



Waxman-Markey Provisions Impacting Carbon Capture and Sequestration

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The following provides a high-level summary of provisions of the “American Clean Energy and Security Act of 2009” (HR 2454) that could impact carbon capture and sequestration (CCS). The bill’s principal sponsors include Representatives Henry Waxman (D-CA) and Edward Markey (D-MA), and the bill is also known as the “Waxman-Markey bill.” This memorandum addresses the Waxman-Markey bill (the Bill) as reported out of the U.S. House Committee on Energy and Commerce and described in the Committee Report dated June 5, 2009. The Bill contains a wide range of provisions that could impact CCS, including significant funding mechanisms (reportedly as much as \$200 billion to spur CCS deployment), coal-fired power plant performance standards that require CCS, and various compliance obligations including those for geologic sequestration sites.

Note that the following provisions are subject to change, and due to the length of the Bill (over 900 pages), not all potentially relevant provisions in the Bill are discussed.

I. Studies and regulatory treatment of CCS under existing environmental statutes

Within 1 year of the Bill’s enactment into law, the U.S. Environmental Protection Agency (EPA) must submit a report to Congress that provides a comprehensive strategy to address “key legal, regulatory and other barriers to the commercial-scale deployment” of CCS. (HR 2454, Sec. 111) This report shall recommend rulemakings, federal legislation, or other actions that should be taken to address such barriers. The Bill also requires EPA to undertake a variety of other actions with respect to CCS and matters within its regulatory authority, including:

- Within one year of enactment, EPA must regulate geologic sequestration wells under the Safe Drinking Water Act (SDWA). The SDWA regulations must include requirements for maintaining evidence of financial responsibility, including for emergency and remedial response, well plugging, site closure, and post-injection site care. (Sec. 112)
- Within one year of enactment, the EPA must report to Congress regarding how the multiple environmental statutes that EPA administers, including the Comprehensive Environmental Response, Compensation, and Liability Act (also known as Superfund) and the Resource Conservation and Recovery Act,

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would apply to geologic sequestration sites and carbon dioxide injection.
(Sec. 113)

- Within two years of enactment, EPA must pass regulations under the Clean Air Act to “protect human health and the environment by minimizing the risk of escape to the atmosphere of carbon dioxide injected for the purposes of geologic sequestration.” (Sec. 112) These regulations must include monitoring, record keeping, and reporting for emissions and certification requirements for geologic sequestration and public participation in that certification process.

Thus, the Bill contemplates SDWA regulation of injection wells, and also broader EPA regulatory requirements under the Clean Air Act for geologic sequestration. The Committee Report says that these provisions will operate in tandem and provide “a comprehensive, multi-media regulatory framework for geologic sequestration activities.” (Committee Report, p. 394, hereafter simply referred to by page number.)

Regarding enhanced oil recovery (EOR), the Committee Report notes that injecting carbon dioxide for geologic sequestration “can take place either solely for the purpose of storing carbon dioxide, or for the dual purposes of storing carbon dioxide and conducting enhanced hydrocarbon recovery activities.” Regulations promulgated under the Clean Air Act and under the SDWA “should apply to all instances where carbon dioxide is injected for geologic sequestration, regardless of whether or not the injection also serves the purposes of enhancing hydrocarbon recovery activities.” (pp. 394-395)

II. Funding mechanisms

A. *Carbon Storage Research Corporation*

The Bill would create a Carbon Storage Research Corporation (the Corporation) to fund projects to accelerate the commercial availability of CCS, which would be financed by an assessment on distribution utilities for fossil fuel-based electricity delivered to retail customers. The assessments are based on CO₂ emission rates for coal, natural gas, and oil, and initially would be not less than \$0.00043, \$0.00022, and \$0.00032 per kilowatt hour for each fuel, respectively. The Corporation would be operated as a division or affiliate of the Electric Power Research Institute, and would be created only on a successful referendum conducted by “qualified industry organizations” with votes from two-thirds of the owners or operators of distribution utilities delivering fossil fuel-based electricity. The Corporation would generate approximately \$1 billion per year in assessments, and would be authorized to collect assessments for a 10-year period.

The Bill has separate provisions for the Electric Reliability Council of Texas (ERCOT). In ERCOT, the assessments under the Bill are levied on “qualified scheduling entities” (QSEs) rather than distribution utilities.

