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The Section 45Q Tax Credit for Carbon Sequestration

Carbon capture and sequestration (CCS) technologies are intended to reduce carbon dioxide (CO₂) emissions from fossil fuel-fired power plants, as well as other large industrial sources. The tax credit for carbon sequestration—often referred to using its Internal Revenue Code (IRC) section, Section 45Q—is intended to incentivize investment in carbon capture and sequestration.

What Is Carbon Sequestration?

Geological sequestration of carbon (i.e., carbon sequestration) is the process of injecting carbon oxides into underground geological formations, where they are to be either permanently trapped or transformed. Geological sequestration is the final step in a CCS system. The process usually involves carbon dioxide (CO₂), although injection and sequestration of other carbon oxides (e.g., carbon monoxide) is also possible. Geological sequestration is intended to permanently trap CO₂ emitted from anthropogenic sources, such as power plants or industrial facilities, thereby reducing net emissions of this greenhouse gas (GHG) into the atmosphere. An emerging technology to capture CO₂ directly from the atmosphere—“direct air capture” (DAC)—could also serve as a source of CO₂ injected for geological sequestration. CO₂ may be sequestered by injecting it underground solely for sequestration purposes or as part of “tertiary” oil recovery, also known as enhanced oil recovery (EOR), from aging oil fields. EOR has been used in the United States since the 1970s. For additional information on the technical aspects and deployment status of CCS, see CRS Report R44902, *Carbon Capture and Sequestration (CCS) in the United States*.

Sequestration Tax Credit (Section 45Q)

The amount that a taxpayer may claim as a Section 45Q tax credit is computed per metric ton of qualified carbon oxide captured and sequestered (before 2018, the tax credit was exclusively for CO₂). For the purposes of the tax credit, *qualified carbon oxide* is a carbon oxide that would have been released into the atmosphere if not for the qualifying equipment.

The amount of the credit, as well as various features of the credit, depend on when the qualifying capture equipment is placed in service (**Table 1**). The taxpayer has to repay the tax credit (credit recapture) to the Treasury if the carbon oxide ceases to be captured, disposed of, or used in a qualifying manner (i.e., if it escapes into the atmosphere).

To claim a tax credit, the carbon oxide emissions must be measured at the point of capture as well as at the point of disposal, injection, or other use. To be eligible based on geological sequestration, the captured carbon oxide must be disposed of in “secure geological storage.” Per IRC Section 45Q, secure geological storage includes “storage at deep saline formations, oil and gas reservoirs, and unminable coal seams.”

Legislative and Regulatory Background

The Energy Improvement and Extension Act of 2008 (Division B of P.L. 110-343) added a credit for CO₂ sequestration to the tax code. The legislation included several provisions designed to encourage cleaner, more efficient, and “environmentally responsible” use of coal specifically, and to encourage GHG emissions reductions broadly. CO₂ captured using equipment placed in service before February 9, 2018, was eligible for tax credits until tax credits were claimed for 75 million metric tons of CO₂. In September 2022, the Internal Revenue Service (IRS) reported that the cap had been met and that 2022 would be the last calendar year that facilities placed in service prior to February 9, 2018, could claim the credit.

The Bipartisan Budget Act of 2018 (P.L. 115-123) expanded and extended the Section 45Q tax credit. Changes included (1) a larger credit amount; (2) a start-of-construction deadline and 12-year claim period; (3) allowing the credit for CO₂ utilization in addition to EOR and for DAC, as well as allowing smaller facilities to claim the credit; and (4) allowing owners of carbon capture equipment to claim tax credits instead of the entity capturing the CO₂, which facilitates tax-equity investment. The deadline to begin construction was further extended for two years, to January 1, 2026, in the Taxpayer Certainty and Disaster Tax Relief Act of 2020 (Division EE of the Consolidated Appropriations Act, 2021; P.L. 116-260).

P.L. 117-169, commonly referred to as the Inflation Reduction Act of 2022 (IRA), modified and further extended the Section 45Q tax credit. In addition to modifying the base credit rates and definition of qualified facilities, the IRA allowed a larger credit for qualified facilities or carbon capture equipment that meet certain prevailing wage and apprenticeship requirements. In addition, the IRA extended eligibility to claim the credit to certain nonprofits (“direct pay”) and entities without ownership interests (“transferability”) and extended the deadline to begin construction to the end of 2032.

