

CCSReg Project



Policy Brief: Regulating Carbon Dioxide Pipelines for the Purpose of Transporting Carbon Dioxide to Geologic Sequestration Sites

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Policy Brief: Regulating Carbon Dioxide Pipelines for the Purpose of Transporting Carbon Dioxide to Geologic Sequestration Sites

Commercial deployment of CCS may require construction of a large CO₂ pipeline system perhaps comparable in size to the current natural gas pipeline network. To build out this system, the U.S. will need to create a workable regulatory framework. Today, CO₂ pipeline developers have no access to federal siting or federal eminent domain authority for construction of such pipelines on non-federal lands; rather, they must deal with a patchwork of individual state laws and regulations. The existing regime has worked for the small CO₂ pipeline system built for enhanced oil recovery (EOR), but is unlikely to be sufficient to support the infrastructure build out necessary for large scale commercial deployment of CCS. Developers will likely need access to a federal siting process, federal eminent domain authority, and a streamlined permitting process for projects on federal lands. These issues are particularly important for multi-state projects and for projects in states that do not provide CO₂ pipelines with eminent domain authority. In addition, policymakers will need to resolve and address the shape of any applicable economic regulation, including rules on rate and access regulation of these pipelines and whether pipelines will need to serve as common carriers before project sponsors will build pipelines to support CCS.

This policy brief summarizes the regulatory issues relating to construction and operation of the carbon dioxide (CO₂) pipeline infrastructure that will be needed to transport CO₂ from source to geologic sequestration sites for purposes of carbon capture and sequestration (CCS).

Recommendations:

- Create an "opt-in" federal regulatory regime that provides the Federal Energy Regulatory Commission (FERC) with authority to consider and grant or deny applications for federal siting permits for new CO₂ pipelines built to transport CO₂ for purposes of permanent sequestration. The federal siting permit should provide the pipeline with federal eminent domain authority.
- Once new CO₂ pipelines with federal siting permits are operational they should be subject to non-discriminatory access and rate regulation. Prescriptive cost-of-service rate regulation is not necessary.
- Retain the current system of state siting and economic regulation for existing CO₂ pipelines. New CO₂ pipelines would also be subject to the current system unless they opt into the federal regulatory regime by filing for and obtaining a federal siting permit.
- Streamline the permitting process for CO₂ pipeline projects on federal lands.
- Utilize the existing pipeline safety regulatory framework to ensure safe operation of all CO₂ pipelines.

1. Introduction

The ability to transport very large volumes of CO₂ via pipeline from source to sequestration site will be crucial to deployment of large scale CCS projects to reduce greenhouse gas (GHG) emissions in the United States. If CCS is successful, as much as 1,800 million tonnes (Mt) per year of CO₂ could be injected into a variety of geological formations.¹ The existing U.S. CO₂ pipeline infrastructure transports approximately 45 Mt of CO₂ per year over 3,500 miles of pipe for enhanced oil recovery (EOR).² For comparison, the existing U.S. natural gas pipeline network transports 455 Mt per year of natural gas over 300,000 miles of interstate and intrastate pipe.³ The small existing CO₂ pipeline infrastructure may eventually have to be expanded to be comparable in size to the country's natural gas pipeline system.

This paper outlines background information about CO₂ transport, summarizes the current state of CO₂ pipeline regulation under federal and state law, evaluates existing law in areas that may be important for a national CO₂ pipeline system, discusses alternative regulatory frameworks that could be considered to support development and operation of a much larger CO₂ pipeline network, and concludes with a recommendations for reform.

We recommend that existing CO₂ pipelines remain subject to current regulation, which is principally at the state level. However, new pipelines should be able to elect to apply for federal permits for construction and operation similar to certificates granted for the construction of interstate natural gas pipelines. Once a federal permit is issued, the project sponsor should not be subject to state siting requirements and would have eminent domain authority similar to that provided to interstate natural gas pipelines. When operational, CO₂ pipelines for which a federal permit is issued should be subject to federal common carrier regulation. This framework is recommended to encourage construction of the new CO₂ pipeline infrastructure necessary for widespread deployment of CCS.

