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Tax Credit Incentives for Carbon Sequestration: Potentially the Most Impactful U.S. Policy to Battle Climate Change

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Tax Credit Incentives for Carbon Sequestration: Potentially the Most Impactful U.S. Policy to Battle Climate Change

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INTRODUCTION

The Bipartisan Budget Act of 2018[1] expanded the §45Q[2] tax credit, the most important federal incentive for encouraging private investment in the development and use of carbon capture technologies and facilities. Tax credits for the capture and long-term, permanent storage of carbon oxides generate a competitive financial return and have a positive environmental impact on the world. In addition, reducing CO_2 emissions mitigates climate change and help keep the increase in global average temperature to well below 2°C above pre-industrial levels. Keeping global average temperature below 2°C above preindustrial levels is a fundamental goal of the Paris Climate Agreement, the highest priority environmental, social, and governance (ESG) issue facing investors.

TAX CREDIT BASICS, TAX EQUITY

A tax credit reduces a company's tax liability dollar-for-dollar. The U.S. government uses tax credits to incentivize certain types of projects that produce economic, environmental, or social benefits. Common tax credit programs include affordable housing, rehabilitation of historic properties, low-income census tract economic development, wind energy, solar energy, and now, carbon sequestration projects. For these projects, the tax credit is an important source of capital, but many project developers do not have enough taxable income to take advantage of the tax credits themselves. In such cases, the developer may monetize the tax credit by attracting a tax equity investor (TEI), usually a corporate tax-paying project partner.

Tax equity is a term that is used to describe an equity ownership interest in a qualified project, where an

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John Pierce is focused on the structuring, development and financing of energy and infrastructure projects. He represents clients in connection with power generation projects fueled by an array of traditional, renewable, and unconventional energy sources.

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[1] Pub. L. No. 115–123.

[2] All section references herein are to the Internal Revenue Code of 1986, as amended (the "Code"), or the Treasury regulations promulgated thereunder, unless otherwise indicated.

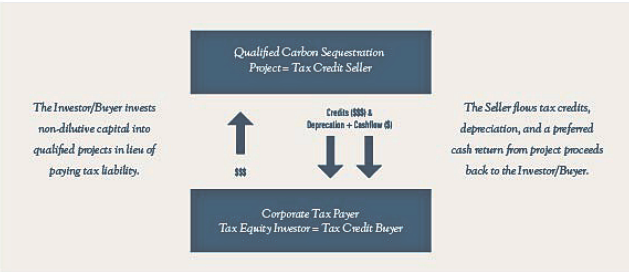
investor receives a return, based not only on project cash flows, but also on tax benefits. In such a transaction, a partnership is typically formed between the project developer and TEI to not only facilitate the investment but allocate and distribute the corresponding tax benefits and project cash flows. The specifics of each partnership vary by project, tax credit type, and transaction structure.

In practice, a tax equity investment uses the same dollars that are earmarked to satisfy a company's tax liability. Those funds are re-purposed and then invested into qualified projects that generate tax credits, such as a solar photovoltaic power plant, an affordable housing project, or as the focus of this article, a carbon sequestration project. The tax benefits generated from the project flow back to the investor, offsetting a corresponding amount of tax liability.

In addition to financial benefits, tax equity investments can also assist in satisfying corporate social responsibility goals and obligations by exemplifying good corporate citizenship through investing in projects that benefit the environment and society. This investment strategy, is referred to as (ESG) investing.

Tax equity investing provides companies two basic benefits: the ability to mitigate tax liabilities, and the opportunity to invest in projects that promote certain social or governmental objectives such as renewable energy production or carbon mitigation for addressing climate change.

FIGURE 1: EXAMPLE TAX EQUITY INVESTMENT ILLUSTRATION



Source: Foss & Company

THE IMPORTANCE OF CARBON CAPTURE AND DECARBONIZATION

Climate researchers and scientists have long stressed the critical nature of curbing carbon emissions to slow the effects of climate change. Yet even as research confirms the need for aggressive strategies to shift away from emissions-heavy industries, our modern societies are increasingly reliant upon them to function. In the United States alone, industrial sectors (such as metals and minerals, chemicals, refineries and others) along with coal-fired and natural gas-fired power plants account for approximately 50 of the country's total CO_2 emissions. More than 833,000,000 metric tons[3] of CO_2 per year are vented directly into our atmosphere by U.S. industry alone.

Decarbonizing these high emissions-generating industries in the short term is extremely difficult, which is why long-term strategies and technologies that remove emissions, like carbon capture and sequestration (CCS), are critical. Every credible climate model — including those from the Intergovernmental Panel on Climate Change and the International Energy Agency — includes capture and permanent geological storage of carbon as a key requirement to achieve global emissions reduction targets by 2050.

Without CCS, there is likely no plausible way to remove enough emissions and fall within scientists recommended ''safe'' limit of temperature rise (1.5-2°C) in the coming decades. In September 2020, the International Energy Agency released a report[4] warning that ''our energy and climate change goals will become virtually impossible to reach'' without carbon capture technology. Global temperature rise above that range would place current and future generations at significant risk of experiencing environmental catastrophe. As a result, governments and organizations around the world are aggressively working to research, incentivize, and develop solutions to combat climate change.

