Red Trail Energy, an ethanol plant in Richardton, North Dakota, is seeking to make its facility more sustainable by integrating carbon capture and storage, or CCS, to reduce carbon dioxide emissions from ethanol production. This reduction in CO₂ emissions will make Red Trail Energy’s ethanol more valuable to states that have low-carbon fuel programs, such as California. 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 in Richardton, North Dakota. 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 geologic storage will position North Dakota as a national leader in developing reduced-carbon ethanol. 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.

What Is Carbon Capture and Storage?
CCS is the practice of capturing CO₂ emissions from an industrial facility instead of releasing them to the atmosphere. Once captured, the CO₂ is transported to a site for injection and safe, permanent storage deep underground. Carbon dioxide 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.”
Gerald Bachmeier, Red Trail Energy Chief Executive Officer
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 technology. The next step is what to do with the CO₂ once it has been captured. Captured CO₂ could be injected deep underground and permanently stored or potentially sold as a commodity to oilfield operators to increase production in aging wells. Red Trail Energy must ensure that the CO₂ is never emitted to the atmosphere in order to meet new CCS qualifications for low-carbon fuel and tax credit programs. 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 EERC at the University of North Dakota, a global leader in CCS research. The EERC’s proven approach features monitoring, characterization, modeling, and simulations to ensure the safety of injecting CO₂ into a suitable geologic container more than a mile deep.

"We are very excited to continue working with the Energy & Environmental Research Center (EERC) to investigate CCS as an 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. Preliminary technical and economic feasibility has been successfully demonstrated. Current activities are focused on facility design, geologic characterization, and public outreach.