2. Existing Framework for Regulation of CO₂ Pipelines

2.1. Current Federal Regulation of CO₂ Pipelines

Siting Regulation: There is no current federal siting regime (except on public lands) or federal eminent domain authority for CO₂ pipelines. The existing framework for federal rate and access regulation of CO₂ pipelines is minimal:

- The Federal Energy Regulatory Commission (FERC) has disclaimed jurisdiction over CO₂ pipelines under the Natural Gas Act (NGA).⁴
- The Surface Transportation Board (STB) has not opined on its jurisdiction over CO₂ pipelines under Title 49, United States Code.⁵
- The Interstate Commerce Commission (ICC) (the predecessor of the STB) disclaimed jurisdiction because CO₂ is a "gas" and, therefore, exempt under Title 49, United States Code.⁶

The only federal agency to have affirmatively asserted some degree of control over CO₂ pipelines is the Department of Interior's Bureau of Land Management (BLM). Pursuant to its authority under the Mineral Leasing Act (MLA),⁷ the BLM controls the siting of CO₂ pipelines crossing federal lands.⁸ In addition, it has asserted authority to regulate access to such

pipelines through the imposition of the equivalent of a common carrier obligation on the ground that CO₂ is "natural gas."⁹

Safety Regulation: Safety regulation of CO₂ pipelines is clearly established and does not suffer from the same uncertainties as economic regulation of those pipelines. Carbon dioxide pipelines are regulated to the same degree as hazardous liquids pipelines by the U.S. Department of Transportation's Pipeline and Hazardous Materials Safety Administration (PHMSA), pursuant to the Hazardous Liquid Pipeline Act of 1979 (HLPAs).¹⁰ PHMSA's Office of Pipeline Safety (OPS) regulates the design, construction, operation, maintenance, and spill response planning for regulated pipelines.¹¹ The agency establishes minimum safety standards for interstate pipelines, and has largely preempted states from establishing their own standards for interstate pipelines.¹²

Eminent Domain: As a general matter, the states and not the federal government are responsible for siting both interstate and intrastate CO₂ pipelines that do not cross federal lands. The power of eminent domain allows pipeline developers to take lands for the public use of pipeline infrastructure development. Lands for pipeline construction are often obtained through leases, with the threat of eminent domain action looming over the transactions. While the federal government has provided natural gas pipelines with eminent domain authority pursuant to a certification process under Section 7 of the Natural Gas Act (NGA),¹³ there are no comparable laws that allow the federal government to grant eminent domain authority to a CO₂ pipeline.

2.2. State Regulation of CO₂ Pipelines

Some states currently regulate CO₂ pipeline in connection with non-CCS related activities, such as EOR. While we have not attempted to survey state regulatory authorities and practices in 50 states, we have reviewed the regulations in Texas and New Mexico to illustrate state approaches to the regulation of CO₂ pipelines within their borders.¹⁴ Both Texas and New Mexico, which are home to EOR facilities, provide CO₂ pipeline operators with eminent domain authority to condemn property to site their pipelines.¹⁵ However, rate regulation varies. In Texas, a CO₂ pipeline can be proprietary or it can choose to become a common carrier and subject itself to rate regulation by the Texas Railroad Commission.¹⁶ New Mexico does not subject CO₂ pipelines to rate regulation, nor does it consider them to be common carriers.¹⁷ Thus, access to pipelines is not state regulated in New Mexico. Finally, CO₂ pipelines in both states must meet the safety regulations required by the HLPAs. Both Texas and New Mexico have state agencies that administer safety regulations pursuant to authority delegated by the OPS.¹⁸

3. Adequacy of Existing Federal Law

Large-scale, commercial implementation of CCS will not only require further development of capture and sequestration technology, but also further delineation of a CO₂ pipeline transportation regulatory regime. This regulatory development will be needed to ensure access to eminent domain to facilitate pipeline construction, and to provide increased regulatory certainty for CO₂ pipeline infrastructure developers that will be necessary for widespread deployment of CCS.

