

PRESENTED AT

**48th Annual Ernest E. Smith Oil, Gas and Mineral
Law Institute and Fundamentals**

April 21-22, 2022
Houston, TX

Fundamentals of Carbon Capture and Sequestration

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by Thomas M. Weber and Paul R. Tough¹

I. Introduction

Recent changes in federal tax law may finally make development and implementation of commercial-scale carbon capture and sequestration (“CCS”) a reality. Effective January 13, 2021, the Internal Revenue Service (“IRS”) adopted amendments to its regulations that expanded existing federal tax credits for the capture and secure geological sequestration of, or authorized use of, carbon oxides. These credits are commonly referred to as the “45Q tax credit.”² The expanded 45Q credit makes investment in CCS projects economically more attractive and creates new business opportunities for the oil and gas industry—especially given the industry’s technical expertise gained through decades of implementing carbon dioxide (“CO₂”) pipeline transportation, enhanced oil recovery (“EOR”), and acid gas injection (“AGI”) projects. Despite this experience, many questions remain including questions about the scope of the credit, how to navigate an evolving federal and state regulatory framework, and how to best manage risk given the uncertainties associated with pore space ownership in Texas. Notwithstanding these uncertainties, a new industry is emerging as dozens of CCS projects move forward in Texas.

II. Federal 45Q Tax Credits

In 2018, Congress enacted the Bipartisan Budget Act of 2018 expanding the existing 45Q tax credit. The IRS then amended its regulations implementing the expanded credit and provided additional clarity on the scope of the credit and the mechanics for claiming it. The expanded tax credit creates a potentially significant economic incentive for developing CCS projects. It is important, therefore, to understand how the credit works, who and what qualifies for the credit, and how to demonstrate and implement the key regulatory requirement of “secure geological storage.”

a. Breaking Down the Credit³

To qualify for the 45Q tax credit, owners of “qualified carbon capture facilities” placed into service on or after February 9, 2018, are required to capture anthropogenic carbon oxides that would otherwise be released to the atmosphere and either (a) dispose of the carbon oxides into “secure geological storage,” (b) inject the carbon oxides as “tertiary injectant” as part of qualifying

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² 86 Fed. Reg. 4728 (Jan. 15, 2021).

³ Subsections (i) through (vii) highlight key provisions of the expanded tax 45Q tax credit but are not intended as a comprehensive summary of potentially applicable IRS regulations.

EOR project, or (c) “utilize” the captured carbon oxide in ways that conform with section 45Q(f)(5) of the IRS Code.⁴

i. The Tax Credits

The 45Q tax credit is claimed on a dollar per-metric-ton basis so long as the volume of carbon oxides captured exceeds certain threshold levels that are dependent on the type of facility where the carbon oxides are captured. The credit can be claimed over a **12-year period beginning on the date the carbon capture equipment is placed into service**.⁵ Table 1 shows the applicable credit available by year for carbon capture equipment placed in service on or after February 9, 2018.⁶

Table 1: Expanded 45Q Tax Credit by Use (\$ per metric ton of carbon oxide)⁷

Taxable Year	2017	2018	2019	2020	2021	2022	2023	2024	2025	2026
Disposal In Secure Storage	22.66	25.70	28.74	31.77	34.81	37.85	40.89	43.92	46.96	50.00
EOR or Utilization	12.83	15.29	17.76	20.22	22.68	25.15	27.61	30.07	32.54	35.00

The amount of the credit varies based on how the carbon oxide is used. A higher credit is available for a taxpayer that disposes of carbon oxide in secure geological storage whereas a lower credit is available for carbon oxides that are either injected in a qualified EOR project or utilized by the taxpayer in a manner authorized under IRS Code § 45Q(f)(5) (e.g., use of carbon oxide for some commercial purpose, that converts carbon oxide into a material or chemical compound that “secures” it, or the “fixation” of carbon oxide by growing bacteria or algae). After 2026, the credit increases according to an inflation adjustment factor.⁸

ii. Who May Claim the Credit?

The taxpayer entitled to claim the credit is the owner of the qualified carbon capture equipment that either physically or contractually ensures that the captured carbon oxides are (1)

⁴ 26 U.S.C.A. § 45Q(f)(5). This paper does not focus on utilization of carbon oxide in commercial processes but rather focuses on injection of carbon oxides for sequestration in Class VI or Class II injection wells as such classification are defined below.

⁵ 26 C.F.R. § 1.45Q-1(c).

⁶ Lower credits are available for carbon capture equipment placed into service at a qualified facility prior to February 9, 2018. 26 C.F.R. § 1.45Q-1. Credits for carbon capture equipment placed into service before February 9, 2018, are subject to an alternative inflation adjustment factor under 26 C.F.R. § 1.45Q-1(b)(2). In the case of carbon capture equipment at a qualified facility placed in service before February 9, 2018, for which additional or modified carbon capture equipment is placed in service on or after February 9, 2018, IRS rules allow allocation of the lower pre-expansion credits and the higher post-expansion credits. 26 C.F.R. § 1.45Q-1(g).

⁷ 26 C.F.R. § 1.45Q-1(d).

⁸ *Id.*

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First appeared as part of the conference materials for the
48th Annual Ernest E. Smith Oil, Gas and Mineral Law Institute session
"Fundamentals of Carbon Capture and Sequestration"