Market-Based Greenhouse Gas Control: Selected Proposals in the 111th Congress

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Summary

As of the date of this report, Members in the 111th Congress have introduced nine stand-alone proposals that would control greenhouse gas (GHG) emissions. The proposals offered to date would employ market-based approaches—either a cap-and-trade or carbon tax system, or some combination thereof—to reduce GHG emissions. The legislative proposals are varied in their overall approaches in controlling GHG emissions. Some control emissions by setting a quantity (or cap); others control emissions by setting a price (or tax/fee). In addition, the proposals differ in their inclusion of particular design elements, such as whether or not to allow offsets (emission reduction opportunities from economic sectors not directly addressed by the primary approach).

H.R. 2454, the American Clean Energy and Security Act of 2009 (Waxman/Markey), and S. 1733, the Clean Energy Jobs and American Power Act (Kerry/Boxer), have been the primary energy and climate change legislative vehicles in the 111th Congress. On June 26, 2009, the House passed H.R. 2454. On November 5, the committee approved Senator Boxer's "Manager's Amendment" as a substitute, and ordered S. 1733 reported. In addition to establishing a cap-and-trade system to regulate GHG emissions, both H.R. 2454 and S. 1733 would address energy efficiency, renewable energy, and other energy topics. Other proposals—H.R. 1862 (Van Hollen) and H.R. 1666 (Doggett)—would control emissions by limiting quantity, but would differ in their structure and implementation.

Three of the proposals—H.R. 594 (Stark), H.R. 1337 (Larson), and H.R. 2380 (Inglis)—would use a carbon tax approach to address carbon dioxide (CO_2) emissions from fossil fuel combustion.

Other proposals do not fit precisely into either a price or quantity control category. H.R. 1683 (McDermott) would establish a program that may be described as a dynamic carbon tax: its tax rate would be linked with annual emission allocations (or caps). S. 2877 (Cantwell) would establish a CO_2 emission control program on fossil fuel producers and importers. Although the bill would limit the number of carbon shares auctioned each year, the auctions would include a price safety valve, allowing for the purchase of additional shares. To counter the emissions from these additional shares (above the cap), the price safety-valve revenues would be used to support mitigation efforts outside of the emission control program.

On May 12, 2010, Senators Kerry and Lieberman released a draft of new climate change legislation. A comprehensive energy and climate change policy proposal, the draft would set GHG reduction goals similar to those of H.R. 2454. The proposal would employ a market-based cap-and-trade scheme for electric generators and industry with a separate set-price mechanism to allocate allowances to cover transportation fuels.

A key element in GHG emission reduction bills is how, to whom, and for what purpose the value of emission allowances or carbon tax revenue would be distributed. The distribution strategy is a critical policy decision, because it would affect (1) the overall cost of the program and (2) how program costs are distributed throughout the economy. In the early years of the program, H.R. 2454 and S. 1733 would distribute allowances at no cost to both covered and non-covered entities to support various policy objectives. In addition, an increasing percentage of the allowances would be sold through auction. As with the distribution of no-cost allowances, auction revenues would be used to further various policy objectives.

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Introduction

A diverse array of efforts to reduce greenhouse gas (GHG)[1] emissions is currently under way or being developed on the international, national, and sub-national level (e.g., individual state actions or regional partnerships). Proposals in the U.S. Congress have generally focused on market-based approaches, but some proposals have included a mix of market and non-market strategies.[2]

Market-based mechanisms that limit GHG emissions can generally be divided into two types: quantity control (e.g., cap-and-trade) and price control (e.g., carbon tax or fee). To some extent, a carbon tax and a cap-and-trade program would produce similar effects: both are estimated to increase the price of fossil fuels, which would ultimately be borne by consumers, particularly households. Preference for a carbon tax or a cap-and-trade program ultimately depends on which variable one wants to directly control—emissions or costs.[3]

Although Members have introduced and debated GHG emission control proposals—both cap-and-trade and carbon tax programs—in previous Congresses,[4] the Obama Administration's stated commitment to GHG emission reduction has spurred interest in developing a workable program. This position contrasts starkly with the previous Administration, which had rejected the concept of mandatory emissions reductions, instead focusing on voluntary initiatives to reduce the growth in GHG emissions (i.e., emissions intensity targets).