Rate Regulation: As the CO₂ pipeline network expands, transportation rates could become a significant issue. To date, no federal agency has made an affirmative statement regarding

its jurisdiction over CO₂ pipeline transportation rates. Even the STB, which may have jurisdiction to regulate rates under existing law, is limited to interstate pipelines and is sufficiently constrained as to offer little protection to customers. States also have not devoted much attention to rate regulation for intrastate pipelines. Most CO₂ pipelines operate on a contractual basis for a specific application (i.e. EOR).

Access Regulation: Nondiscriminatory access could become an important issue as the CO₂ pipeline network expands. While nondiscriminatory access is a requirement for receiving a permit under the MLA to cross federal lands,¹⁹ there is no current regulation of CO₂ pipelines that do not cross federal lands. Policies aimed at avoiding duplication of facilities and capturing economics of scale may impel Congress or the states to impose nondiscriminatory access requirements.

Safety Regulation: The current safety regime is well-defined, with PHMSA-administered minimum standards and delegation to states. State programs for CO₂ pipelines are managed by the same agencies that manage other pipeline regulation. This program of delegated authorities on pipeline safety seems to function well in practice. In the period from 1990 to 2001, the accident rate for the relatively small CO₂ pipeline network was approximately 0.32 incidents per 1000 km per year; over the same period, the rate for natural gas pipeline network was 0.17 per km per year.²⁰ Further build-out of the CO₂ pipeline infrastructure does not appear to require any changes to the existing statutory framework for pipeline safety, so long as the safety regime stays up-to-date with current pipeline building practices.²¹

Siting Authority: There is currently no federal siting authority for CO₂ pipelines, except over federal lands. Thus, under existing law, pipelines are largely dependent on state eminent domain authority to site both interstate and intrastate CO₂ pipelines, though it is not clear whether that authority is available in all of the states. As the pipeline network expands (particularly in or through states with no EOR experience), federal siting authority for interstate CO₂ pipelines may become a practical necessity. In addition, the cumbersome process for issuing permits for projects crossing federal lands needs to be streamlined.

4. Options for Pipeline Regulatory Framework

There are various approaches to regulate CO₂ pipelines. First, the existing model for CO₂ pipeline regulation could be retained. Under that model, states retain authority for siting CO₂ pipelines. The federal government only involves itself in siting CO₂ pipelines that cross federal lands. The STB does not regulate rates or access. The Department of Transportation's OPS acts to ensure safety, with state involvement if states so choose.

Second, the model that currently exists for oil pipelines could be used for CO₂ pipelines. Under this model, the states would be responsible for pipeline siting. FERC, rather than the STB, would have authority for transportation rates and access. Safety issues would be handled by OPS.

Third, the natural gas pipeline model could be applied. This model envisions a larger federal role. FERC would have authority for the siting of CO₂ pipelines, like the authority provided for natural gas pipelines in the Natural Gas Act.²² In addition, FERC would be responsible for transportation rates. The authority for pipeline safety would remain within the Department of Transportation, under PHMSA.²³

In addition, there are other models that could be used for siting of CO₂ pipelines. For example, a federal "backstop" authority, like that provided for electricity transmission siting in the Energy Policy Act of 2005 (EPA 2005), could serve to keep CO₂ pipeline development on schedule.²⁴ Under this model, states would have initial siting authority. However, if a state fails to act and there is a need for such development, the FERC is authorized to issue a permit to developers of CO₂ pipelines.²⁵ FERC would act to issue permits that would provide federal eminent domain authority to holders of those permits.

