

Section 45Q Credits: A Primer for Carbon Capture Projects

Introduction

Section 45Q of the Internal Revenue Code is a US federal income tax credit designed to incentivize the capture, removal and permanent storage of carbon dioxide. It has become one of the most consequential policy tools shaping the economics of carbon capture projects in the United States. The credit can materially influence how carbon capture projects are structured, including their siting, financing models and underlying commercial arrangements across the project value chain.

At its core, the credit is available to projects with carbon capture equipment placed in service in the United States and claimed by an entity that files a US federal income tax return. Projects developed and operated entirely outside the United States, or that do not involve a US taxpayer in the capture chain, will generally fall outside its practical scope.

Section 45Q is best understood not as a zero-sum credit, but as a holistic project structuring framework through which project developers, investors and other participants in the carbon management ecosystem can align their respective roles to design, finance and commercialize carbon capture projects.

Credit Pathways and Eligibility

Eligible Capture Pathways

Section 45Q recognizes two primary carbon capture pathways: point source capture and direct air capture.

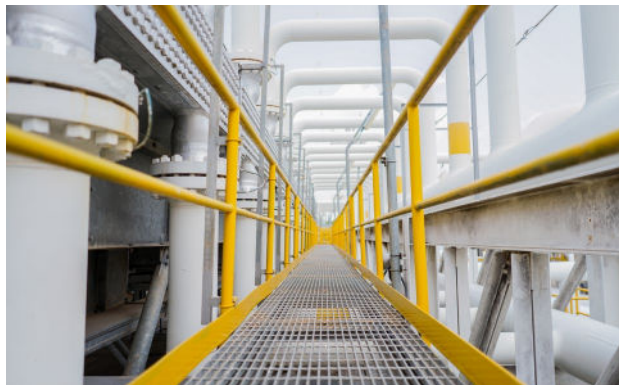
1. Point Source Capture (including BECCS)

Point source capture covers carbon dioxide captured from industrial facilities or power plants, such as cement plants, ethanol facilities or fossil-fueled power generation. The defining feature of this pathway is that carbon dioxide is captured from a known, concentrated emission source, rather than from the ambient air.

Eligibility depends in part on the type of facility and its annual capture volumes, with higher minimum tonnage thresholds applying to electric generating units than to other industrial plants. Conventional point source capture projects are most often implemented at large, established industrial facilities with existing emissions profiles and infrastructure, and are frequently sponsored by incumbent operators for whom carbon capture is added to an established industrial process rather than serving as the primary project objective.

Bioenergy with carbon capture and storage (BECCS), in comparison, occupies a distinct position within the point source capture category. BECCS pairs biogenic carbon dioxide sources with permanent storage, giving rise to net-negative emissions and aligning capture activity directly with carbon removal objectives. From a Section 45Q perspective,

BECCS projects operate within the same statutory framework as other point source capture projects, but are often developed as dedicated carbon projects rather than as add-ons to existing industrial operations. This combination has made BECCS an increasingly compelling pathway for project developers seeking to build purpose-designed projects that can fully leverage Section 45Q while delivering durable carbon removal outcomes.



2. Direct Air Capture

Direct air capture (DAC) involves removing carbon dioxide directly from ambient air, rather than from a concentrated emission source. Unlike point source capture, DAC projects are not tied to existing industrial facilities and can be sited based on a broader set of considerations, including access to energy, storage infrastructure and permitting regimes. This flexibility also means that DAC projects are typically developed as purpose-built carbon removal facilities, with project design and scale-up shaped by technical and commercial considerations that differ from those associated with capture technologies integrated into existing industrial operations.

Reflecting both the novelty and the project development complexities associated with DAC, Section 45Q assigns materially higher credit values to DAC projects and applies significantly lower minimum tonnage thresholds than those applicable to point source capture. This differentiation is intentional. It is designed to support early-stage deployment, modular buildout strategies and phased scale-up, aligning the credit with how DAC projects are typically developed and brought to commercial scale.

From a practical standpoint, DAC projects are often developed as dedicated carbon removal facilities, with capture, transport and storage planned as an integrated system from the outset. As a result, Section 45Q frequently plays a central role in project design, financing and siting decisions for DAC developers. Questions around aggregation of capture units, alignment with storage pathways and long-term credit monetization are central structuring considerations. These issues are typically addressed early in the project lifecycle, as they influence how capture capacity is grouped for credit purposes, how storage arrangements scale alongside deployment and how credits can be underwritten and monetized over time.

