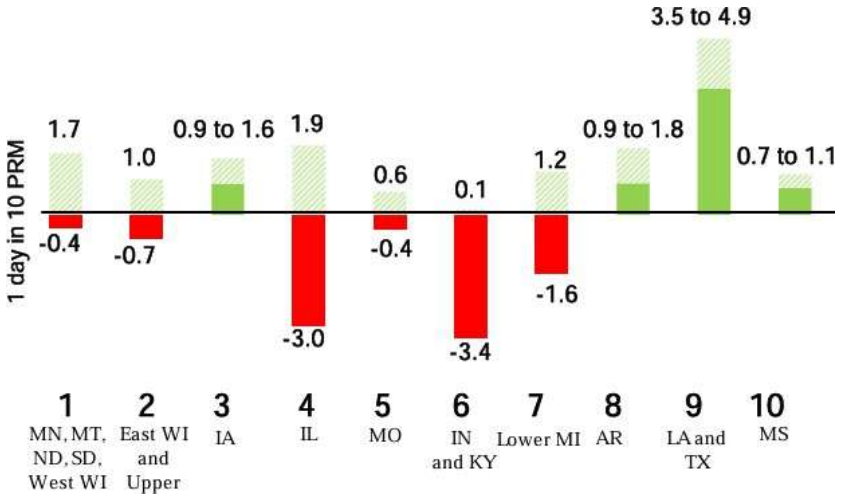


Figure 2: MISO Electric Load Capacity Forecast, 2020. MISO was forecasting resource deficits across 6 of its 10 zones, including North Dakota.

HB 1452 ultimately passed the Senate 41-6 and the House 76-12. In addition to a general fund appropriation of **$25 million for the purpose of providing grants**, CSEA was also provided with a **$250 million line-of-credit** from the Bank of North Dakota (BND) for providing long-term, low-interest loans to projects.

2021 Special Legislative Session Hydrogen Grants

In November 2021, Governor Burgum called for a special session of the North Dakota Legislative Assembly, which purposes included appropriation of federal dollars approved under the American Rescue Plan Act (ARPA). These dollars were required to be contracted by December 31, 2024 and spent by December 31, 2026.

During the special session, the Governor recommended using $25 million of ARPA dollars for CSEA projects.

During the summer of 2021, significant interest was shown toward the development of hydrogen projects. Firstly, a $500,000 appropriation to fund a “hydrogen roadmap” was added to the Industrial Commission’s budget during the 2021 regular legislative session. While this work was underway, Bakken Energy announced a partnership with Mitsubishi to purchase the Great Plains Synfuels Plant and convert it to hydrogen production. Crucial to their efforts was obtaining federal matching dollars from the Department of Energy (DOE). In November 2021, the Infrastructure Investment and Jobs Act (IIJA) was signed, which included $7 billion for investments in hydrogen hubs across the country.

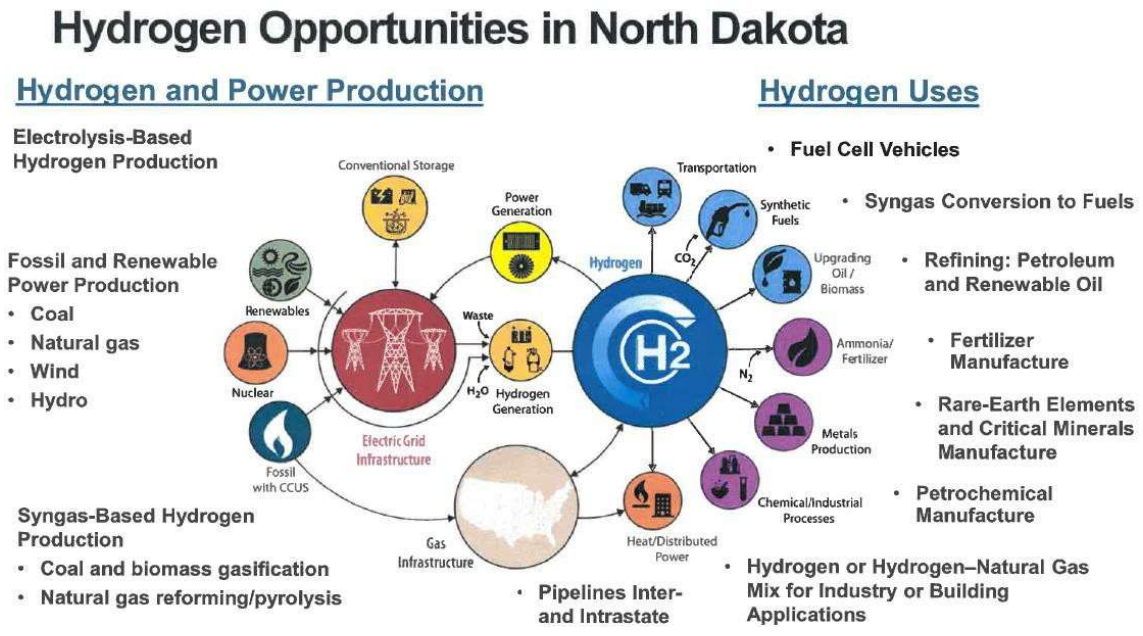


Figure 3: Hydrogen Opportunities, from EERC Legislative Road Map Report, 2022

At the end of the 2021 special session, SB 2345 included **$20 million** for CSEA "for the purpose of providing **hydrogen development grants**".

2023 Legislative Session

During the 2023 legislative session, $50 million was requested for grants and an additional $250 million was requested for loans.

On January 26th, 2023, Bakken Energy announced that its plans to acquire the Great Plains Synfuels Plant were ceased, and it would no longer be moving forward with the project. Citing shifting markets, including an increase in natural gas prices as well as in increase in the 45q carbon capture tax credit, Basin Electric declined to sell the plant. In December 2021, Bakken Energy had received a $10 million grant from the hydrogen ARPA funds as well as an $80 million loan. At the time of Bakken's announcement, they had spent $4,763,929.12 of their grant funds, and had not drawn on their loan, leaving $5,236,070.88 in remaining ARPA funds.

During the 2023 legislative session, topics of focus related to CSEA were:

- Deteriorating outlook for electric grid reliability
- Need for natural gas takeaway capacity by 2027 in order to maintain oil production and thus maintain state tax revenues
- Continued market pressures and ESG concerns
- Discrimination against fossil fuels, i.e. in insurance markets
- Concern with large volume of proposed federal rules and policies in other states (for example, state of Minnesota's carbon-free standard) and their impacts on North Dakota's economy and grid reliability

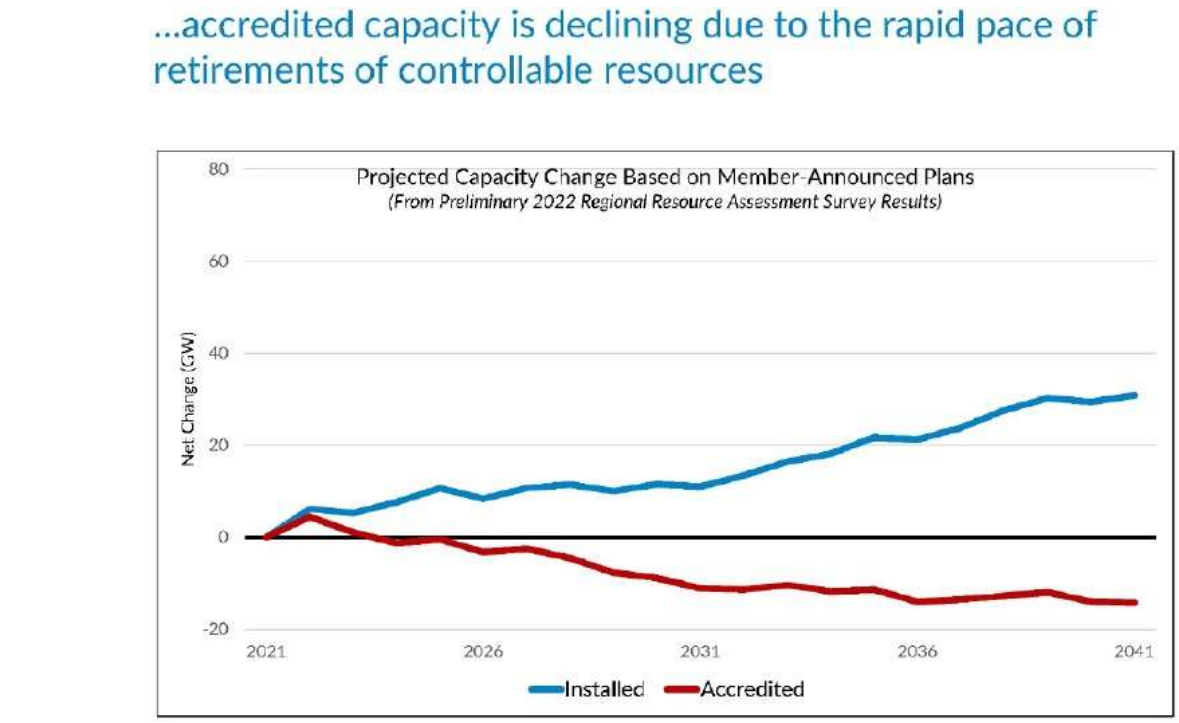


Figure 4: MISO electric installed vs. accredited capacity forecast, updated in 2022. This forecast showed an alarming trend of baseload retirements by late 2025.