The Corporation would administer a program to accelerate the commercial availability of CCS through competitively awarded grants and other financial assistance provided to



eligible entities. Eligible entities may include electric utilities and other private entities, academic institutions, national laboratories, federal research agencies, state research agencies, and nonprofit organizations. Pilot-scale and similar small-scale projects are not eligible. The Corporation must seek to support at least five commercial-scale demonstration projects. (Sec. 114)

B. Allowances for CCS to spur commercial deployment

The Bill establishes an EPA program to provide funding to commercial CCS projects by distributing allowances (created by the cap-and-trade provisions described below) to “the owner or operator of a project” that implements CCS at certain electric generating units and a limited number of industrial sources. Eligible electric generating units must have a capacity over 200 megawatts and derive at least 50 percent of their annual fuel input from coal. Eligible industrial sources would emit, absent CCS, greater than 50,000 tons per year of carbon dioxide. (Sec. 115)

The pool of available allowances for eligible CCS projects includes 1.75 percent of the total allowances available under the cap-and-trade program in years 2014 through 2017, increasing to 4.75 percent in 2018 and 2019, then increasing to 5 percent from 2020 through 2050. (Section 782) To put this value into context, the total allowances under the cap-and-trade program in 2020 number approximately 5 billion; 5 percent of these allowances at an assumed price of \$20 per allowance equates to roughly \$5 billion available for CCS bonus allowances in 2020.

“Bonus allowance” values are provided for the first 6 gigawatts of eligible electric generating units. For those generating units achieving an 85 percent capture and sequestration rate, the bonus allowance value is \$90 per ton of CO₂ avoided. The bonus allowances decline to \$50 per ton for generating units achieving a 50 percent capture and sequestration rate. Furthermore, EPA must reduce the bonus allowances for EOR projects “to reflect the lower net cost of the project when compared to sequestration into geological formations solely for purposes of sequestration.” For projects other than those in the first tranche of awards for generating units, allowance values shall be set through reverse auctions or an EPA-promulgated schedule for the award of bonus allowances.

No greater than 72 gigawatts of total cumulative generating capacity (including industrial applications) can receive these CCS allowances. A qualifying project may only receive allowances for the first 10 years of operation, and not more than 15 percent of the available allowances under these CCS provisions may be distributed to industrial sources in any year. (Sec. 115)

Coal-fired generating units permitted from 2015 through 2019 lose eligibility for the bonus allowances if they don’t reduce emissions by 50 percent (*i.e.*, use CCS) when they *commence* operations. If these units don’t use CCS when they commence operations, they must retrofit with CCS generally by no later than 2025 (per the power plant performance standards discussed in Section III, below) without the ability to obtain bonus allowances. Coal-fired generating units permitted from 2009 through 2014 lose eligibility for bonus



allowances if they don't retrofit with CCS within five years after commencing operations; if they don't retrofit with CCS by then, they must retrofit with CCS generally by no later than 2025 without bonus allowances.

C. Clean Energy Deployment Administration

The Bill creates the Clean Energy Deployment Administration (CEDA) within the Department of Energy. CEDA may issue loans, letters of credit, and loan guarantees to deploy clean energy technologies, with a cap of 30 percent of financial support going to any one technology. (Sec. 187) CEDA could provide an additional source of funding for CCS. Supported "clean energy technology" includes technologies involving "sequestration of energy-related emissions." (Sec. 183) The Bill does not appropriate a specific amount but authorizes appropriation into the "Clean Energy Investment Fund" of such funds as are necessary to carry out the subtitle. (Sec. 184)

III. Coal-fired power plant emission standards

The Bill establishes CO₂ performance standards for new coal-fired power plants. Units initially permitted starting in 2020 must reduce CO₂ emissions by 65 percent. Units that are initially permitted after January 1, 2009 through 2019 shall reduce CO₂ emissions by 50 percent by the earlier of: (a) four years following the commercial operation of 4 gigawatts of generating capacity equipped with CCS, or (b) 2025. The EPA may postpone the 2025 date by 18 months upon a finding of technical infeasibility. These performance standards essentially mandate CCS.

