Congressional Research Service
Informing the legislative debate since 1914

INSIGHT

Siting Challenges for Carbon Dioxide (CO_2) Pipelines

October 27, 2023

Carbon dioxide (CO_2) pipelines are an essential part of carbon capture and storage (CCS) systems, promoted by the Biden Administration and some in Congress to reduce emissions of CO_2—a greenhouse gas—from power plants and other industrial facilities. Approximately 5,000 miles of CO_2 pipeline already operate in the United States, primarily linking natural CO_2 sources to oil fields for enhanced oil recovery. However, a much larger pipeline network would be needed for CCS to meet national goals for greenhouse gas reduction. Several large CO_2 pipeline projects recently have been proposed in the Midwest, but these projects have encountered public opposition and regulatory challenges, including denial of state siting permits. One project has already been cancelled. These development challenges raise questions about the future availability of CO_2 pipelines for CCS and the federal role in CO_2 pipeline expansion.

CO_2 Pipelines in Development

Since 2021, four large CO_2 pipeline projects have been proposed in the Midwest which, collectively, would comprise over 4,000 miles of additional CO_2 pipeline (**Figure 1**). Three projects involve building new pipelines and one is a pipeline conversion. States have primary siting jurisdiction for new CO_2 pipelines, although federal approvals may be required for specific segments (e.g., across waterways).

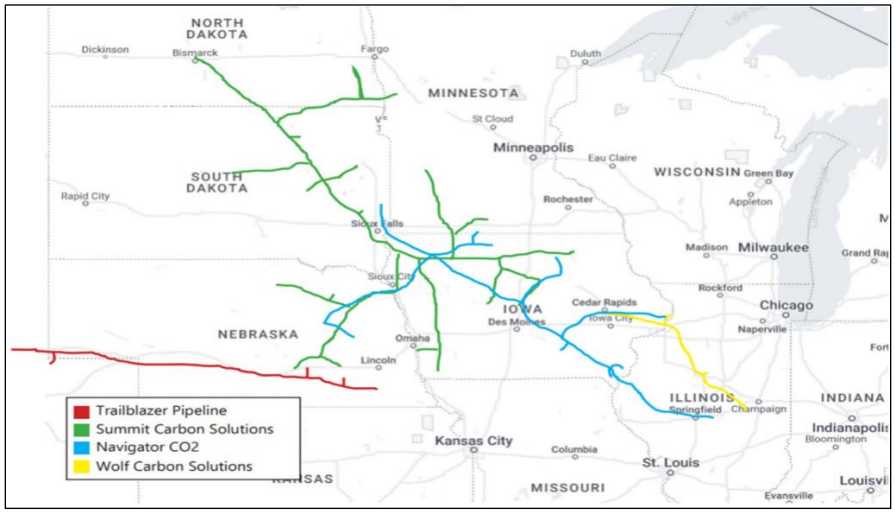
- **Summit Carbon Solutions.** Announced in February 2021, Summit's project would build 2,000 miles of new CO_2 pipeline across Iowa, Minnesota, Nebraska, North Dakota, and South Dakota to support CCS from regional ethanol plants. On August 4, 2023, North Dakota regulators denied Summit's pipeline permit application, although on September 15, they granted the developer's petition to reconsider. On September 11, 2023, South Dakota denied siting approval to Summit's pipelines in that state, although the developer intends to refile its application and remains committed to the project.
- **Navigator CO_2 Ventures.** Announced in March 2021, Navigator's Heartland Greenway project planned to build 1,300 miles of new CO_2 pipeline across Illinois, Iowa, Minnesota, Nebraska, and South Dakota under a similar scheme to that of Summit. South Dakota denied pipeline siting approval on September 6, 2023. Navigator subsequently asked regulators to suspend pipeline permit proceedings in Iowa. On October 20, 2023, Navigator announced the cancellation of the

Congressional Research Service
https://crsreports.congress.gov
IN12269

entire project, citing "the unpredictable nature of the regulatory and government processes involved."