Section 45Q is a key part of the U.S. government's effort. It is a bipartisan acknowledgment and recognition of the need to address climate change and the role CCS plays as a solution. Democrats and Republicans, fossil fuel companies, unions, and environmentalists have supported §45Q's expansion as an investable program — one that benefits the environment and creates economic opportunities through the development, construction and ongoing utilization of these technologies.

Section 45Q Garners Bi-Partisan Support

Carbon capture may be a rare exception in the world of U.S. climate policy — it garners bi-partisan support. President Biden's $2 trillion Climate Plan calls for accelerating the development and deployment of carbon capture technology. Massachusetts Senator Ed Markey, a Green New Deal coauthor, has been supportive of carbon capture technology, as have been unions, thanks to the potential for developing the

[3] https://www.epa.gov/sites/production/files/2020-04/documents/us-ghg-inventory-2020-main-text.pdf.

[4] Energy Technology Perspectives 2020 – Special Report on Carbon Capture Utilisation and Storage, International Energy Agency (2020), https://www.iea.org/reports/energy-technology-perspectives-2020.

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workforce and creating millions of new jobs, especially across rural America. On December 3, 2020, Reps. David McKinley, R-WV, and Marc Veasey, D-TX, introduced a bill, the ACCESS 45Q Act,[5] that would provide a 10-year extension of §45Q, thereby giving project developers and investors financial certainty and the time required for completing their projects.

WHAT DOES SECTION 45Q INCENTIVIZE?

Building on previously adopted renewable energy tax credits, such as §45 production tax credit (PTC) for wind and §48 investment tax credit (ITC) for solar, §45Q is a relatively new tax incentive centered around the development and use of carbon capture technologies and facilities.

Section 45Q provides tax incentives to businesses that sequester carbon oxide,[6] preventing them from entering the atmosphere and contributing to anthropogenic global warming. Originally launched in 2008, §45Q incentives were revised in the Bipartisan Budget Act of 2018 to spur development of additional carbon capture projects and technologies nationwide. Changes to the original §45Q include an increase in the credit amount, the elimination of volumetric sequestration caps, and easier-to-transfer §45Q credits, all of which make the §45Q credits more attractive to tax equity investors. As a result, §45Q is becoming one of the United States' most effective policies to battle climate change, resulting in significant economic and environmental benefits. It creates various multi-benefit opportunities for corporate federal taxpayers, particularly those who have also made substantial ESG commitments.

HOW SECTION 45Q WORKS

Section 45Q awards tax credits to owners of capture technology equipment for every metric ton of carbon oxide sequestered. Everything from power plants and refineries to large-scale industrial sites that emit significant amounts of CO_2 are viable sources for capture and sequestration projects. These projects may be retrofitted into existing facilities or incorporated into new developments. The carbon capture development may be led by the facility's operators, or independent development parties.

The credit is an amount per metric ton of carbon captured. Credits are awarded to capture technology operators over a 12-year period beginning with injection in varying dollar amounts based on one of two methods of sequestration: Carbon Capture and Sequestration (CCS) or Carbon Capture Utilization and Sequestration (CCUS). In comparison with pure CCS technology, CCUS permanently stores carbon and also is used for some commercial application with revenue associated to the activity. Section 45Q allows these CCUS credits to be transferred to other entities able to monetize the credits, allowing for flexibility in business and investment opportunities for organizations bringing these projects to fruition.

Who qualifies?

The statute defines a qualified facility as:[7]

> (a) an industrial facility that emits up to 500,000 metric tons of CO_2 a year and puts at least 25,000 tons to commercial use;
>
> (b) a power plant that emits 500,000 metric tons or more of CO_2 a year; or
>
> (c) a direct air capture facility, or any other facility not described in (a) or (b), that captures at least 100,000 metric tons of CO_2 per year.

In other words, an electric generating plant would have to capture at least 500,000 metric tons of carbon oxide per year to qualify. Any other type of facility — a cement plant or a natural gas processing facility, for example — would have to capture at least 100,000 metric tons of carbon oxide per year.

It is anticipated that tax equity investors would size their investment by discounting the net benefit streams (tax credits and deductions) expected from the carbon capture project using their target Internal Rate of Return (IRR) as the discount rate, similar to how wind tax equity investments are sized.

CCS vs CCUS

CCS: Pure Sequestration Through Dedicated Geological Storage

Under a pure carbon capture and sequestration strategy, facilities and operators sequester anthropogenic carbon oxide deep underground where it cannot contribute to climate change. Captured carbon oxide, virtually exclusively CO_2, is transported from emissions sources to geologic formations where it can be safely injected into depleted oil or gas reservoirs, saline water-bearing strata thousands of feet deep and below all sources of potable water. At the depths used

[5] H.R. 8858, 116th Cong. (introduced Dec. 3, 2020).