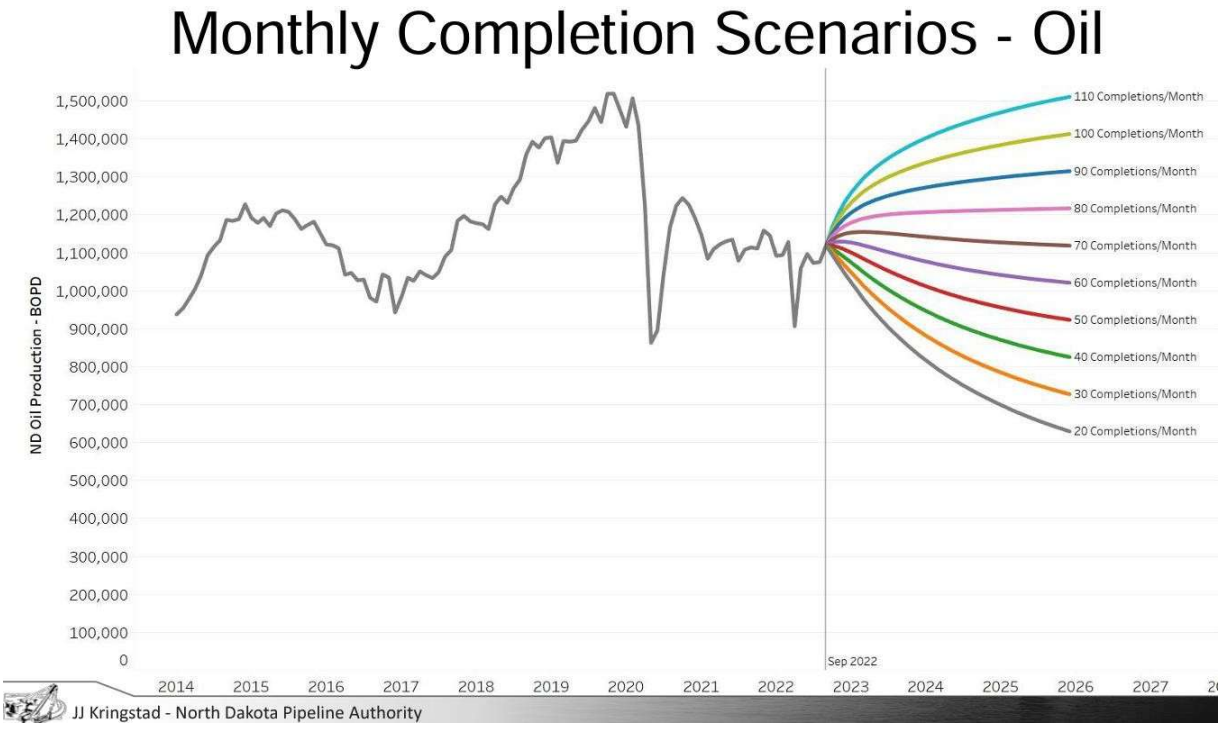


Figure 5: During the 2023 session, Justin Kringstad projected that between 70-80 well completions per month would be needed to maintain oil production and therefore maintain state tax revenues

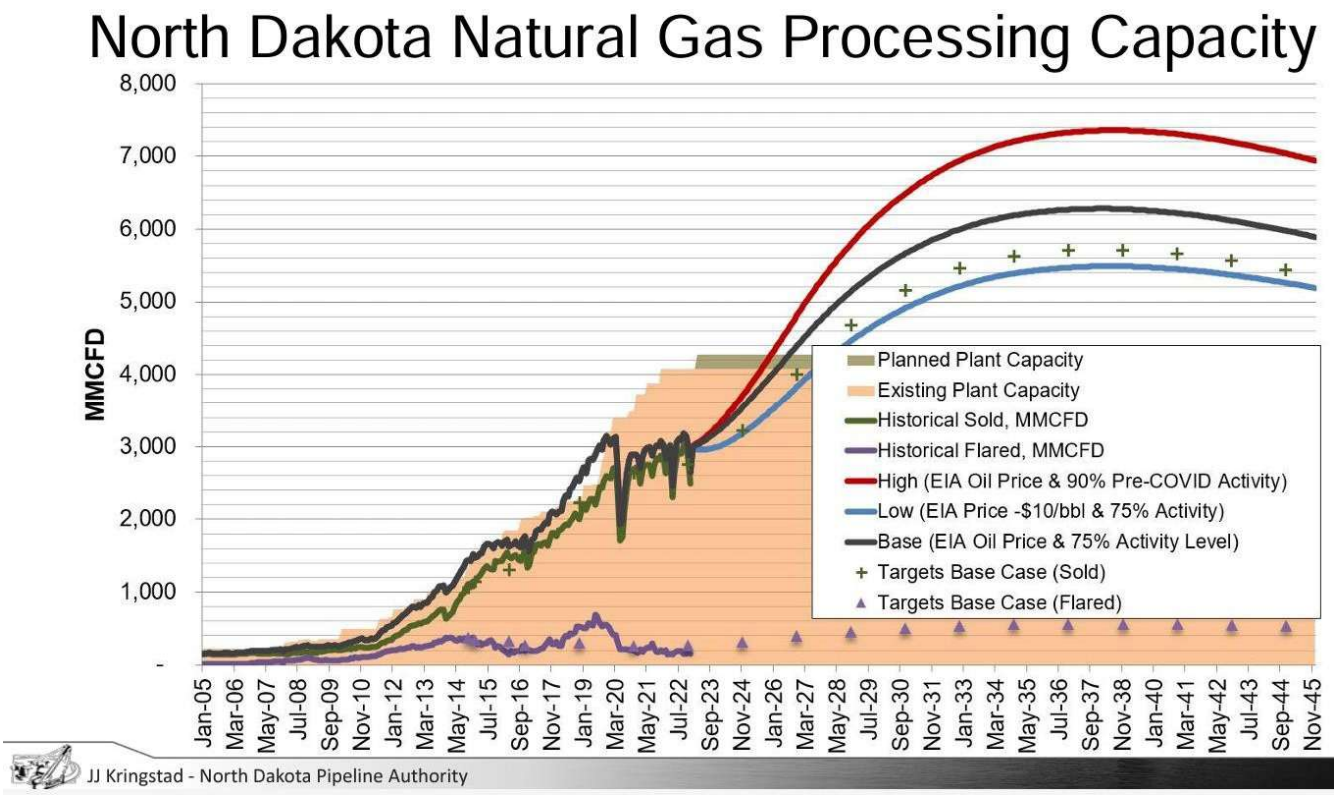


Figure 6: During the 2023 session, Justin Kringstad projected that we would need additional natural gas takeaway capacity between 2026-2027. Without additional takeaway capacity, companies would scale back production and therefore state tax revenues would be reduced

At the end of the 2023 legislative session, HB 1014 appropriated **$30 million for new grants** and authorized an additional **$250 million for loans**. To achieve the new loan-making authority, the legislature used $30 million from SIIF to repay a portion of the existing BND line-of-credit, extended the existing line-of-credit from $250 million to $390 million, and Bakken Energy's $80 million loan was de-committed.