- **Wolf Carbon Solutions.** Announced in January 2022, Wolf Carbon Solutions proposes a new 280-mile CO_2 pipeline from electric cogeneration and ethanol plants in Iowa to carbon sequestration sites in Illinois. The developer filed pipeline permit applications with regulators in both states in 2023. Both permit reviews are ongoing.
- **Tallgrass Energy.** Announced in May 2022, the Trailblazer Conversion Project would convert 392 miles of the existing Traiblazer natural gas pipeline to carry CO_2 captured from ethanol production facilities in Nebraska through Colorado to a sequestration site in Wyoming. Currently an interstate natural gas pipeline, Trailblazer is under the jurisdiction of the Federal Energy Regulatory Commission (FERC). On October 23, 2023, FERC issued an order approving the "abandonment" of the Trailblazer mileage for the purposes of conversion to carry CO_2. FERC will no longer have regulatory authority over the pipeline after abandonment is completed.

Figure 1. Proposed CO2 Pipeline Projects in the Midwest



Source: Courtesy of Iowa Renewable Fuels Association, *Comparative Economics of Carbon, Sequestration for Iowa Ethanol Plants*. Prepared by Decision Innovation Solutions, LLC, 2023.

Opposition to CO_2 Pipelines

In states where CO_2 pipeline projects are proposed, some local stakeholders favor their development, citing job creation, support of ethanol producers, and other economic factors. However, other local groups have opposed CO_2 pipeline projects. The North Dakota Public Service Commission summarized several reasons for opposition in its Summit permit denial.

> The Commission received extensive public comment…. Those testifying expressed broad concerns regarding eminent domain, safety, the policy of permanent CO_2 sequestration and storage, setback distances, irreparable harm to underground [drainage] systems, impacts on property values, and the ability to obtain liability insurance.

Other groups object to CO_2 pipelines because they believe CCS perpetuates the use of fossil fuels, which they oppose, or because they believe federal funding for CCS would be better spent on other technologies, such as renewable energy.

CO_2 pipeline safety is a particular concern. The Pipelines and Hazardous Materials Safety Administration (PHMSA) has long regulated the safe construction, operation, and maintenance of CO_2 pipelines (49 C.F.R. §§190, 195-199). However, a 2020 CO_2 pipeline rupture near Satartia, MS, which required a local evacuation and caused 45 people to be hospitalized, prompted criticism from pipeline safety advocates about PHMSA's existing regulations. In May 2022, PHMSA announced a rulemaking to update its CO_2 pipeline safety standards. The agency plans to publish a Notice of Proposed Rulemaking in June 2024, but has not set a date for a final rule. On October 3, 2023, 13 Members of Congress wrote to President Biden asking for "a moratorium on any federal permitting of new carbon pipelines and related infrastructure until PHMSA's safety regulations are finalized."

Issues for Congress

Cancellation of the Summit project has heightened concerns among some stakeholders about CO_2 pipeline development, particularly considering the Biden Administration's recent announcements of financial support for regional hydrogen hubs and direct-air capture hubs, both of which may require CO_2 pipelines. The Environmental Protection Agency's proposed carbon pollution standards for fossil fuel-fired power plants also include CCS as one compliance option. Some analysts assert that the current siting regime for CO_2 pipelines "will be a significant problem if more interstate CO_2 pipelines are built."

Given the siting challenges in the states, certain proposals would federalize interstate CO_2 pipeline siting. In May 2023, the Biden Administration urged Congress to "address the siting of ... carbon dioxide pipelines and storage infrastructure and provide federal siting authority for such infrastructure." Some stakeholders may object to federalization of CO_2 pipeline siting authority, however, contending that CO_2 pipeline development for CCS is relatively new and that steps can be taken, such as finalizing new CO_2 pipeline safety regulations, to facilitate pipeline development without federal preemption. Transporting CO_2 by other modes, such as tanker ship or rail, may also be an alternative.

Author Information

Paul W. Parfomak
Specialist in Energy Policy

Disclaimer