

# Carbon capture and storage: The legal and regulatory context

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In addition to regulating how CO<sub>2</sub> is stored and transported, governments increasingly provide incentives to accelerate adoption of carbon capture and storage





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# Foreword

**T**his report looks at where we are in the journey toward implementing carbon capture and storage (CCS) technologies, with a focus on how laws and regulations in the US and Australia affect CCS adoption. We see two main ways that authorities will shape the CCS landscape, often acting as catalysts to speed implementation.

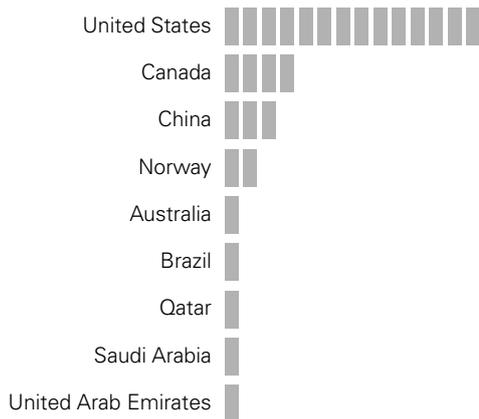
- **Incentives:** Governments may establish mechanisms to encourage adoption of CCS strategies. At the federal level in the US, this is currently done through a tax credit—detailed in Section 45Q of the Internal Revenue Code of 1986, as amended—that specifically targets CCS. In a recently enacted bill, these tax incentives were further extended to potentially allow projects that begin construction before 2026 to be eligible for tax credits. President Biden’s climate plan would further enhance the 45Q tax credit and provide other financial incentives for CCS. It would also increase R&D funding for CCS technologies and provide federal financing for carbon dioxide transport infrastructure. In addition, several US states offer state tax incentives for carbon capture projects.
- **Protections:** Governments will ensure compliance with environmental and other protections as companies pursue CCS. These include protections for habitat and species, drinking water, historic and cultural sites, and other areas. The US currently has no CCS-specific environmental laws—but Australia does, especially at the state level. Companies will have to navigate a complex network of state and federal protections in both of these countries, and understanding the often complex regulatory context is critical for companies pursuing CCS.

Our objective is to help companies understand the CCS landscape so they can pursue the best possible course to meet climate change mitigation goals and finance and properly structure CCS projects. To that end, this report has a section on US incentives for CCS, which zooms in on the 45Q tax credit, and a section on federal environmental and other protections in the US. The report has a section on Australian regulations affecting CCS, which covers CCS-specific rules and relevant environmental and other protections in the country. And it includes a brief section on the outlook for CCS M&A, which we believe will accelerate in coming years.

# CCS by the numbers

## Commercial CCS facilities around the world

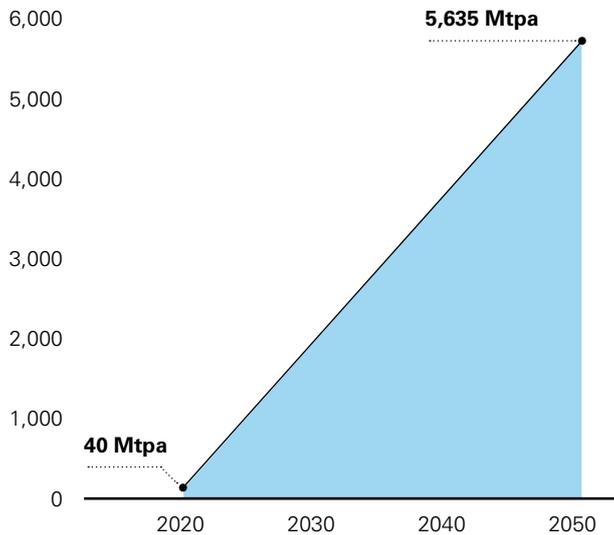
### 28 are operational



### 37 are in construction or development

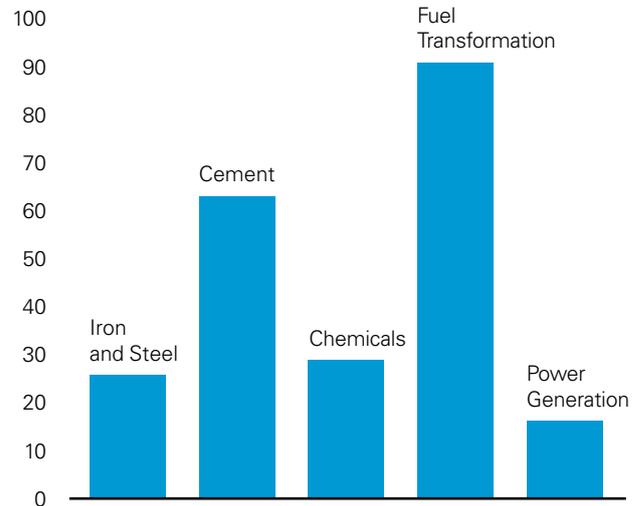


## Current and future global capture capacity



\*Includes CO<sub>2</sub> captured for use (369 Mtpa) and storage (5,266 Mtpa) in 2050.

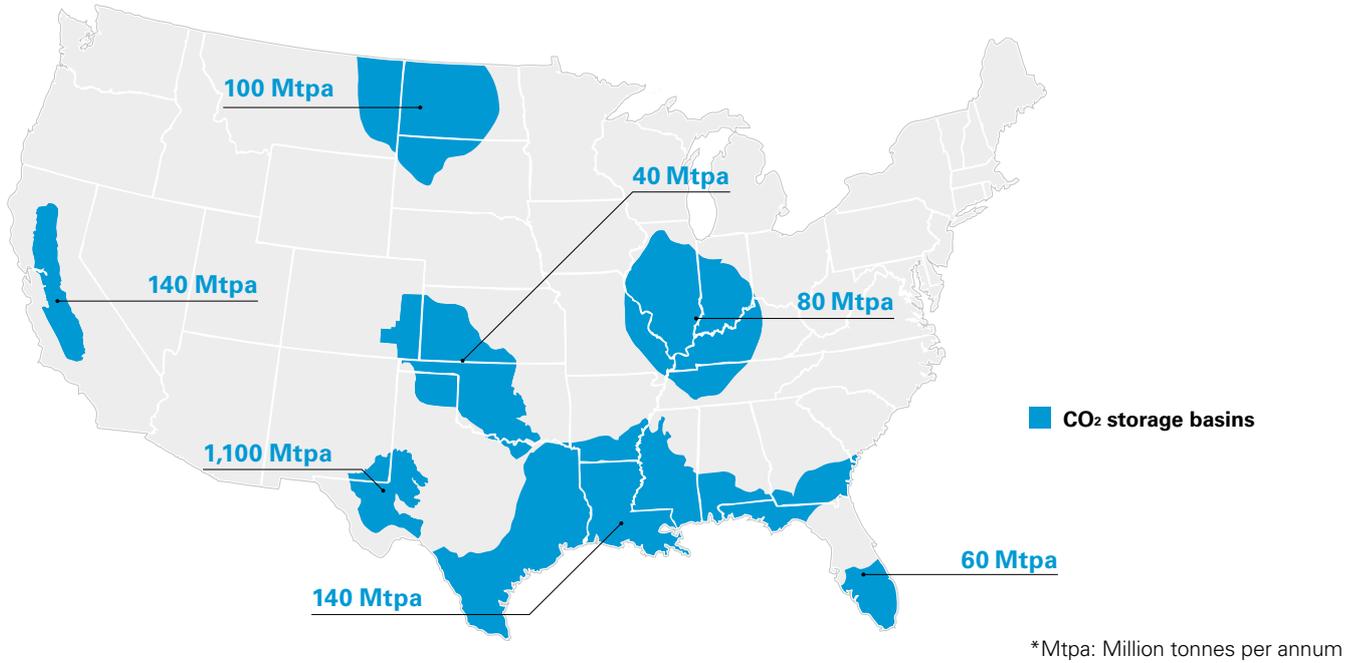
## Global CO<sub>2</sub> emissions reductions by sector due to carbon capture use and storage, 2070 v 2020