[6] The statute refers to ''carbon oxide,'' which includes CO_2, carbon monoxide (CO), and carbon suboxide. Notice 2020-12; Rev. Proc. 2020-12.

[7] Notice 2020-12; Rev. Proc. 2020-12.

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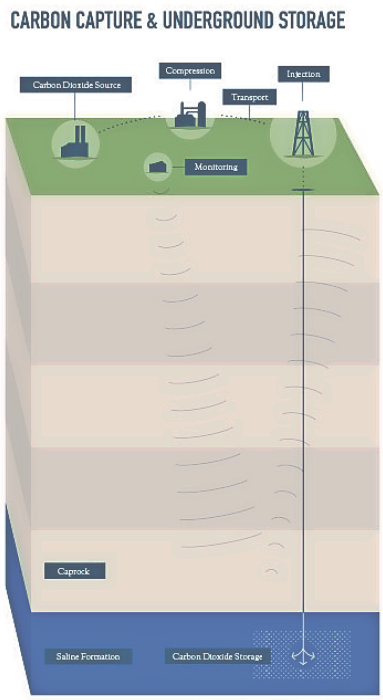
for sequestration, the injected CO_2 is no longer a gas but a dense fluid that is retained and secured by layers of impermeable rock barriers and natural formations.

CARBON CAPTURE & STORAGE DIAGRAM



STORAGE DEPTH EXCEEDING 2,700 FEET

CCS technologies can vary drastically in implementation as well as cost. Currently, there are three main methods to capture CO_2:

- pre-combustion;
- post-combustion; and
- oxy-fuel.

In pre-combustion CO_2 capture, the CO_2 is removed from the fuel (such as coal) prior to combustion.

Post-combustion refers to capturing CO_2 from flue gases at the emissions source (waste streams at industrial facilities) and diverting it from entering the atmosphere.

In oxy-fuel combustion systems the fossil fuel is burned in oxygen instead of air.

While advantages and disadvantages exist for the different CO_2 capture technologies — from cost to chemistry —§45Q credits are linked to the installation and use of carbon capture equipment.

CCS projects that solely sequester carbon qualify for tax credit up to $50 per metric ton of CO_2 captured, before continuing growth via an inflation adjustment factor. The §45Q tax credit amount is set by taxable calendar years growing via linear interpolation from $22.66 in tax year 2016 to $50 per metric ton in tax year 2026. After 2026, the tax credit dollars-per-ton amount is $50 multiplied by an inflation adjustment factor specific to each calendar year; each year will be nominally greater than $50 per metric ton sequestered for CCS.

Table 2: Value of the CCS Tax Credit (2017–2026) ($ per metric ton)[8]

TABLE 2: VALUE OF THE CSS TAX CREDIT (2017–2026) – $ PER METRIC TON

Year	Applicable Dollar Amount
2017	$22.66
2018	$25.70
2019	$28.74
2020	$31.77
2021	$34.81
2022	$37.85
2023	$40.89
2024	$43.92
2025	$46.96
2026	$50.00

CCUS: Creating Beneficial Use of Carbon Emissions

In CCUS projects, captured carbon emissions are put to work in a variety of applications to benefit other businesses and industries. By far the most common commercial use of CO_2 is through enhanced oil recovery (EOR), where captured CO_2 is injected into the earth to improve oil extraction, thereby reducing the carbon intensity of the fossil fuel production. The injected CO_2 mixes with the oil making it less viscous so it flows more easily. As the oil is produced, the CO_2 comes out of solution with the oil and is recaptured and reinjected into the reservoir for another cycle of EOR. EOR projects using an efficient recycle scheme effectively store all injected CO_2. EOR projects that use naturally sourced CO_2 — that is, CO_2 not captured from industrial emissions — do not qualify for §45Q credits. Other potential applications of CO_2 for permanent sequestration include production of advanced materials, mineralization in products such as concrete, and usage of CO_2 in algae or bacteria growth.

[8] Notice 2018-93.

ISSN 0148-8295

For CCUS projects that use and store anthropogenic carbon via EOR or use it in other processes and materials, §45Q will award up to $35 per metric ton of CO_2 captured, before growing by the inflation adjustment factor. The CCUS §45Q credit began at $12.83 in tax year 2016 and will grow to $35 per metric ton in tax year 2026 via linear interpolation. Beginning in tax year 2027, the §45Q credit for CCUS projects is the product of $35 and an inflation adjustment factor — the same inflation adjustment factor each year as pure CCS.

Table 3: Value of the CCUS Tax Credit (2017 – 2026) ($ per metric ton)[9]

TABLE 3: VALUE OF THE CCUS TAX CREDIT (2017–2026) – $ PER METRIC TON

Year	Applicable Dollar Amount
2017	$12.83
2018	$15.29
2019	$17.76
2020	$20.22
2021	$22.68
2022	$25.15
2023	$27.61
2024	$30.07
2025	$32.54
2026	$35.00

[9] Notice 2018-93.