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For developers pursuing DAC at commercial scale, Section 45Q can play a foundational role in project economics. Understanding how DAC-specific design choices interact with credit eligibility, credit value and downstream storage or utilization requirements is essential to building projects that can scale and attract long-term capital.

Eligible Storage and Utilization Pathways

The choice of storage or utilization pathway is a key gating consideration for Section 45Q eligibility. Once carbon dioxide has been captured through an eligible pathway, Section 45Q requires that it be disposed of or utilized in one of the following approaches:

- **Geological Storage.** This pathway involves the injection of carbon dioxide into deep saline formations or other suitable geological reservoirs for long-term sequestration. Projects relying on geological storage are subject to monitoring, reporting and verification frameworks designed to demonstrate that injected carbon dioxide remains securely stored over time, including requirements under applicable US Environmental Protection Agency statutes.
- **Enhanced Oil Recovery (EOR).** This pathway involves the injection of carbon dioxide into oil reservoirs for use in oil production, with geological storage occurring as part of the process. EOR projects must demonstrate that injected carbon dioxide is ultimately retained underground and are subject to monitoring and reporting frameworks, including applicable US Environmental Protection Agency reporting programs designed to track injection volumes and resulting storage outcomes.
- **Utilization.** This pathway refers to the use of captured carbon dioxide as an input into products or processes. The taxpayer must show how much carbon dioxide is used, how it is incorporated into the product or process and that the use prevents the carbon dioxide from returning to the atmosphere. For most utilization pathways, this determination is made through lifecycle analysis conducted using methodologies recognized by the US Department of Energy and the Internal Revenue Service, which quantify the net emissions impact of the process relative to an appropriate baseline. As a result, utilization pathways tend to be among the most fact-specific applications of the credit and typically require careful upfront analysis.

Credit Claimant

Once carbon dioxide has been captured through an eligible pathway and then permanently stored or utilized, Section 45Q allocates entitlement to the credit to the US taxpayer that owns the carbon capture equipment and places that equipment in service at a qualified facility. In practical terms, eligibility is anchored at the point of capture and follows the ownership

of the capture equipment, rather than the performance of downstream activities such as transportation, storage or utilization by third parties.

The statute distinguishes between the qualified facility and the carbon capture equipment installed at that facility. In the context of point source capture, the qualified facility is typically the underlying industrial plant or power generation unit at which carbon dioxide is captured, while the carbon capture equipment refers to the systems installed to separate, condition and prepare the captured carbon dioxide for transport and storage or utilization. For direct air capture projects, these concepts often overlap. Because DAC projects are typically developed as purpose-built capture facilities, the capture equipment itself may constitute the qualified facility for Section 45Q purposes.

The owner of the qualified facility and the owner of the carbon capture equipment need not be the same entity, and capture equipment installed at an otherwise qualifying facility may generate credits for the owner of that equipment. This structure reflects a deliberate policy choice to incentivize investment in, and operation of, carbon capture equipment by allocating the credit to the party bearing the capital and operational risk of capture. In practice, that party has the statutory freedom to contract in a manner it sees fit to allocate some, all or none of the revenue from the Section 45Q credit to other participants in the value chain.

Value Chain Participants

Many parties play indispensable roles in carbon capture projects without qualifying as the credit claimant. Carbon utilization companies, storage operators, feedstock suppliers, transport providers, equipment manufacturers and certain investors may fall into this category. Their involvement can be essential to making a project work, but it does not, on its own, create entitlement to the Section 45Q credit.

That said, the value of the credit frequently influences how commercial arrangements are priced and structured. It is common for the economic benefit associated with the credit to be reflected indirectly through service pricing, capacity arrangements, revenue-sharing mechanics or other negotiated terms between the credit claimant and other counterparties in the value chain. For parties that are not positioned to claim the credit directly, understanding where the credit sits helps clarify both commercial expectations and negotiating dynamics across the project value chain.



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IRS Framework

The capture and disposition criteria described above form the core architecture of Section 45Q. Within that framework, a few additional IRS rules influence how credits are generated, timed and monetized in practice. While more technical in nature, these considerations also play an important role in how projects are structured.