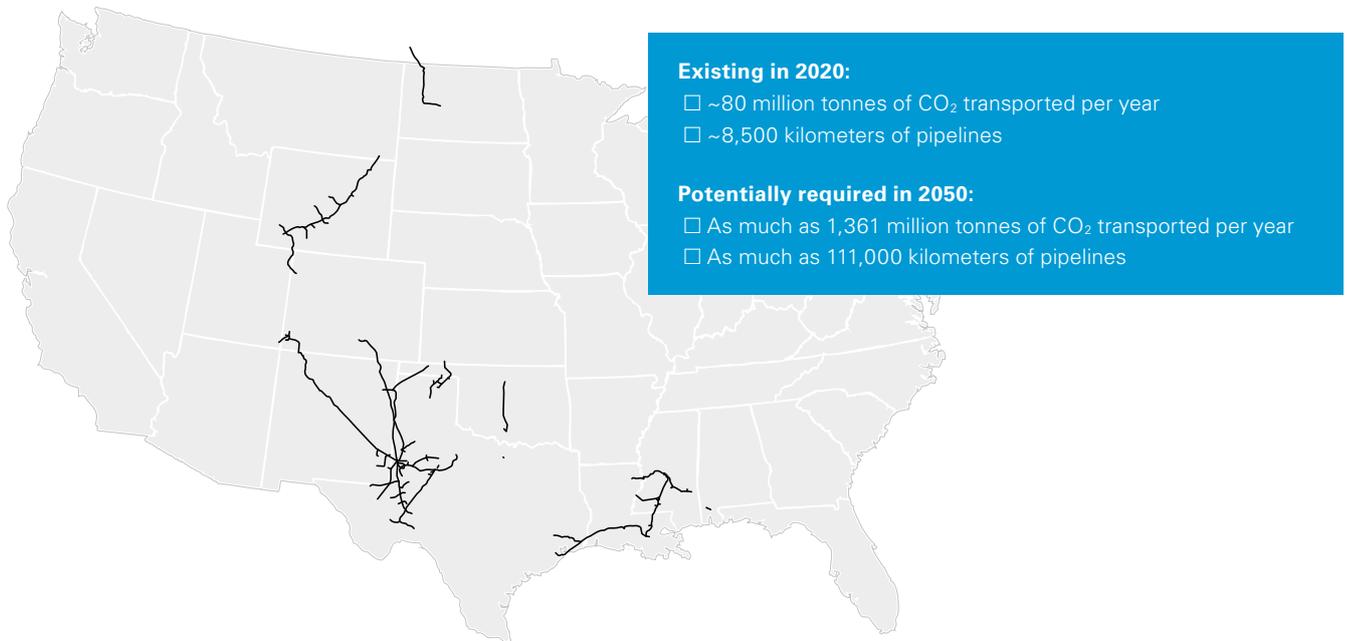
\*Fuel transformation covers sectors such as refining, biofuels, and merchant hydrogen and ammonia production

Source: Global status of CCS 2020," Global CCS Institute; "Energy Technology Perspectives 2020, Special Report on Carbon Capture Utilisation and Storage," International Energy Agency

**Notional CO<sub>2</sub> storage capacity in 2050: ~1.8 billion tonnes per year**



**Existing CO<sub>2</sub> pipeline network in 2020**



**Source:** "Net-Zero America: Potential Pathways, Infrastructure, and Impacts," Princeton University

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# US tax credit encourages investment in carbon capture and storage

Our overview of the Section 45Q tax credit helps investors understand how they may receive incentives to capture, store and use carbon dioxide and carbon oxide

By Michael Rodgers, Hagai Zaifman, Brandon Dubov

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**T**he US federal government provides tax credits to taxpayers that capture and store, or use carbon dioxide and carbon oxide in accordance with rules laid out in Section 45Q of the Internal Revenue Code of 1986, as amended, and the Treasury Regulations thereunder. The purpose is to incentivize investment in carbon capture and storage (CCS) projects.

The 45Q tax credit has been expanded a number of times since it was initially established in 2008, most recently at the end of December 2020 (for details, see the sidebar “Evolution of the Section 45Q tax credit”). Investors have responded positively to the current rules, which could help unlock significant investment in CCS in the future.

The Bipartisan Budget Act of 2018 instituted a number of important changes to Section 45Q that made these credits more attractive to investors. It expanded Section 45Q to cover both carbon dioxide and carbon oxide. It eliminated limits on the overall credits available in the market—and for some types of taxpayers, it lowered thresholds for the amount of carbon that would have to be captured in a given year.

It clarified how long credits would be available—12 years, beginning when the carbon capture equipment is placed in service—providing more certainty for investors. And importantly, it increased the value of Section 45Q credits.

In 2020 and early 2021, the US Treasury Department and the Internal Revenue Service published guidance that addressed many remaining open questions about how the credit works, providing additional confidence to investors. Regarding project development, the guidance is broadly similar to guidance previously provided for wind and solar projects.

Further, on December 27, 2020, President Trump signed into law the Taxpayer Certainty and Disaster Tax Relief Act of 2020, also known as the “Extenders Bill,” which extends the Section 45Q tax credit to projects that begin construction prior to January 1, 2026 (extending by two years the original date of January 1, 2024).

In the remainder of this article, we provide a detailed overview of the current state of the Section 45Q tax credit to help taxpayers understand how they may be able to take advantage of it.



## EVOLUTION OF THE SECTION 45Q TAX CREDIT

In an effort to incentivize additional investments in carbon capture and sequestration projects, in 2008, Congress added Section 45Q to the Internal Revenue Code. In its original form, Section 45Q provided a tax credit for each metric ton of qualified carbon dioxide captured and either disposed of in secure geological storage or used for certain purposes, such as a tertiary injectant in connection with certain oil or natural gas extraction processes. Such credits, however, were made available only for the first 75 million tons of qualified carbon dioxide captured by all projects. As each taxpayer claiming Section 45Q credits was required to capture at least 500,000 metric tons of qualified carbon dioxide in a single taxable year, the program limitation was expected to be quickly reached.

The relatively low value of the initial Section 45Q credit and the 75 million-ton program limitation stalled interest for developing projects to claim the credit. Specifically, the uncertainty with respect to the amount of Section 45Q credits remaining available at any given time for a specific project (out of the limited overall pool of 75 million tons of carbon dioxide from which the credits could be derived) significantly discounted the value taxpayers ascribed to such tax credits.

In a letter issued earlier in 2020 by the Treasury Inspector General for Tax Administration in response to inquiries made by members of the US Senate Finance Committee, the Inspector General confirmed that in the years 2010 to 2019, ten taxpayers claimed 99.9 percent of all Section 45Q credits. Realizing the poor reception to the Section 45Q credit, Congress amended Section 45Q pursuant to the Bipartisan Budget Act of 2018.

As amended, the current Section 45Q extends a credit to taxpayers who use carbon capture equipment to capture and sequester qualified carbon oxide at a qualified facility (together, such equipment and facility, a “project”). Notably, Section 45Q credits are now available for the capture of carbon oxide, not only carbon dioxide.

In addition, the amendment eliminated the 75 million-ton program limitation for claiming Section 45Q credits and generally reduced the project minimum requirements. Now, a taxpayer owning a project that captures and sequesters, for example, at least 100,000 (in the case of a direct air-capture facility) or 500,000 (in the case of an electricity generating facility) metric tons of qualified carbon oxide in a taxable year

generally will be entitled to receive Section 45Q credits for the 12-year period beginning when the carbon capture equipment is placed in service.

Further, the Act increased the value of the Section 45Q credit. The dollar amount of the tax credit each project could claim is based on the amount of carbon oxide captured and whether it is then stored in a secure geological storage space or used for certain other permitted purposes. For taxpayers who dispose of qualified carbon oxide in secure geological storage spaces, a Section 45Q credit worth US\$22.66 per metric ton was available for 2017 and increases linearly until it reaches a value of US\$50 per metric ton in 2026. A Section 45Q credit worth US\$12.83 per metric ton was available for 2017 and increases linearly until it reaches US\$35 per metric ton in 2026 for taxpayers who capture and then use qualified carbon oxide either (i) as a tertiary injectant in connection with a qualified enhanced oil or natural gas recovery project and then dispose of such carbon oxide in secure geological storage spaces or (ii) in certain fixation projects using photosynthesis or chemosynthesis, in certain projects involving chemical conversion and subsequent storage, or for certain other approved purposes for which a commercial market exists. After 2026, the amount of the credit is subject to an inflation-adjusted increase.

While the Act was a welcomed development and it renewed interest in developing projects to claim Section 45Q credits, activity in the sector remained lackluster given numerous uncertainties, including the manner in which projects could be developed and financed and when previously earned credits might be required to be forfeited.

In 2020, the US Treasury Department and the Internal Revenue Service (IRS) released long-awaited guidance answering most of the open questions. Such guidance includes proposed regulations (on which taxpayers may currently rely), Notice 2020-12, and Revenue Procedure 2020-12. The proposed regulations were followed by final regulations in early 2021 (“final regulations”).

In general, this guidance is taxpayer-favorable and, in the case of project development and finance, is broadly similar to guidance previously provided for wind and solar projects. As such, this guidance provides developers, investors and lenders the necessary clarity and certainty to allow them to develop and invest in new carbon capture sequestration projects.

## WHAT PROJECTS ARE ELIGIBLE FOR THE SECTION 45Q TAX CREDIT?

To be eligible for the Section 45Q credit, a project must be a “qualified facility.” A qualified facility must either store or use the carbon oxide it captures in accordance with the rules under Section 45Q.

### Characteristics of qualified facilities

A qualified facility is a facility that meets certain minimum emission thresholds and the construction of which began before January 1, 2026, with either (i) the construction of carbon capture equipment used at the facility also beginning before such date, or (ii) the original planning and design for the facility having included the installation of carbon capture equipment (the “beginning of construction requirement”). Notably, the deadline was extended by two years from the prior “before January 1, 2024” deadline, pursuant to the 2020 Extenders Bill.

The final regulations simplified the definition of “carbon capture equipment,” and provided greater flexibility, by removing the components list included in the proposed regulations and including a broader definition. As such, carbon capture equipment includes all components necessary to compress, treat, process or perform other physical action to capture carbon oxide. This definition further includes gathering and distribution lines that collect carbon oxide captured from one or more qualified facilities constituting a single project. Carbon capture equipment excludes, however, equipment used for transporting qualified carbon oxide for disposal, injection or utilization.