2023 Special Legislative Session Fertilizer Loan

During the 2023 Special Legislative Session, HB 1546 directed CSEA to issue a loan of up to **$125 million** for a fertilizer development project. The project was required to use "hydrogen produced by the electrolysis of water". CSEA was directed to forgive the loan "upon completion of the construction" of the facility, and to request an appropriation from SIIF to repay the loan.

On January 23, 2024, the CSEA voted to award $75 million to Prairie Horizon and $50 million to NextEra, contingent upon their acceptance of the loan terms. 40% of the award was due upon final completion of construction, and 60% was due once the facility began selling up to 75% of its nameplate capacity.

Prairie Horizon declined the award, citing economic disadvantages with the electrolysis technology required within the incentive program parameters. NextEra accepted the parameters and received the entire $125 million award.

2025 Legislative Session

During the 2025 Legislative Session, no additional funding was appropriated to the Clean Sustainable Energy Fund.

2027 Outlook: Purpose and Need for Continued CSEA Investment

As North Dakota looks toward 2027 and beyond, the Clean Sustainable Energy Authority (CSEA) can continue to support large-scale projects that strengthen the state's energy infrastructure, develop new markets for its natural resources, and encourage investment in emerging technologies. The program's role in supporting engineering, demonstration, and commercialization remains important for projects that require substantial upfront capital and face technical or market uncertainties.

Future opportunities for CSEA investment are expected to center on three areas:

Natural Gas Infrastructure Development and Energy Storage

North Dakota's continued growth in oil and natural gas production presents significant opportunities for investment in natural gas infrastructure, processing, transportation, and storage. As natural gas production increases alongside oil production in the Bakken, additional gathering systems, processing facilities, pipeline takeaway capacity, and other infrastructure will be necessary to prevent production constraints, reduce natural gas flaring, and support continued growth in state tax revenues. Opportunities also exist to expand the utilization of natural gas within North Dakota through power generation, petrochemical manufacturing, and other value-added industrial development. Growing demand for computing infrastructure creates opportunities to use North Dakota natural gas closer to where it is produced. Projects that pair data centers with in-state gas-fired generation could support additional oil production by expanding gas demand, help reduce or prevent flaring, and incorporate carbon capture where technically and economically feasible. CSEA may play a role in advancing the engineering and demonstration work needed to evaluate these integrated developments.

Additionally, the state's underground salt formations may provide opportunities for large-scale storage of natural gas, propane, and other hydrocarbons, improving energy security, balancing seasonal demand, and providing greater flexibility during periods of supply disruption. CSEA can play an important role in advancing these opportunities by supporting technical feasibility studies, engineering design,

innovative processing and storage technologies, and commercial-scale infrastructure projects that may otherwise face financing challenges. By helping bridge funding gaps and attracting private-sector investment, CSEA can support the development of critical energy infrastructure, strengthen North Dakota's position as a reliable energy producer, encourage in-state utilization of its abundant natural gas resources, and promote long-term economic growth and diversification.

Critical Minerals and Low-Carbon Manufacturing Development

North Dakota's emerging critical minerals industry and expanding opportunities in low-carbon manufacturing present significant potential for continued investment through the Clean Sustainable Energy Authority. With substantial deposits of rare earth elements and other critical minerals associated with the state's lignite coal resources, along with opportunities to recover valuable minerals such as lithium from oilfield produced water, North Dakota is uniquely positioned to become a leader in the domestic production and processing of materials essential to advanced manufacturing, energy technologies, national defense, and infrastructure development. CSEA can play an important role in advancing these industries by supporting pilot-scale demonstrations, commercial-scale processing facilities, and innovative extraction, refining, and manufacturing technologies. Opportunities also extend to the production of advanced carbon materials, battery components, low-carbon fuels, and other value-added products utilizing North Dakota's abundant natural resources and energy infrastructure. These investments can help bridge the gap between research and commercialization, reduce financial risks for private-sector developers, and attract additional investment to the state. By leveraging North Dakota's existing energy infrastructure, abundant lignite and oil and gas resources, and technical expertise, CSEA can help establish new industries, create high-paying jobs, diversify the state's economy, reduce environmental impacts, and strengthen domestic supply chains for critical materials and manufactured products that are currently heavily dependent on foreign sources. The AmeriCarbon Forge, Ore Spring Materials, and Packet Digital projects reflect this broader opportunity for energy-related manufacturing.

Carbon Capture, Utilization, and Storage Development

North Dakota is uniquely positioned to become a national leader in carbon capture, utilization, and storage (CCUS) technologies due to its abundant coal resources,

existing energy infrastructure, and favorable geological formations capable of supporting permanent underground carbon dioxide (CO_2) storage. Large-scale projects such as Minnkota Power Cooperative's Project Tundra demonstrate the potential for carbon capture technologies to preserve the long-term viability of North Dakota's lignite-based electric generation fleet while significantly reducing carbon emissions. Continued CSEA investment could play a critical role in advancing these projects by helping address the substantial capital costs, technical challenges, and financing gaps associated with commercial-scale carbon capture facilities, CO_2 transportation infrastructure, and underground storage development. Beyond coal-fired generation, opportunities also exist to support carbon capture and storage associated with natural gas processing, industrial manufacturing, and other energy-intensive operations. CSEA could assist with feasibility studies, engineering, demonstration projects, and commercial deployment of innovative technologies that improve capture efficiency, reduce costs, and expand the state's CO_2 storage capabilities. By leveraging public investment to attract private and federal funding, CSEA can help protect North Dakota's existing energy industries, sustain high-paying jobs, support reliable baseload electric generation, and position the state as a leader in the development and commercialization of carbon management technologies.

These areas represent potential future uses of CSEA rather than commitments to specific projects. Continued investment should be guided by the program’s statutory purpose, independent technical and financial review, demonstrated market demand, and the potential for lasting economic benefits to North Dakota.

How CSEA Works

NDCC 54-63.1 outlines the authorities and processes for CSEA. Applicants are eligible to apply for either grants or loans. All applications undergo an economic feasibility review by the Bank of North Dakota as well as an independent technical review. Applications are then forwarded to a non-voting technical review committee, which meets in public to review applications. The CSEA then meets in public to review each application, and applicants are given the opportunity to present to the authority. The CSEA votes to make a recommendation to the Industrial Commission, which is the ultimate authority for approving or denying projects.