In another model, an "opt-in" approach could be used for CO₂ pipeline siting. The current regime of state siting would continue, but developers of new pipelines could choose whether or not to avail themselves of federal siting authority. Under this approach, CO₂ pipeline developers who need federal siting authority in connection with construction of their CO₂ pipelines could apply for a federal certificate. If granted, the certificate would provide the developer with federal authority to construct and operate the pipeline using federal eminent domain authority, notwithstanding state law. If the Congress were to provide pipeline developers with federal eminent domain authority, it is likely that it would also subject the pipeline to some form of federal economic regulation by FERC or another agency. That regulation could entail nondiscriminatory access requirements modeled on the MLA or full rate and service regulations modeled on the NGA.

5. Recommendation for a New Federal Role

The massive build out of CO₂ pipeline infrastructure that may be required for large scale commercial deployment of CCS will likely require substantial change in CO₂ pipeline regulation. In particular, it is not clear whether reliance on state-by-state siting processes and eminent domain authority will be sufficient to support construction—over a period of a couple of decades—of a network of interstate CO₂ pipelines that may approach the size of the current natural gas pipeline system. As a result, some developers will likely need access to a federal siting process and federal eminent domain authority to enable construction of this national CO₂ pipeline system. This authority is likely to be particularly needed for multi-state projects and for projects in states that do not provide CO₂ pipelines with eminent domain authority.

In addition, existing law governing access and rate regulation of CO₂ pipelines is unclear at best. Greater certainty as to the extent of that regulation will help facilitate project financing. In order to obtain financing project developers (and their debt and equity investors) need to know what regulatory requirements—if any—will apply to the pipeline during its operational phase, so they evaluate potential regulatory risks.²⁶ When Congress grants federal siting and eminent domain authority to such pipelines, it should impose some form of "common carrier" requirements, such as nondiscriminatory access and rate regulation—among other reasons, to avoid a multiplicity of small high unit-cost facilities.

Finally, the existing framework for safety regulation of CO₂ pipelines—which relies on a federal regulatory program, with delegation of some functions to state regulators—seems clear and workable.²⁷

In light of these considerations, Congress should adopt an "opt-in" federal regulatory regime for new CO₂ pipelines that consists of the following elements:

- The current system of state siting and economic regulation of CO₂ pipelines should

be retained, except with respect to those new CO₂ pipeline projects for which a permit application is filed, as provided below.

- Any entity proposing to construct a new CO₂ pipeline to transport CO₂ for purposes of permanent sequestration may elect to apply to the FERC for a federal siting permit for the new pipeline. The FERC should have exclusive authority, similar to that under the NGA, to consider and grant or deny the applications. The FERC should impose conditions on any permit granted. The FERC would undertake environmental reviews comparable to those now conducted under the NGA (see description above).
- Once a the FERC permit is granted, the project sponsor should have federal eminent domain authority, and the permit should have the same preemptive effect over state and local land use regulation as a certificate of public convenience and necessity now does under the NGA.
- When operational, the pipeline should be subject to non-discriminatory access and rate regulation similar to the FERC's current authority over oil pipelines and the STB's authority over commodity pipelines. Prescriptive regulation of rates and service—on the NGA model—would not be required.
- Whether or not a pipeline opts for a federal siting permit, it should have access to a streamlined permitting process for use of federal lands.

Congress should address these matters sooner rather than later, so that project sponsors will have greater certainty as to the CCS pipeline regulatory ground rules applicable to new CO₂ pipelines by the time that the first commercial scale CCS projects are ready for deployment in the next decade.

6. Endnotes

¹ Adam Newcomer and Jay Apt, "Implications of Generator Siting for CO₂ Pipeline Infrastructure," *Energy Policy*, Vol. 36, No. 5, 21 (May 2008).