Table 4: Advancing Large Scale Carbon Management and Expansion of the Section 45Q Tax Credit

TABLE 4: ADVANCING LARGE SCALE CARBON MANAGEMENT AND EXPANSION OF THE 45Q TAX CREDIT

TAX CREDIT VALUE AVAILABLE FROM DIFFERENT SOURCES AND USES OF CO_2

MINIMUM SIZE OF ELIGIBLE CARBON CAPTURE PLANT BY TYPE ($ktCO_2$/YR)				RELEVANT LEVEL OF TAX CREDIT IN A GIVEN OPERATIONAL YEAR ($USD/$tCO_2$)									
Type of CO_2 Storage/Use	Power Plant	Other Industrial Facility	Direct Air Capture	2018	2019	2020	2021	2022	2023	2024	2025	2026	BEYOND 2026
Dedicated Geological Storage	500	100	100	$25.70	$28.74	$31.77	$34.81	$37.85	$40.89	$43.92	$46.96	$50.00	Indexed to Inflation
Storage via EOR	500	100	100	$15.29	$17.76	$20.22	$22.68	$25.15	$27.61	$30.07	$32.54	$35.00	
Other Utilization Processes[1]	25	25	25	$15.29	$17.76	$20.22	$22.68	$25.15	$27.61	$30.07	$32.54	$35.00	

[1] Each CO_2 source cannot be greater than 500 kCO_2/yr

[1] Any credit will only apply to the portion of the converted CO_2 that can be shown to reduce overall emissions

SOURCE: GLOBAL CCS INSTITUTE, WITH RAW DATA FROM THE U.S. DEPARTMENT OF ENERGY

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HISTORY AND FUTURE OF CARBON CAPTURE IN THE UNITED STATES

The United States has been a leader in the commercial capture, transport, and storage of CO_2. The first carbon capture-based projects date back to the 1970s, with the Terrell Natural Gas facility in Texas, which provided the first CO_2 feedstocks for enhanced oil recovery in the United States. As of January 2020, the United States is home to 10 of 19 large-scale carbon capture projects[10] currently operating around the globe.[11]

EOR using captured anthropogenic CO_2 is seen as a positive step toward a lower carbon future. Capturing the emissions generated during production and using them instead of sourcing alternative CO_2 feedstocks can ultimately result in fossil fuels and other products that are less carbon-intensive than those produced using normal methods. Thoughtful investors understand that hydrocarbon fuels (oil and gas and coal) that are compatible with the existing infrastructure are needed for the next decade, as the world will continue to need oil in the near term. Therefore, reducing the carbon intensity of these fuels and their associated production processes is an effective step toward reducing our carbon footprint. Essentially, CCUS and EOR provide an ''on-ramp'' for future capture and sequestration projects, accelerating innovation and enabling CCS to scale by driving down technology costs similar to what has been achieved in the solar industry with the solar investment tax credit.

Carbon capture is poised to be a key area of legislative interest at the federal level. President Biden, along with recommendations released in 2020 by Democrats on the *House Select Committee on the Climate Crisis*[12] and *Senate Special Committee on the Climate Crisis*,[13] underscore CCS technology as a critical area for financial investment (e.g., federal funds, grants, and additional tax incentives). House Democrats have specifically suggested building upon legislation introduced in 2019[14] to extend the §45Q tax credit and to more broadly deploy CCS in hard-to-abate sectors of the economy. Given Democratic control of the Senate, there is the possibility of comprehensive climate change legislation, which would almost certainly include additional funding for CCS, further bolstering the Rand D R&D and other initiatives included in the FY 2021 Omnibus legislation that passed in late December 2020.

Even in the absence of new federal action to incentivize CCS, existing and proposed state policies provide a role for carbon sequestration in helping states achieve greenhouse gas (GHG) reduction goals. For example, California's Low Carbon Fuels Standard (LCFS) includes a detailed protocol delineating how carbon capture projects can obtain ''permanence certification'' from the California Air Resources Board and, in turn, generate valuable LCFS credits. The LCFS is a market-based policy that requires reductions in the carbon intensity of transportation fuels sold in California. The current goal is a reduction in carbon intensity of California's transportation fuel mix of 20% by 2030, relative to a 2010 benchmark.

The California CCS Protocol allows four types of projects to generate credits:

1. CCS at refineries;
2. Carbon sequestration associated with oil and gas production;
3. CCS associated with renewable fuel production (e.g., ethanol plants); and
4. Direct air capture projects.

As with many other environmental policies, California has paved the way for other states to follow. Oregon has largely adopted the California framework in its Clean Fuels Program, which also allows for credit generation from CCS projects. Other states, from New York to Minnesota and Washington to Colorado, are considering adopting LCFSs that would likely provide incentives for lower carbon fuels produced with carbon sequestration technologies. At the federal level, the Biden administration considered advancing a nationwide LCFS under existing Clean Air Act authorities, which would likely have been based on the California model and could have provided substantial financial incentives for CCS. This effort appears to have stalled for now but may be revisited in the future.