Not later than 2025, the EPA shall review the standards for new covered units and reduce the maximum CO₂ emission rate to a rate which reflects the degree of emission limitation achievable through the application of the best system of emission reduction which has been adequately demonstrated. (Sec. 116)

IV. Cap-and-trade provisions

The Bill establishes broad "cap and trade" provisions that would regulate approximately 85 percent of the U.S. economy. Each "covered entity" needs to surrender one emission allowance or a substitute (such as an emission "offset") for each ton of carbon-dioxide equivalent (CO₂e) of greenhouse gases emitted by, or attributed to, its operations. Emission reductions are achieved through a cap on the number of available emission allowances that declines each year. These caps equate to greenhouse gas emission reductions from all capped entities (in aggregate) of 3 percent below 2005 emission levels by 2012; 17 percent below 2005 emission levels by 2020; and 83 percent below 2005 emission levels by 2050. A detailed review of the cap-and-trade provisions is beyond the scope of this memorandum. However, important provisions under the cap-and-trade provisions relevant to CCS include the following:

A. *“Covered entities” and the treatment of CCS*

As noted above, “covered entities” have allowance surrender obligations for greenhouse gases emitted by, or attributed to, their operations. Covered entities for which CCS is relevant include:

1. **Power plants and industrial sources**

It appears under the Bill that covered entities such as power plants and industrial sources can avoid surrendering allowances by undertaking CCS to sequester greenhouse gas emissions that would otherwise be emitted to the atmosphere. The Bill defines “emission” as “the release of a greenhouse gas into the ambient air” and “does not include gases that are captured and sequestered, except to the extent that they are later released into the atmosphere.” If there is a subsequent release to the atmosphere, the compliance provisions requiring an allowance surrender by “geological sequestration sites” will apply. (Sec. 700) This regulatory arrangement thus incentivizes CCS as follows: CCS creates value by eliminating emissions and thus the cost of surrendering an allowance.

2. **Geological sequestration sites**

The “geological sequestration site” regulations require the owner or operator of such sites to surrender one emission allowance for each ton of carbon dioxide emitted by the site each year. A geologic sequestration site is minimally defined as “a site where carbon dioxide is geologically sequestered.” “Geologic sequestration” is defined as “the sequestration of greenhouse gases in subsurface geologic formations for purposes of permanent storage.” Although this definition could be interpreted as excluding EOR operations, this could be clearer.

3. **Fuel and industrial gas producers, importers, and LDCs**

Other “covered entities” under the Bill include certain fuel and industrial gas producers, and importers, and natural gas local distribution companies (LDCs). The regulation of these producers, importers and LDCs is considered “upstream,” because the point of regulation occurs before fuel is subsequently combusted by third parties and/or greenhouse gas emissions occur. For instance, fuel producers and importers must surrender one allowance for each ton of CO₂e of greenhouse gases that “would be emitted” from the combustion of any petroleum-based or coal-based liquid fuel, petroleum coke, or natural gas liquid, produced or imported by such entity for sale or distribution in interstate commerce. When determining the number of allowances these “upstream” entities must surrender, the bill assumes no CCS. Not allowing the consideration of CCS may remove incentives to undertake sequestration by the third parties that combust the provided fuels. However, it is possible that such CCS undertaken by such third parties could qualify under as-yet undefined “offset” provisions described below.



One subset of industrial gas producers is any stationary source that produces, for sale or distribution in interstate commerce, in bulk, more than 25,000 tons of CO₂e in any year, “fossil fuel-based carbon dioxide.” The precise reach of the regulatory requirements for this category of covered entities is unclear. (*See generally* Sec. 722.)

B. Allowance allocations

The Bill allocates a substantial number of free allowances, including approximately 85 percent of the total number of allowances in the early years of the program. For instance, the electricity sector receives for free 44 percent of the total number of allowances in 2012, declining to 35 percent in 2016-2025, and further declining to 7 percent by 2029. As noted above, a certain share of allowances are set aside to incentivize CCS through the bonus allowance provisions: 1.75 to 5 percent of total allowances from 2014 through 2050. Other recipients of free allocations include trade-vulnerable industries, refineries, and natural gas LDCs, among others. To the extent that allowance recipients monetize these credits and use the funds to install or use CCS, these allocations can provide a significant incentive to CCS. Note that permitted uses of free allocations to certain electric utility recipients and natural gas LDCs may be limited, which could reduce available incentives for CCS. The Bill contains lengthy and detailed provisions regarding a variety of allowance allocations, which are generally beyond the scope of this memorandum. (Sec. 782)