Notice 2020-12 provides that taxpayers may satisfy the beginning of construction requirements by meeting either the “physical work” test or the 5 percent safe harbor. This disjunctive test for satisfying the beginning of construction requirements is

consistent with the IRS guidance applicable to wind and solar projects (“wind and solar guidance”).

Under the physical work test, a project is treated as beginning construction once a taxpayer has begun work of a significant nature on the project. Whether physical work of a significant nature has occurred is a facts-and-circumstances inquiry, turning on the nature of the work performed rather than the amount or cost of the work. Physical work may be performed by the taxpayer or by a third party under a binding written contract, and may be performed onsite or offsite. Examples of physical work of a significant nature include the excavation for and installation of foundations, the manufacture of components necessary for carbon capture processes and the installation of equipment necessary for the disposal of qualified carbon oxide in secure geological storage spaces.

Notably, physical work of a significant nature does not include preliminary activities, such as securing financing, clearing a carbon capture project site, or obtaining permits and licenses. Further, as under the wind and solar guidance, work to produce components that are either in existing inventory or are normally held in inventory also does not qualify.

Under the 5 percent safe harbor, construction begins once a taxpayer pays or incurs at least 5 percent of the total cost of the carbon capture project. Relevant costs include all costs included in the depreciable basis of the project, as well as certain front-end planning, design and engineering costs.

Once construction has begun, taxpayers must further satisfy an additional “continuity” requirement by making continuous efforts to complete the carbon capture project (in the case of the 5 percent safe harbor) or by maintaining a continuous program of construction until the completion of the project (in the case of the physical work test).

Notice 2020-12 deems this continuity requirement to be satisfied if the project is placed in service by the end of a calendar year that is no more than six calendar years after the calendar year during which construction began (the “continuity safe harbor”). This six-year safe harbor period is more favorable than the four-year period contained in the wind and solar guidance, and reflects the longer time horizon for carbon capture projects as compared to wind and solar projects.

Projects that fail to meet the continuity safe harbor will be tested under a facts-and-circumstances analysis, the result of which may be difficult to predict with a high degree of confidence.

## STATE TAX CREDITS

In addition to Section 45Q credits, several states also offer tax incentives for carbon capture sequestration projects. Various states have set certain goals for greenhouse gas emission reduction. Some states, including (among others) California, Hawaii, New York and Washington have passed legislation adopting 100 percent clean or renewable energy mandates or goals.

The types of state tax incentives generally vary with respect to the type of relevant taxes and the scale of the incentives, mainly in terms of the respective tax reduction and the time and periods such incentives apply to the specific project.

Texas, for example, has the widest variety of incentives for carbon sequestration projects, especially for projects involving enhanced oil recovery (EOR). Such incentives include sales tax exemptions, franchise tax credits and severance tax reductions. California also provides state tax credits subject to a certain cap per ton, under its “Low Carbon Fuel Standard.”

In analyzing the economics and the ability to finance carbon capture sequestration projects, developers and investors should explore and take into account the state and local tax incentives in the relevant jurisdiction, in addition to Section 45Q credits.

## Storage and use requirements

To qualify for the Section 45Q credit, a qualified facility must either properly dispose of the carbon oxide in secure geological storage spaces or use it for certain approved purposes, such as a tertiary injectant in connection with certain oil or natural gas extraction processes.

Secure geological storage includes storage in deep saline formations, oil & gas reservoirs and unminable coal seams. To securely dispose of the carbon oxide, the facility needs to meet certain requirements. The final regulations provide that, for carbon oxide used as a tertiary injectant in EOR, the existence of a “secure geological storage” requires compliance and reporting either under Subpart RR of the Federal Environmental Protection Agency’s Greenhouse Gas Reporting Program or under the International Organization for Standardization (ISO) standard for quantifying safe long-term storage of carbon dioxide in association with EOR.

If a qualified facility uses, rather than simply stores, carbon oxide, it must do so in one of several approved ways, which are intended to enhance specific processes and technology developments. These include (i) chemical conversion into a compound in which such carbon oxide is securely stored, (ii) fixation through photosynthesis or chemosynthesis (such as growing bacteria), or (iii) use for other purposes for which a commercial market exists. The final regulations define the term “commercial market” broadly as a market in which a product, process, or service that utilizes carbon oxide is sold or transacted on commercial terms. Notably, the definition is not limited to any particular type of product or market, inviting interesting possibilities, including serving a distinct pre-existing need and thereby incentivizing a significant uptick in carbon capture by existing industries, such as companies engaged in the use of carbon oxide

for meat preservation or creating soft drinks.

## WHO COULD CLAIM THE 45Q CREDIT?

In general, the taxpayer who owns equipment placed in service on or after February 9, 2018 and physically or contractually ensures the capture and disposal, injection or utilization of such carbon oxide is entitled to the tax credits with respect thereto. The final regulations clarify that the taxpayer who owns the carbon capture facility does not need to own the facility that emits the carbon oxide that is being captured to be eligible for the credits.

Therefore, a taxpayer may, but need not, personally dispose of, inject or utilize carbon oxide; thus, it may hire a contractor to sequester carbon oxide generated by the taxpayer’s facility. The final regulations provide that a taxpayer “contractually ensures” the sequestration of carbon oxide when it enters into a binding written contract requiring the counterparty to sequester carbon oxide in accordance with the requirements of Section 45Q and the regulations thereunder. A binding written contract must be enforceable under state law and generally must not limit the amount of damages to less than 5 percent of the contract price. Further, the contract must include commercially reasonable terms, contain enforcement mechanisms, require the counterparty to comply with relevant tax law and regulatory requirements, and provide information relating to recapture events (in the case of qualified carbon oxide that is intended to be disposed of in secure geological storage spaces and not used as a tertiary injectant). Each party to the contract generally is required to report such contract (and certain other information) to the IRS on an annual basis.

In lieu of claiming a Section 45Q credit, the owner of the carbon capture equipment may elect to allow the person who contractually

ensures the sequestration of the carbon oxide to claim all or a portion of the credit associated with the amount of carbon oxide disposed of, injected or utilized by such person. The Section 45Q credit, however, may not be transferred to a subcontractor of the person contracted to perform the sequestration of captured carbon oxide. The taxpayer may enter into multiple contracts with multiple counterparties in a single year. If there are multiple counterparties, the maximum amount of Section 45Q credits allowable to each counterparty is proportional to the amount of captured carbon oxide sequestered by such person.

As such, the taxpayer who owns a project that captured carbon oxide may, for example, enter into a contract with one party to use a portion of captured carbon oxide as a tertiary injectant and with another party to properly dispose of a portion of captured carbon oxide, while electing to pass a portion of the Section 45Q credits to each such party.

Together with the fact that elections are made on an annual basis, this pass-through credit mechanism provides significant flexibility for taxpayers to use or monetize a project’s tax credits.

## CAN A MODIFIED OR RETROFIT FACILITY BE ELIGIBLE FOR THE CREDITS?

Section 45Q provides lower-value credits for projects placed in service prior to February 9, 2018, the date of the enactment of the Bipartisan Budget Act of 2018, than for projects placed in service on or after such date. In general, if a project placed in service before such date is modified on or after such date, and such physical modification or addition results in an increase in the carbon oxide capture capacity of existing carbon capture equipment, the final regulations require a bifurcation approach for determining the amount of any Section 45Q credits. In particular, higher-value credits may be available with

respect to carbon capture capacity arising from such modification, and lower-value credits generally will be available with respect to carbon capture capacity not arising from such modification.

The final regulations adopt a rule similar to the so-called “80/20” rule from Revenue Ruling 94-31, with respect to facilities that contain some used property. This rule has been used in recent years in the context of repowering operating wind farms, allowing such projects to restart the applicable production tax credit period. Similarly, if a modified or rebuilt carbon capture facility results in the existing or used components comprising 20 percent or less of the total fair market value of the project, then the entire project generally will be treated as being originally placed in service at the time such retrofitting is completed. In such a case, if the retrofitting occurs on or after February 9, 2018, no bifurcation of the Section 45Q credits is required and the higher-value credits generally will be available with respect to the entire project.

#### **WHAT ARE THE RULES FOR CREDIT RECAPTURE?**

Section 45Q credits are subject to recapture if previously stored or utilized carbon oxide leaks into the atmosphere during the recapture period. The recapture period is the period that begins on the date of the first injection of qualified carbon oxide and ends at the earlier of three years after the taxable year for which the applicable Section 45Q credit was claimed or the date the relevant monitoring requirements end under Subpart RR of the Federal Environmental Protection Agency’s Greenhouse Gas Reporting Program regulations or the ISO standard, as applicable.

In general, leaked carbon oxide first reduces the Section 45Q credits available in the taxable year in which the leak is identified and reported. If the amount of the leaked carbon oxide exceeds the carbon oxide captured in such

taxable year, the excess leaked carbon oxide generally will result in the recapture of Section 45Q credits in preceding taxable years. The recapture of Section 45Q credits generally is determined on a last-in-first-out (LIFO) basis and, as discussed above, generally is limited to the three taxable years preceding the taxable year of the leak. For example, if 500 metric tons of carbon oxide are captured in each of years one through three, but 1,000 metric tons of carbon oxide leak in year three, no Section 45Q credits are available in year three and the Section 45Q credits obtained in year two are then subject to recapture.