Ultimately, choosing to invest in a CCS or CCUS project will often come down to a prospective investor's corporate sustainability goals and requirements, as well as the amount of tax liability they wish to offset.

IRS GUIDANCE

Notice 2020-12 and Rev. Proc. 2020-12 were issued contemporaneously in February 2020 bringing long-awaited guidance and clarifications while still leaving some grey areas and unanswered questions. While the IRS may take an iterative approach to providing necessary clarifications given carbon sequestration is a nascent industry, the IRS was able to leverage pre-existing tax credit guidance governing wind, solar, and historic tax credits.

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[10] https://www.betterenergy.org/blog/carbon-capture-101/.

[11] See appendix for project history.

[12] https://climatecrisis.house.gov/report.

[13] https://www.democrats.senate.gov/climate-report.

[14] H.R. 5156, Carbon Capture and Sequestration Extension Act of 2019, 116th Cong. (introduced Nov. 19, 2019).

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Beginning of Construction

The IRS leveraged wind and solar guidance originally conceived in the §1603 Treasury Grant program that was subsequently evolved and refined through a multitude of IRS Notices. There are two paths to satisfy beginning of construction requirements:

1. Physical Work – on or offsite physical work of a ''significant nature;'' and

2. 5% Safe Harbor – incur a minimum of 5% of the total cost of the carbon capture facility.

Similar to wind and solar there may be investor and tax counsel preference towards the 5% Safe Harbor given the subjectivity involved in determining whether the ''significant'' threshold was satisfied with respect to the physical work test.

Other notable elements and key dates include a begun construction deadline prior to January 1, 2026, similar project transfer provisions, and a six-year automatic continuity safe harbor. The six-year automatic continuity provision differs from the four years stipulated for wind and solar and was likely driven by the extensive permitting and construction timeline involved in many carbon sequestration projects.

Partnership Flip Safe Harbor

Monetizing federal tax credits typically requires a tax equity investor to take an ownership interest in a project. A common structure used in the wind and solar industries by Fortune 500 tax equity investors is the partnership flip. This structure allows the tax equity investor to efficiently monetize both the tax credits and deductions (e.g., depreciation) during the initial 12 years and is typically structured for the tax allocations to ''flip'' once the tax equity investor achieves a desired target internal rate of return. The participation of tax equity investors in the transaction allows the project sponsor to monetize the tax credits and depreciation benefits generated from the carbon capture equipment while allowing the project sponsor to retain a long-term residual (ownership) interest in the underlying equipment and to monetize other economic benefits and cash flows that may be available.

From past precedents applied on wind and historic tax credit transactions, the IRS carried forward many of the same principles including, but not limited to, minimum interest thresholds for sponsor and tax equity investor, prohibition on certain economic guarantees by the sponsor to the tax equity investor, and limitations regarding ''pay-as-you-go'' contingent capital contributions on behalf of the tax equity investor. Unlike wind and solar transactions, which generate taxable income and cash flows from sales of electricity, CCUS projects typically do not have such economics. This poses unique challenges for tax practitioners, such as ensuring the allocations of losses and particularly the allocation of credits have substantial economic effect. Without taxable income or cash flows, the TEI may face additional constraints caused by the impact of operating expenses and depreciation on the TEI's tax basis and the need to prevent reallocation of losses to the sponsor. Reallocation of losses may result in unintended reallocation of tax credits away from the tax equity investor. Accordingly, the project sponsor and TEI will need to work together in structuring partnership flip transactions to prevent reallocation of tax credits through a combination and optimization of depreciation methodologies, project level debt, and/or an appropriately sized limited deficit restoration obligation on behalf of the tax equity investor.

FINAL IRS RULES

In May 2020, the IRS proposed new regulations that expand on the Guidance.[15] The agency then finalized the said regulations.[16] The final regulations provide additional clarity and certainty to CCS investors in a number of areas. Significantly, with respect to transfer of the §45Q credit, the rule clarifies and establishes procedures for the owner of the sequestration equipment to allow one or more offtaker(s) of the captured carbon to claim the tax credit. Relatedly, the regulations provide guidance regarding the standard for owners of CCS/CCUS equipment who do not physically dispose of the carbon to ''contractually ensur[e]'' sequestration/utilization occurs, as required by the statute.

In addition to providing definitional clarity for a number of significant statutory terms, the rule establishes standards for secure geological storage that offer much-needed certainty to the regulatory standards necessary to show the stored carbon will not escape back into to the atmosphere. The agency reasonably grounded such requirements in existing EPA regulatory programs (e.g., the Underground Injection Control program for Class VI wells under the Safe Drinking Water Act; the Greenhouse Gas Reporting Program, Subparts RR and UU); and, for EOR wells not subject to these requirements, an alternative standard established by the International Organization for Standardization (ISO)).

Another salient feature of the regulations is that they remove some uncertainties regarding a taxpayer's potential exposure in the event of release of the stored carbon, i.e., IRS ''recapture'' of the §45Q

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[15] *Credit for Carbon Oxide Sequestration*, REG-112339-19, 85 Fed. Reg. 34,050 (June 2, 2020) (proposed rule).

