RESPONSE

DO WE NEED A NEW LAW TO GOVERN CARBON CAPTURE AND STORAGE IN FEDERAL PORE SPACE?[†]

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CONTENTS

[†] An invited response to Tara Righetti & Madeleine Lewis, *The Valorization of Federal Pore Space*, 105 B.U. L. REV. 549 (2025).

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INTRODUCTION

Carbon sequestration, also known as carbon capture and storage ("CCS"), was first suggested as a climate change mitigation strategy in 1977.[1] Most basically, CCS is a means of storing some of the carbon dioxide ("CO_2") produced in industrial operations, particularly from the combustion of fossil fuels to produce electricity.[2] Optimistic projections suggest that aggressive use of CCS could reduce global CO_2 emissions by 17% by 2050.[3] As Tara Righetti and Madeleine Lewis demonstrate, however, CCS remains a complicated facet of climate change mitigation, especially as a legal and policy subject.[4]

CCS is technically complicated. As the U.S. Department of Energy emphasizes, not every site that has an injection well and an underground reservoir can be used for CCS.[5] Instead, first, "[a] storage site needs to have sufficient storage resource (space) to contain large amounts (millions of metric tons) of compressed CO_2."[6] Second, the site must have sufficient injectivity to make storage possible, referring to "the rate at which CO_2 can be injected into the subsurface," which in turn depends on the subsurface formation's permeability.[7] Third, and most importantly for long-term safety and climate mitigation effectiveness, the storage formation must have integrity—that is, "the ability to confine CO_2 safely within a predetermined volume without a breach from the storage complex. A storage complex must have one or more confining zones that seal above the injected formation that are intact and do not have leakage pathways."[8] Finally, "[t]he CO_2 storage zone needs to be located at a sufficient depth and pressure so that CO_2 can be injected as a supercritical fluid. Supercritical CO_2 is dense and behaves more like a liquid than a gas, allowing for storage of higher concentrations of CO_2 by volume."[9] Supercritical CO_2

[1] Arshad Raza, Raoof Gholami, Reza Rezaee, Vamegh Rasouli & Minou Rabiei, *Significant Aspects of Carbon Capture and Storage—A Review*, 5 PETROLEUM 335, 335 (2019) (citing Cesare Marchetti, *On Geoengineering and the CO_2 Problem*, 1 CLIMATIC CHANGE 59, 60-61 (1977)); BERT METZ, OGUNLADE DAVIDSON, HELEEN DE CONINCK, MANUELA LOOS, LEO MEYER, INTERGOVERNMENTAL PANEL ON CLIMATE CHANGE, IPCC SPECIAL REPORT ON CARBON DIOXIDE CAPTURE AND STORAGE 9 (2005).

[2] Raza et al., *supra* note 1, at 335.

[3] *Id.*

[4] *See generally* Tara Righetti & Madeleine Lewis, *The Valorization of Pore Space in Federal Public Lands*, 105 B.U. L. REV. 549 (2025) (analyzing legal and policy implications of CCS).

[5] *Carbon Storage FAQs: What Is Carbon Capture and Storage*, NAT'L ENERGY TECH. LAB'Y, U.S. DEP'T OF ENERGY, https://netl.doe.gov/carbon-management/carbon-storage/faqs/carbon-storage-faqs [https://perma.cc/ZCF3-KQVY] (last visited Mar. 11, 2025).

[6] *Id.*

[7] *Id.*

[8] *Id.*

[9] *Id.*

exists at "a temperature in excess of 31.1°C (88°F) and a pressure in excess of 72.9 [atmospheres] (about 1,057 [pounds per square inch])."[10]

As the Department of Energy also acknowledges, CCS is not risk-free.[11] Indeed, CCS poses risks both to human health and safety and to the environment at every stage of the process. "For example, in the CO_2 capture process, the widely used alcohol amine solution may cause alcohol amines to be emitted in gaseous or liquid form, exposing nearby workers and ecosystems to such [contaminants] through air and drinking water."[12] "After some of the substances enter the human body, they damage target organs such as the liver and kidneys and cause irreversible damage to the human immune system."[13] CO_2 leaking from pipelines or storage facilities can asphyxiate any animal that breathes air.[14] As a result, pipes and storage sites must be continuously monitored after injection to ensure that the CO_2 remains in place.[15] Injected CO_2 can also contaminate groundwater and increase seismicity,[16] while the capture of CO_2 at power plants can increase those plants' demand for (potentially scarce) water[17] and decrease their efficiency in producing electric power.[18]

Of course, climate change itself also creates risks for human health and the environment, at all scales, up to and including planet-wide processes.[19] From

[10] *Id.*; *see also* Raza et al., *supra* note 1, at 336 & fig.1 (discussing and diagramming various physical states CO_2 can exist in).

