

North Dakota

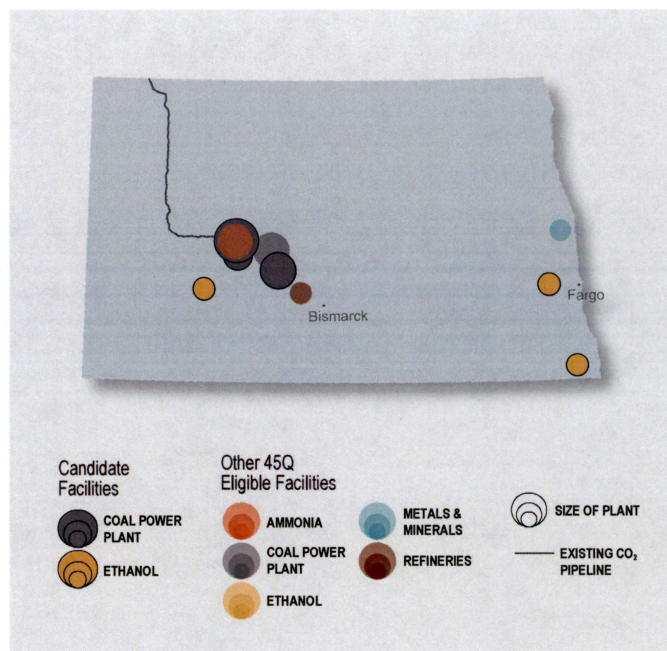
IMPLEMENTING CARBON CAPTURE AND STORAGE TECHNOLOGY

KEY TAKEAWAYS

- North Dakota has near-term potential to capture over 7 million metric tons (MT) of non-biogenic CO₂ at six industrial and power facilities.
- Recent legislation enacted in the state builds on existing laws to expand investment and development potential for carbon capture.
- Governor Doug Burgum has emphasized his commitment to carbon capture and its essential role in meeting North Dakota's long-term goal of becoming carbon neutral.
- Near- and medium-term modeling suggests up to 568 miles of CO₂ transport infrastructure capable of generating over \$598 million in capital investment in the state.

Figure 1 (Right): North Dakota has several facilities large enough to qualify for the 45Q carbon capture tax credit, including coal power plants and ethanol plants. Facilities identified by the Regional Carbon Capture Deployment Initiative as potential early candidates for capture retrofit based on emissions, equipment, and estimated capture cost, are shown with outlines and darker colors. Details on these facilities are listed in the table below. Source: Great Plains Institute 2020; EPA 2019.

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POTENTIAL CANDIDATE FACILITIES FOR CAPTURE WITH ANNUAL EMISSIONS

Facility Name	Location	Industry	Total Facility CO ₂ Emissions thousand tons	CO ₂ Captured Target thousand tons	Estimated Capture Cost \$/ton
Antelope Valley	Beulah	Coal Power Plant	6,702	3,200	\$54
Coyote	Beulah	Coal Power Plant	2,950	1,600	\$57
Milton R Young	Center	Coal Power Plant	5,934	1,600	\$57
Tharaldson Ethanol Plant I	Casselton	Ethanol	782	526	\$15
Hankinson Renewable Energy	Hankinson	Ethanol	640	451	\$15
Red Trail Energy	Richardton	Ethanol	263	180	\$19

Table 1: The Regional Carbon Capture Deployment Initiative estimated theoretical facility capture costs based on published capture equipment costs, facility-specific operational patterns, existing equipment and level of emissions. Most states have a large number of facilities eligible for 45Q. Of those facilities, the above table lists likely economically feasible candidates based on estimated capture cost. This list is not meant to be definitive. Commercial decisions by participating companies, and policy and regulatory decisions by state governments, will ultimately determine if a project is feasible for carbon capture. Captured Emissions refers to the amount of carbon dioxide that can be expected to be captured at a facility considering relevant technological and economic constraints. Source: GPI 2019; EPA 2018.

The **Regional Carbon Capture Deployment Initiative** brings together state officials with diverse industry, NGO, labor, and other stakeholders to promote broad scale deployment of infrastructure for carbon capture, CO₂ pipelines, enhanced oil recovery (EOR), other forms of geologic storage, and beneficial utilization of CO₂ in the Western and Midwest regions of the country.

The Initiative is staffed by the Great Plains Institute (GPI), a nonpartisan, nonprofit working to transform the energy system to benefit the economy and environment. For more information on this effort, go to carboncaptureready.org or contact Patrice Lahlum at plahlum@gpisd.net.

LEGISLATIVE CONTEXT

North Dakota has taken great strides in developing carbon capture policy, and current legislation has encouraged further investment and innovation for carbon capture in the state. The recently enacted House Bill 1452 calls for the allocation of \$25 million over the next two years to accelerate clean, sustainable energy investment. The bill also establishes a Clean Sustainable Energy Authority to advise the state's Industrial Commission and provide oversight on sustainable energy projects and funds. The recently passed Senate Bill 2152 increases sales and use tax exemptions for the secure geologic storage of CO₂ and Senate Bill 2206 allows utilities to "recover its research and development costs incurred to develop lignite more cleanly, efficiently, or economically, including carbon dioxide capture and sequestration utilization." Governor Doug Burgum voiced his support for carbon capture stating, "of all the opportunities, perhaps none has more potential than carbon capture and storage." The Governor has set a goal of achieving state-wide carbon neutrality by 2030 and promotes an "all-of-the-above" approach to advance domestic clean energy production and become the nation's first carbon-negative state.