[16] *Credit for Carbon Oxide Sequestration*, T.D. 9944, 86 Fed. Reg. 4728 (Jan. 15, 2021) (final rule).

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credit. Specifically, the agency finalized a recapture period, which begins on the date of first injection and ends the earlier of (a) three years after the last taxable year in which the credit is claimed, or (b) the cessation of monitoring as required by EPA regulation or the ISO standard. The recapture period is limited to the three years preceding the date a leak is discovered, referred to as the lookback period. This timeframe was shortened from five years in the proposed regulations. The regulations provide that any recapture amount must be accounted for in the taxable year that it is identified and reported (rather than amending a prior year's return). Additionally, if a recapture event occurs at a storage facility owned by multiple owners or tax claimants, the recapture credits must be proportionately allocated amongst the parties in relation to their ownership interests. Consistent with the IRS guidance, to mitigate against risks associated with recapture, the regulations provide that a taxpayer may obtain third-party recapture insurance.

Although the rules do not provide investors and other industry participants with all the answers they were seeking, they are a positive step in elaborating and clarifying the legal and regulatory regime applicable to §45Q credits in a manner that will provide investors and project managers greater certainty to move forward.

RISKS AND CHALLENGES WITH CCS AND CCUS

Environmental and Safety Risks

From an environmental and safety perspective, carbon capture and sequestration projects are considered low risk. Carbon dioxide is both nonflammable and nontoxic to humans at concentrations below some tens of thousands of parts per million, greatly reducing any risks associated with handling and transport. The geological formations used for CO_2 sequestration undergo a rigorous evaluation to ensure they are similarly safe, with natural formations and hydrocarbon reservoirs existing under layers of rock deep below the earth's surface that have held water or oil and gas in place for millions of years. Regulators, both at the federal and state level, monitor sites where CO_2 is stored to ensure that injected CO_2 does not escape to the surface or leak into the atmosphere. The U.S. Department of Energy (DOE) and Environmental Protection Agency (EPA) have conducted decades of research, demonstration, and monitoring to prove the efficacy and safety of carbon capture and storage.

While considered relatively low risk, CCS and CCUS projects are not completely free of risk. Inadequate physical monitoring, reporting, and verification of sequestered CO_2 can put the project and the investment in jeopardy. Unanticipated leaks at storage and recapture sites also pose a risk, including that of IRS recapture or LCFS credit invalidation, to these projects. For these reasons and a many more, it is important for project developers to work with professional scientists, engineers, and investment professionals to not only understand and mitigate construction and operational risks, but also tax structuring risks as well.

Legal and Regulatory Challenges

There are a variety of risks and liabilities to consider at each stage of a CCS project — encompassing siting and permitting the CCS facility; acquiring rights to underground storage reservoirs or other geologic formations; permitting injection wells; transporting CO_2 from generation to its sequestration location, including siting, permitting, and eminent domain rights associated with any CO_2 pipelines; monitoring and verification requirements; site closure; and long-term liability regimes, including possible transfer of ownership and/or liability to the state. Certain states (e.g., Louisiana and North Dakota) have legislative and regulatory frameworks significantly more favorable to CCS than other jurisdictions across many of these parameters where there may be greater regulatory uncertainty. There is not an overarching, comprehensive federal legal and regulatory regime applicable to carbon sequestration projects; nor is there uniformity across states in the legal frameworks that apply to these projects. Accordingly, investors must carefully consider, in conjunction with technical and economic factors, the benefits and disbenefits of particular jurisdictions for pursuing CCS investments. Additionally, sequestration projects must be mindful of not only federal and state requirements in the jurisdictions in which the projects are located, but also requirements under the LCFS or other regulatory programs to the extent it is desirable for a CCS project to be eligible to generate credits under those programs.

Construction Risk

To qualify for §45Q tax credits, the facility must start construction by year-end 2025. The role of the developer toward planning and designing the facility and securing the necessary permits for the construction and operations of the facility will be critical to ensure that the start-of-construction rules are met.

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Table 5: Summary of Key Risks and Mitigants

TABLE 5: SUMMARY OF KEY RISKS AND MITIGANTS

RISK	MITIGANTS
ENVIRONMENTAL & SAFETY	Engaging technical firms and staff (engineers, scientists, project developers, etc.) with experience in the design, planning, permitting and operations of large, complex infrastructure projects
LEGAL & REGULATORY	• Frequent, open consultations with federal and state agencies and their respective staff • Engaging legal and regulatory firms with experience in tax, project finance, environmental permitting compliance, and relevant industry sectors
CONSTRUCTION	• Partnering with project developers with a proven track record in developing complex infrastructure projects • Turn-key construction services agreement with top tier construction (EPC) firm
TECHNOLOGY	• Most of the components used in carbon capture have long and proven operating history (e.g., gathering systems, compressors, liquefying equipment, pumps, etc.) • Comprehensive geotechnical surveys and studies by specialized engineering firm to ensure security of geological storage
PRODUCTION	Robust contractual framework encompassing the capture, disposal, or injection, as applicable, of CO2s with reputable and experienced counterparties
LEAKAGE TAX (INCL. RECAPTURE)	• See Technology and Production • Strong oversight and review from well qualified counsel including legal, accounting, project finance, etc. • Insurance (see The Role of Tax Credit Insurance in a CCS Project)