In general, the recapture of Section 45Q credits results in an increase to the taxpayer’s income tax liability in the taxable year in which the leak is identified and reported. The taxpayer is not required to amend its prior-year income tax returns to take into account recaptured Section 45Q credits. Thus, in the example above, all adjustments would occur on the taxpayer’s income tax return for year three.

Although the final regulations do not include a recapture safe harbor, they do provide limited exceptions to recapture in certain events. These exceptions include leaks arising from actions not related to the selection, operation or maintenance of the storage facility, such as, volcanic activity or a terrorist attack. To further mitigate any recapture concerns, taxpayers may consider obtaining recapture insurance.

#### **FINANCING STRUCTURES – CAN FLIP PARTNERSHIPS BE USED TO FINANCE PROJECTS?**

There are various ways through which taxpayers may monetize Section 45Q credits. As discussed above, a portion or all of the credits could be transferred to those who contractually ensure the sequestration of the carbon oxide, including the relevant offtaker.

Following the issuance of the new guidance, prospective developers may also now consider tax equity

structures to finance their projects, similar to the structures used regularly to finance wind and solar projects, with the most common being the “flip partnership.”

A flip partnership could either own the relevant project or otherwise could be assigned the Section 45Q credit in connection with its contractual obligation to dispose of or utilize the relevant carbon oxide.

In general, a flip partnership is a partnership, for tax purposes, between a developer and one or more tax equity investors (a “project company”). The most common tax equity investors in today’s market are financial institutions, strategic investors and certain companies with significant taxable income.

In this structure, until such time as the tax equity investors achieve an agreed after-tax internal rate of return (the “flip rate”), 99 percent of all partnership taxable items, including tax credits and losses, generally are allocated to them, along with a lower percentage of cash distributions. Once the flip rate is reached, the allocations and distributions “flip,” and going forward, the developer generally is allocated 95 percent of the partnership taxable items and is entitled to distributions of an equal amount of cash, while the remaining 5 percent is allocated or distributed to investors.

Revenue Procedure 2020-12 provides a safe harbor (the “carbon capture safe harbor”) pursuant to which the IRS will treat an investor in a project company that is structured as a flip partnership as a partner for US federal income tax purposes. Where such carbon capture safe harbor is met, allocations of partnership items to such investor, including allocations of the Section 45Q credits, generally will be respected.

For the carbon capture safe harbor to apply, taxpayers must satisfy all applicable requirements set forth in Revenue Procedure 2020-12. This revenue procedure conceptually tracks the structure

and requirements provided in Revenue Procedure 2007-65, which sets out the analogous “allocation safe harbor” for wind projects, including by explicitly blessing the flip partnership structure. Some of these requirements include the following:

First, an investment in the project company must constitute a “bona fide equity investment” with a reasonably anticipated value commensurate with the investor’s overall percentage interest in the project company. This generally requires that the value of the interest be subject to both upside and downside risk and not resemble a preferred return representing a payment for capital.

Second, when the investor acquires its interest in the project company, it must make an unconditional investment, equal to at least 20 percent of the total capital investments plus reasonably anticipated contingent investments. The investor must maintain this investment for as long as it maintains its interest in the project company, with the exception that such investment amount may be reduced by distributions paid out of the proceeds of the project company’s operations.

Third, unlike for wind projects, the carbon capture safe harbor permits the tax equity investor to have a put option to sell its partnership interest in the project company to the developer, or to any other person involved in the project, as long as the exercise price does not exceed its fair market value as determined at the time the option is exercised. The carbon capture safe harbor, however, does not allow the developer, the investors or any

related person to have a call option to purchase the equipment, the project or the partnership interest of another party.

Fourth, an investor may not receive guarantees from parties associated with the carbon capture project with respect to its ability to claim the Section 45Q credits or the cash equivalent thereof. The carbon capture safe harbor does not, however, prohibit investors from obtaining similar guarantees or insurance from third parties, including recapture insurance.

The carbon capture safe harbor specifically permits the investor and the project company to obtain guarantees concerning the performance of acts necessary to obtain the Section 45Q credits and the non-performance of acts that would cause the project company to fail to qualify for, or lose via recapture, such Section 45Q credits. Permitted guarantees include guarantees relating to proper storage of qualified carbon oxide, as well as completion guarantees, operating deficit guarantees, environmental guarantees and financial covenants.

Likewise, the carbon capture safe harbor permits agreements entered into on arm’s-length terms between the project company and an emitter or offtaker, concerning the long-term purchase of carbon oxide, leases of carbon capture equipment by the project company and certain services to be provided by the project company.

## FINAL THOUGHTS

Section 45Q marks an important development in clean energy incentives in the US and an opportunity for taxpayers, particularly in the growing tax-equity market. Market participants have carefully watched congressional and regulatory development of Section 45Q for more than a decade.

First stalled by the then-relatively low credit amount and output limitations, the amendments under the Bipartisan Budget Act of 2018 renewed interest in developing projects to claim Section 45Q credits. So too did the taxpayer-friendly regulations, Notice 2020-12 and Revenue Procedure 2020-12. Investors and developers were generally pleased by the notice and revenue procedure containing guidance broadly similar to existing authorities for wind and solar projects with which they are already familiar and comfortable. As of 2020, there were 14 commercial CCS facilities in operation in the US and 19 in construction or development, according to the Global CCS Institute. Legislation in late 2020 extending the beginning of construction requirement deadline from prior to January 1, 2024 to prior to January 1, 2026 was also welcomed by taxpayers, given delays in providing guidance for Section 45Q projects and the overall impact of the COVID-19 pandemic.

The guidance, final regulations and deadline extensions, together with the new presidential administration and Congress focusing on proliferating clean energy technology and projects, should contribute to this industry and likely provide a boon for the market in the coming year.

# How US environmental laws and regulations affect carbon capture and storage

Although there are no CCS-specific federal environmental laws or regulations, the federal government has significant influence on how CCS is implemented in the US

By Seth Kerschner, Taylor Pullins, Brittany Curcuru

**C**arbon capture and storage (CCS) does not fit neatly within the current regime of federal environmental law and regulation in the US. The development, construction and operation of CCS projects and associated carbon dioxide and carbon oxide pipelines are primarily regulated by states. Indeed, there are no federal environmental regulations that are specific to CCS projects or associated pipelines.

There are, however, numerous federal environmental laws and regulations that enable federal agencies to influence efforts across the CCS value chain, often in coordination with state regulatory agencies. And though there is bipartisan support to increase incentives for using CCS to combat climate change, CCS projects still face many obstacles in the US, and current federal environmental laws and regulations may often impede progress.

Here we discuss a variety of areas, under seven broad categories, where federal environmental laws and regulations may affect CCS projects and pipelines:

- Environmental impact
- Water and wetlands
- History and culture
- Species and habitat
- Air quality
- Drinking water
- Pipeline safety

## ENVIRONMENTAL IMPACT: THE NATIONAL ENVIRONMENTAL POLICY ACT

The National Environmental Policy Act (NEPA) is the principal federal law that dictates how environmental review and permitting works at the federal level. NEPA imposes procedural requirements on federal agencies. For any particular federal agency, compliance may require assessing the activities of other entities, inside or outside government. Projects in the private sector may be subject to NEPA if they have a federal nexus—for example, if they need a significant federal permit or involve federal land, federal funding or federally managed infrastructure. The NEPA process is conducted by the federal agency or agencies that are connected to the project's particular federal nexus.

Thus CCS projects with a federal nexus may trigger NEPA. Some triggers are relatively easy to intuit, while others are less so. Take funding, for instance. CCS projects in the US may receive federal funding, whether they are in development or fully operational. NEPA is triggered if federal funding involves significant federal control or influence over the use of funds. The Department of Energy (DOE) takes the lead on NEPA for many CCS projects in the US due to its prominent role in CCS project funding. Federally funded projects are not subject to NEPA when the federal funds are minimal and no agency has control over the project's outcome.

A carbon dioxide or carbon oxide pipeline may also require NEPA review if it has a federal nexus, such as crossing federal lands or waterways. But even a pipeline that doesn't have a direct or independent federal nexus may be subject to NEPA review if it is "connected" to a CCS project that has a federal nexus. Similarly, a pipeline transporting carbon oxide from a CCS project that does not independently require NEPA review may be considered "connected" if that project operates in conjunction with another CCS project that has a federal nexus.

## CONNECTED: "PROPOSED FEDERAL ACTIONS" AND "CONNECTED ACTIONS"

In the language of NEPA, projects are connected and therefore may be subject to NEPA review if they contain "proposed federal actions" that qualify as "connected actions."

Proposed federal actions are activities that have an existing or foreseeable federal nexus.

Proposed federal actions qualify as connected actions if they automatically trigger other actions that may require NEPA review—actions that are "closely related" and "should be discussed" in the same NEPA document. Such proposed actions cannot or will not proceed unless other actions are taken previously or simultaneously, or if the actions are interdependent parts of a larger action and depend on the larger action for their justification.

It is worth noting that carbon dioxide and carbon oxide pipelines do not necessarily have the same potential for environmental impact as oil and natural gas pipelines. But given recent high-profile opposition and litigation relating to the environmental impact of oil and natural gas pipelines in the US, opposition to permitting of carbon dioxide and carbon oxide pipelines could increase, particularly for projects that involve NEPA review.