C. Offsets and the treatment of CCS

The Bill does not list the types of projects that may qualify as “offset” projects. Offset projects are activities that reduce or avoid greenhouse gas emissions that are undertaken by entities that are not covered entities and meet various eligibility requirements. Although the Bill does not list specific, eligible offset project types, the Committee Report notes that EPA shall “fully evaluate” certain types of projects for eligibility, including “projects that capture and geologically sequester uncapped greenhouse gas emissions with or without enhanced oil or methane recovery in active or depleted oil, carbon dioxide, or natural gas reservoirs.” (p. 411) The Bill does require that any offset credits from sequestration projects must be for emission reductions that are “permanent.” Note that “sequestration” could refer to either geological sequestration or biological sequestration (such as sequestering carbon dioxide in forests), so that the inclusion of these permanence provisions does not necessarily mean that offset credits will be available for geological sequestration.

Regarding the permanence of offsets generated by sequestration activities, the Bill requires EPA to “prescribe mechanisms to ensure that any sequestration with respect to which an offset credit is issued ... results in a permanent net increase in sequestration, and that full account is taken of any actual or potential reversal of such sequestration, with an adequate margin of safety.” (Sec. 734) A reversal is an intentional or unintentional loss of sequestered greenhouse gases to the atmosphere.

Mechanisms to address permanence include “offset reserves” or insurance. An offset reserve is a program whereby, before issuance of offset credits, EPA subtracts and reserves from the quantity to be issued a portion of the offsets based on the risk of reversal. For sequestration



projects, EPA must, among other things, require (a) reporting of any reversal, and (b) emission allowances to be held in amounts to fully compensate for reversals, and to assign responsibility for holding such emission allowances. If a reversal occurs, EPA removes offset credits from the reserve and cancels them to fully account for the carbon no longer sequestered, and requires the offset project developer to replenish the offsets reserve with other offsets or allowances. (*See generally* Sec. 734.) The term “offset project developer” means the individual or entity designated as such in a petition to EPA to have the offset project approved.

The offset provisions contain a variety of other technical and procedural requirements that are beyond the scope of this memorandum.

D. Reporting requirements

Reporting provisions require all “covered entities” to submit information on their greenhouse gas emissions commencing in 2011. Because “geological sequestration sites” are defined as covered entities, this could impose reporting requirements regardless of whether such sites have any significant emissions of carbon dioxide. Information that must be reported includes “the capture and sequestration of greenhouse gases.” Also, these provisions specifically require EPA to “establish measurement protocols for carbon capture and sequestration systems.” (Sec. 713) The relationship between these reporting requirements and EPA’s recent reporting rule on greenhouse gas emissions is not clarified under this version of the Bill.

E. State preemption

The Bill would place an interim moratorium (from 2012 through 2017) on state cap-and-trade programs. Other state programs to reduce greenhouse gas emissions could continue, including state emissions limits or standards. A full analysis of preemption is beyond the scope of this regulation (including the impact of federal regulation under the Safe Drinking Water Act and Clean Air Act), but the principal preemption provisions of the cap-and-trade bill (in Section 861) would not rule out the possibility of additional state regulation of sequestration.

V. Other provisions

The Bill includes a national Renewable Electricity Standard (RES), which requires that a certain percentage of each retail electric supplier’s generation be deemed to be from renewable resources such as wind or solar power, which compliance is measured through the submission of tradable renewable energy credits (RECs). A portion of this compliance obligation may also be achieved through energy efficiency measures. Alternatively, a retail electric supplier can comply by making an “alternative compliance payment.” Under the RES, an electric supplier’s requirement to procure renewables is reduced in proportion to any portion of its electricity sales that is generated from certain existing hydroelectric facilities, new nuclear generating units, and fossil-fueled units that capture and geologically



sequester greenhouse gas emissions. (Sec. 101) This provides an incentive for CCS in that CCS would lower the requirement for seeking additional renewable sources of electricity.

The Bill also includes provisions to promote “Exporting Clean Technology” to eligible developing countries. Eligible technologies include CCS technologies for electric generating units or large industrial sources. (Sec. 445)

Other provisions in the Bill are beyond the scope of this memorandum, but the above provides an indication of the range and significance of provisions in the Bill that may impact CCS.

For further information about the Waxman-Markey bill or the CCS provisions contained therein, contact [Christopher Carr, ccarr@velaw.com](mailto:ccarr@velaw.com), 202.639.6764.

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