THE ROLE OF TAX CREDIT INSURANCE IN A CCS PROJECT

As noted above, it is expected that tax equity will play a large role in the financing of construction of CCS projects. As we have seen with other asset classes, whether it be wind and solar renewables or affordable housing, tax equity investors can have demanding requirements in terms of indemnities and guarantees that often surpass the credit quality of sponsors and other transaction parties. This is particularly so as the business matures, and the same balance sheets are looked to for support on multiple projects. Tax credit insurers bring to a project and its financing a large, rated balance sheet that can support the indemnities independent of the sponsor's or counterparty's financial strength and allow the tax equity investor to underwrite that aspect of the project without relying solely on the sponsor and other parties.

While new to CCS, tax credit insurance has been used since the early 1980s. Initially these policies supported the investment tax credit available then for all types of equipment leases. Today, the insurance solution has been used to support affordable housing and historic rehabilitation financings, and most relevant to the CCS discussion, renewable energy financings in a variety of structures ranging from flip partnerships, inverted lease passthroughs and sale-leasebacks. These insurance companies and concepts have been battle-tested over hundreds of transactions and are now well-positioned to support the financings for CCS transactions. Indeed, we note that Notice 2020-12 even states that the safe harbor does not prohibit the tax equity investor from procuring insurance unrelated to the CCS project.[17]

Tax credit insurance is very flexible and can be customized to each project and transaction. It can be underwritten directly to a tax equity investor or indirectly benefit the tax equity investor by being written to a project company in which the tax equity investor is generally a 99% ''limited partner.'' Alternatively, tax credit insurance can insure the managing member or other transaction parties as a ''reinsurance'' for claims against a traditional indemnity given to the tax equity investor. Under any of those scenarios, the insurance will enhance an indemnity and give the tax equity investor a stronger counterparty to face and in some cases the insurers will be providing risk-transfer for the benefit of all parties to the transaction.

The coverage can extend to three main categories: structure, credit qualification, and recapture. If the renewables world is a guide, some policies will seek to cover all categories and others will be more focused on particular risks. Some of the key risks that a CCS tax credit policy can cover are:

- **Transaction structure** – this aspect of the risk will ensure the investor that the investment structure is such that the tax credits will flow through to the tax equity investor as intended. In other words, at the outset, this will likely mean that the safe harbor provided for in Notice 2020-12 has been qualified for. Over time, as more transactions are done and there are business needs to deviate from the safe harbor in ways nevertheless supported by the tax law, the coverage would be that the resultant structure would be respected as a passthrough to the tax equity investor.
- **Requirements for Qualification for the CCS credit and Determination of the Credit Amount** – as noted above, the IRS guidance outlined numerous statutory requirements for qualifying for the credit. In addition, various characteristics of the CCS project are factors in the amount of the credit. These include:
  - o Qualified facility and passthrough – the carbon capture equipment is in service at a ''qualified facility'' or there are satisfactory contractual requirements with third parties assuring the se-

[17] The IRS has included similar approval of tax credit insurance in guidance related to wind projects and historic rehabilitations, and has evidenced a preference for the investor to procure the insurance over sponsor guaranties.

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questration of qualified carbon oxide. In addition, the tax credit can be passed through from the equipment owner to the contractual ''sequesterer.''

- o That the IRS respects the placed in service dates are key to the credit being earned in particular years and the specified amounts.
- o Construction Start Date – Notice 2020-12 provides a deadline of the end of 2023 for commencement of construction. As noted above, how to determine whether construction began looks to actively operable standards for physical work of a significant nature or 5% to determine when a project has begun construction. Yet there remains a great deal of uncertainty with applying these standards and the strength of legal opinions can be less than required by tax equity investors. Tax credit insurance has been relied upon actively to support these analyses in renewables and can similarly support CCS projects.
- o 80/20 Test Satisfaction – For retrofitted projects, Notice 2020-12 also looked to a similar rule to that applied to wind repowerings that the value of new equipment makes up at least 80% of the project value. Tax credit insurance has been used to support these transactions and similarly could be used in the CCS context to support these valuations.

- **Forward Looking Requirements, Recapture** – the CCS tax credit contains a number of forward-looking requirements and mechanisms for recapture of tax credits. As noted above, these are primarily related to ongoing utilization of the carbon oxide; that disposal and injection be to secure geological storage in compliance with EPA requirements and the three-year recapture requirement. We expect tax credit insurance to be able to support the tax equity investor in key aspects of these issues, but we caution that the tax credit insurers perspective will be to protect tax equity distinguished from providing a full risk transfer from the operating partners. For example, we would expect the tax credit insurers to ensure that storage facilities and the utilization plan to initially qualify; however, as to ongoing future compliance, the tax credit insurers likely will be secondary to the parties in control of these issues on an ongoing basis. Similarly, we would expect the tax credit insurers willingness to cover recapture to be highly dependent on the underlying ''traditional'' insurance programs and underlying financial assurance provided by the parties with primary responsibility for a leak.