² *Coal: A Clean Future*, Hearing Before S. Subcomm. on Energy of the Comm. on Finance, 110th Cong. (2007) (Statement of Bill Townsend, CEO, Blue Source). See also, 2008 Oil & Gas Journal Worldwide EOR Survey. The survey reports that 240,313 bbl/d is currently produced via CO₂-flood EOR and the amount of CO₂ delivered into Texas is 27 Mt/y. The number may be smaller, however, CO₂ considering that the typical net utilization of CO₂ in EOR projects falls somewhere between 5 to 7 mscf/bbl, equal to 23 to 32 Mt/y of CO₂.

³ *Id.* at 22. ("while the total mass of CO₂ is 4 times larger than the mass of current natural gas transport (455 Mt), that does not mean that the total pipeline infrastructure will be 4 times larger, since at operational conditions, a CO₂ pipeline carries about 3 times more mass per unit of length than does a natural gas pipeline").

⁴ 15 U.S.C. § 717 *et seq.* (2006); see also *Cortez Pipeline Co.*, 7 FERC ¶ 61,024 (1979) (finding that the NGA did not regulate CO₂, thus FERC lacked jurisdiction over facilities that transported CO₂).

⁵ The General Accounting Office (GAO) released a report that specifically found that CO₂ pipelines are within the oversight authority of the STB, along with at least one other gas, hydrogen. Testimony and Statement for the Record by Phyllis F. Scheinberg before the Subcommittee on Surface Transp. and Merchant Marine Infrastructure Safety and Security, U.S. Senate, *Issues Associated with Pipeline Regulation by the Surface Transportation Board*, Gov't Accountability Office, GAO/RCED-98-99, Appendix 1, Pipelines and Commodities Under STB's Jurisdiction (April 1998) ("GAO Report"). To date, the STB (established in 1995) has not heard any case specifically requesting it to rule on its jurisdiction over CO₂ pipelines, and on that basis has declined to address the jurisdictional issue raised in the GAO report.

⁶ *Cortez Pipeline Co.*, 45 Fed. Reg. 85177 (1980), *aff'd* 46 Fed. Reg. 18805 (1981). The ICC also ruled in the same order on a similar petition filed by the Atlantic Richfield Company, who sought, like the Cortez Pipeline Co., to transport CO₂ via pipeline from Colorado to Texas for tertiary recovery through EOR. As the predecessor agency to the STB, the STB may be inclined to follow the ICC *Cortez* decision with respect to jurisdiction over CO₂ pipelines.

⁷ 30 U.S.C. § 185(a) (providing the Secretary of the Interior with authority to grant pipeline rights-of-way through federal lands for "the transportation of oil, natural gas, synthetic liquid or gaseous fuels, or any refined product produced therefrom to any applicant...").

⁸ See *Exxon Corp. v. Lujan*, 970 F.2d 757 (10th Cir. 1992) (upholding a BLM decision to grant rights of way for CO₂ pipelines over federal lands using the MLA, which creates a common carrier obligation, as opposed to the Federal Land Policy and Management Act (FLPMA), 43 U.S.C. § 1761(a)(2), which regulates pipelines that do not transport natural gas and creates no common carrier obligation. However, the court notes the lack of clarity in either act over the definition of "natural gas" and defers to the agency interpretation of the MLA).

⁹ By contrast, FERC has categorically concluded that the NGA does not confer jurisdiction for it to regulate CO₂ as a "natural gas." See *Cortez Pipeline Co.*, 7 FERC ¶ 61,024 (1979). However, the Tenth Circuit declared in *Exxon Corp.* that the interpretation of the word "gas" by agencies other than Department of Interior do not make Interior's definition internally inconsistent. 970 F.2d at 762.

¹⁰ 49 U.S.C. § 601 (2006).

¹¹ 49 C.F.R. §§ 190, 195-199 (2008).

¹² 49 U.S.C. § 60104(c) (generally, states and local authorities "may not adopt or continue in force safety standards for interstate pipeline facilities or interstate pipeline transportation."); *Olympic Pipeline Co. v. City of Seattle*, 437 F.3d 872 (9th Cir. 2006) (finding that safety regulations imposed in addition to federal-state pipeline safety agreement were preempted by the Federal Pipeline Safety Act.).

