

RED TRAIL ENERGY CCS PROJECT

PROJECT

FACT SHEET

INTEGRATED CARBON CAPTURE AND STORAGE FOR NORTH DAKOTA ETHANOL PRODUCTION

RTE CCS Project

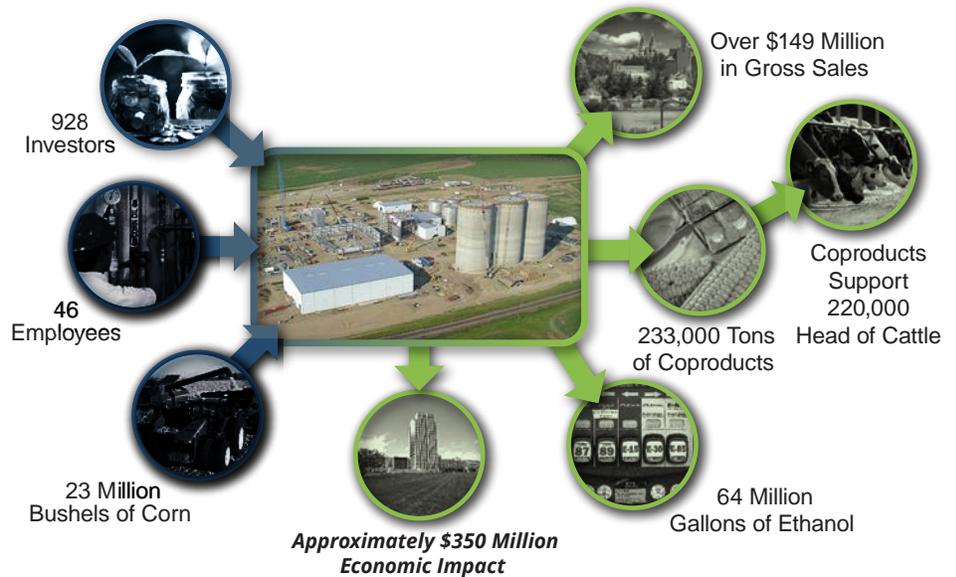
Red Trail Energy, an ethanol production plant in Richardton, North Dakota, is seeking to make its ethanol more valuable by integrating carbon capture and storage, or CCS, to reduce carbon dioxide emissions from ethanol production. Generating an ethanol fuel applicable for low-carbon fuel (LCF) programs in states such as California and Oregon will provide a long-term premium market for Red Trail Energy and stability for employees and local corn growers.

Keeping CO₂ out of the atmosphere could also qualify for federal tax credits to offset some of the cost of integrating and operating CCS.



Building on Success

Since 2007, Red Trail Energy has been producing corn-based ethanol and distillers grains at its investor-owned plant. The ethanol plant provides an alternative market to farmers in 32 counties in the region and creates tax revenue in eastern Stark County. Integration of CO₂ capture and permanent geologic storage will position North Dakota as a national leader in developing reduced-carbon ethanol with a strategic first-to-market advantage over other states. The ability to command premium pricing and diversify product markets will help secure Red Trail Energy's future, providing stability in a volatile, commodity-driven market.