Timing

Section 45Q eligibility is tied both to when construction of a qualified facility begins and when the associated carbon capture equipment is placed in service. Under current law, construction of the relevant qualified facility must begin before January 1, 2033. Once carbon capture equipment is placed in service, Section 45Q credits are generally available for a 12-year credit period beginning on the placed-in-service date, provided the project continues to satisfy applicable requirements throughout that period.

For projects developed in phases or using modular capture systems, each capture unit may have its own placed-in-service date. As a result, different units within the same project may begin their 12-year credit periods at different times as additional capture capacity is deployed. At the same time, developers may treat multiple units deployed at a common site as part of a single project for purposes of satisfying the beginning-of-construction requirement. Where that treatment is supported by the underlying project facts, such as common ownership, coordinated development and shared infrastructure, later-installed capture units may, depending on the project configuration, be able to rely on the earlier construction start date while still generating their own credit periods once placed in service.

These timing mechanics are particularly relevant for direct air capture projects, which are often designed as modular facilities capable of expanding over time. A DAC facility that begins construction before the statutory deadline may, depending on the relevant project facts, continue to add capture modules at the same site, with each module beginning its own 12-year credit period when placed in service.

A similar framework applies where carbon capture equipment is installed as a retrofit at an existing industrial facility. In those cases, the capture equipment installed at the facility may itself constitute the relevant carbon capture equipment for Section 45Q purposes, with the placed-in-service date tied to when that equipment becomes operational. This structure allows existing facilities to add capture systems over time while separately qualifying those systems for Section 45Q credits.

Payment and Monetization Pathways

Section 45Q provides several IRS-authorized mechanisms for realizing credit value. Projects may pursue one or more of the following approaches, depending on ownership, tax planning

strategies and commercial arrangements:

- **Direct Pay.** The claimant receives a cash payment from the IRS rather than applying the credit against federal income tax liability. Certain governmental and tax-exempt entities may elect direct pay for the full 12-year credit period, while other taxpayers may generally elect direct pay only for the first five years following the placed-in-service date.
- **Tax Offset.** The credit is used to offset the claimant's federal income tax liability.
- **Transferability.** The credit is transferred to a third party in exchange for cash consideration pursuant to a negotiated transfer agreement.

While each pathway ultimately monetizes the same underlying credit, they differ meaningfully in how credits are documented, priced and diligenced, as well as how ongoing compliance and recapture risk is allocated. In particular, transferability introduces a bilateral transaction between the credit claimant and the credit buyer, in which buyers typically undertake diligence on the claimant's eligibility to claim the credit, whether appropriate monitoring, reporting and verification systems are in place for capture and storage activities and the extent of any potential recapture exposure across the credit period. As a result, monetization planning is closely tied to decisions around how ownership of the carbon capture equipment is structured, since the identity of the credit claimant determines both eligibility for the credit and how that credit may ultimately be monetized.

Credit Value and Capture Thresholds

Section 45Q credit values vary depending on both the capture pathway and the ultimate storage or utilization outcome. The current headline rates and minimum capture thresholds are summarized below.

	DAC (Geological Storage, EOR Storage and Utilization)	Point Source (Geological Storage, EOR Storage and Utilization)
Price per tonne	\$180	\$85
Minimum tonnage	1,000	18,750 (for electric plants) 12,500 (other plants)

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These credit amounts generally apply where projects satisfy applicable prevailing wage and apprenticeship requirements. Projects that do not comply with these labor conditions may remain eligible for Section 45Q but at reduced credit values.

Recapture Risk

Section 45Q credits may be subject to recapture or repayment if carbon dioxide that was treated as stored is later released, or if applicable requirements are not satisfied, during the applicable three-year recapture period. As a default, the IRS will generally look to the credit claimant as the party responsible for the credit and any related exposure.



Conclusion

Section 45Q is not a simple check-the-box tax filing. For project developers, investors and other participants across the carbon management ecosystem, the credit rewards thoughtful planning from the outset. Decisions about ownership of carbon capture equipment, project timelines, deployment of capture capacity and alignment with qualifying storage or utilization pathways can all materially affect eligibility, credit value and monetization options.

Because many of these considerations arise early in project development, successful projects typically address them alongside technical and commercial planning rather than treating them as a downstream tax exercise. In practice, developers often incorporate input from legal, tax and other specialized advisors as projects are designed and deployed, helping ensure that project architecture aligns with the Section 45Q framework and that statutory eligibility can translate into durable, financeable outcomes.

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