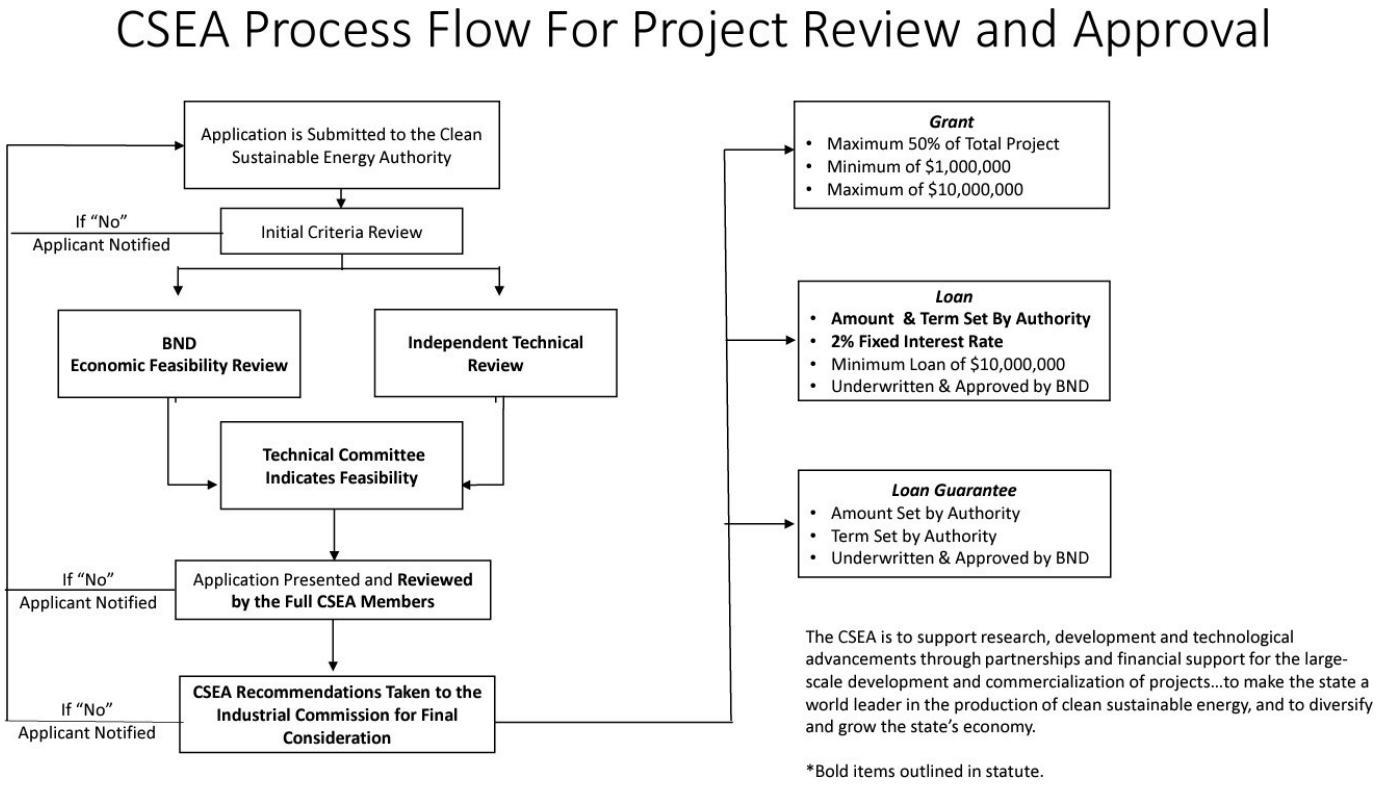


Figure 9: CSEA Process Flow Diagram

Current Status

As of October 2026, the CSEA Fund cash balance is **$17,307,636.77**. The portion of the cash balance that is committed is **$6,813,542.79**, of which $6,701,444.00 is outstanding commitments to grant projects and the remainder consists of administrative costs and other outstanding expenses. **$10,494,093.98** of uncommitted dollars remain in the fund.

During the 2025-2027 biennium, the fund did not receive any new legislative appropriations. The fund also received $505,456 in interest payments.

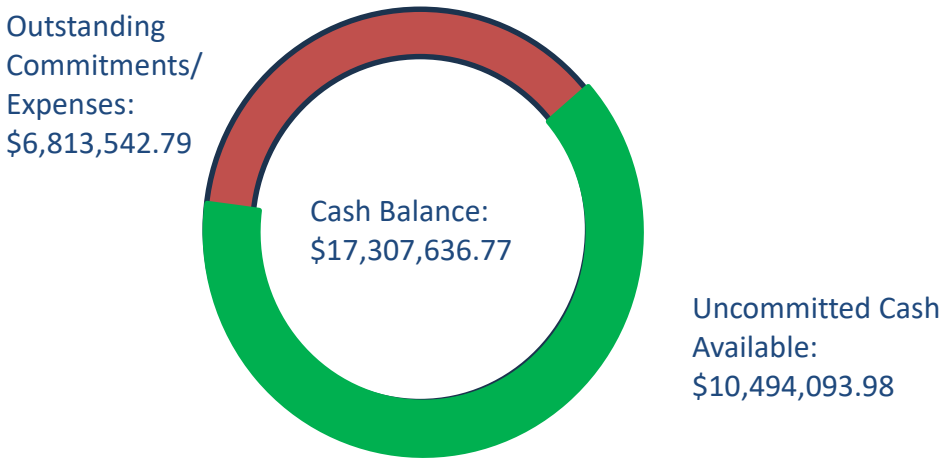


Figure 10: As of October 2026, the uncommitted balance of the CSEA Fund is $10,494,093.98.

Cumulatively, the fund has received $65 million in income from state and federal appropriations. 20 projects have been awarded, with 15 currently active, 5 grants and 10 loans. Since CSEA's inception, $81.8 million has been approved for grants and $585.5 million for loans. $10 billion in non-state match has been committed toward these projects.

Project Updates

C-01-01 : Bakken Energy Dakota H_2 Hub (ARPA Grant and Loan)

The Great Plains Hydrogen Hub project, led by Bakken Energy LLC, aimed to transition the Great Plains Synfuels Plant from coal-based synthetic natural gas production to hydrogen and ammonia production using natural gas as a feedstock. This project received a $10 million grant from ARPA funds and an $80 million loan. The project included three main subprojects:

- Redeveloping the plant with hydrogen production capabilities and carbon capture
- Re-purposing an existing CO_2 pipeline for natural gas transport
- Establishing CO_2 sequestration facilities through partnerships and proprietary Development

Accomplished tasks for this project included:

- Plant scanning for 3D modeling
- Adjusting utility requirements
- Feasibility studies on new electrical systems, cogeneration (COGEN) options, and cooling water integration.

The project team finalized several preliminary designs, issued reports for review, and updated capital cost estimates based on the selection of a preferred autothermal reformer (ATR) licensor, which would streamline hydrogen production. Notably, Bakken planned to initially use hydrogen-fired co-generation to avoid CO_2 emissions and reduce initial capital outlays, with a later transition to natural gas-fired co-generation with carbon capture as hydrogen demand increased. The team also evaluated the potential impact of the Inflation Reduction Act (IRA) on project costs and timelines.

Ultimately, the project team was not successful in negotiating a sale of the Great Plains Synfuels Plant from Basin Electric, citing favorable coal-gasification economics and challenging hydrogen markets. The project ultimately de-committed **$5,236,070.88** in

ARPA funds, and de-committed its entire $80 million loan.

C-01-02 : Cerilon GTL FEL-2 (Grant and Loan)

The Cerilon GTL ND Phase 1 project, led by Cerilon GTL ND Inc., was designed to convert North Dakota's excess natural gas into synthetic products like ultra-low sulfur diesel and Group III+ base oils, helping reduce natural gas flaring in the region. This project received a **$7 million grant** and a **$40 million loan**.

In its FEL-2 phase, the project focused on Front-End Loading (FEL) Stage 2, which involves preliminary design and feasibility work to establish technical and economic viability before detailed engineering begins. Specifically, the FEL-2 phase included securing land, advancing environmental studies, and preliminary engineering tasks like syngas production and Fischer-Tropsch synthesis evaluations. Carbon capture and sequestration plans were also developed, aiming to reduce emissions by storing captured CO_2 underground. Environmental permitting and assessments were conducted, with the site selected to be close to pipelines and transport infrastructure, as well as suitable geology for CO_2 storage.



Figure 12: Preliminary Site Layout

The project team engaged local stakeholders, officials, and potential business partners, projecting economic impacts from job creation and infrastructure investments. The team also drafted offtake agreements with companies for the sale of the facility's products. Planned next steps included the transition to FEL-3, or Front-End Engineering and Design (FEED), which involves more detailed design and final cost estimates to support a potential Final Investment Decision (FID) by 2025. However, the project's continuation depended on further financing and regulatory approvals, as well as securing additional commercial agreements. Phase 1 has been completed.

C-01-03 : Wellspring Hydro Produced Water (Grant)

The Wellspring Hydro project focused on converting produced water from the Bakken oil fields in North Dakota into valuable products, including salt for chlor-alkali production and lithium. The project received a **$1 million grant.**

This project advanced through its FEL-3 (Front-End Loading Stage 3) phase, where it completed detailed engineering designs, feasibility studies, and market assessments. Wellspring Hydro's process aimed to repurpose produced water into a sustainable resource, with additional goals to reduce waste and emissions. The FEL-3 phase also included pilot testing with engineering consultants and subject matter experts to validate the quality of recovered salts and initial lithium extraction processes, with support from Prairie Lithium. An analysis was conducted to compare the project's environmental and operational impact with conventional chlor-alkali facilities, which are typically subject to strict environmental regulations.