It's also worth noting that NEPA review can significantly delay a project—in part, because the process often involves many stakeholders and is subject to public review and comment. Those who oppose CCS projects may invoke NEPA to challenge them.

### The NEPA process

Prior to permitting and construction, CCS projects that are subject to NEPA must undergo an environmental analysis called an Environmental Assessment (EA). Generally, an EA evaluates the need for the proposed project, identifies and evaluates any reasonable alternatives, and assesses the environmental social, economic and cultural impacts of the proposed project and alternatives. This may involve consideration of potential impacts to air quality, soil, groundwater, surface water, biological resources, cultural resources, aesthetics and noise.

Based on the EA's results, the lead federal agency conducting the environmental review may then prepare a more rigorous assessment that is open to public review and comment, and responds to substantive public comments. This more rigorous assessment results in an Environmental Impact Statement (EIS). NEPA requires an EIS to be prepared whenever a proposal involves a "major federal action" that will significantly affect the quality of the human environment.

If an agency is required to prepare an EIS, it must do so in consultation with agencies that are conducting studies mandated by

specified environmental laws. The EIS must include the comments of federal agencies that have jurisdiction by law or have special expertise with respect to any environmental impact involved. An agency must comply with NEPA's documentation requirements before any irreversible and irretrievable commitment of resources is made. The agency leading the NEPA process must prepare a record of decision that states whether it will issue a permit to the applicant, identifies alternatives considered and relevant factors used in making its decision, and outlines the mitigation, monitoring and enforcement measures required to avoid environmental harm.

### NEPA exclusions

A federal action (i.e., an action that has a federal nexus) may be "categorically excluded" from NEPA if it does not, individually or cumulatively, have a significant effect on the environment. The reason for an exclusion is usually explained in the NEPA procedure regulations that are adopted by each federal agency.

In 2011, for example, the DOE promulgated a new regulation to create 20 categorical exclusions to NEPA review. These excluded federal actions include experimental wells for injection of small quantities of carbon dioxide (wells that would be used, over the duration of the project, to inject, in aggregate, less than 500,000 tons of carbon dioxide into a geologic formation). To be excluded, such wells and associated drilling activities must also (1) have a low potential for seismicity, subsidence and contamination of freshwater aquifers; (2) be compliant with applicable requirements, best practices and DOE protocols; and (3) be sufficiently remote that they don't have the potential to cause significant impacts due to noise and other vibrations. Wells may be used for enhanced oil or natural gas recovery or for secure storage of carbon dioxide in saline formations or other secure formations.

## RECENT REVISIONS TO NEPA

On July 16, 2020, the White House Council on Environmental Quality published a final rule that revises how NEPA is implemented. The rule makes several procedural changes, including establishing presumptive time limits of one year for the preparation of EAs and two years for the preparation of EISs. It also makes several substantive changes, including redefining the terms "major federal action," environmental "effects" and "reasonable alternatives."

The rule went into effect on September 14, 2020. However, opponents of the rule filed challenges arguing that it is contrary to the purpose of NEPA, disregards cases and guidance documents interpreting NEPA, and violates the Administrative Procedure Act.

Furthermore, President Biden issued an executive order directing the Environmental Protection Agency to review the July 2020 rule on January 20, 2021. The Biden administration is expected to rescind the rule.

### WATER AND WETLANDS: THE CLEAN WATER ACT

A federal permit may be required under the Clean Water Act if a CCS project or pipeline crosses water or wetlands. The Army Corps of Engineers issues permits for discharge of dredge or fill materials under Section 404 of the Clean Water Act. Section 404 requires a permit for any utility line crossing that requires the discharge of dredge or fill materials into US waters. This includes "any pipe or pipeline for the transportation of any gaseous, liquid, liquescent or slurry substance for any purpose."

The level of environmental analysis is based on the type of permit required. Permits issued under Section 404 are categorized as either general or individual. General permits cover activities that have minimal cumulative impact. Although projects assessed for general permits "undergo a stringent pre-approval evaluation process that involves a comprehensive environmental assessment under NEPA and also public notice and comment," the process does not involve substantive findings related to each discrete project.

Individual permits cover water or wetland crossings with potentially significant impact and require a more extensive evaluation process that involves consideration of alternatives and incorporation of compensatory mitigation.

#### **HISTORY AND CULTURE: THE NATIONAL HISTORIC PRESERVATION ACT**

The National Historic Preservation Act (NHPA) may require federal review of a CCS project or pipeline if it has the potential to impact a federally recognized historic or cultural property. The NHPA's consultation and review process is designed to avoid or minimize harm to historic properties where "the area of potential effects" from a proposed project may result in changes to a property's character or use.

The NHPA requires federal agencies to consult with the Advisory Council on Historic Preservation and other stakeholders prior to taking an action that may affect a site "included in or eligible for inclusion" in the National Register of Historic Places. Sites may include "traditional cultural properties" that, due to their association with the cultural history, practice or traditions of Native American groups, rural communities or particular cultural groups "are important in maintaining the continuing cultural identity of the community." If a proposed CCS project or pipeline could impact historic or cultural properties, an agency must engage in the NHPA consultation process.

#### **SPECIES AND HABITAT**

CCS projects or pipelines may require review of potential impacts to threatened or listed species under habitat protection and mitigation requirements. Federal laws such as the Endangered Species Act (ESA), the Migratory Bird Treaty Act (MBTA), and the Bald and Golden Eagle Protection Act prohibit developers from activities that are likely to result in a "take" of a protected species. These statutes impose both civil

and criminal penalties for take violations, including the prescriptive imposition of criminal penalties under the MBTA.

The term "take" means to harass, harm, pursue, hunt, shoot, wound, kill, trap, capture or collect, or to attempt to engage in any such conduct.

Before engaging in activities that are likely to result in a take, project developers must consult with the Fish and Wildlife Service (FWS) as part of NEPA or obtain an Incidental Take Permit under Section 10 of the ESA. They must also develop a habitat conservation plan. Based on FWS conclusions, projects may be required to redesign or reroute infrastructure or implement other "reasonable and prudent alternatives" to avoid takes of protected species. Alternatively, if a project must obtain an Incidental Take Permit, conditions for the implementation of measures to minimize the incidental taking's impact may be included in an Incidental Take Statement prepared by FWS. Developers, in coordination with agencies, may also agree to voluntary conservation measures through public-private conservation agreements or letters of commitment

#### **AIR QUALITY: THE GREENHOUSE GAS REPORTING PROGRAM**

The federal Environmental Protection Agency's (EPA's) Greenhouse Gas Reporting Program (GHGRP) requires reporting of greenhouse gas (GHG) data and other relevant information from large GHG emission sources, fuel and industrial gas suppliers, and carbon oxide injection sites in the US. This includes information regarding the capture, supply and underground injection of carbon oxide in the US. Approximately 8,000 facilities are required to report their emissions annually, and the reported data are made available to the public each year.

GHG emissions data from these activities are reported under several different subparts of the GHGRP regulations. Regulations governing

suppliers of carbon dioxide (subpart PP) apply to facilities that capture carbon dioxide from industrial sources and process or extract it from natural carbon dioxide-bearing formations for supply into the economy. Regulations governing underground injection of carbon dioxide (subpart UU) apply to facilities that inject carbon dioxide underground for enhanced oil recovery, acid gas injection and disposal, carbon storage research and development, or for any other purpose other than geologic sequestration. Regulations governing geologic sequestration of carbon dioxide (subpart RR) apply to facilities conducting geologic sequestration and provide a mechanism for such facilities to monitor their own activities and report to the EPA about the amounts of carbon dioxide they sequester.

Facilities submit a plan for monitoring, reporting and verifying carbon dioxide sequestered underground. Once the plan is approved, facilities report basic information on carbon dioxide received for injection, data related to the amounts of carbon dioxide sequestered, and annual monitoring activities.

#### **DRINKING WATER: THE UNDERGROUND INJECTION CONTROL ACT**

The Safe Drinking Water Act (SDWA) requires the EPA to establish rules to protect underground sources of drinking water (USDW) from endangerment. The EPA developed the Underground Injection Control (UIC) program to protect USDW by setting rules for operating underground injection wells. The EPA has promulgated regulations and established minimum federal requirements for six classes of injection wells.

There are two primary UIC well classes that may include CCS projects with carbon dioxide injection. Class II wells are those used exclusively to inject fluids that



are associated with oil and natural gas production (e.g., wastewater from hydraulic fracturing and fluids used for enhanced oil recovery (EOR)). Geologic storage of carbon dioxide associated with such operations can be incidental (for example, the storage of carbon dioxide associated with EOR). Class VI wells are those used to inject carbon dioxide into deep geologic formations for the purpose of storing carbon dioxide. The EPA established this well class separately from Class II to provide specific regulations for projects where the purpose is geologic storage.

It is important to note that the EPA has delegated primary regulatory authority (also referred to as “primacy”) to many states to administer the UIC program. The EPA may grant primary authority to a state for all or part of the UIC program. In some jurisdictions, primacy for certain well classes may be shared with the EPA or divided between different states, territories or tribal authorities. A state seeking UIC program primacy must demonstrate to the EPA that the state has jurisdiction over underground injection; state regulations meet or exceed the federal UIC requirements; and the necessary administrative, civil and criminal enforcement remedies are in place.

