

ENERGY DEVELOPMENT AND TRANSMISSION COMMITTEE

The Energy Development and Transmission Committee was created in 2007 and was made permanent in 2011. Under North Dakota Century Code Section 54-35-18, the committee is directed to study the impact of a comprehensive energy policy for the state. The study may include reviewing and recommending policies related to extraction, generation, processing, transmission, transportation, marketing, distribution, and use of energy.

The committee is responsible for receiving various reports, as assigned by the Legislative Management, including:

- An annual report from the State Energy Research Center regarding its research activities and accomplishments. (Section 15-11-40)
- A biennial report from the North Dakota Transmission Authority regarding its activities. (Section 17-05-13)
- A biennial report from the Energy Policy Commission regarding recommendations for a comprehensive energy policy. (Section 17-07-01)
- A report, beginning December 2014 and every 4 consecutive years thereafter, on the amount of money in the carbon dioxide storage facility trust fund and on the amount of fees needed to satisfy the fund's objectives. (Section 38-22-15) The next report is scheduled to be received in December 2022.
- A biennial report from the High-Level Radioactive Waste Advisory Council regarding its findings (Section 38-23-08)
- A biennial report from the North Dakota Pipeline Authority regarding its activities. (Section 54-17.7-13)
- A report from a coal conversion facility that achieves a 20 percent capture of carbon dioxide emissions and receives a tax credit. (Section 57-60-02.1) The committee did not receive a report because there are currently no eligible coal conversion facilities receiving a credit; therefore, no report is required.
- Status reports during the 2019-20 interim report from the Industrial Commission, through its study contractor, regarding the status of the Industrial Commission's study on recycling produced water in oil and gas operations and receive a final report on the study by October 1, 2020 (2019 House Bill No. 1014, § 19).
- A report from the Energy and Environmental Research Center regarding the results and recommendations of the underground gas storage pilot project (2019 House Bill No. 1014, § 25).

Committee members were Senators Rich Wardner (Chairman), Brad Bekkedahl, Kathy Hogan, Ray Holmberg, Merrill Piepkorn, and David S. Rust and Representatives Dick Anderson, Tracy Boe, Mike Brandenburg, Alisa Mitskog, Todd Porter, and Don Vigesaa.

COMPREHENSIVE ENERGY STUDY

The committee is responsible for studying a comprehensive energy policy for the state. As part of this study, the committee received a report from the Energy Policy Commission, also known as the EmPower ND Commission.

Energy Policy Commission

In 2009 the Energy Policy Commission was created by Section 17-07-01 to develop a comprehensive energy policy and to monitor progress toward reaching the goals of the policy. The commission consists of the Commissioner of Commerce as Chairman and members appointed by the Governor to represent the agricultural community, Lignite Energy Council, North Dakota Petroleum Council, biodiesel industry, biomass industry, wind industry, ethanol industry, North Dakota Petroleum Marketers Association, North Dakota investor-owned electric utility industry, generation and transmission electric cooperative industry, lignite coal-producing industry, refining or gas-processing industry, and additional nonvoting members.

The committee received a report from the Energy Policy Commission regarding policy recommendations. The commission's recommendations relate to infrastructure, research and development, and the regulatory environment.

Infrastructure:

- Source private equity and developing infrastructure to support expansion.
- Continue support for key infrastructure for energy and community development throughout the state.

- Improve North Dakota's transmission capacity by working with the Southwest Power Pool and Midcontinent Independent System Operator to ensure new electricity generation within the state has a place to go.
- Invest significant capital into a petrochemical complex and support incentives to encourage petrochemical industrial development.
- Support the future of the DC transmission line from Coal Creek Station to Minnesota by minimizing the barriers preventing full use of the line for a combination of conventional generation, carbon-free generation, renewable generation, and electrical storage.
- Continue supporting and pursuing installation of carbon capture systems on North Dakota generation facilities.
- Find another entity to take ownership and continue to operate Coal Creek Station.

Research and development:

- Encourage private equity and awareness to biomass and biomass opportunities.
- Continue to appropriately fund the Commerce Department with the objective of continuing a robust recruitment approach for biomass.
- Utilize carbon credits in conjunction with carbon capture and storage technologies to make them more economically viable.
- Continued investment in carbon capture utilization and storage enhanced oil recovery and lignite as well as research councils.