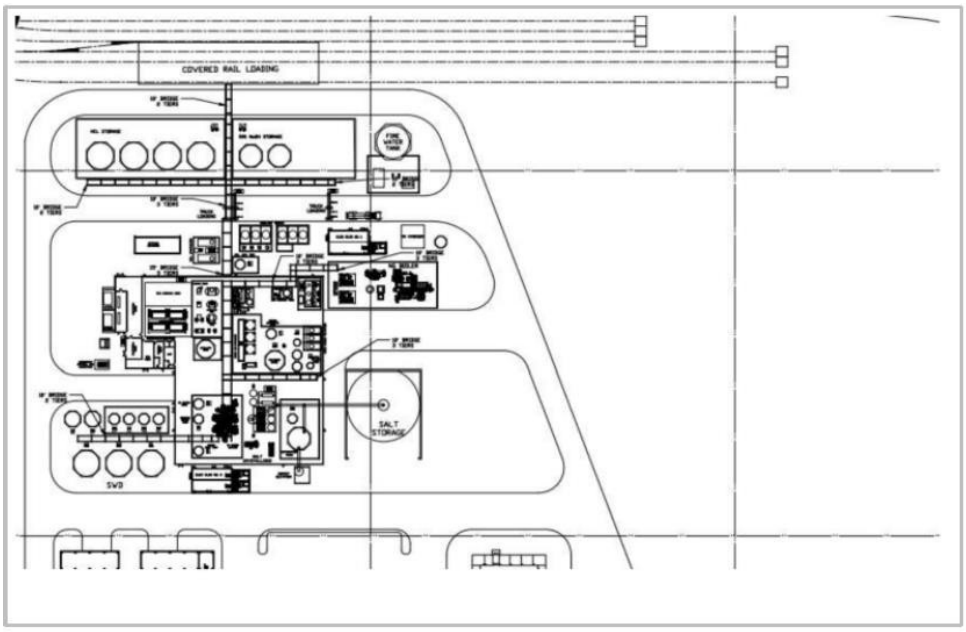


Figure 13: Preliminary Plant Layout

The project progressed toward final engineering and permitting steps, supported by various engineering and consulting firms. Wellspring Hydro collaborated with DEQ (Department of Environmental Quality) and NDIC (North Dakota Industrial Commission) to advance the permitting process, including discussions for a saltwater disposal well. The company completed market research to evaluate economic and environmental benefits, highlighting potential competitive advantages over other chlor-alkali facilities. The project was estimated to reduce environmental impacts associated with produced water disposal and promote resource sustainability in North

Dakota. Wellspring Hydro planned to continue with the permitting, patenting, and engineering validation stages, with additional design refinements expected to improve project viability and attract investor interest. This project has been completed.

C-01-04 : Midwest Ag Energy Carbon Capture (Grant and Loan)

This project involved the development and implementation of a commercial-scale carbon capture and sequestration project by Midwest Ag Energy Group in McLean County, North Dakota. The project received a **$3 million grant** and a **$100 million loan**.

The project involved the construction of a Capture Compression & Dehydration Facility (CCDF), an injection well (MAG 1), a monitoring well (MAG 2), and a CO_2 transport line. With necessary regulatory approvals obtained, including a Class VI permit from the North Dakota Department of Mineral Resources and EPA's Monitoring, Reporting, and Verification (MRV) Plan, the project aimed to capture CO_2 emissions from the Blue Flint Ethanol facility and store them securely underground. The successful execution of the project demonstrated that CO_2 emissions could be managed effectively, supporting regional sustainability by enhancing the economic feasibility of ethanol production.



Figure 14: Photo of Completed Carbon Capture Facility

The project was marked by multiple operational challenges such as delays due to equipment issues and weather conditions. Despite these, Midwest Ag Energy completed the project by October 2023, achieving all performance metrics, including environmental baseline monitoring and pipeline installation. The first CO_2 injection occurred in late October 2023, and by early 2024, the system had proven its operational reliability. The initiative reduced the carbon intensity of ethanol production, contributing to sustainable energy practices and encouraging similar CCS projects in the region. This pioneering work not only met its carbon reduction goals but also positioned the company as a leader in innovative energy solutions, influencing potential future CCS projects and receiving support for further large-scale initiatives, including a $38 million DOE grant for related endeavors.

C-01-05 : EERC Coal Creek CCUS Design (Grant)

This project involves the front-end engineering and design (FEED) for a CO_2 capture project at Coal Creek Station, North Dakota's largest lignite power plant. The project received a **$7 million grant**.

Key project partners include Rainbow Energy Center as the operator, Mitsubishi Heavy Industries as the technology provider, and Burns & McDonnell handling engineering aspects. The design emphasizes a dual-train CO_2 capture system, capturing 95% of emissions from two boiler units. Challenges such as the need for equipment redundancy, integration of steam cycle with existing turbines, and adaptation to cold weather performance were addressed.
This project was completed successfully.

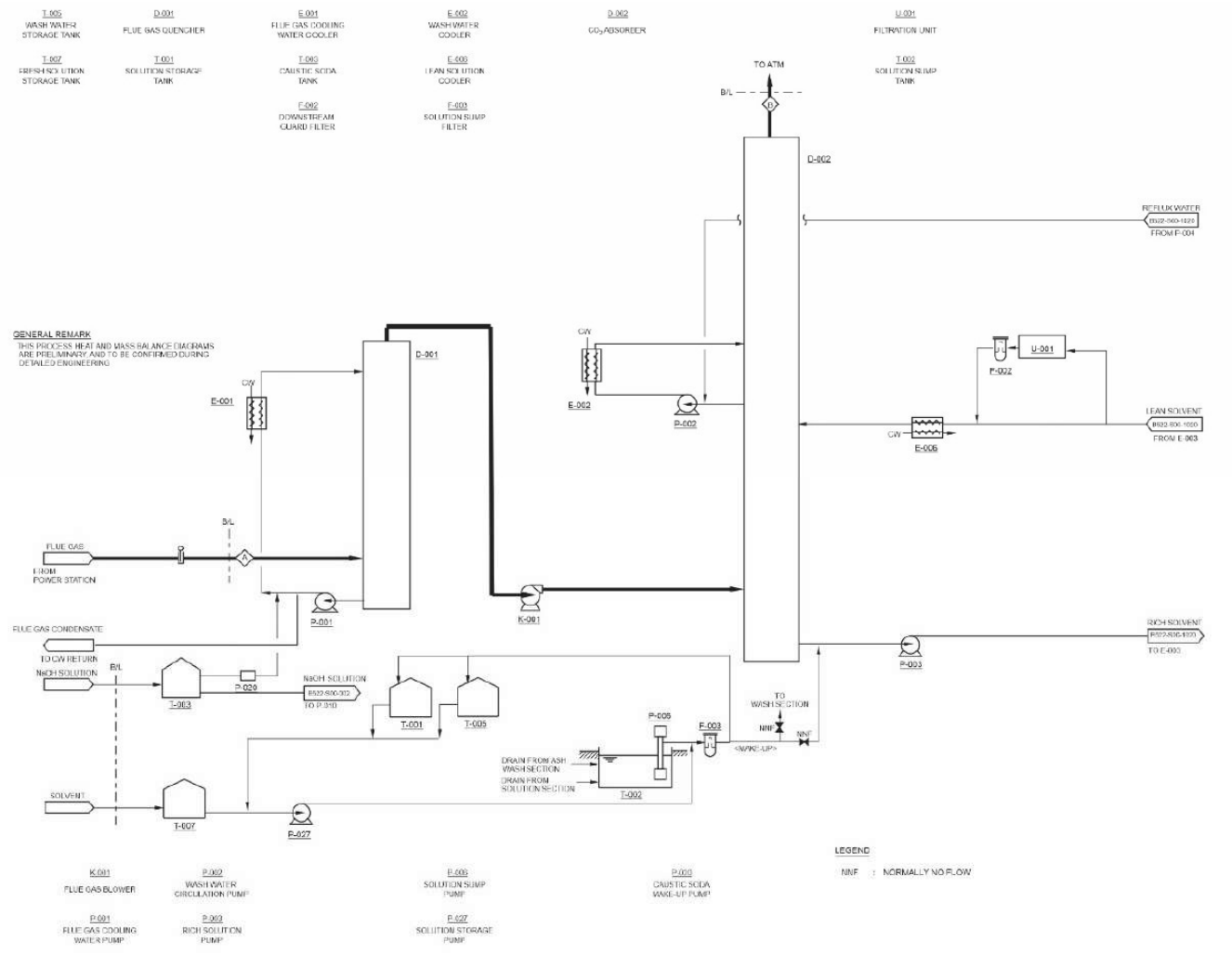


Figure 15: Process Flow Diagram for Coal Creek Carbon Capture System

Progress was made despite initial delays due to financial constraints linked to the ownership change of Coal Creek Station, completed in May 2022. The project has reached near-completion of its FEED phase, with essential documentation such as the Basic Engineering Design Data (BEDD) undergoing continuous updates to reflect evolving design and operational requirements. A major finding was the need for equipment redundancy (e.g., additional compressors) to ensure operational reliability. The integration of CO_2 capture with existing turbines revealed the necessity for modifications to handle various steam extraction scenarios. Permitting strategies, involving air and water discharge considerations, have now been developed, alongside a comprehensive cost-estimation framework, incorporating inputs from vendor bids and engineering assessments.

