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IN FOCUS

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Carbon Sequestration Legislation in the 116th Congress

Utilizing permanent underground storage of carbon dioxide (CO_2), also known as geological sequestration, as a potential strategy to reduce net greenhouse gas (GHG) emissions is receiving increasing congressional attention. Proponents of geologic sequestration of CO_2 view the process as a promising method of reducing GHG emissions from industrial sources, such as coal-fired power plants, while continuing to use fossil fuels as a source of electricity. Several bills introduced in the 116th Congress would address geological sequestration policy issues, focusing on federal research and development (R&D) and federal tax credits for storing carbon.

Carbon Sequestration

Geological sequestration of CO_2, a type of carbon storage, is the process of storing CO_2 by injecting it into an underground geological formation. Geological sequestration is the final step in a carbon capture and storage (CCS) system—sometimes referred to more expansively as CCUS (carbon capture, utilization, and storage). Geological sequestration is intended to trap CO_2 emitted from anthropogenic sources permanently underground and reduce net emissions of this GHG into the atmosphere. CO_2 can also be stored underground when injected as part of oil and gas production (called enhanced oil recovery, or EOR).

In a CCS system, CO_2 is captured from a stationary source, compressed into a fluid to allow for transportation by pipeline, and then injected through specially designed wells into geological formations typically a half a mile or more below the earth's surface. An emerging technology to capture CO_2 directly from the atmosphere—"direct air capture"—could also serve as a source of CO_2 for geological sequestration. Subsurface geological formations across the United States could be suitable for large-scale sequestration of CO_2. These include, for example, deep saline reservoirs (underground basins containing salty fluids) and oil and gas reservoirs no longer in production. CO_2 may also be sequestered offshore in deep ocean waters or under the seabed. When injected deep enough underground, high pressures combined with impermeable rocks above the target formation are expected to keep the CO_2 from migrating upwards into shallower groundwater or into other geological formations. For additional information on the technical aspects of CCS, see CRS Report R44902, *Carbon Capture and Sequestration (CCS) in the United States*, by Peter Folger.

Beyond Research and Development

Over the last decade, the focus of federal R&D efforts for geological sequestration has shifted from small demonstration projects to exploring the use of sequestration as a technically and commercially viable method for storing large volumes of captured CO_2. The U.S. Department of Energy (DOE) leads the federal government's R&D efforts in geological sequestration of CO_2 as part of the agency's fossil fuel programs. DOE's work includes conducting fundamental laboratory research on wells, storage design, geologic settings, and monitoring and assessment of the injected CO_2. DOE also sponsors numerous geological sequestration testing and validation projects through partnerships with the petroleum and chemical industries and public and private research institutions. To date in the United States, nine R&D projects have injected CO_2 into underground formations in large-scale field tests of permanent geological sequestration and storage associated with EOR. Four of these projects are currently injecting and/or storing CO_2.

CCS Legislation in the 116th Congress

Some Members of Congress have introduced legislation intended to support geological sequestration R&D. (See **Table 1** for a list of legislation introduced in the 116th Congress.) Several bills—S. 383/H.R. 1166, S. 1201, and H.R. 3607—would enhance DOE's work in supporting geological sequestration through continuation and/or expansion of its CCS programs, including carbon storage programs. These bills would amend current statutes to direct DOE to develop and implement R&D programs related to geological sequestration methods, storage siting, and assessment of potential impacts. S. 1201 and H.R. 3607 would also direct DOE to continue its partnership programs for large-scale sequestration demonstration projects. S. 383/H.R. 1166 and S. 1201 would require reports to Congress, such as a report from DOE on saline reservoir storage and a report from the Council on Environmental Quality on ways to facilitate development of CCS projects.

Legislation addressing federal tax credits for carbon storage is receiving significant industry attention. One bill in the 116th Congress, S. 2263, would address these tax credits (see **Table 1**). S. 2263 would amend the federal tax code, Section 45Q, by changing what is considered "secure geological storage" of carbon oxide (a more general term covering CO_2 and other oxides). To qualify as secure storage, the carbon oxide would need to be stored in compliance with existing EPA rules, the Clean Air Act, and the Safe Drinking Water Act. S. 2263 would also set out eligibility requirements for tax credits for carbon oxide storage associated with EOR.

Table 1. Carbon Sequestration Legislation Introduced in the 116th Congress

Bill Number	Short Title	Status	Short Summary of Major Carbon Sequestration Provisions
S. 383	USE IT Act	Written report from the Committee on Environment and Public Works filed in Senate[a]	Would amend the Clean Air Act by directing the U.S. Environmental Protection Agency (EPA) to conduct certain carbon capture research activities. Would require the U.S. Department of Energy (DOE) to submit a report to Congress on the potential risks and benefits to project developers associated with increased storage of carbon dioxide (CO_2) in deep saline formations and recommendations for federal policy changes to mitigate identified risks. Would direct the Council on Environmental Quality (CEQ) to prepare a report including information on permitting and review of carbon capture, utilization, and sequestration (CCS) projects and issue guidance on development of carbon dioxide pipelines and storage projects.
H.R. 1166	USE IT Act	Referred to House Subcommittees on the Environment; Environment and Climate Change; Highways and Transit, Energy and Mineral Resources; and Water, Oceans, and Wildlife	Would amend the Clean Air Act by directing EPA to conduct certain carbon capture research activities. Would require DOE to submit a report to Congress on the potential risks and benefits to project developers associated with increased storage of CO_2 in deep saline formations and recommendations for federal policy changes to mitigate identified risks. Would direct the CEQ to prepare a report including information on permitting and review of CCS projects and issue guidance on development of CO_2 pipelines and storage projects.
S. 1201	EFFECT Act	Placed on Senate Legislative Calendar	Would amend the Energy Policy Act of 2005 (P.L. 109-58) to direct DOE to carry out CCS research and development programs. Program requirements would include conducting research to support sites for large volume storage of CO_2 and accompanying infrastructure and continuing a demonstration program for large-scale carbon storage validation and testing. Would require DOE to submit a report to Congress on CCS activities. Would establish an optional program to transition large-scale carbon sequestration demonstration projects into integrated commercial storage complexes.
H.R. 3607	Fossil Energy Research and Development Act of 2019	House Science, Space, and Technology Committee voted favorably for bill to be reported	Would amend the Energy Policy Act of 2005 to direct DOE to carry out a program of research, development, and demonstration for CCS. Would direct DOE to conduct large-scale carbon sequestration partnerships through the Regional Carbon Sequestration Partnerships.
S. 2263	CO_2 Regulatory Certainty Act	Referred to Committee on Finance	Would amend the Internal Revenue Code, Section 45Q, to revise the requirements for the secure geological storage of carbon oxide for the purpose of the tax credits for permanent sequestration and enhanced oil recovery. Would require the Treasury Department to establish regulations setting out these requirements, including compliance with federal environmental statutes and regulations and other measures to prevent carbon oxide from escaping into the atmosphere.

Source: Congress.gov and CRS analysis.

Notes: This In Focus outlines carbon storage through sequestration. These bills (and others) also encompass provisions that cover carbon capture and/or utilization.

a. S. 383 was incorporated into S. 1790, the National Defense Authorization Act for Fiscal Year 2020, which was passed by the Senate on June 27, 2019, and S. 2302, America's Transportation Infrastructure Act, which was reported in the Senate on August 1, 2019.

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Angela C. Jones, Analyst in Environmental Policy

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