The UIC program regulations generally require owners or operators of all classes of wells to set aside financial resources sufficient to maintain, plug and abandon wells consistent with approved closure plans. The regulations also set forth more specific financial responsibility requirements applicable to each well class. States with primacy may impose additional financial responsibility on owners or operators.

#### **PIPELINE SAFETY**

The Department of Transportation’s Pipeline and Hazardous Materials Safety Administration (PHMSA) has primary authority to regulate interstate carbon dioxide pipelines. The PHMSA’s Office of Pipeline Safety regulates the design, construction, operation, maintenance and spill response planning for regulated pipelines. The PHMSA establishes minimum safety standards for interstate pipelines, and has largely preempted states from establishing their own standards for interstate pipelines. However, states that have carbon dioxide pipelines may regulate the safety of such pipelines to varying degrees under delegation of authority from the Hazardous Liquid Pipeline Act.

## **GHG EMISSIONS LIABILITY**

There are several GHG emissions trading schemes in the US, including the Regional Greenhouse Gas Initiative and the California Cap-and-Trade Program. It’s important to understand that leaks from CCS projects may result in liability for project operators if emissions trading regimes provide benefits to CCS projects for carbon dioxide storage. Emissions trading regimes may offer benefits to CCS projects because carbon dioxide captured and stored by such projects is effectively carbon dioxide that has not been emitted into the atmosphere, and thus represents a reduction in emissions according to the standards of some such regimes.

The potential for leakage from CCS projects raises the issue of GHG emissions accounting liability. GHG emissions trading regimes typically include a process for verifying emissions to ensure there is no incompatibility with GHG “allowances” or credits claimed, actual emissions and credits traded. Some GHG emissions trading regimes require an annual reconciliation where operators of installations within the system must produce credits equal to their GHG emissions or face financial penalties. They may also require an up-front financial security deposit to cover potential liabilities. CCS operators receiving benefits for carbon dioxide storage from a GHG emissions trading regime should confirm the requirements and potential liabilities that may be imposed by the regime in the event of a carbon dioxide leak.

It is important to note that the PHMSA regulates pipelines transporting carbon dioxide in a supercritical liquid state, but it does not regulate pipelines transporting carbon dioxide in a subcritical fluid or gaseous state. Nevertheless, because carbon dioxide is generally more difficult to transport as a gas, the majority of carbon dioxide transported over distances is in a supercritical liquid state and therefore subject to PHMSA regulation. The PHMSA has considered revisions to existing regulations that would include pipelines transporting gaseous carbon dioxide, but it has not yet implemented any such changes.

\* \* \*

Developers of CCS projects should be aware of the numerous environmental laws and regulations that may directly or indirectly affect such projects. While the federal government has established substantial incentives for the development of CCS projects, the nascent CCS industry will likely remain subject to a complex and changing environmental legal and regulatory landscape for years to come.

## UNDERGROUND INJECTION AND EMISSIONS LIABILITY

Although both were dismissed, two cases in the past six years demonstrate the potential for legal challenge that CCS developers and operators may face in connection with environmental permitting.

In *DJL Farm LLC v. United States EPA*, a group of landowners filed suit to challenge the issuance of permits to FutureGen Industrial Alliance, a company that had sought to use CCS technology to develop the world's first near-zero emissions power plant. FutureGen had applied for permits to construct four Class VI UIC wells and inject approximately 22 million metric tons of carbon dioxide into the wells over a 20-year period. In May 2015, the EPA issued four permits to FutureGen authorizing it to construct and operate the UIC wells. A group of Illinois landowners then challenged the issuance of the permits in court. The court ultimately dismissed the case because FutureGen lost funding for the project and closed it down before the legal process ran its course.

In *In re Archer Daniels Midland Co.*, a citizen filed a petition in 2014 challenging a UIC permit issued to Archer Daniels Midland Company, a food processing and commodities company, for a CCS project in Illinois that would include a carbon dioxide injection well. The petitioner, who had standing to challenge the permit because he had submitted written comments on the draft permit, argued that the EPA had violated the ESA by failing to consult with the FWS, and that the EPA failed to include provisions in the permit that would properly compensate Illinois property owners for the migration of carbon dioxide to their "pore space." The EPA Environmental Appeals Board dismissed the challenge, and the petitioner filed a voluntary notice of dismissal after the EPA sought to dismiss the petition on the ground that it was not timely.

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# Carbon capture and storage M&A is likely to accelerate in the US

Despite short-term headwinds, long-term trends are likely to drive increased investment in carbon capture and storage

By Ipek Candan Snyder

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Carbon capture and storage (CCS) M&A is still in a nascent stage in the US, as it is globally. Though interest in CCS is rising rapidly, there were only 14 commercial CCS facilities in operation in the US and 19 in construction or development in 2020, according to the Global CCS Institute.

Moreover, demand for CCS declined due to the economic downturn as falling demand for oil & gas caused a drop in the use of captured carbon dioxide for enhanced oil recovery (EOR). For example, Petra Nova, a large CCS facility in Texas that supplied carbon dioxide for EOR, was mothballed in 2020 due to waning demand. The decline in demand obviously affects the outlook for CCS M&A in the short term.

But in the longer term, a number of trends are likely to accelerate adoption of CCS, which would generate more investment in the space. Governments around the world are taking steps to deliver on commitments to reduce greenhouse gas (GHG) emissions, with some pledging to become “net zero” by mid-century. If the US takes a more aggressive approach to reducing GHG emissions, demand for CCS would likely rise—especially if it were to set net-zero targets, which would almost certainly require expansion of CCS capacity.

Some companies in carbon-intensive industries are already pledging to become net-zero by

2050—including power generators, oil majors, mining and materials companies and airlines—many of which will need to implement CCS strategies to meet their goals.

Government support is also an important factor driving CCS adoption and investment. The federal tax credit detailed in Section 45Q of the US Internal Revenue Code provides incentives to companies to implement CCS strategies. Recent guidance from the Internal Revenue Service enhanced understanding of the 45Q tax credit, which should increase confidence among investors and boost CCS adoption. (For details on the 45Q tax credit, see the article “US tax credit encourages investment in carbon capture and storage” in this report.) Moreover, increasing opportunities for public-private partnerships with the US Department of Energy make it easier for companies to finance CCS project development, which could accelerate equity fundraising and co-investment.

Recent investments in CCS in the US have mostly fallen into one of two categories: large co-investments in development-stage projects and small investments in early-stage companies developing carbon capture technologies. Two projects are illustrative.

In 2020, OGI Climate Investments and Starwood Energy announced that they would co-invest in the development of a

large carbon capture project at a gas-fired power plant. The project is expected to use commercially available technology to capture approximately 90 percent of the carbon dioxide emissions from the plant, which would be used in EOR or sequestered in an existing oil field. Construction is expected to start in 2021, and the project will reportedly be eligible for 45Q tax credits.

Enchant Energy is currently seeking equity partners for a US\$1.3 billion project that would enable it to reopen its San Juan coal-fired power plant with carbon capture technology in 2023. Enchant purchased the 46-year-old 847-megawatt plant from a group of investors in 2019 with the CCS project in mind. Enchant expects to earn roughly 40 percent of its revenues from the sale of electricity, 40 percent from 45Q tax credits and 20 percent from the sale of carbon dioxide to oil & gas producers. Enchant remains optimistic about the project despite questions about its viability in light of the Petra Nova closure—particularly because it expects the 45Q tax credit to buttress the project’s economics.

In the longer term, the outlook for CCS M&A is promising. Even in the face of short-term headwinds, deals continue to happen. Current trends are likely to drive demand for CCS, which will bring more investors to the table in search of deals.

# How Australian laws and regulations affect carbon capture and storage

CCS projects are regulated by the Commonwealth, states and territories under CCS legislation and more general environmental laws and requirements

By Tim Power

The legal framework for encouraging and regulating carbon capture and storage (CCS) in Australia is divided among the Commonwealth and the states and territories.

Commonwealth CSS laws only apply to the offshore areas within the Commonwealth jurisdiction, while state and territory CCS laws apply to onshore and offshore projects within their jurisdictions. However, there is significant variation across states and territories—and though the relevant frameworks are comprehensive in some parts of the country, they are much less so in other parts.

Here we outline the legal and regulatory context for CCS in Australia and highlight important issues that participants may have to navigate in the market.

## CLIMATE POLICY AND CCS IN AUSTRALIA

Policy support for CCS is gaining momentum. In September 2020, the Commonwealth published its “First Low Emissions Technology Statement—2020,” a proposed greenhouse gas emissions reduction strategy that gives CCS a prominent role.

The “Statement” emphasizes the importance of CCS in sequestering greenhouse gas emissions generated in natural gas processing and hard-to-abate industries (such as steel and aluminum manufacturing). It proposes a “stretch goal” of reducing the combined cost of compression, transport and hub storage (this does not include capture processes) to AUD 20 per tonne of carbon dioxide equivalent. The “statement” also commits the government to providing AUD 50 million in research for R&D and for amending legislation to ensure CCS is eligible for support from the Emissions Reduction Fund, the Australian Renewable Energy Agency and the Clean Energy Finance Corporation (all three of these groups are already authorized to provide funding for other Commonwealth climate change objectives).