Regulatory environment:

- Modify and strengthen the sales and use tax exemption for enterprise information technology equipment and computer software used in a qualified data center by extending the program until 2030, removing the four data center limit, and allowing a qualified data center to be a minimum of 15 thousand square feet to qualify.
- Add "qualified data center" as an eligible recipient of property tax abatement for up to 10 years to increase visibility to data center developers with the goal of attaining a mega data center in North Dakota.
- Continue to work with the Southwest Power Pool and Midcontinent Independent System Operator to ensure the power produced can be transmitted and sold.
- Encourage federal agencies to work with state agencies when developing regulations.
- Improve regulatory friendliness and technology use to promote safety and more effectively support industry.
- Encourage the federal delegation from North Dakota to enhance the 45Q tax credit legislation to provide certainty that is required to develop a successful carbon capture business within North Dakota plants.

Recommendation

The committee makes no recommendation regarding the comprehensive energy study.

NORTH DAKOTA TRANSMISSION AUTHORITY REPORT

The committee received a report from the North Dakota Transmission Authority pursuant to Section 17-05-13. According to the report, the North Dakota Transmission Authority commissioned Barr Engineering to conduct a Power Forecast 2019 to estimate the energy growth over the next 20 years. The Power Forecast 2019 projects an increase of 71 percent in energy demand over the next 20 years under the consensus scenario. The load factors have been in excess of 90 percent, which is expected to continue with the rising demand. Utilities will be tasked with meeting both the capacity and energy requirements associated with that growth.

According to the report, the electric transmission system in North Dakota is operating well and serving the load reliably with the current generation. However, transmission congestion is increasing and in parallel with that, the wholesale prices are more volatile. The increased retail demand in North Dakota has contributed to the good operation of the grid. The events of 2020 resulted in demand destruction both in the Bakken area and the surrounding markets. The uncertainty created by the potential closure of Coal Creek Station and the resulting uncertainty of the future of the DC transmission line associated with the plant has raised the stakes for long-term planning of transmission capacity for North Dakota as a method of keeping the generation of both lignite-based electricity and renewable generation robust.

The report included an overview of the North Dakota Transmission Authority's 2018-19 activities. According to the report, the North Dakota Transmission Authority intends to update the power demand forecast for the Bakken region, review the generation interconnect requests that have been processed recently for connection to the transmission grid,

prepare its annual report, support the Department of Commerce on potential development, and continue its contact with stakeholders in all aspects of the generation and transmission in North Dakota and surrounding states.

NORTH DAKOTA PIPELINE AUTHORITY REPORT

The committee received multiple updates from a representative of the North Dakota Pipeline Authority on oil and gas pipelines in the state. As of March 2020, 69 percent of the oil produced in North Dakota is exported out of the state by pipeline, while 19 percent is exported to Canada by truck or rail. Eighty-seven percent of gas is captured and sold, while four percent of gas is flared from zero sales wells because of the lack of pipelines. The remaining nine percent is flared from wells with at least one thousand cubic feet (Mcf) sold because of challenges on existing infrastructure.

The North Bakken Expansion Project would provide 200 million cubic feet of natural gas transportation capacity per day. In addition, the project would provide approximately 67 miles of new pipeline construction, compression, and ancillary facilities to transport natural gas from core Bakken production areas in western North Dakota to an interconnection point with Northern Border Pipeline. The project is expected to: be completed in 2021, cost \$220 million, be designed using 20-inch diameter pipeline, and provide residue gas service from north of Lake Sakakawea to Northern Border Pipeline in McKenzie County.

According to the report, natural gas produced from the Bakken and Three Forks Formations is very high in natural gas liquids such as ethane, propane, and butane. It is expected natural gas liquid production will exceed pipeline capacity again in 2021 until further system expansions take place or a new market option is developed. During the 2019-20 fiscal year, the North Dakota Pipeline Authority will be commissioning a study of the expected natural gas liquid chemistry changes from a typical Bakken and Three Forks well over its productive life. The research will be used by the North Dakota Pipeline Authority and industry participants to improve natural gas liquid forecasting capabilities and support future decisions to enhance gas capture in North Dakota. The North Dakota Pipeline Authority will continue to utilize new and existing development information to gain a deeper understanding of the crude oil, natural gas, natural gas liquids, and carbon dioxide pipeline needs in the Williston Basin.