C-01-J: Valence Flare Gas Capture (Loan)

Valence Natural Gas Solutions LLC pursued a project to scale its Flare Gas Capture (FGC) technology in North Dakota, with the aim of reducing gas flaring and providing mobile natural gas solutions. This project received a **$15 million loan**.

This effort included the expansion of its Standard FGC units (4.0 MMCFD) and development of Micro FGC units (1.0 MMCFD) to capture stranded flare gas across the state. In 2022, Valence successfully deployed its second Standard FGC unit and began fabrication of additional units. Meanwhile, Valence advanced the Micro FGC units, completing design, ordering long-lead items, and beginning fabrication and assembly. The company also bolstered its CNG transport capabilities, growing its fleet by deploying 10 new transport trailers. By the end of the reporting period, Valence had captured 1.7 billion cubic feet of flare gas, reducing CO_2 emissions by over 155,000 tons, while providing cost savings to producers who used CNG to displace diesel. This expansion led to 26 new hires, contributing to Valence's increased staffing.



Figure 16: Valence Unit in Operation in North Dakota, 2022.

Valence encountered several challenges, particularly supply chain disruptions that extended equipment lead times and delayed the deployment of Micro FGC units. Labor shortages and rising wages also impacted the pace of hiring for skilled roles, including truck drivers and gas plant operators. Despite these setbacks, the company adapted by re-designing some system components for field installation and securing rental options for essential equipment to maintain deployment schedules. Lessons learned included the importance of timing in FGC unit availability to align with customer needs, and the rising incidence of H_2S in some customer locations, prompting adjustments in their technology.

To date, the State of North Dakota has received over **$30 million** in additional tax revenue due to the volume of gas captured by Valence's CSEA project.

C-02-06: Enerplus Carbon Capture (Grant)

In 2022, Enerplus received a $1 million grant to evaluate and test industrial scale carbon capture from natural gas power generators. Supply chain limitations along with delays in securing additional funding delayed the pilot project. Additionally, in 2024 Chord Energy announced its acquisition of Enerplus's assets in North Dakota. No contract was signed and this grant award was decommitted.

C-02- C-02-I: Minnkota Project Tundra (Loan)

Project Tundra is a proposed large-scale carbon capture and storage initiative associated with Minnkota Power Cooperative's Milton R. Young Station, a lignite-fired power plant in North Dakota. The initiative is intended to capture carbon dioxide from power generation and provide for its transportation and permanent geologic storage, supporting the continued utilization of North Dakota lignite resources while reducing emissions.

The CSEA loan arrangement has been revised to a total of $205 million, allocated as $45 million to Minnkota Power Cooperative and $160 million to project partner Reliant Carbon Capture & Storage. This revised financing structure supersedes the earlier description in the 2023–2025 report. The allocation reflects the distinct project roles of the power-generation and carbon-capture-and-storage participants.

C-03-07 : EERC Liberty H_2 Hub (ARPA Grant)

The Liberty H_2 Hub project, led by the Energy & Environmental Research Center (EERC), aimed to develop a comprehensive front-end engineering and design (FEED) study supporting large-scale clean hydrogen (H_2) production, transport, and storage at the Prairie Horizon facility in southwest North Dakota. The project received a **$10 million ARPA grant**.

Involving stakeholders like MPLX and TC Energy, the project sought to produce clean hydrogen at a rate of 190 tons per day using autothermal reforming (ATR) combined with carbon capture and storage (CCS). The FEED study also included geologic storage considerations for both hydrogen and CO_2, logistics infrastructure for pipelines, and clean ammonia production to leverage market opportunities. Progress toward project tasks included adjustments to scope, such as increased ATR capacity and removal of electrolysis, along with the advancement of technology licensor selection and engineering design updates.

Challenges emerged in subsurface storage design, requiring comprehensive assessments of potential hydrogen and CO_2 storage sites west of Dickinson, ND. The EERC screened formations, analyzed well logs and seismic data, and initiated plans for drilling a stratigraphic test well to gather data crucial for subsurface characterization. Efforts included landowner engagement efforts for pipeline routes and survey permissions, with an emphasis on voluntary participation. Progress was also made on permitting strategies, despite a change in the consulting firm handling this scope. Expenditures and budget tracking were detailed, showing significant investment in labor, administrative efforts, and subcontracting services.

In 2024, MPLX and TC Energy decided to halt further spend on the project, citing premature hydrogen markets. A total of **$6,836,638.60** was de-committed.

C-03-08 : Newlight Project Phoenix (Grant and Loan)

Newlight Technologies' Project Phoenix aimed to develop a large-scale facility in North Dakota for producing AirCarbon®, a biodegradable, carbon-negative biopolymer derived from renewable natural gas (RNG). The project received a **$4,185,625 grant** and a **$30 million loan**.

This project followed Phase 1 feasibility studies, which confirmed that constructing such a plant in the state was viable, although it presented challenges due to local climate and logistical considerations. The Front-End Engineering and Design (FEED) phase was conducted in partnership with Burns & McDonnell and reached 97% completion, with the final deliverables expected by the end of 2024. Progress included optimizing the site layout to reduce construction costs, enhancing system efficiency by adjusting equipment sizing, and exploring options for wastewater reuse as crop fertilizer. Site development efforts involved assessing multiple land plots at Marley Crossing, initiating utility tie-in plans, and negotiating with potential partners to ensure timely infrastructure delivery.



Figure 17: AirCarbon® Manufacturing Facility

Despite notable progress, the project encountered delays, such as a late start to Process Hazard Analysis (PHA) documentation, pushing the timeline for some material take-offs. Utility partnerships and site selection were underway, with Newlight engaging local providers and analyzing groundwater for potential use. The project focused on securing competitive bids for equipment and advancing engineering in various scopes, including process, mechanical, piping, and electrical engineering, as well as civil design. Permitting and technical challenges were managed with assistance from Barr Engineering, ensuring critical path items were addressed. To complete the project, site negotiations were finalized, identified risks were mitigated, and preparation was undertaken for subsequent phases that would involve state and local support.

C-03-09 : Enerplus Geothermal (Grant)

This project involved the replacement of conventional water coolers with geothermal power production skids, enhancing operational energy efficiency and sustainability. This project received a **$1,098,500 grant**.

Traditionally, water cooling has been managed by large coolers to prepare produced water for third-party gathering lines, but Enerplus sought to integrate geothermal technology that utilizes the Organic Rankine Cycle to convert waste heat from water cooling into on-site power. This power would help offset the energy demands typically met by line power or on-site natural gas generators. The plan included deploying these geothermal skids at well sites during initial production phases when water temperatures and flow rates are highest, thereby maximizing both cooling efficiency and power generation.

Phase 1 of the project included the engineering, design and leasing of a geothermal skid for initial testing at the Devils Canyon Pad in North Dakota. By the end of the second quarter of 2024, the geothermal skid was installed and prepared for operation. The results from these operations, including temperature, flow rates, and power output data, were planned for analysis and subsequent reporting in early 2025. However, this project contract expired and $948,249.00 was decommitted.

C-04-10 : Bushel Farm Traceability Dashboard (Grant)

Bushel Inc. embarked on a project to develop a grain traceability dashboard that facilitates farm data sharing and reporting across all producers utilizing the Bushel Farm platform. This project received a **$3.5 million grant**.