A number of energy companies have announced that they are interested in CCS, and the Victorian government has continued work on its proposed CarbonNet CCS project. It is important to acknowledge that CCS remains controversial in Australia, and as a result there may be resistance to legislative efforts called for in the “Statement.” Nevertheless, the industry push for CCS as a means to reduce greenhouse gas emissions seems likely to continue for the foreseeable future.

## CCS-SPECIFIC REGULATIONS

The Commonwealth and some states have established CCS-specific regulations. Commonwealth CCS legislation only applies to offshore areas that are beyond state jurisdictions, which generally extend three miles offshore. State CCS-specific legislation applies onshore and offshore within their respective jurisdictions.

### Commonwealth CCS-specific regulations

The Commonwealth regulates CCS in the Commonwealth marine area under the Offshore Petroleum and Greenhouse Gas Storage Act 2006 (Cth), also called the Offshore Act.

There are three main statutory requirements for getting CCS projects approved and operational under the Offshore Act:

- Obtain a greenhouse gas assessment permit to explore for geologic formations to store greenhouse gases. These permits are typically granted through a competitive tender process
- Obtain a greenhouse gas injection license. These are only given to applications that already have a greenhouse gas assessment permit or a petroleum license
- Obtain a declaration from the Minister of Resources indicating that the relevant geologic formation is eligible for greenhouse gas storage. To be eligible, a formation must be suitable, without engineering enhancements, to store a specific amount (at least 100,000 tonnes) of an identified greenhouse gas substance, injected at specified points

The Offshore Act also creates other titles such as holding leases and research consents for scientific purposes, and for constructing and operating pipelines in the Commonwealth marine area. Importantly, it also contains a comprehensive statutory regime for the rehabilitation and restoration of CCS locations, and requires CCS operators to provide security to

cover the cost of environmental and rehabilitation obligations.

The primary Commonwealth environmental and safety regulator for CCS is the National Offshore Petroleum Safety and Environmental Management Authority (NOPSEMA). NOPSEMA has extensive powers to issue remedial directions to CCS titleholders and operators. It is also responsible for approving and enforcing the environment plan that every CCS project must submit.

No greenhouse gas activity can commence before NOPSEMA has assessed and accepted an environment plan from the project titleholder that contains a description of the activity and its environmental risks and impacts, outlines relevant environmental performance standards, and provides an implementation strategy for the activity. In deciding whether to approve an environment plan, NOPSEMA considers whether it is appropriate for the nature and scale of the activity proposed, protects any potentially affected World Heritage properties, complies with the Environment Protection and Biodiversity Conservation Act 1999 (Cth), and provides for appropriate environmental performance outcomes. NOPSEMA publishes both submitted and final-form environment plans in full.

One notable shortcoming of the Offshore Act had been that the Commonwealth could not issue greenhouse gas injection licences for storage formations that traverse the maritime boundary of a state or territory. To address this issue, the Commonwealth Parliament passed amendments to the Offshore Act in May 2020 that remove this obstacle.

### State and territory CCS-specific regulations

Only Victoria and Queensland have passed comprehensive legislation to regulate CCS, although South Australia's onshore petroleum and geothermal energy legislation includes rules about the storage of

carbon dioxide in natural reservoirs. Both New South Wales and Western Australia prepared bills to regulate CCS in their states, but neither state parliament passed the bills.

The Victorian approach to regulating CCS in the coastal waters of the state is closely modeled on the Commonwealth Offshore Act.

In Queensland, two types of greenhouse gas titles are required for CCS exploration and production:

- The greenhouse gas exploration permit allows holders to search for geologic formations that are suitable for storing greenhouse gases. The permits are granted through a competitive tender process
- The greenhouse gas injection and storage license allows holders to inject greenhouse gases into identified geologic formations

In all jurisdictions, titleholders are required to prepare work plans (called by various names, depending on the jurisdiction). In broad terms, the work plans must describe any proposed CCS activities, along with the necessary management and monitoring activities for the project. The regulator must approve the work plans. CCS legislation also deals with a host of other matters regarding land access, environmental protection, and priorities/liabilities concerning overlapping title areas (including when CCS titles overlap with other CCS titles and when CCS titles overlap with petroleum titles).

The largest commercial CCS project in the world is the Gorgon carbon dioxide injection project located at Barrow Island in the state of Western Australia. This project is regulated under Western Australian environmental law and the Barrow Island Act 2013 (WA).

The Gorgon project involves the development of two offshore gas fields. The reservoir carbon dioxide is separated from the natural gas stream prior to gas processing and liquefaction. Carbon dioxide is then injected into a geologic formation

more than two kilometers beneath the surface of Barrow Island. The Western Australian Environmental Protection Authority requires that 80 percent of reservoir carbon dioxide (calculated on a five-year rolling average) be removed from gas processing operations on Barrow Island and injected into the designated geologic formation for carbon dioxide storage.

## ENVIRONMENTAL ASSESSMENTS

The Commonwealth retains responsibility for enacting and enforcing Australia's international environmental treaty obligations and protecting matters of national environmental significance. The main Commonwealth environmental legislation that can effect CCS projects is the Environment Protection and Biodiversity Conservation Act 1999 (Cth), also called the EPBC Act.

Australia's states and territories are primarily responsible for conducting environmental impact assessments and approving new projects, including CCS projects.

In the remainder of this section, we discuss Commonwealth and state and territory environmental assessment requirements.

### Commonwealth environmental assessments

The EPBC Act protects a number of "matters of national environmental significance." These include listed nationally threatened flora and fauna species and ecological communities, listed marine species, the Commonwealth marine area, world heritage properties, Ramsar Convention wetlands and places inscribed on the National Heritage List.

Under the EPBC Act, the proponent refers a CCS project to the Commonwealth Minister for the Environment to determine whether the project must undergo environmental assessment and be approved by the Commonwealth

government. The referral is placed on public exhibition for ten days before a decision is made.

The Commonwealth has entered into bilateral agreements with the states and territories to limit the potential for duplicating environmental assessments. For most onshore projects in Australia, proponents have only had to prepare environmental assessments that comply with relevant state and territory laws. The Commonwealth has relied on these assessments to decide whether to approve projects.

The situation for offshore projects is typically more complicated because the bilateral agreements do not apply to projects that extend outside the jurisdiction of the relevant state or territory. Thus CCS projects that involve activities in the Commonwealth marine area as well as ancillary infrastructure (such as transport pipelines) within a state or territory require bespoke, integrated environmental assessments that are agreed upon and conducted in coordination with both tiers of government. This is not required by law, but is typically done in practice.

The Commonwealth has recently undertaken a review of the EPBC Act, although as of the date of writing the government had not yet made the final review report public. However, in conjunction with this review, the Commonwealth is proposing amendments to the EPBC Act that will enable the Commonwealth, states and territories to enter into bilateral agreements under which only the state and territory will approve new projects under the Act. These amendments are presently before the federal parliament.

### State and territory environmental assessments

Land-use planning regulators typically administer the environmental assessment laws of each of the states and territories, although in Western Australia the Western Australian Environmental

Protection Authority administers these laws. While the legislation and administrative practices vary from state to state, the environmental assessments usually include the following elements:

- A screening decision as to whether environmental assessment is required. This decision is typically made by a state government minister or agency
- The regulator prepares and exhibits scoping requirements or terms of reference for the environmental assessment. In some jurisdictions, public comment is sought on drafts of the requirements before approval is granted
- The proponent undertakes the environmental assessment in accordance with the approved scoping requirements or terms of reference
- The environmental assessment is placed on public exhibition (for up to six weeks in some jurisdictions) so that the public may comment on it
- In most jurisdictions, a proponent is required to prepare a response to the matters raised in public submissions and provide it to the regulator. However, in Victoria and sometimes in Tasmania, there is an intermediate step under which an independent inquiry conducts a public hearing into the environmental assessment and hears submissions and evidence called by the proponent, relevant government agencies and submitters
- The regulator ultimately prepares and publishes the assessment of the project, after which authorities usually decide whether to grant approval

### REGULATION UNDER STATE ENVIRONMENTAL LAWS

In Victoria and South Australia, a site used for CCS operations in accordance with the Greenhouse

Gas Geologic Sequestration Act 2008 (Vic) and the Petroleum and Geothermal Energy Act 2000 (SA) does not require approvals or licensing from the respective state Environmental Protection Authorities. However, in Queensland, greenhouse gas storage activity is classified as an “environmentally relevant activity” under the Environmental Protection Act 1994 (Qld) and requires an approval called an environmental authority from the Department of Environment and Science.

All Australian state and territory environmental laws, including new laws that are scheduled to commence in Victoria in July 2021, have a general environmental duty. Broadly speaking, these duties require people to take all reasonable or practicable measures to reduce risks of harm to the environment. In Victoria, the proposed general environmental duty applies to all activities undertaken in the state, and the scope of the duty extends to reducing risks to human health and the environment from pollution. In most Australian states, non-compliance with the general environmental duty can give rise to civil penalties and enforcement actions undertaken by state environmental regulators or third parties. However, non-compliance with the proposed Victorian general environmental duty is also a criminal offence.

Thus CCS operations not only must address the regulatory and environmental management requirements of CCS legislation, but must also be assessed against and satisfy state Environmental Protection Authority duties, laws, policies and guidelines.