HIGH-LEVEL RADIOACTIVE WASTE ADVISORY COUNCIL REPORT

The committee received a report from the High-Level Radioactive Waste Advisory Council pursuant to Section 38-23-08. According to the report, the High-Level Radioactive Waste Advisory Council was created on July 1, 2019, via the enactment of Senate Bill No. 2037 (2019) and is responsible for:

- Reviewing high-level radioactive waste site suitability;
- Issuing reports for proposed high-level radioactive waste facilities to the Legislative Assembly or Industrial Commission;
- Reviewing and making recommendations to the Industrial Commission regarding administrative rules and standards relating to high-level radioactive waste and the duties of the Industrial Commission; and
- Making recommendations to the Industrial Commission regarding the administration of Chapter 38-23.

According to the report, since its creation on July 1, 2019, the High-Level Radioactive Waste Advisory Council reviewed the high-level radioactive waste issues in North Dakota, including the proposed deep test hole in Pierce County in late 2015 and early 2016, the Department of Environmental Quality's radiation safety program, North Dakota's low-level waste compacts, North Dakota's high-level radioactive waste statutes that had been in effect from 1979 to 2019, and the federal Nuclear Waste Policy Act of 1982. The committee was informed the High-Level Radioactive Waste Advisory Council's proposed administrative rules were adopted on October 1, 2020.

STATE ENERGY RESEARCH CENTER REPORT

The committee received a report from a representative of the State Energy Research Center pursuant to Section 15-11-40. According to the report, the State Energy Research Center receives \$5 million per biennium to conduct exploratory, transformational, and innovative research that advances future energy opportunities to benefit North Dakota's economy and environment. The Energy and Environmental Research Center researchers submitted 26 research proposals for consideration, each of which went through a rigorous review process. Each proposal included a scope of work, timeline, and budget. The review teams scored, discussed, and debated the benefits and drawbacks of each project and how well the project would fit within the goals of the State Energy Research Center. The projects selected include rare earth elements, energy storage, and electromagnetic pulses that could disrupt electrical transmission on the grid. The goal of the research projects is not only to produce more energy using North Dakota's fossil and alternative resources, but also do it in an efficient, cost-effective, and environmentally friendly manner. The goal is the technology developed under the State Energy Research Center can be used in North Dakota now and 10 to 15 years in the future.

The research projects approved for State Energy Research Center funding are:

- Critical minerals assessment of North Dakota shales.
- Evaluation of high-value solid carbon products from North Dakota coal and gas resources.
- Power production and distribution resilience to electromagnetic pulses.
- Identification of the most efficient and least cost process for conversion of wellhead gas to transportable liquid products.
- Evaluation of energy storage technologies and the benefit to North Dakota utilities.
- Solvent extraction of rare earth elements from lignite coal in situ.
- Waste utilization for bio-based alternatives to chemicals and fuels.
- Crude oil swelling with injected rich gas and carbon dioxide as a potential mechanism for enhanced oil recovery in the Bakken.
- Enhancing reservoir productivity through a new hydraulic fracturing approach.
- Bench-scale extraction of rare earth elements from lignite coal ash.

According to the report, the projects and research have economic, social, and environmental research objectives including assuring affordable and reliable energy, maintaining and expanding jobs, maintaining a healthy environment, and maintaining and growing state, tribal, and local tax revenues. One hundred percent of all funding has been allocated this biennium, and there have been six new invention disclosures achieved in the 2020 fiscal year.

ENERGY AND ENVIRONMENTAL RESEARCH CENTER REPORT

The committee received a report from a representative of the Energy and Environmental Research Center regarding the results and recommendations of the underground gas storage pilot project pursuant to Section 25 of House Bill No. 1014 (2019). According to the report, subsurface injection of excess produced gas could be a mechanism to meet gas capture requirements and decrease flaring, reduce curtailed oil production, and facilitate sustained growth in oil production. Establishing gas storage infrastructure also could facilitate enhanced oil recovery and petrochemical investment. The potential gas injection scenarios are gas storage into saline or salt formations for future recovery and use or injection into conventional or unconventional hydrocarbon reservoirs for pressure maintenance.

With funding from the Industrial Commission, the Energy Environmental Research Center performed a higher-level assessment in late 2018 to evaluate and simulate produced gas injection into the subsurface with focused examination of the Broom Creek Formation. According to the report, the Broom Creek Formation may be a technically and economically viable target for temporary produced gas storage in the southern portion of the core Bakken area. Gas recovery factors from temporary storage range from 47 to 63 percent in the most realistic scenarios, which include constrained rates of gas production or reuse of the same storage reservoir to facilitate additional well development.