[11] *See Carbon Storage FAQs: What Is Carbon Capture and Storage*, *supra* note 5.

[12] Xiaoxi Tian et al., *Unleashing Tomorrow's Potential: A Comprehensive Exploration of Risks in Carbon Capture and Storage*, 210 RENEWABLE & SUSTAINABLE ENERGY REVS. 9 (2025).

[13] *Id.*

[14] *See id.*; *see also* Seyed Kourosh Mahjour & Salah A. Faroughi, *Risks and Uncertainties in Carbon Capture, Transport, and Storage Projects: A Comprehensive Review*, GAS SCI. & ENG'G, Nov. 2023, at 1, 6 fig.7 (showing human injuries at various CO_2 concentrations).

[15] Raza et al., *supra* note 1, at 339; *see also* Steven T. Anderson, *Risk, Liability, and Economic Issues with Long-Term CO_2 Storage—A Review*, 26 NAT. RES. RSCH. 89, 91 (2017) ("Geologic uncertainty concerning the pathways that injected CO_2 and pressurized or displaced formation fluids will take is a major contributor to uncertainty in estimates of potential risk.").

[16] Mahjour & Faroughi, *supra* note 14, at 5-6; Anderson, *supra* note 15, at 90.

[17] Sara Sneath, *The Cost to Capture Carbon? More Water and Electricity*, GUARDIAN (Oct. 15, 2022), https://www.theguardian.com/environment/2022/oct/15/emissions-capture-carbon-cost-water-electricity [https://perma.cc/R5S2-YHS9] ("Carbon capture and sequestration increases water withdrawals at power plants between 25% and 200% . . . .").

[18] Howard Herzog, *If a Fossil Fuel Power Plant Uses Carbon Capture and Storage, What Percent of the Energy It Makes Goes to the CCS Equipment?*, MIT CLIMATE PORTAL (Mar. 28, 2024), https://climate.mit.edu/ask-mit/if-fossil-fuel-power-plant-uses-carbon-capture-and-storage-what-percent-energy-it-makes ("Carbon capture equipment typically consumes between 15 and 25 percent of a power plant's energy production.").

[19] INTERGOVERNMENTAL PANEL ON CLIMATE CHANGE, CLIMATE CHANGE 2022: IMPACTS, ADAPTATION AND VULNERABILITY 9-20 (2022).

one perspective, therefore, CCS localizes the risks that CO_2 emissions create. It transforms those emissions' contributions to increasing global risk from the greenhouse effect as a result of accumulating CO_2 in the atmosphere into new and different community-level risks resulting from the local concentration of supercritical CO_2 through carbon capture, transportation, and storage.

This fact is relevant to the project Righetti and Lewis pursue, which is to figure out how to operationalize CCS in underground formations ("pore space") owned by the federal government.[20] As this Response will eventually argue, the choice of how to price federal pore space for CCS is unavoidably a policy choice. And as Righetti and Lewis acknowledge, current public lands law and its insistence on fair market value are extremely poor mechanisms for making and expressing national-level policy decisions regarding this inherent risk-risk analysis in the development of CCS.[21]

As Righetti and Lewis also amply demonstrate, CCS in federal pore space is not only technically, but also legally complicated.[22] It is *so* legally complicated, in fact, that this Response suggests that an entirely new legal regime might be necessary both to allow CCS storage in federal pore space and to rationalize and clearly state federal policies regarding climate change mitigation, the promotion (or not) of CCS, and the legacy of the nation's public lands in the Anthropocene.