Policy Periods

One important aspect of tax credit insurance is the policy term. Typical tax policies have a seven-year term although many insurers have shown a willingness to go longer – 10 years plus, on wind PTC transactions. During this period, an insured event must occur, or an IRS audit must commence. Hence this is sufficient for many threshold qualification or structure issues. In the context of CCS credit which can extend 12 years, there are a core of insurers who can be responsive to these extended policy periods today. However, the entire tax credit insurance market is not yet there. For tax credit insurance to be widely relied upon in the CCS context, insurers will need to broadly support longer policy terms.

Other Risks

Although each is a topic in and of itself, CCS projects will be looking to the insurance industry for various other types of policies, both traditional and non-traditional.[18] These will include insurance programs covering construction risk, traditional coverage for physical damage and liability, recapture for leakage, production risk, technology risk, emitter supply chain risk, environmental risk and possibly additional credit enhancements supporting various counterparties. No single policy will cover all risk and it highlights the importance of a full-service global insurance advisor to access the full breadth of the insurance marketplace for these coverages. As noted above, a key area of focus by the tax credit underwriters when asked to insure the tax equity investor for loss of CCS tax credits due to the forwardlooking events noted above will be the exitance of a robust property and casualty insurance program supporting the project on a primary basis.

Overall, as we have seen with other similar federal tax incentives for renewables, the tax credit insurance market will have an important role in supporting tax equity investment in CCS projects. This can be significant today and should evolve over time. In the beginning some of the tougher risks may depend on underlying support to the project, say by sponsors and traditional insurance programs. As the markets' experience and underwriting capabilities with CCS projects grows and they have good experience, we expect these capabilities to build and expand.

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[18] Tax credit policies also include a small number of exclusions, such as misrepresentations by the insured party, change in law, claiming inconsistent tax positions, and changes to the insured transaction or its documents without the insurer's consent. In addition, where construction related tax losses are covered, we would expect the tax insurers to cover the tax characteristic, like a placed-in-service date, not being respected assuming the project is actually built. More direct construction coverage would be provided by those insurers that routinely insure construction.

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A SUSTAINABLE PATH FORWARD

The §45Q tax incentive for carbon capture projects is just one of many tax equity investments that can be considered socially responsible or sustainable, better known among investors as ESG investments and sometimes referred to as impact investments.

ESG investments — and tax equity investments in general — not only provide businesses with opportunities to offset financial liabilities and meet fiscal obligations through relatively low-risk investment programs but also allow companies to meet growing shareholder demands for corporate sustainability. Tax equity investments, like §45Q and others, represent the elusive win-win: a smart investment strategy that responds to corporate stakeholder demands while contributing to the well-being of our communities at large.

APPENDIX: HISTORY OF CARBON CAPTURE IN THE UNITED STATES

1972	Texas: Terrell natural gas processing plant is the first begins supplying CO_2 to oilfields in first large-scale CO_2 pipeline
1982	Oklahoma: Enid Fertilizer plant
1986	Wyoming: Exxon Schute Creek Gas Processing Facility begins operation—and is now the largest commercial carbon capture facility globally (7 million tons of annual capture capacity)
2000	North Dakota: Dakota Gasification's Great Plains Synfuels plant
2003	Michigan: South Chester Gas
2008	Section 45Q becomes part of the U.S. tax code, originally offering incentives of $20 per metric ton of CO_2 sequestered in geological storage and $10 per metric ton for CO_2 used in EOR
2009	Kansas: Conestoga Energy Partners' Arkalon Bioethanol plant becomes the first ethanol plant to deploy carbon capture technology
2010	Texas: Occidental Petroleum's Century Plant
2012	Texas: Air Products Port Arthur Steam Methane Reformer Project; Conestoga Energy Partners / Kansas: Petro Santander Bonanza Bioethanol plant
2013	Wyoming: ConocoPhillips Lost Cabin plant / Kansas: CVR Energy Coffeyville Gasification Plant / Michigan: Anterim Gas Plant
2016	Texas: NRG Petra Nova project
2017	Illinois: ADM Illinois Industrial Carbon Capture and Storage Project began capture from an ethanol production facility and is sequestering CO_2 in a deep saline formation—where up to 1.1 million tons of CO_2 can be sequestered per year.
2018	Texas: NET Power Demonstration Facility launches as the first facility to reduce its emissions to zero based on its unique design to capture CO_2
2018	Section 45Q amended by the FUTURE Act, ramping up to $50 per ton of CO_2 sequestered in geologic storage, and $35 per ton of CO_2 used in EOR
2021	Department of Treasury and Internal Revenue Service issued final regulations under section 45Q

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