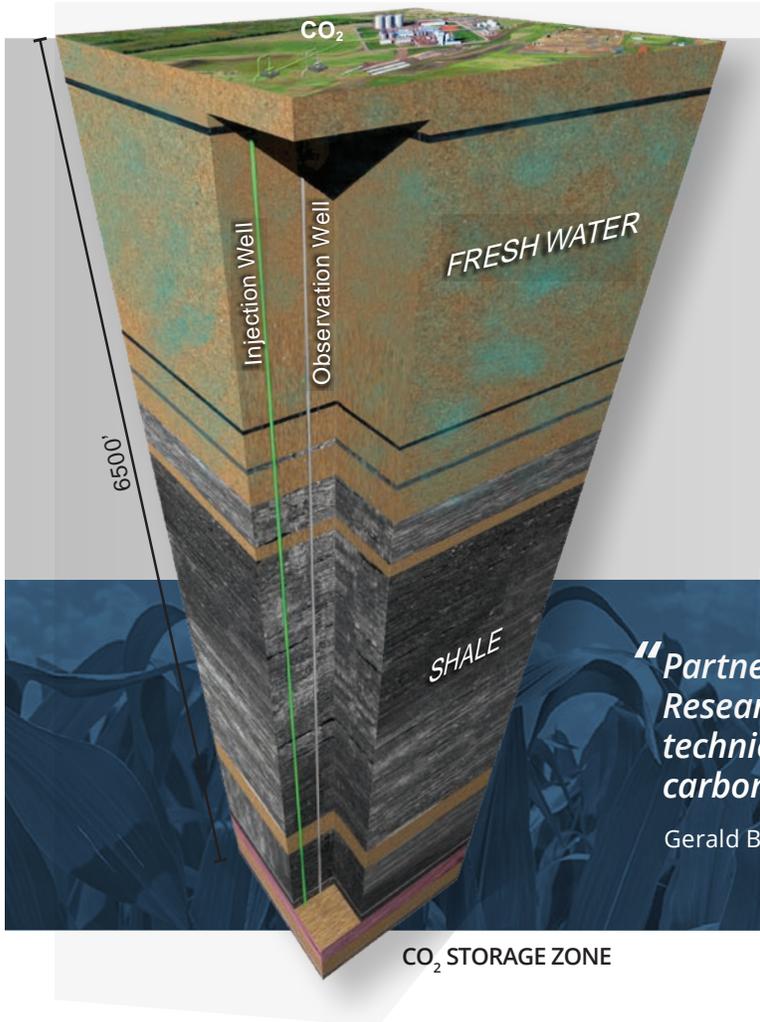
Carbon Capture and Storage

CCS is the practice of capturing CO₂ emissions from an industrial facility instead of releasing the emissions to the atmosphere. Once captured, the CO₂ is transported to a site for injection and safe, permanent storage deep underground. CO₂ injection is currently practiced in over 100 locations in the United States, typically for extending the life of older oil fields.

Integrating carbon capture and storage ensures the long-term viability of Red Trail Energy.

First of Its Kind

The integrated CCS project is a first of its kind in North Dakota. Incorporating CO₂ capture into the ethanol facility can be done with existing commercial technology. Captured CO₂ could then be injected deep underground and permanently stored. Red Trail Energy must ensure that the CO₂ is never emitted to the atmosphere in order to meet the low-carbon fuel requirement. North Dakota has well-suited geology for safe, permanent CO₂ storage; a regulatory framework to oversee all aspects of such projects; and authority from the federal government to do so.



Collaboration with Experts

Geologic CO₂ storage requires a deep porous layer to hold CO₂ and overlying impermeable rock layers as seals to keep the CO₂ in place. Red Trail Energy is collaborating with the Energy & Environmental Research Center at the University of North Dakota, a global leader in CCS research. Researchers investigated every aspect of permanent geologic storage below the plant, the cost of CO₂ capture, and the likelihood of economic favorability. These steps were necessary before any permitting or CO₂ injection could take place. The EERC's proven approach features characterization, modeling, and simulations to ensure the efficacy and safety of injecting CO₂ into a suitable geologic container more than a mile deep.

“Partnering with the Energy & Environmental Research Center has helped us to validate CCS as a technical and economical option for meeting low-carbon fuel program markets in other states.”

Gerald Bachmeier, Red Trail Energy Chief Executive Officer

Multiphase Path to a Commercial Venture

Investigation of CCS integration with the Red Trail Energy ethanol plant has been ongoing since 2016. Technical and economical feasibility has been successfully demonstrated. Recent activities include equipment contracting, public outreach, and development of the first North Dakota CO₂ Storage Facility Permit application, submitted in February 2021.

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