I. CAN TERRESTRIAL PUBLIC LANDS AGENCIES DEMONSTRATE SUFFICIENT LEGAL AUTHORITY TO ALLOW CCS IN FEDERAL PORE SPACE?

The first issue is whether any federal public lands agency actually has the necessary legal authority to allow CCS in federal pore space. With some caveats regarding dominant use lands like national parks and national wildlife refuges, Righetti and Lewis accept that at least some federal agencies—notably, the Bureau of Land Management ("BLM")—could allow CCS on many of the lands it manages.[23] However, the U.S. Supreme Court has spent its last three terms meticulously patrolling federal agency attempts to exercise discretion, particularly when they are trying to deal with new problems like climate change and the COVID-19 pandemic. The Court's decisions suggest that the existing public land regulatory regimes may not be adequate to allow CCS projects under most of the terrestrial federal public lands.

A. *The Major Questions Doctrine*

In 2022, the Environmental Protection Agency's ("EPA") attempt to deal with power plants' greenhouse gas emissions under the Clean Air Act, an elaborate rule known as the Clean Power Plan, became the occasion for the Supreme Court

[20] *See* Righetti & Lewis, *supra* note 4, at 555.

[21] *Id.* at 583-92.

[22] *Id.* at 556-74.

[23] *See, e.g.*, *id.* at 535 (discussing guidance from various federal agencies on sequestration rights).

to fully articulate a new check on federal agency authority: the Major Questions Doctrine ("MQD").[24] According to the Court, "Where the statute at issue is one that confers authority upon an administrative agency, [statutory construction] must be 'shaped, at least in some measure, by the nature of the question presented'—whether Congress in fact meant to confer the power the agency has asserted."[25] In particular, "there are 'extraordinary cases' . . . in which the 'history and the breadth of the authority that [the agency] has asserted,' and the 'economic and political significance' of that assertion, provide a 'reason to hesitate before concluding that Congress' meant to confer such authority."[26] For example:

> Extraordinary grants of regulatory authority are rarely accomplished through "modest words," "vague terms," or "subtle device[s]." Nor does Congress typically use oblique or elliptical language to empower an agency to make a "radical or fundamental change" to a statutory scheme. Agencies have only those powers given to them by Congress, and "enabling legislation" is generally not an "open book to which the agency [may] add pages and change the plot line."[27]

As a result, under the MQD, when a federal agency relies on textual ambiguity to claim authority to do something that it has never done before that is not immediately analogous to prior actions, "something more than a merely plausible textual basis for the agency action is necessary. The agency instead must point to 'clear congressional authorization' for the power it claims,"[28] particularly when the social and economic consequences are significant. The MQD thus polices "agencies asserting highly consequential power beyond what Congress could reasonably be understood to have granted."[29]

As Righetti and Lewis acknowledge, none of the federal public land statutes on which they focus explicitly mentions CCS or carbon sequestration.[30] Nor is CCS just a new form of mining (i.e., removal of minerals from the ground) that can be easily analogized to the more traditional forms of mineral extraction (i.e., gold mining, oil and gas leasing) that have occurred on many federal public lands since at least the Mining Law of 1872.[31] CCS involves the (effectively) permanent storage of CO_2 below the land's surface. As such, for MQD purposes, CCS differs considerably from hydraulic fracturing or helium extraction on the federal public lands, both of which are easily categorized as mining activities.

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[24] *See* West Virginia v. EPA, 597 U.S. 697, 700 (2022) (finding issue presented should be decided using Major Questions Doctrine).

[25] *Id.* at 721 (quoting FDA v. Brown & Williamson Tobacco Corp., 529 U.S. 120, 159 (2000)).

[26] *Id*. (alteration in original) (quoting *Brown & Williamson*, 529 U.S. at 159-60).

[27] *Id*. at 723 (alterations in original) (citations omitted).

[28] *Id.* (quoting Utility Air Regul. Grp. v. EPA, 573 U.S. 302, 324 (2014)).

[29] *Id*. at 724.

[30] *See generally* Righetti & Lewis, *supra* note 4 (reviewing legislation).

[31] Mining Law of 1872, 30 U.S.C. §§ 22-24, 26-30, 33-35, 37, 39-42, 47.

Finally, almost all contemporary assessments of CCS stress its expense and the economic risks of investing in it,[32] again suggesting that CCS raises MQD red flags.

Predicting which agency innovations the Supreme Court will deem to be major questions that require clear congressional delegations of authority remains the province of art and lucky guesses rather than strict legal logic. Nevertheless, the extension of existing terrestrial public land management authority to CCS appears to be a strong candidate for MQD policing by the federal courts, especially in light of recent congressional action.