In addition to the policy shift in the executive branch, a number of states have taken actions in recent years that directly address GHG emissions. For example, 23 states have joined one of the three regional partnerships that would require GHG (or just carbon dioxide) emission reductions. One of these partnerships—the Regional Greenhouse Gas Initiative (RGGI)—took effect January 2009.[5] Industry stakeholders are especially concerned that the states will create a patchwork of climate change regulations across the nation. This prospect is causing some industry leaders to call for a federal climate change program. Some have stated a preference for a cap-and-trade system; others have indicated a preference for a carbon tax approach.

Another potential driver of market-based federal legislation is activity by the Environmental Protection Agency (EPA) to control GHG emissions under existing Clean Air Act authority. On December 15, 2009, EPA finalized an "endangerment finding" under Section 202 of the Clean Air Act, which requires the agency to regulate pollutants due to their GHG impacts.[6] In addition, on

[1] Under the United Nations Framework Convention on Climate Change (UNFCCC), greenhouse gases are carbon dioxide (CO_2), methane (CH_4), nitrous oxide (N_2O), hydrofluorocarbons (HFCs), perfluorocarbons (PFCs), and sulfur hexafluoride (SF_6). Some greenhouse gases are controlled under the Montreal Protocol on Substances that Deplete the Ozone Layer, and are not covered under UNFCCC.

[2] For a comprehensive discussion of different approaches to climate change, see CRS Report RL34513, *Climate Change: Current Issues and Policy Tools*, by (name redacted).

[3] For a further discussion, see CRS Report R40242, *Carbon Tax and Greenhouse Gas Control: Options and Considerations for Congress*, by (name redacted) and (name redacted).

[4] CRS Report RL33846, *Greenhouse Gas Reduction: Cap-and-Trade Bills in the 110th Congress*, by (name redacted), (name redacted), and (name redacted); and CRS Report RL34067, *Climate Change Legislation in the 110th Congress*, by (name redacted) and (name redacted).

[5] CRS Report RL33812, *Climate Change: Action by States to Address Greenhouse Gas Emissions*, by (name redact ed).

[6] See CRS Report R40145, *Clean Air Issues in the 111th Congress*, by (name redacted).

May 19, 2009, President Obama announced a plan to integrate federal fuel economy standards (under the Energy Policy and Conservation Act) with federal vehicle emissions standards (under the Clean Air Act) and state standards (driven by California's rulemaking action).[7] The Administration finalized GHG and fuel economy standards in the May 7, 2010, *Federal Register*.[8]

In the context of these events and efforts, Members in the 111th Congress have introduced several proposals that would use market-based approaches to reduce GHG emissions. This report focuses on these legislative proposals.

Legislative Proposals

In the 111th Congress, Members have introduced nine bills that include provisions to impose or permit some form of market-based controls on GHG emissions. General descriptions of these bills follow. The major provisions of the House bills are compared in **Table 1**; the Senate bills are compared in **Table 2**.

H.R. 2454, introduced May 15, 2009, by Representatives Waxman and Markey, passed the House on June 26, 2009. It includes numerous energy policy provisions as well as cap-and-trade provisions (Titles III, IV, and V). H.R. 2454 would set up a cap-and-trade system that would reduce GHG emissions from covered sources to 17% below 2005 levels by 2020 and 83% below 2005 levels by 2050. Covered entities would account for approximately 85% of U.S. total GHG emissions. The proposal would allow covered entities to submit offsets to cover an increasing percentage (approximately 27% in 2016) of compliance obligations. Unlike previous cap-and-trade proposals (from previous Congresses), the program would create a rolling two-year compliance period. H.R. 2454 would distribute allowances to both covered and non-covered entities at no cost to support various policy objectives. In addition, an increasing percentage (approximately 17% in 2016) of the allowances would be sold through auction. As with the distribution of no-cost allowances, auction revenues would be used to further various policy objectives.