During the second quarter of 2024, significant progress was made in three key areas: infrastructure development, security enhancements, and partner outreach for integration into carbon and environmental, social, and governance (ESG) programs. The team modernized application processing and storage systems in preparation for increased demand and incorporated single sign-on (SSO) capabilities to streamline data linking essential for carbon programs. Security measures were also strengthened to meet SOC2 compliance standards. Concurrently, Bushel engaged with partners to align carbon modeling efforts with regulatory compliance, including preparatory work for 45Z compliance audits and governance.

Deliverables during this period included creating a commercial/advisor view to allow data aggregation and reporting by field representatives or program managers, establishing advisor access for data sharing, and developing a Kubernetes-based infrastructure alongside a Google Cloud Build migration from AWS. Challenges faced included delays in 45Z legislation, which impacted commercialization efforts and the standardization of their model. Lessons learned highlighted the importance of direct producer engagement to scale programs effectively and the necessity of third-party involvement to ensure tax credit claims related to ESG activities are verified and auditable.

C-04-11 : Wellspring Hydro Produced Water 2 (Grant and Loan)

Wellspring Hydro continued a project to harness produced water as a sustainable feedstock for clean energy and commercial products. The project received a **$5 million grant** and a **$2.5 million loan**.

This project aims to produce lithium via extraction from oilfield produced water. The project's primary objectives included field validation to demonstrate technical and commercial feasibility, obtaining performance guarantees from technology providers, and completing initial detailed designs to secure technology vendors and plan for the procurement of critical equipment. Progress in this initial phase involved collaborations with Alfa Laval on designing a salt crystallizer and setting up field validation protocols for small-scale pilot tests. Independent preparations for field analysis were also carried out to accelerate preliminary feedback and support future pilots.

During the reporting period, Wellspring Hydro completed FEL-3.1 and FEL-3.2 stages, refining the project's design and capital budget. These advancements enhanced the project's efficiency and allowed for capital allocation strategies with input from construction vendors. Meetings with regulatory bodies such as the North Dakota Department of Environmental Quality (DEQ) and the North Dakota Industrial Commission (NDIC) were also conducted to align permitting processes for the facility and saltwater disposal (SWD) well. Furthermore, a comprehensive market report with partner Nex-Chlor was completed to assess local supply, demand, and sustainability comparisons, aiding strategic planning.
A lithium refining unit, with approval from the CSEA advisory board, was installed on a location in Texas, which allowed the company to obtain needed samples for potential commercial partners.

C-04- F: Rainbow Energy Coal Ash Recycling (Loan)

Rainbow Energy Center's project, titled "Lignite Combustion Product Enhancements," aimed to optimize the use of coal combustion residuals at Coal Creek Station. The project received a **$42.5 million loan**.

The project is focused on establishing commercial facilities capable of processing bottom ash and flue gas desulfurization (FGD) materials into high-grade commodities for regional markets, thus moving away from traditional storage in solid waste facilities. The initiative is designed to support environmental and economic objectives by reducing waste, lowering CO_2 emissions, and supporting the state's carbon neutrality goals by 2030. Key tasks involve detailed engineering, design, and construction of drying and grinding facilities for bottom ash and processing facilities for FGD materials, leveraging expertise from partners like EcoMaterial Technologies Inc. and Barr Engineering Co.

C-05-12 : Scranton Green Pig Iron (Grant)

Scranton Holding Company/North American Iron, Inc. (NAI) embarked on a project to develop a "green" pig iron production facility aimed at replacing traditional high-carbon-emission iron production with a near carbon-neutral, U.S.-based alternative. This project received a **$7 million grant**.

The initiative focused on deep decarbonization in the steel production process, reclaiming mining waste stockpiles, and bolstering market competitiveness by supplying major U.S. steel buyers. Project efforts included collaboration with Civil and Environmental Consultants, Inc. (CEC) to commence the FEL-2 Front-End Engineering Design (FEED) study, with equipment and process design work supported by Tenova. During this period, NAI also engaged in land acquisition, securing leases at multiple sites, and prepared for various environmental and operational permits with state regulatory bodies.

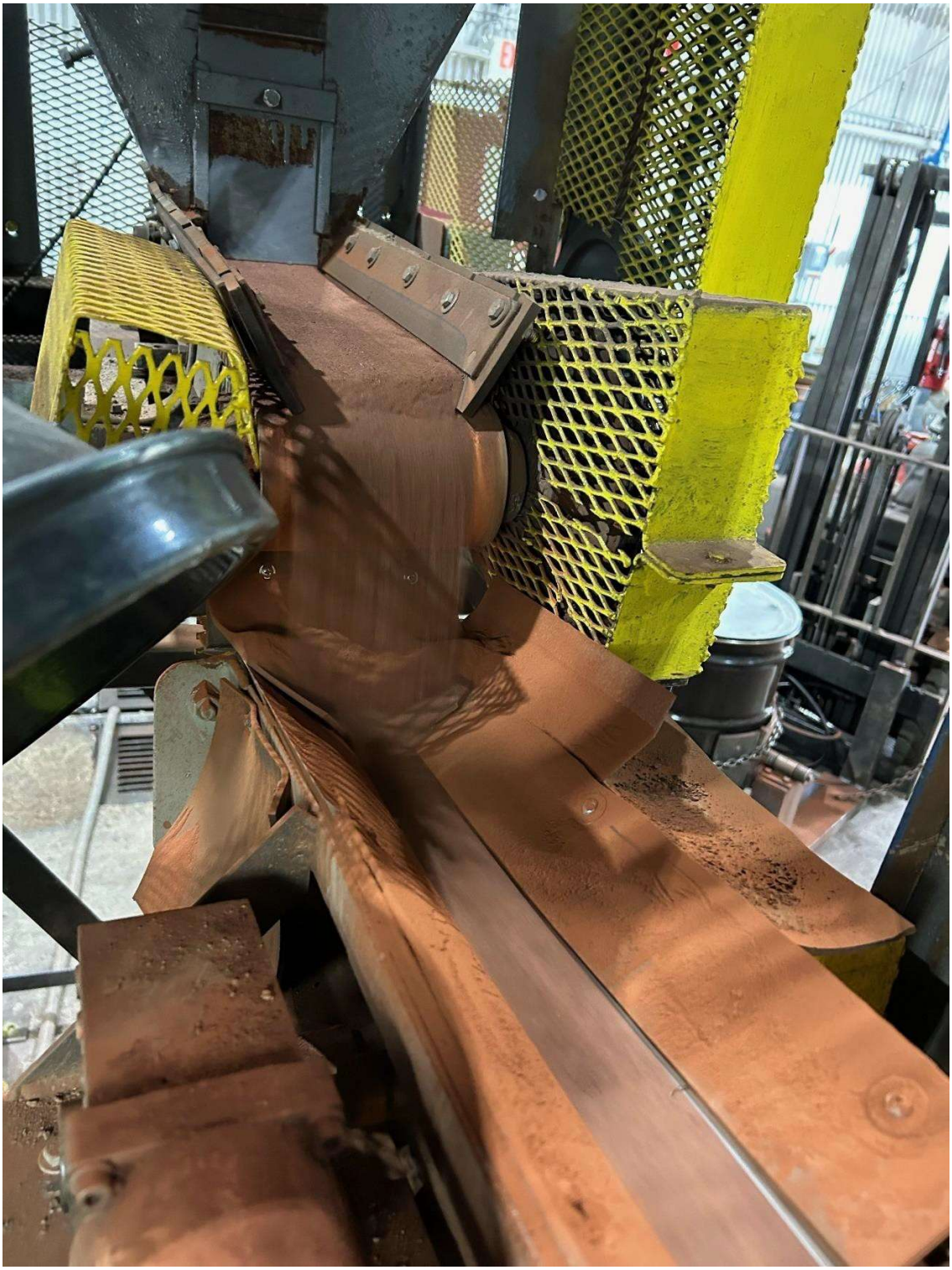


Figure 18: Pig Iron Materials Handling

Progress highlights included mineral exploration and ore testing by Northeast Technical Services, with specifications met for pellet production to be tested by

Tenova. Permitting processes advanced, notably with applications submitted to the Minnesota Department of Natural Resources for mining operations.

Mineral Exploration and permitting tasks have successfully been completed, and this project has completed.