Dominant use lands, such as national parks and national wildlife refuges, will likely prove the easiest MQD targets for challengers seeking to prevent CCS beneath the federal public lands. Righetti and Lewis note that dominant use lands pose particular problems for CCS authorization,[33] but the MQD may put these lands completely out of reach absent congressional amendment. For example, the mission of the U.S. Fish & Wildlife Service for lands in the National Wildlife Refuge System "is to administer a national network of lands and waters for the conservation, management, and where appropriate, restoration of the fish, wildlife, and plant resources and their habitats within the United States for the benefit of present and future generations of Americans."[34] While Congress explicitly designated wildlife-dependent recreation as compatible with this conservation mission,[35] the Service's duty is to "ensure that the biological integrity, diversity, and environmental health of the System are maintained for the benefit of present and future generations of Americans."[36] Similarly, the National Park Service, in administering the National Park System, acts "to conserve the scenery, natural and historic objects, and wild life in the System units and to provide for the enjoyment of the scenery, natural and historic objects, and wild life in such manner and by such means as will leave them unimpaired for the enjoyment of future generations."[37] Under the MQD, it is difficult to infer "clear congressional authorization" for CCS within either of these multigenerational preservation mandates.

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[32] *See, e.g.*, Hwarang Lee, Jeongeun Lee & Yoonmo Koo, *Economic Impacts of Carbon Capture and Storage on the Steel Industry—A Hybrid Energy System Model Incorporating Technological Change*, APPLIED ENERGY, July 2022, at 1, 1 ("[T]he high costs of CCS are considered to be an economic barrier to its adoption and diffusion."). According to the Institute for Energy Economics and Financial Analysis in 2022, "[c]arbon capture and storage (CCS) projects are not yet ready to warrant them investable." Michael Salt, *Investment Risks of Carbon Capture and Storage Currently Outweigh Its Potential*, INST. FOR ENERGY ECON. & FIN. ANALYSIS (July 7, 2022), https://ieefa.org/articles/investment-risks-carbon-capture-and-storage-currently-outweigh-its-potential [https://perma.cc/7VJ7-7DCC].

[33] *See* Righetti & Lewis, *supra* note 4, at 571-73.

[34] 16 U.S.C. § 668dd(a)(2).

[35] *Id.* at § 668dd(a)(3).

[36] *Id.* at § 668dd(a)(4)(B).

[37] 54 U.S.C. § 100101(a).

However, the MQD could also undermine the abilities of federal agencies who administer multiple use federal lands, like the BLM (Department of the Interior) and the U.S. Forest Service (Department of Agriculture), to allow CCS below those lands. First, Congress *does* know how to include CCS and carbon sequestration in statutes when it wants to. For example, the Department of Energy has broad and explicit authority to pursue CCS projects,[38] including on tribal lands.[39] Against this explicit authorization, any MQD-minded federal court will likely find the continuing congressional silence regarding CCS in the Federal Land Policy and Management Act[40] ("FLPMA," for the BLM) and the National Forest Management Act[41] to be deafening proof of those agencies' lack of CCS authority.

Moreover, the BLM and Forest Service also have a congressional failure-to-act problem, again strongly suggesting that Congress did not intend CCS leasing on the lands they control. First, in 2021, through the Infrastructure Investment and Jobs Act, Congress amended the Outer Continental Shelf Lands Act (which the Department of the Interior's Bureau of Ocean Energy Management ("BOEM") administers) explicitly to allow leasing of the federal government's offshore submerged lands (the outer continental shelf) for carbon sequestration.[42] Second, in 2022, Congress explicitly authorized carbon sequestration demonstration projects on Department of Defense lands.[43] The fact that Congress explicitly amended statutes to allow for CCS beneath two specific kinds of federal lands creates an unusually strong implication—again, particularly in light of the MQD—that no other federal public lands agencies have that authority.

That implication grows even stronger in light of the explicit carbon sequestration authorities that the relevant public lands Secretaries *do* have. On dry ground, the Secretary of the Interior has explicit authority only to assess the potential carbon sequestration formations in the United States (acting through the U.S. Geological Survey)[44] and the carbon sequestration potential of ecosystems.[45] As for the Department of Agriculture, Congress is far more

[38] *See, e.g.*, 42 U.S.C. § 16293 (authorizing Secretary of Department of Energy to engage in carbon sequestration).