In addition to setting a carbon neutrality goal, Governor Bergum recently signed a CO₂ Transport Infrastructure MOU, joining Kansas, Louisiana, Maryland, Montana, Oklahoma, Pennsylvania and Wyoming. These states are collectively developing an action plan for the buildout of regional CO₂ transport infrastructure to enable large-scale carbon management that will create and preserve family-sustaining jobs, bolster domestic energy production, and significantly reduce carbon emissions.

CAPTURE AND STORAGE POTENTIAL

In 2020, coal fired power plants provided 57% of North Dakota's electricity generation. Four of the state's coal power plants qualify for the reformed and extended 45Q tax credit; three of which have been identified as economically feasible near-term candidates for carbon capture. These three coal power plants hold potential to capture over six million MT of CO₂ annually, which is roughly 16% of North Dakota's total non-biogenic industrial and power CO₂ emissions. North Dakota also produces roughly 3% of the nation's fuel ethanol and its three ethanol facilities have been identified as economically feasible near-term candidates for capture retrofit, with the combined potential to capture over 890,000 MT of CO₂ annually.

The state can also garner considerable economic benefits by developing CO₂ transport infrastructure. Near- and medium-term modeling suggests up to 568 miles of CO₂ transport infrastructure capable of generating over \$598 million in capital investment in the state. Through the development of CO₂ transport hubs, North Dakota can store 133 billion MT of CO₂ in saline formations and over 148 million MT of CO₂ in enhanced oil recovery fields.

REGIONAL CAPTURE OPPORTUNITIES

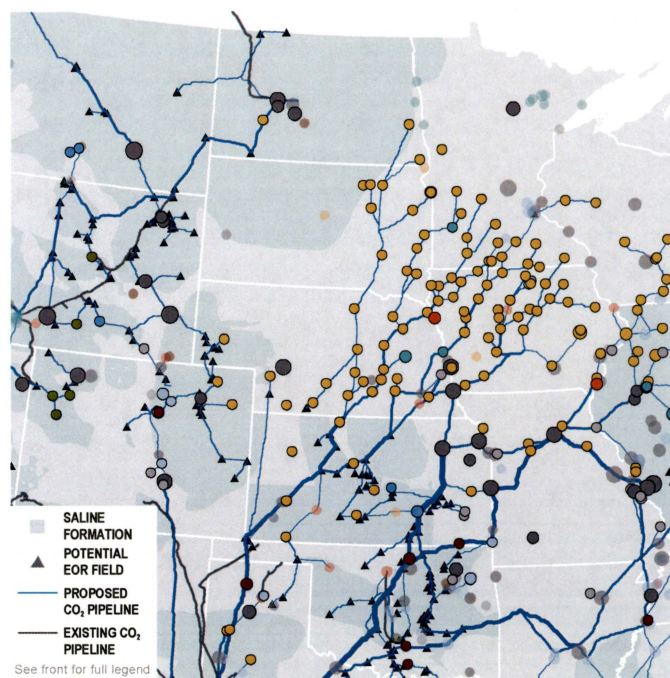
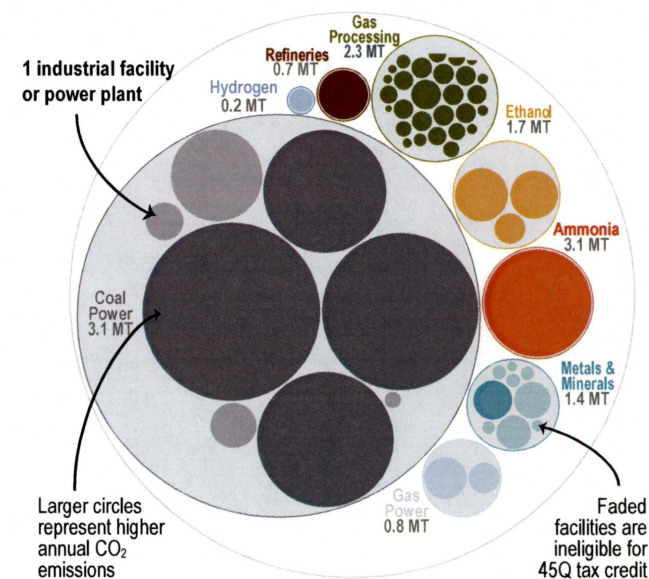


Figure 2: Potential regional CO₂ sources and pipeline corridors for transportation to utilization and storage sites as modeled by the Regional Carbon Capture Deployment Initiative.

FACILITIES AND EMISSIONS BY INDUSTRY



MT: Million metric tons CO₂

Figure 3: This bubble diagram visualizes the number of facilities and corresponding annual CO₂ emissions for each industry in North Dakota. The darker large bubbles are eligible for the 45Q carbon capture tax credit, while the faded bubbles are too small to be eligible. The total amount of CO₂ emissions in North Dakota is listed for each industry. Source: GPI 2020; EPA 2018.

Updated July 2021

Maps and graphics within this document are based on work by the Great Plains Institute (GPI) to help the Regional Carbon Capture Deployment Initiative identify facilities that qualify for the federal 45Q tax credit and are optimal near-term investment opportunities for carbon capture for each state. For more information, visit carboncaptureready.org.