S. 1733, introduced September 30, 2009, by Senator Kerry, was ordered reported by the Senate Committee on Environment and Public Works on November 5, 2009.[9] Largely similar to H.R. 2454, S. 1733 would establish an economy-wide GHG cap-and-trade program, while addressing other energy-related matters through numerous energy policy provisions. Although the similarities outweigh the differences, six key distinctions include the following: (1) the Senate bill has a more stringent emissions cap between 2017 and 2029; (2) the two bills allocate emissions allowances and auction revenue to different recipients at different levels; (3) the bills would treat offsets differently; (4) the House bill would establish extensive carbon market regulation (the

[7] The White House, Office of the Press Secretary, *President Obama Announces National Fuel Efficiency Policy*, Washington, DC, May 19, 2009, http://www.whitehouse.gov/the_press_office/President-Obama-Announces-National-Fuel-Efficiency-Policy/.

[8] For additional information, see CRS Report R40166, *Automobile and Light Truck Fuel Economy: The CAFE Standards*, by (name redacted) and (name redacted).

[9] For this report, S. 1733 refers to the bill as amended by the Manager's Amendment released by Senator Boxer on October 30, 2009, and available on the website of the Senate Committee on Environment and Public Works at http://epw.senate.gov/public/index.cfm?FuseAction=Files.View&FileStore_id=1d1bc826-beed-4eb3-933b-d7559bc61d4b.

Senate bill currently has a placeholder for this topic); (5) the House bill would establish a requirement that importers purchase special emission allowances for certain imports from countries without greenhouse gas controls (the Senate bill currently has a placeholder for this topic); and (6) both bills would limit EPA's authority to regulate greenhouse gases under the Clean Air Act, although in different ways. For a more comprehensive comparison between H.R. 2454 and S. 1733, see CRS Report R40896, *Climate Change: Comparison of the Cap-and-Trade Provisions in H.R. 2454 and S. 1733*, by (name redacted), (name redacted), and (name redacted).

H.R. 594, introduced January 15, 2009, by Representative Stark, would impose a carbon-content tax on fossil fuels starting at $10/ton[10] and increasing by $10 every year. The tax would apply to fossil fuels as they enter the U.S. economy (i.e., at the production or importation level). The bill does not specify how the tax revenues would be applied.

H.R. 1337, introduced March 5, 2009, by Representative Larson, would impose a carbon-content tax on fossil fuels starting at $15/ton. The tax would increase by $10 each year, but if identified emission targets (established by EPA, based on reaching 80% below 2005 emissions by 2050) are not met, the tax would increase by $15 in that year. The tax revenues would be used to support (1) a payroll tax rebate; (2) affected industry transition assistance; and (3) clean energy technology. The vast majority of the revenue would support the payroll tax rebate. The proposal also would impose a carbon equivalency fee on imported carbon-intensive goods.

H.R. 1666, introduced March 23, 2009, by Representative Doggett, would establish a cap-and-trade program to reduce greenhouse gas emissions from covered sources from 6.2 billion metric tons in 2012 to 253 million in 2050. The program would be administered through the Department of the Treasury and 100% of the allowances would be auctioned. In order to mitigate price volatility in the early years of the program, the bill would establish a Climate Program Oversight and Coordination Board to set targets for allowance prices and manage quarterly auctions to maintain a smooth allowance price path. The managed price program would run from 2012 through 2019, and, depending on a review, revisions would be made for 2020 and beyond. If the price path resulted in excess emissions from the expectations set out in the bill, those emissions would be made up through additional reduction in the years 2020 through 2030. Auction revenues would be put in an Auction Revenue Trust Fund at Treasury, but no specific purpose is delineated in the bill for them.