[39] 25 U.S.C. § 3502(b)(4)(A) (mandating that Director of Department of Interior develop and implement projects "that provide Indian tribes with opportunities to participate in carbon sequestration on Indian land . . . .").

[40] *See* Federal Land Policy and Management Act, 43 U.S.C. §§ 1701-1782 (1976).

[41] *See* National Forest Management Act, 16 U.S.C. §§ 1600-1614 (1976).

[42] Infrastructure Investment and Jobs Act, Pub. L. No. 117-58, § 40307, 135 Stat. 429, 1002-03 (2021) (amending 43 U.S.C. §§ 1331, 1337).

[43] Prototype and Demonstration Projects for Energy Resilience at Certain Military Installations, Pub. L. No. 117-263, § 322(c)(5), 136 Stat. 2511 (2022), as amended by Pub. L. No. 118-31, § 316(a), 137 Stat. 217 (2023).

[44] 42 U.S.C. § 17271.

[45] *Id.* at § 17272.

interested in biological sequestration of CO_2 than injection of CO_2 underground on agricultural and forest lands. In 2022, the Department of Agriculture's Natural Resources Conservation Service received an appropriation explicitly to assess the carbon sequestration potential of agriculture.[46] The Secretary of Agriculture also has explicit authority to establish forest reserves to enhance carbon sequestration *by trees*[47] and to improve carbon sequestration through grazing practices.[48]

In short, Congress has been clear recently when it wants federal agencies to have authority over subsurface CCS by injection—and equally clear when it wants agencies to focus on biological sequestration. Therefore, all federal lands agencies except the Department of Defense and BOEM are vulnerable to MQD invalidations if they attempt to allow CCS in federal pore space. Given that the BLM is already pursuing CCS rights of way, it is likely to become the subject of the first MQD challenge to CCS on federal public lands. If so, two other recent Supreme Court developments will aid the challengers.

B. *More from the Supreme Court:* Corner Post *and* Loper Bright

In 2024, the U.S. Supreme Court decided two cases that make it easier for plaintiffs to challenge federal agency innovations. First, in *Loper Bright Enterprises v. Raimondo*,[49] the Court overruled *Chevron* deference, a Court-created doctrine that gave federal agencies considerable authority to interpret ambiguities in the statutes they administer.[50] Instead, the Court lodged all authority to interpret federal statutes within the federal courts.[51] Moreover, "such statutes, no matter how impenetrable, do—in fact, must—have a single, best meaning. That is the whole point of having written statutes; 'every statute's meaning is fixed at the time of enactment.'"[52] Thus, under *Loper Bright*, and especially in light of the discussion above, federal courts could easily find that Congress could not have meant to include CCS in any statute enacted before 1977, when CCS was first suggested as a climate change mitigation strategy[53]—

[46] Pub. L. No. 117-169, § 21002(a)(2), 136 Stat. 1818, 2018 (2022).

[47] *See, e.g.*, 16 U.S.C. § 6501 (noting purpose of section to "enhance productivity and carbon sequestration").

[48] *Id.* at § 3839aa-24(d); *see also* 7 U.S.C. § 6712 (creating credits for carbon sequestration through forestry or agriculture).

[49] 603 U.S. 369 (2024).

[50] *Id.* at 396-99.

[51] *Id.* at 386-90.

[52] *Id.* at 400 (quoting Wisconsin Cent. Ltd. v. United States, 585 U.S. 274, 284 (2018)).

[53] For the proposition that Congress cannot have written a statute to include a term different from the term's meaning at the time of writing, see, e.g., Texas v. Becerra, 739 F. Supp. 3d 522, 533 (E.D. Tex. July 3, 2024) (relying on *Loper Bright* to conclude that "sex" in Title IX could not refer to gender identity, because "when Title IX was enacted in 1972, 'sex' unambiguously meant only a person's biological sex—'an immutable characteristic determined solely by the accident of birth'" (quoting Frontiero v. Richardson, 411 U.S. 677,

and, notably, Congress enacted most of the federal public lands statutes before 1977. FLPMA and the National Forest Management Act both came into being in 1976.[54]

Second, in *Corner Post, Inc. v. Board of Governors of the Federal Reserve System*,[55] the Court created an "injury rule" for statute of limitations accrual in lawsuits against federal agencies brought pursuant to the federal Administrative Procedure Act ("APA").[56] As the Court explained, "[t]he default statute of limitations for suits against the United States requires 'the complaint [to be] filed within six years after the right of action first accrues.'"[57] "An APA plaintiff does not have a complete and present cause of action until she suffers an injury from final agency action, so the statute of limitations does not begin to run until she is injured."[58] As a result, if the BLM or Forest Service relies on existing regulations to lease pore space for CCS, newly injured parties will still have a cause of action, regardless of when the federal agency promulgated those rules.