¹³ 15 U.S.C. § 717f.

¹⁴ See also, Philip M. Marston and Patricia A. Moore, *From EOR to CCS: The Evolving Legal and Regulatory Framework for Carbon Capture and Storage*, 29 ENERGY L.J. 421, 456-461 (2008)

(discussing the common carrier status of CO₂ pipelines under state statutes in Texas, Mississippi, and Louisiana).

¹⁵ TX NAT. RES. CODE ANN §§ 111.002 and 111.019 (2008); NM STAT. ANN. § 42A-1-22 (2008) (requiring a pipeline to be a trunkline to obtain eminent domain authority).

¹⁶ *Id.* § 111.002 (2008).

¹⁷ NM STAT. ANN. § 70-3-1 (2008).

¹⁸ TEX. ECON. REG. CODE ANN. § 8.1 *et seq.* (2008). New Mexico has a Pipeline Safety Bureau that conducts compliance inspections and investigates accidents involving intrastate CO₂ pipelines in conjunction with oversight by the OPS.

¹⁹ 30 U.S.C. § 185(r).

²⁰ None of the incidents involving CO₂ pipelines during this period resulted in fatalities or injuries. See Gale, J. and J. Davidson (2004). "Transmission of CO₂- Safety and Economic Considerations." Energy 29: 1319-1328.

²¹ See Marston and Moore, *supra* note 14 at 449-451.

²² 15 U.S.C. § 717 *et seq.* (2006).

²³ AMERICAN WIND ENERGY ASS'N & SOLAR ENERGY INDUS. ASS'N, WHITE PAPER, *Green Transmission Superhighways* (2009).

²⁴ 16 U.S.C. § 824p.

²⁵ *But see Piedmont Env'tl. Council v. FERC*, No. 07-1651, slip op. at 8-9 (4th Cir. Feb. 18, 2009) (holding that FERC lacks the expansive permitting authority and control over state siting decisions that FERC had interpreted the statute to confer).

²⁶ The type of risks that worry developers and investors include regulatory agency modifications of transportation contracts (as under section 5 of the Natural Gas Act), the imposition of open access transportations requirements. See also, *Pipeline Service Obligations and Revisions to Regulations Governing Self-Implementing Transportation Under Part 284 of the Commission's Regulations and Regulation of Natural Gas Pipelines After Partial Wellhead Decontrol*, Order 636, 59 FERC ¶ 63,030 (1992), *partial reh'g and clarification*, Order No. 636-A, 60 FERC ¶ 61,102 (1992), *reh'g denied and order clarified*, Order No. 636-B, 61 FERC ¶ 61,272 (1992), *order on remand*, Order No. 636-C, 78 FERC ¶ 61,186 (1997); the Interstate Commerce Act section 3(1) (creating pro rationing requirements for common carrier oil pipelines that prevent a pipeline from giving anyone shipper undue preference. 49 U.S.C. app. § 3(1)).

²⁷ See Marston and Moore, *supra* note 14 at 449-451.

About the CCSReg Project

The CCSReg Project is an interdisciplinary project which aims to design and facilitate the rapid adoption of a U.S. regulatory environment for the capture, transport and geological sequestration of carbon dioxide. Our objective is to assure that CCS will be done in a manner that is safe, environmentally sound, affordable, compatible with evolving international carbon control regimes (including emissions trading) and socially equitable.

The project is anchored in the Department of Engineering and Public Policy at Carnegie Mellon University. Other members of the project team are located at the Hubert H. Humphrey Institute of Public Affairs at the University of Minnesota, the Institute for Energy and the Environment at the Vermont Law School, and the Washington, DC law firm of Van Ness Feldman.

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More information on the CCSReg Project is available at: <http://www.ccsreg.org/>