According to the report, the goal for the Energy and Environmental Research Center is to partner with North Dakota oilfield producers on up to three pilot projects to define and assess the key technical, economic, and regulatory components of produced natural gas injection into geologic targets in the Williston Basin. The expected outcome of the pilot projects would be learning the key information needed for the state, the oil and gas industry, and other interested parties to assess the techno-economic viability of produced gas storage or injection into the subsurface as a means of achieving gas capture requirements, expanding Bakken oil production, and conserving the state's resources. The Energy and Environmental Research Center recommended the Legislative Assembly consider implementing a statutory provision allowing a gas tax exemption for gas storage purposes. The tax exemption could be permanent or be due when the gas is extracted from the storage reservoir.

INDUSTRIAL COMMISSION REPORT

The committee received a report from a representative of the Energy and Environmental Research Center regarding the Industrial Commission's study on recycling produced water in oil and gas operations pursuant to Section 19 of House Bill No. 1014 (2019). According to the report, the Energy and Environmental Research Center was awarded the contract by the Industrial Commission's Oil and Gas Research Program to conduct the study on the recycling of water used in oil and gas operations, also known as produced water, from oil and gas producing regions of North Dakota. The report provided a compilation of results of the study including regulatory, scientific, technological, and feasibility methods and considerations associated with North Dakota produced water management. The report also provided an assessment of North Dakota produced water management practices and trends and discusses associated opportunities, challenges, and industry perspectives aggregated from top producers and service companies operating in the Williston Basin.

According to the report, water management is a significant technical and economic challenge for sustainable oil and gas production, and water volumes are linked intrinsically to oil production volumes. North Dakota oil production rose to over 1.5 million barrels per day in 2019, and despite a downturn in oil price, North Dakota oil production has recovered to over 1 million barrels per day as of July 2020. Bakken petroleum system development between 2008 and 2019 has resulted in a nearly fourfold increase in produced water volumes to 740 million barrels per year and a fivefold increase in saltwater disposal volumes to 683.5 million barrels per year. Produced water and saltwater disposal volumes are forecast to double by 2030.

Saltwater disposal is the primary method of produced water management used in North Dakota, with approximately 95 percent of the saltwater disposal volume occurring through injection into sandstones of the Dakota Group. Produced water recycling was not found to be occurring in North Dakota, with the exception of the reinjection of coproduced water associated with secondary waterflood recovery in select conventional fields. While there has been limited prior technical success using produced water as hydraulic fracture makeup water dating back to 2015, commercial adoption has been precluded by regulatory, logistical, and economic challenges.

Localized pressurization of the Dakota Group resulting from saltwater disposal and projected increases in produced water volumes could impact the economics of North Dakota oil production. As a result, there is an emerging need to pursue alternative produced water management approaches, including recycling and reuse. Investing resources to pursue recycling or reuse options and other solutions to address emerging produced water management challenges now could help curtail and defer operational and cost impacts of produced water management on the economics of North Dakota oil production in the future. Several options include characterization of alternative saltwater disposal targets, integrated produced water pipeline systems to transport produced water to more suitable saltwater disposal locations, surface storage alternatives that reduce risk for recycling, and novel approaches to implementing recycling and reuse in North Dakota.

OTHER

Wind Energy Conversion Facilities

The committee received information from the Public Service Commission regarding a status update on wind energy conversion facility siting. There are 3,153 megawatts (MW) in operation in North Dakota. So far, an additional 600 MW have been approved and are under construction but not yet in operation while 988 MW have received permits but have yet to begin construction. The Public Service Commission received 34 decommissioning plan requests. The average cost to decommission a turbine is \$156,974.

The committee learned that turbine projects have raised public concerns from nonparticipating landowners including concerns relating to noise, shadow flicker, and impact on land values.

Oil and Gas Update

The committee received information from the Department of Mineral Resources regarding gas capture and enhanced oil recovery. As of August 2019, North Dakota produces 1,477,394 barrels of oil per and 3,013,014 Mcf per day, and has 15,942 producing wells. By 2040, these numbers are projected to be 2 million barrels per day and 5.5 million Mcf per day; and 65,000 producing wells.