Table I. Key Elements of the Section 45Q Credit

Equipment Placed in Service after 2/8/2018 and before 1/1/2023	Equipment Placed in Service after 12/31/2022 and Construction Beginning Prior to 1/1/2033
Credit Amount (per Metric Ton of CO₂)	
<i>Geologically Sequestered CO₂</i>	
\$40.89 per Metric Ton of CO ₂ in 2023. Increasing ratably to \$50 by 2026, then inflation-adjusted.	Base credit of \$17 per Metric Ton of CO ₂ (\$36 for DAC), increased to \$85 (\$180 for DAC) for facilities that pay prevailing wages during the construction phase and during the first 12 years of operation and meet registered apprenticeship requirements. Amounts adjusted for inflation after 2026.
<i>Geologically Sequestered CO₂ with EOR</i>	
\$27.61 in 2023. Increasing ratably to \$35 by 2026, then inflation-adjusted.	Base credit of \$12 (\$26 for DAC), increased to \$60 (\$130) for facilities that pay prevailing wages during the construction phase and during the first 12 years of operation and meet registered apprenticeship requirements. Amounts adjusted for inflation after 2026.
<i>Other Qualified Use of CO₂</i>	
\$27.61 in 2023. Increasing ratably to \$35 by 2026, then inflation-adjusted.	Base credit of \$12 (\$26 for DAC), increased to \$60 (\$130) for facilities that pay prevailing wages during the construction phase and during the first 12 years of operation and meet registered apprenticeship requirements. Amounts adjusted for inflation after 2026.
Claim Period	
12-year period once facility is placed in service.	12-year period once facility is placed in service, reduced to 5-year period if transferred.
Annual Capture Requirements	
<i>Power plants:</i> Capture at least 500,000 metric tons. <i>Facilities that emit no more than 500,000 metric tons per year:</i> Capture at least 25,000 metric tons. <i>DAC and other capture facilities:</i> Capture at least 100,000 metric tons.	<i>Power plants:</i> Capture at least 18,750 metric tons and a capture design capacity not less than 75 percent of baseline emissions. <i>DAC facilities:</i> capture at least 1,000 metric tons. <i>Other capture facilities:</i> capture at least 12,500 metric tons.
Eligibility to Claim Credit	
Entity who owns the capture equipment and physically or contractually ensures the disposal, utilization, or use as a tertiary injectant of the CO ₂ .	Entity who owns the capture equipment and physically or contractually ensures the disposal, utilization, or use as a tertiary injectant of the CO ₂ . Certain tax-exempt entities can claim the tax credit through “direct pay” and other entities are allowed a one-time transfer to another entity.

Source: CRS analysis of IRC Section 45Q, 26 U.S.C. §45Q.

Notes: After 2017, the credit can be claimed for all carbon oxides, not just CO₂. Equipment placed in service prior to February 8, 2018, is no longer eligible for the 45Q tax credit.

Cost Estimates

Tax expenditure estimates, or estimates of the revenue foregone due to tax credit claims, provide information on the Section 45Q credit’s “cost.” In December 2022, the Joint Committee on Taxation estimated that Section 45Q-associated tax expenditures would be less than \$50 million per year (the *de minimis* amount) through 2026, or about \$0.2 billion over the 2022-2026 five-year period. The Department of the Treasury’s March 2022 tax expenditure estimates for Section 45Q were \$2.4 billion for the 2022-2026 five-year period and \$30.3 billion from 2022 to 2032, suggesting an expected increase in tax credit claims in later years. The variation in these estimates reflects, in part, uncertainty about future CCS deployment.

Issues for Congress

Some policymakers and stakeholders support the tax credits as one mitigation strategy to reduce CO₂ emissions into the atmosphere. In contrast, others view policies promoting CCS, such as tax credits, as subsidizing the continued development and combustion of fossil fuels that emit GHGs into the atmosphere. For policymakers interested in

promoting CCS development, tax policy is a congressional option for supporting EOR, DAC, and CCS technologies and projects. Tax incentives may be considered in conjunction with other legislative options such as CCS R&D and appropriations to related agencies and programs.

Specific issues in the 118th Congress related to the Section 45Q tax credit might include oversight of the IRS’s implementation of recent changes to the statute, including verification of tax claims. For example, in recent years, concerns have been raised about potentially fraudulent Section 45Q tax credit claims and the need to recapture the credit in the case of carbon leakage. Congress may consider whether the IRS has adequately addressed concerns about improper claims through its responses to Congress, guidance, and Section 45Q regulations.

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