II. CAN CCS ON FEDERAL PUBLIC LANDS BE CONSIDERED ANYTHING LESS THAN A PURCHASE?

Righetti and Lewis characterize CCS as a *use* of federal pore space, but that is a classification worth more consideration. Obviously, Congress itself considered the use of offshore CCS storage sites to be a "lease" under the 2021 Outer Continental Shelf Lands Act amendments. Nevertheless, to the extent that underground CO_2 storage needs to last essentially forever, the lease of federal pore space can never end.[59] In Righetti and Lewis's terms, CCS is "hegemonic";[60] in property terms, there is, as a practical matter, no reversionary interest for the federal government.

Treating the CCS pore space property arrangements as easements or rights of way (like the BLM would) makes a bit more sense, because at least these two forms of property rights can be perpetual. Nevertheless, they remain an imprecise fit for what the CCS pore space property transaction will actually allow. Easements and rights of way are nonexclusive rights to *use* someone

686 (1973))). *See also* Marchetti, *supra* note 1, at 60-61 (discussing for first time possible use of CCS as climate change mitigation strategy).

[54] *See* sources cited *supra* note 40-41.

[55] 603 U.S. 799 (2024).

[56] *Id.* at 809 ("An APA plaintiff does not have a complete and present cause of action until she suffers an injury from final agency action, so the statute of limitations does not begin to run until she is injured."); *see also* 5 U.S.C. §§ 701-706.

[57] *Corner Post*, 603 U.S. at 804 (second alteration in original) (quoting 28 U.S.C. § 2401(a)).

[58] *Id.* at 809.

[59] *See* Anderson, *supra* note 15, at 89 (noting for CCS to be effective climate mitigation, CO_2 must remain "isolate[d] . . . from the atmosphere for hundreds to thousands of years, or even longer").

[60] Righetti & Lewis, *supra* note 4, at 569.

else's property.[61] In contrast, to the extent that other uses threaten the integrity of the storage space, the CCS pore space property right is also perpetually exclusive. The underground pore space becomes, in effect, the CO_2 storer's exclusive space to occupy in perpetuity.

That sounds a lot like a sale of federal land. The distinction matters because a public land agency's authority to lease or to convey a right of way is not authority to sell. For example, Congress explicitly limits the sale of lands in the National Wildlife Refuge System.[62] In contrast, FLPMA is more open to sales of BLM land, if certain criteria are met:

> (1) such tract because of its location or other characteristics is difficult and uneconomic to manage as part of the public lands, and is not suitable for management by another Federal department or agency; or
>
> (2) such tract was acquired for a specific purpose and the tract is no longer required for that or any other Federal purpose; or
>
> (3) disposal of such tract will serve important public objectives, including but not limited to, expansion of communities and economic development, which cannot be achieved prudently or feasibly on land other than public land and which outweigh other public objectives and values, including, but not limited to, recreation and scenic values, which would be served by maintaining such tract in Federal ownership.[63]

The third category, applied only to the pore space (and not the surface lands), could reasonably accommodate the sale of BLM pore space to CCS operations. Somewhat paradoxically, valuing the sale of the entire subsurface estate might prove easier than valuing a right of way or lease to the pore space. Nevertheless, special congressional approval procedures apply if the underground space amounts to 2,500 acres or more.[64] As Righetti and Lewis describe them, the Moxa Carbon Storage Project and Sweetwater Carbon Storage Hub in Wyoming and the Snowy River CO_2 Sequestration Project in Montana all far exceed this acreage limitation.[65]

This discussion may seem overly technical, a property lawyer's blundering through public lands law. Nevertheless, even if some federal agencies do have the legal authority to allow CCS, it should be recognized from the beginning that they are creating a new form of property right in federal lands that is neither a lease nor an easement/right of way, but rather a permanent and exclusive right of occupancy that simultaneously imposes new risks on the surface users and

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[61] *See Easement*, BLACK'S LAW DICTIONARY (12th ed. 2024) ("Unlike a lease or license, an easement may last forever, but it does not give the holder the right to possess, take from, improve, or sell the land. The primary recognized easements are (1) a right-of-way . . . .").