#### **LIABILITY FOR LEAKAGE**

All relevant Australian legislation requires that proponents of CCS projects demonstrate to the satisfaction of the relevant Commonwealth or state regulators that the formations they plan to

use can safely contain the target volume of the particular greenhouse gas substances they plan to store, injected at particular locations, without leaking or compromising the formation’s geotechnical integrity.

All Australian CCS legislation empowers regulators to take administrative action when greenhouse gas substances leak or have the potential to leak following injection. These include powers to direct the proponent to suspend or cease injection, cancel the title and take reasonable steps to remedy the situation. If the regulator takes steps to remedy a situation, it can in some jurisdictions draw on the financial security provided by the proponent to cover the cost of those activities. In others, such as Victoria and Queensland, costs incurred by the state are a debt due by the titleholder.

However, only one Australian Act deals with the question of liabilities associated with leaks. The Gorgon LNG and CCS Project on Barrow Island in Western Australia is partly regulated under the Western Australian Barrow Island Act 2003 (WA). Under this Act, the State of Western Australia indemnifies the Gorgon joint venture parties from post-closure common law liability claims for loss or damage caused by the injection of greenhouse gas substances.

The Barrow Island Act also empowers the state to ask the Commonwealth to give notice that it is satisfied as to certain matters. These matters include the Commonwealth’s satisfaction that the greenhouse gas substances stored in the formation are behaving as modeled, and that there is no significant risk of leakage, nor is there a significant risk of adverse impacts to the geotechnical integrity of the formation or the environment, or human health and safety. The state can only request this notice 15 years after the CCS injection activities cease.

#### **DECOMMISSIONING AND REHABILITATION**

Rules regulating the decommissioning and rehabilitation of CCS projects are promulgated by the Commonwealth as well as states and territories.

#### **Commonwealth decommissioning requirements**

Under the Offshore Act, a CCS project may only be decommissioned after a site closing certificate is granted by the Commonwealth to the greenhouse gas injection licensee. In order to obtain a certificate, the licensee must model the behavior of the greenhouse gas substance injected (including its expected migration pattern and the short-term and long-term consequences of the substance on geotechnical integrity, human health or safety or the environment), and propose an approach for the Commonwealth to take in monitoring the greenhouse gas storage formation.

The licensee must provide security for the proposed program of monitoring operations. The Commonwealth can recover from the licensee any reasonable costs or expenses incurred in carrying out the program.

If the Commonwealth is satisfied that the greenhouse gas is behaving as modeled and there is no significant risk of major impact on geotechnical integrity, human health or safety, or the environment, the Commonwealth may declare that a closure assurance period has occurred. After issuing the declaration, the Commonwealth will indemnify the greenhouse gas injection licensee against any liability in relation to the formation. The closure assurance period must be a minimum of 15 years.

At the time of writing, the Commonwealth had recently published a consultation paper on enhancing the decommissioning framework under the Offshore Act. While the primary focus of

the consultation paper is on the decommissioning framework for offshore oil & gas activities, many of the principles and options canvassed in the consultation paper could equally apply to offshore CCS projects, although it remains to be seen whether the Commonwealth will pursue this same approach.

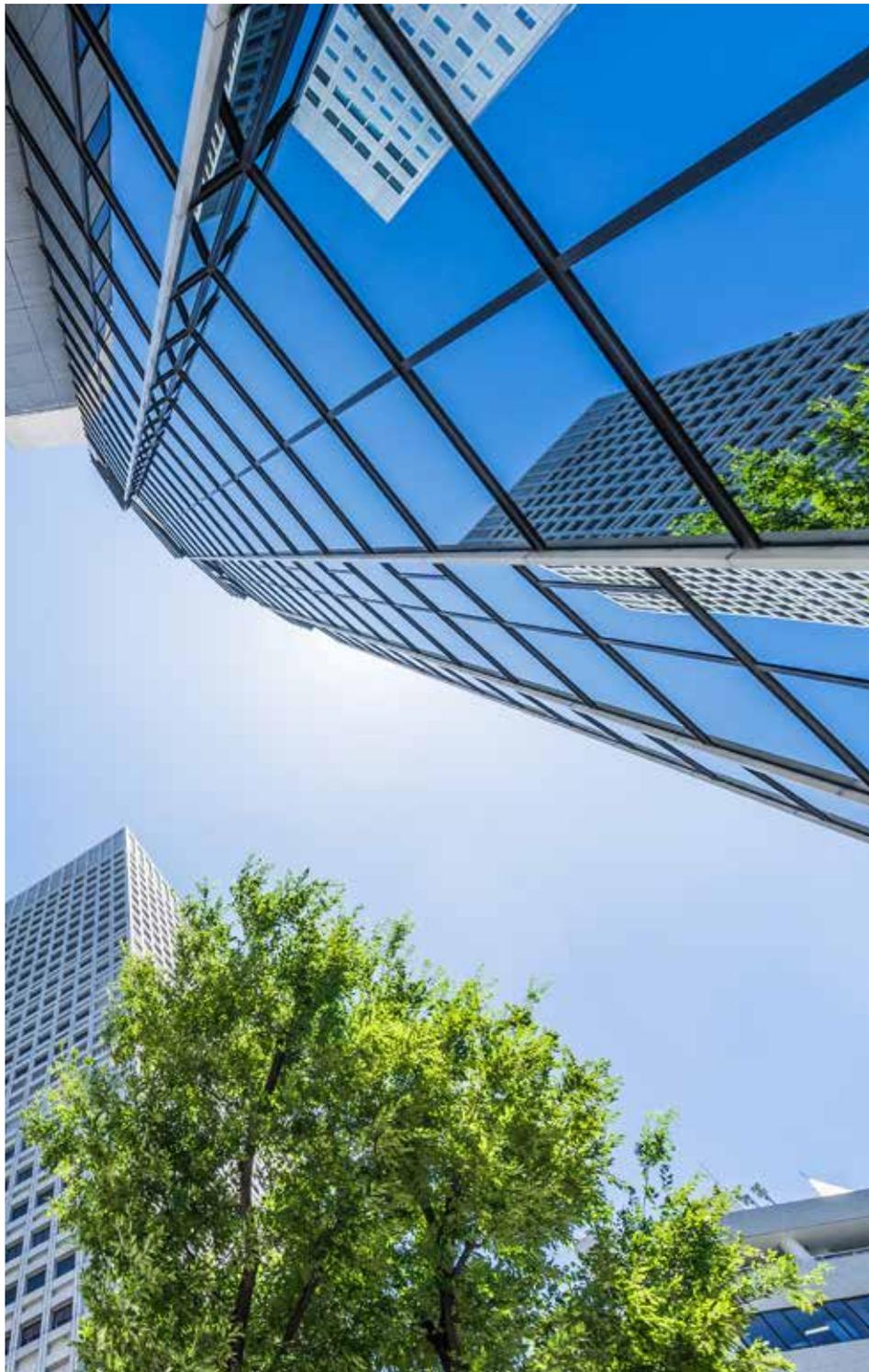
### **State decommissioning requirements**

Obligations to rehabilitate CCS operations are set out in the relevant CCS legislation or regulated under a condition of the CCS title or through a combination of both. The titleholder must rehabilitate the site of CCS operations and remove infrastructure before the title is relinquished or surrendered. In South Australia and Queensland, the regulator can also undertake rehabilitation actions itself and recover the costs of doing so from the titleholder.

In Victoria, the holder of the injection title is required to obtain a rehabilitation bond that is accepted by the Victorian Minister for Resources before commencing CCS operations. If the titleholder fails to remediate the land, the Minister may do all things necessary to do so and draw on that bond, as well as recover any costs incurred from the licensee.

\* \* \*

Companies pursuing CCS strategies in Australia must navigate a complex network of Commonwealth and state and territory laws and regulations. And even as demand for CCS increases, the legal and regulatory situation in Australia is likely to evolve.





**Americas**

**Ipek Candan Snyder**

Partner, New York

**T** +1 212 819 2684

**E** [ipek.candansnyder@whitecase.com](mailto:ipek.candansnyder@whitecase.com)

**Seth Kerschner**

Partner, New York

**T** +1 212 819 8630

**E** [seth.kerschner@whitecase.com](mailto:seth.kerschner@whitecase.com)

**Taylor Pullins**

Partner, Houston

**T** +1 713 496 9653

**E** [taylor.pullins@whitecase.com](mailto:taylor.pullins@whitecase.com)

**Hagai Zaifman**

Partner, New York

**T** +1 212 819 8912

**E** [hagai.zaifman@whitecase.com](mailto:hagai.zaifman@whitecase.com)

**Brittany Curcuru**

Associate, New York

**T** +1 212 819 7074

**E** [brittany.curcuru@whitecase.com](mailto:brittany.curcuru@whitecase.com)

**Brandon Dubov**

Associate, New York

**T** +1 212 819 7034

**E** [brandon.dubov@whitecase.com](mailto:brandon.dubov@whitecase.com)

**Michael Rodgers**

Associate, Houston

**T** +1 713 496 9665

**E** [michael.rodgers@whitecase.com](mailto:michael.rodgers@whitecase.com)

**Asia-Pacific**

**Tim Power**

Partner, Melbourne

**T** +61 3 8486 8037

**E** [tim.power@whitecase.com](mailto:tim.power@whitecase.com)

**whitecase.com**

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