

Siting Challenges for Carbon Dioxide (CO₂) Pipelines

Updated November 30, 2023

Carbon dioxide (CO₂) 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 CO₂—a greenhouse gas—from power plants and industrial facilities. Approximately [5,000 miles of CO₂ pipeline](#) already operate in the United States, primarily linking natural CO₂ 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 CO₂ 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 CO₂ pipelines for CCS and the federal role in CO₂ pipeline expansion.

CO₂ Pipelines in Development

Since 2021, four large CO₂ pipeline projects have been proposed in the Midwest which, collectively, would comprise over 4,000 miles of additional CO₂ pipeline (**Figure 1**). Three projects involve building new pipelines and one is a pipeline conversion. States have primary siting jurisdiction for new CO₂ 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 CO₂ pipeline across Iowa, Minnesota, Nebraska, North Dakota, and South Dakota to support CCS from ethanol plants. On August 4, 2023, North Dakota regulators [denied](#) Summit's 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.
- **Navigator CO₂ Ventures.** [Announced](#) in March 2021, Navigator's [Heartland Greenway](#) project planned to build 1,300 miles of new CO₂ 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

Congressional Research Service

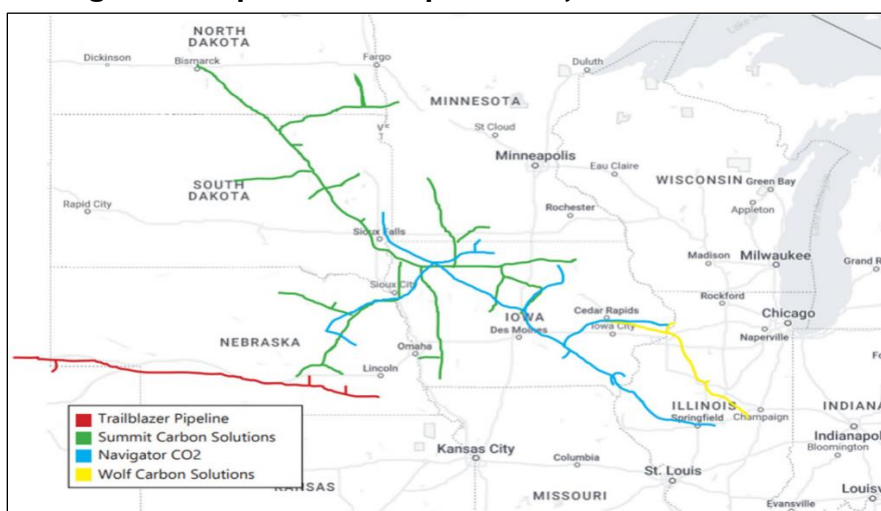
<https://crsreports.congress.gov>

IN12269

asked regulators to [suspend pipeline permit proceedings](#) in Iowa. On October 20, 2023, Navigator [announced](#) the cancellation of the entire project.

- **Wolf Carbon Solutions.** [Announced](#) in January 2022, Wolf Carbon Solutions proposes a new [280-mile CO₂ pipeline](#) from electric cogeneration and ethanol plants in Iowa to carbon sequestration sites in Illinois. On November 20, 2023, in response to a [permit denial recommendation](#) from Illinois Commerce Commission staff, the developer [announced](#) the voluntary withdrawal of its application in that state with plans to reapply in 2024. The Iowa permit review is ongoing.
- **Tallgrass Energy.** [Announced](#) in May 2022, the Trailblazer Conversion Project would [convert 392 miles](#) of the existing Trailblazer natural gas pipeline to carry CO₂ 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 [approved](#) the “abandonment” of the Trailblazer mileage for the purposes of conversion to carry CO₂. 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 CO₂ Pipelines

In states where CO₂ 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 CO₂ pipeline projects. North Dakota regulators summarized several reasons for stakeholder opposition in its Summit permit denial.

Those testifying expressed broad concerns regarding eminent domain, safety, the policy of permanent CO₂ 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 CO₂ 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.

CO₂ pipeline safety is a particular concern. The [Pipelines and Hazardous Materials Safety Administration \(PHMSA\)](#) has long [regulated](#) CO₂ pipeline safety. However, a 2020 [CO₂ pipeline rupture](#) near Satartia, MS, which required a local evacuation and caused [45 people to be hospitalized](#), prompted [criticism](#) from safety advocates about PHMSA's existing regulations. In May 2022, PHMSA [announced](#) a rulemaking to update its CO₂ 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.” The proposed PIPES Act of 2023 (H.R. 6494) would require PHMSA to finalize its CO₂ pipeline safety standards within a year of enactment.

Issues for Congress

Cancellation of the Navigator project [has heightened concerns](#) among some stakeholders about CO₂ 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 CO₂ 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 CO₂ pipelines “will be a significant problem if more interstate CO₂ pipelines are built.”

Given the siting challenges in the states, certain [proposals](#) would federalize interstate CO₂ 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 CO₂ pipeline siting authority, however, contending that CO₂ pipeline development for CCS is relatively new and that steps can be taken, such as finalizing new CO₂ pipeline safety regulations, to facilitate pipeline development without federal preemption. Transporting CO₂ by other modes, such as [tanker ship](#) or [rail](#), may also be an alternative.

Author Information

Paul W. Parfomak
Specialist in Energy Policy

Disclaimer

This document was prepared by the Congressional Research Service (CRS). CRS serves as nonpartisan shared staff to congressional committees and Members of Congress. It operates solely at the behest of and under the direction of Congress. Information in a CRS Report should not be relied upon for purposes other than public understanding of information that has been provided by CRS to Members of Congress in connection with CRS's institutional role. CRS Reports, as a work of the United States Government, are not subject to copyright protection in the United States. Any CRS Report may be reproduced and distributed in its entirety without permission from CRS. However, as a CRS Report may include copyrighted images or material from a third party, you may need to obtain the permission of the copyright holder if you wish to copy or otherwise use copyrighted material.