[62] 16 U.S.C. § 668dd(a)(5).

[63] 43 U.S.C. § 1713(a).

[64] *Id.* § 1713(c).

[65] *See* Righetti & Lewis, *supra* note 4, at 566.

nearby residents.[66] It is thus likely that at least a few federal courts will subject these property arrangements to the varying requirements for sales of federal lands—or void any attempts by the relevant agencies to use their normal leasing or right-of-way procedures to allow CCS in federal pore space.

III. SHOULDN'T WE ALIGN FEDERAL TAX POLICY AND FEDERAL LANDS POLICY IN THE PURSUIT OF A NATIONAL CLIMATE POLICY?

As Righetti and Lewis observe, Congress enacted tax credits to encourage the development of CCS, awarding a credit for each ton of CO_2 sequestered underground.[67] However, the credit goes to the person who *captures* the CO_2, not to the person who actually sequesters it underground.[68] Instead, the injector who uses federal public lands must pay fair market value for the pore space without necessarily receiving the tax credit benefit.

Presumably, if the person who captures the CO_2 and the person who injects the CO_2 are different people, the injector will pass the costs of using federal public lands on to the capturers who are paying the injector for storing the CO_2—as is the arrangement for CCS located under private land.[69] As Righetti and Lewis recognize, however, treating the public lands transaction the same as a private land transaction (fair market value in its most obvious sense) ignores the enormous policy implications that underly whatever price tag an agency seeks.[70] The "fair market value" ends up imposing on federal pore space the *least* sensical approach, at least from the perspective of national climate policy, which is to treat the public lands like any other real property with usable pore space beneath it.

In an approach that Righetti and Lewis would probably favor, Congress could fully embrace its prior decisions that it is worth giving up federal money (in the form of taxes) to incentivize CCS by extending those monetary incentives to storage in federal pore space. Univalent CCS incentives from the federal government would unambiguously implement the conclusion that economists have already reached: CCS is unlikely to become widespread without government help.[71]

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[66] *See* Anderson, *supra* note 15, at 104-05 (discussing difficulty of characterizing the property rights in pore space).

[67] Righetti & Lewis, *supra* note 4, at 624 ("[T]he primary market for carbon removal is driven by federal tax credits . . . .").

[68] 26 U.S.C. § 45Q(a) (establishing amount of the credit available based on amount of carbon *captured* by taxpayer).

[69] *See* Righetti & Lewis, *supra* note 4, at 590.

[70] *Cf. id.* at 597 ("Though it is possible that some empirical valuation standards could be gleaned from private pore space leases, there is very little precedent in terms of either publicly available comparable sales or established rents.").

[71] As Anderson noted:

> The benefits of CCS in mitigating rising atmospheric concentrations of CO_2 would be global and nonexcludable, which means that investors will not be able to recoup the full

From this climate policy perspective, the additional economic incentive of allowing federal pore space to be used at submarket rates makes perfect sense, especially if increased regulation and oversight of the CCS facility are part of the bargain. Congress could decide, in other words, both that it wants to encourage CCS in general and that, as a matter of national policy, *federal* pore space is the best place for the CO_2 to go—for the economies of scale, to avoid trespass problems, to limit the number of formations overall that are being used for CCS, to concentrate CCS in less populated areas, and/or to ease the regulatory coordination and economic issues involved in getting CCS up and running.[72]

Conversely, Congress could make the policy decision that the federal public lands deserve special protection as spaces for public recreation and as ecological refugia and hence should be the *last* places that CCS projects should go. In that case, the value of federal pore space should reflect the public lands' public and multigenerational value as well as the near-permanent loss of the subsurface if CCS projects were allowed. To completely rationalize this policy choice, however, Congress should also deny the federal tax credits to people who ship their captured CO_2 to any storage facility that makes use of federal pore space beneath useable federal lands.[73]

In short, Congress should view the federal public lands, including the pore space beneath them, as vehicles for advancing a well-defined public policy (much as in the Homestead Acts of the nineteenth century[74]), not as market competitors for CCS facilities. Whichever way that policy decision goes—and it probably should go in different directions for different types of federal public lands—the *least* helpful price that the federal government can charge for federal pore space is fair market value.