C-05-13 : EERC Marathon Renewable Fuel Expansion (Grant)

The Energy & Environmental Research Center (EERC), in partnership with Marathon Petroleum Corporation (MPC), proposed a front-end engineering and design (FEED) study for the expansion of the Dickinson Renewable Fuel Facility in North Dakota. The project received a **$3.3 million grant**.

This project aimed to enhance the facility's renewable fuel production capacity by up to 90% and diversify its output to include sustainable aviation fuel (SAF). The scope also involved the addition of a pretreatment unit to process various low-carbon feedstocks and the integration of carbon capture technology at the hydrogen production facility to reduce the carbon intensity (CI) of its operations by more than 20%.

In 2024, the project sponsor notified the NDIC that it would not be moving forward with the project, citing market challenges. The entire award was de-committed.

C-05-14 : Dakota Lithium Batteries/Dakota Battery Materials (Grant)

Dakota Lithium Materials (DLM) launched a project to develop a production line in Grand Forks, North Dakota, capable of producing 1,000 metric tons per year (MT/Y) of lithium iron phosphate (LFP) cathode materials using a novel dry-process technology. This project received a **$2 million grant**.

The project was funded partly by CSEA to help mitigate U.S. supply chain challenges for battery materials. Initial progress focused on project management, planning, and the procurement of necessary equipment. Despite not receiving funding from the Department of Energy's Storage Innovation program, DLM increased its contribution by $2 million to match the NDIC grant, securing a project total of $4,019,944. Facilities

were leased, including a 6,542-square-foot warehouse in Grand Forks that was equipped for chemical lab operations, testing, and pilot production.

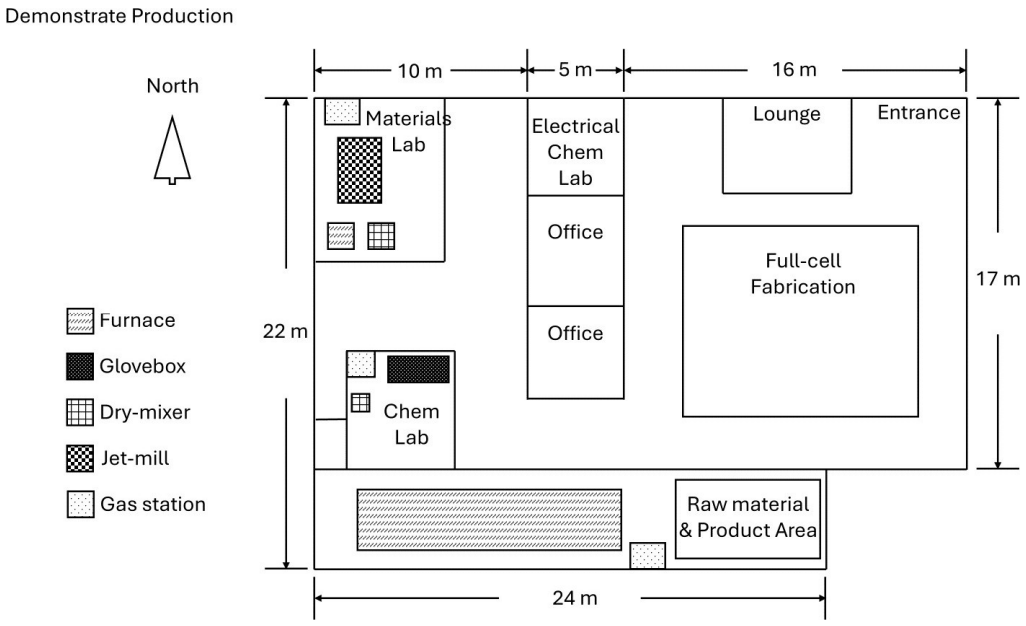


Figure 19: Dakota Lithium Facility Layout

The project's progress included the installation and activation of key equipment such as a two-station glovebox, a Resodyn LabRAM II mixer, and a full-cell battery tester, among others. Initial material testing and preparation were conducted, resulting in mixed LFP batches now pending further calcination and testing. Some delays occurred due to city code compliance requirements for high-power outlet installations needed for the pilot-scale furnace. Lessons learned emphasized the importance of early engagement with local suppliers for services such as power and gas, highlighting the efficiencies gained from consolidating all tasks in-house at their leased facility.
Due to internal restructuring and the creation of a new business entity, the new business name for this project is Dakota Battery Materials, Inc. A one-year extension was also granted, and the Final Report is due June 30, 2028.

C-05-15 : Cerilon GTL FEL-3 (Grant and Loan)

Packet Digital, LLC is developing a domestic lithium-ion battery cell manufacturing and research facility in Fargo, North Dakota. The company's October 2025 application describes an approximately 80,000-square-foot facility intended to manufacture high-power and high-

energy-density pouch cells for unmanned aircraft systems, defense, aerospace and other autonomous applications. The facility is intended to support domestic supply chains and reduce reliance on imported battery cells.

This initiative was driven by the critical need to strengthen the national supply chain for energy storage, specifically to support the U.S. military and commercial autonomous systems that rely on high-energy-density, lightweight batteries. The plant, set to be operational by late 2026, aims to enhance national security by reducing dependency on foreign battery suppliers and emphasizing domestic production of critical goods.

The project application identifies a total proposed project cost of $100,827,845 and requested a $2,297,376 grant and an $18,842,659 loan. The company received the grant funds requested of $2,297,376. In addition to the $17 million CSEA loan award identified in the prior biennial report, Packet Digital received a further $10 million loan award, bringing the reported CSEA loan awards to $27 million. Together with the $2,297,376 grant, total reported CSEA awards for Packet Digital are $29,297,376. The additional $10 million loan amount was provided for this report update.

According to the application, construction began in October 2024, with commissioning and initial production targeted for 2026. The proposed initial capacity is approximately 2,000 battery cells per eight-hour shift, with future expansion contemplated. The application also describes research partnerships focused on battery chemistries and North Dakota-derived materials. These are applicant-reported plans, not independently verified completed milestones.

C-06-17: Ore Spring Materials – The Forge Project: Rare Earths and Critical Materials Integration (Grant)

Ore Spring Materials, LLC, an affiliate of AmeriCarbon Enterprises, proposes to integrate rare earth element and critical mineral recovery with the advanced carbon manufacturing operations planned for AmeriCarbon's Forge Project in McLean County. The project is intended to create additional value from North Dakota lignite and process by-products by recovering rare earth elements, germanium, gallium and other critical materials.

The October 2025 application proposed a $4.5 million project and requested a $2.25 million CSEA grant. The amount of grant funds awarded was $1,125,000.

Ore Spring plans to collaborate with the University of North Dakota, Microbeam Technologies, AmeriCarbon and other partners to optimize lignite-derived feedstocks, evaluate recovery of

critical minerals from carbon-process ash and residues, and develop engineering and economic plans for commercial-scale integration at the Forge site. The expected results include validated process-integration strategies and a framework for potential commercial deployment; these remain proposed outcomes pending project reporting.

C-06-D: AmeriCarbon Forge – The Forge Project (Loan)

AmeriCarbon Forge, LLC is developing The Forge Project, a proposed commercial-scale advanced carbon manufacturing facility near Underwood in McLean County, North Dakota. The facility would use AmeriCarbon's proprietary Liquid Carbon Process to convert North Dakota lignite into Eco-Pitch™, an engineered carbon material intended for industrial, infrastructure, advanced-materials and defense applications. The development is planned near the Falkirk Mine and Coal Creek Station, leveraging the region's existing lignite and energy infrastructure.

The October 2025 application sought a $40 million CSEA loan for a project with a planning cost of approximately $100 million. The CSEA loan award is $30 million. The award amount, rather than the $40 million application request, is used in this report. The application describes an approximately 100-ton-per-day facility producing an estimated 30,000 tons per year of Eco-Pitch™ and carbon by-products, along with approximately 250–300 construction jobs and 50 permanent operating positions. These are projected outcomes, not completed results.

The project is intended to expand the market for North Dakota lignite through value-added manufacturing and to provide a platform for related critical-materials recovery activities, including the separate Ore Spring Materials project. The applicant describes a development sequence involving engineering, construction, commissioning, product qualification and performance demonstration.