Gas Innovations

Crusoe Energy Systems Inc. provided information to the committee regarding digital flare mitigation. Crusoe helps operators maintain and increase oil production by solving the regulatory and environmental challenges of associated gas by converting "stranded" natural gas into electricity for energy-intensive computing on the well site. The committee was informed digital flare mitigation solves critical regulatory challenges for oil and gas companies by achieving beneficial use and reducing emissions and the digital flare mitigation system is a mobile and modular assembly of power generation, computing, and remote telecommunications systems optimized specifically for stranded gas resources.

Great River Energy

Great River Energy provided information to the committee regarding its Coal Creek Station. The committee was informed Great River Energy is facing economic challenges at Coal Creek Station and is reviewing the generation and transmission portfolio continually to provide reliable and competitively priced electricity to Great River Energy's 28-member cooperatives based in Minnesota. Great River Energy is conducting an analysis of the economic conditions experienced by Coal Creek Station and assessing available possibilities to address the challenges. According to the testimony, persistent low market prices since 2008 are having a nationwide impact on the coal fleet and neither Great River Energy nor North Dakota has been immune to the impact.

Ethanol Industry

The North Dakota Ethanol Council and Dakota Ethanol Producers Association provided information to the committee regarding the importance and status of the ethanol industry in North Dakota. The committee was informed the North Dakota ethanol industry:

- Employs more than 270 workers directly and thousands indirectly.
- Has an annual economic impact of more than an \$623 million.
- Has a capacity of 550 million gallons per year.
- Produces 2.8 gallons of ethanol, 18 pounds of livestock feed, 18 pounds of carbon dioxide, and 0.5 pounds of crude corn oil for every bushel of corn processed.

The committee was informed while ethanol production provides clean, renewable, high octane option for refiners, reasonably priced fuel for consumers, and high-quality feed for livestock producers, there are challenges. Testimony indicated fuel prices have plummeted, fuel demand has been cut in half, and farmers and ethanol plants are losing money. Fifty percent of ethanol plants across the country have ceased production and margins are negative even though North Dakota ethanol plants continue operations.

Technologically Enhanced Naturally Occurring Radioactive Material Disposal

The committee received information from AE2S Nexus regarding the disposal of technologically enhanced naturally occurring radioactive material (TENORM). When crude oil is extracted, natural biproducts are brought to the surface with it including radioactive substances that can be found in nature like soils, rocks, and water. Technologically enhanced naturally occurring radioactive materials are found in various materials as part of the oil and gas extraction and production, including drill cuttings, wastewater, tank sludge, pipe scale, and disposable socks filters during oil extraction and production.

North Dakota does not have any landfills approved for TENORM and an average of 92,000 tons is transported out of the state per year. The information indicated 89.7 percent of North Dakota TENORM is hauled to Montana for disposal. AE2S Nexus recommended reducing dependency of neighboring states for waste produced in North Dakota by selecting the optimal location to safely dispose of TENORM in North Dakota and acknowledging an average maximum limit, ensuring appropriate bonding of the solid waste landfills, and ensuring financial guarantee levels are adequate, including any county responsibilities in the calculation of the financial guarantee.

Biological Remediation Methods for Oil Spills

Targa Resources provided information to the committee regarding landfarming hydrocarbon impacted soil. The committee was informed landfarming, or "bioremediation," is the use of living microorganisms to degrade environmental contaminants in the soil into less toxic or nontoxic materials. The microorganisms can be indigenous or bioaugmented commercial bacterial mixtures. Bacteria feed on organic waste and derive nutrition for growth and reproduction. Using landfarming speeds up the process by increasing the rate of bacterial metabolism and growth. At the conclusion of the landfarm process, hydrocarbons in the soil will be reduced to a level that will not pose a threat to the environment. The treated soils can be beneficially reused instead of occupying space in a landfill. Beneficial reuse includes placing the soil into the excavation and seeding with native grass mix or placing the property into crop rotation. According to the information, bioremediation is much more environmentally sustainable, cost-efficient, and time saving than other remediation alternatives. It was asserted federal and state regulations allow biological remediation methods to be used for certain oil spills, but a streamlined regulatory process could reduce remediation costs increasing the feasibility of bioremediation.

Chief Oilfield Services, LLC and Oppenheimer Biotechnology, Inc. also provided information to the committee regarding biological remediation. These companies' general approach to bioremediation consists of bioaugmentation, biostimulation, and natural attenuation. Chief Oilfield Services and Oppenheimer Biotechnology have completed 340 successful soil and ground water remediation projects. According to the information, 58.2 percent of these projects occurred at gas stations while 30.6 percent occurred at agricultural facilities, power plants, construction sites, and oil spill sites.