CONCLUSION: A NEW STATUTORY REGIME?

Righetti and Lewis offer the very helpful legal exercise of coloring within the lines—that is, applying the existing statutory and regulatory legal regimes for

> social value of their CCS projects. On the other hand, local stakeholders will bear most of the CO_2 storage costs and risks. Given the social nature of the benefits of CCS and the private costs and local risks, simply allowing free reign of market forces in this nascent sector could lead to far less implementation of CCS projects than necessary to meet goals for CO_2 reduction. A possible approach to correcting this potential market failure could involve governments providing incentives for implementation of CCS.

Anderson, *supra* note 15, at 90.

[72] *See id.* at 104 (discussing some advantages of negotiating with one federal government over multiple private owners and hinting at advantage of simple definition for such property rights).

[73] In contrast, Congress could legitimately treat federal pore space that exists below privately owned surface estates differently because there is no surface public estate to protect for future generations.

[74] *See The Homestead Act of 1862*, NAT'L ARCHIVES, https://www.archives.gov/education/lessons/homestead-act [https://perma.cc/998G-89GS] (last visited Mar. 11, 2025).

public lands to the emerging issue of CCS in federal pore space. What their article demonstrates most vividly, however, is that fitting CCS into those regimes is both damn hard and potentially nonsensical if the goal is to advance coherent climate change mitigation and public lands management policies simultaneously. As the authors come close to recognizing at the end of their article, valuation of federal pore space is the tail wagging the dog—an excessively limited process within which federal agencies must fight through (or ignore) enormous policy debates.[75] Does the value of reducing global climate change impacts "count"? How do we balance that benefit against the creation of a new concentration of risks to the local community? Do we want to encourage CCS at the expense of providing deeper incentives for other and more complete mitigation measures, such as the transition to renewable energy?

Given the U.S. Supreme Court's recent administrative law decisions discussed above (*West Virginia*,[76] *Loper Bright*,[77] and *Corner Post*[78]), all federal public land agencies except BOEM and the Department of Defense currently occupy exceedingly shaky legal ground regarding their authority to even authorize CCS. Even shakier is their authority to value the resulting real estate transactions—especially because the property interest they will convey does not fit comfortably into traditional notions of either leases or rights of way. The fact that Congress apparently felt a need to fix some of this legal ambiguity for BOEM and the Department of Defense[79] just underscores the desirability of a more comprehensive statutory regime to govern CCS on federal public lands. Ideally, that new legislation would: (1) pursue a clear policy goal or goals in the national interest; (2) clearly distinguish the types of public lands where CCS is allowed (e.g., non-specialized BLM lands) and where it is prohibited (e.g., national parks, wilderness areas, national wildlife refuges); (3) define the exact property interest being conveyed; (4) impose extensive design, construction, and monitoring requirements to protect the general public and the environment; and (5) set a price per acre that reflects the public policy goal Congress is pursuing, whether that is to promote or hinder CCS development on the public lands.

[75] *See* Righetti & Lewis, *supra* note 4, at 626 (noting "the biggest question [is] how do we value climate mitigation relative to other uses of public lands, and should Congress use land management policy to encourage sequestration?").

[76] West Virginia v. EPA, 597 U.S. 697, 700 (2022).

[77] Loper Bright Enters. v. Raimondo, 603 U.S. 369 (2024).

[78] Corner Post, Inc. v. Bd. of Governors, 603 U.S. 799 (2024).

[79] As discussed above, Congress recently amended the Outer Continental Shelf Lands Act to allow BOEM to lease the Outer Continental Shelf for CCS. *See* Infrastructure Investment and Jobs Act, Pub. L. No. 117-58, § 40307, 135 Stat. 1002-03 (2021) (amending 43 U.S.C. §§ 1331, 1337). Congress also enacted legislation to allow the Department of Defense to carry out pilot CCS projects on its land. *See* Prototype and Demonstration Projects for Energy Resilience at Certain Military Installations, Pub. L. No. 117-263, § 322(c)(5), 136 Stat. 2511 (2022), as amended by Pub. L. No. 118-31, § 316(a), 137 Stat. 217 (2023).