H.R. 1683, introduced March 24, 2009, by Representative McDermott, would establish a hybrid approach to GHG emission control. The approach may be described as a dynamic carbon-content tax. Producers and importers of GHG emission substances—fossil fuels and other GHG emission inputs—would be required to purchase emission permits for each ton of emissions that would occur from the combustion or use of the GHG emission substance. Permits may not be traded or exchanged, thus the purchase requirement would effectively act as a carbon-content tax (or fee). The Department of the Treasury would determine the (annual) price for emission permits based on annual emission allocations (or caps) identified in the bill. Treasury would publish price schedules every five years, but the sale price may be modified (under certain conditions and to a limited extent) within the five-year periods. If the permits sold exceed allocations allotted in a particular year, subsequent year allocations would be reduced, thus imposing an overall cap.

[10] Some proposals (including H.R. 594 and H.R. 1337) measure emissions in short tons; other bills use metric tons (sometimes spelled as tonne). A short ton is 2,000 pounds. A metric ton (or tonne) is approximately 2,205 pounds.

H.R. 1862, introduced April 1, 2009, by Representative Van Hollen, would cap emissions associated with the combustion of CO_2. Fossil fuel producers and importers would be required to surrender carbon permits in relation to the carbon dioxide emissions generated through the combustion of fossil fuels the entities sold during the previous year. The cap would decline annually, leading to an 85% reduction below 2005 CO_2 emissions from covered entities by 2050. All of the carbon permits would be sold through an auction process. Nearly 100% of the auction proceeds would be redistributed monthly to those with a social security number.

H.R. 2380, introduced May 13, 2009, by Representative Inglis, would impose a carbon-content tax on fossil fuels starting at $15/ton. The tax rate would increase by an equal percentage each year (approximately 6.5%), until it reached $100/ton in 2040 (not including inflation adjustments). All of the tax revenue would be used to offset reductions in the payroll tax paid by employees, employers, and self-employed persons. The proposal would impose a tax on carbon-intensive imported goods.

S. 2877, introduced December 11, 2009, by Senator Cantwell, would create a program that seeks to combine both emission and price control. The program would apply only to CO_2 emissions (covering 80% of U.S. GHG emissions), requiring fossil fuel producers (e.g., coal mines, wellheads) and importers to submit "carbon shares" for the carbon dioxide (CO_2) emissions related to the fossil fuels they produce or import. The President would limit (or cap) the quantity of carbon shares available for submission each year, and the Department of Treasury would distribute all of the carbon shares through monthly auctions. The auctions would have a price floor and a price ceiling (i.e., safety valve). If the price ceiling were reached in a given auction, additional carbon shares would be sold to accommodate all bids. Offsets would not be allowed for compliance purposes; however, if the price ceiling is reached during an auction—the possibility of which would be increased by not allowing offsets—revenues from the additional carbon shares would be used exclusively on domestic mitigation activities, including offset-like projects from agriculture and forestry sectors. S. 2877 would distribute 75% of its auction revenue to individuals on a monthly basis;[11] the remaining 25% would be allotted (through the appropriations process) to support a range of policy objectives.

Two bills—H.R. 1759 and S. 2729—have been introduced to address specific issues. H.R. 1759, introduced by Representatives Inslee and Doyle on March 26, 2009, would set up an allowance distribution scheme to assist energy-intensive industries that are trade-exposed and potentially subject to carbon leakage.[12] S. 2729, introduced by Senator Stabenow on November 4, 2009, includes (among other provisions) comprehensive offset provisions that could serve as an alternative to offset program text in other cap-and-trade proposals.[13]

[11] See CRS Report R40841, *Assisting Households with the Costs of a Cap-and-Trade Program: Options and Considerations for Congress*, by (name redacted) and (name redacted).

[12] Concerns have been raised that if the United States adopts a carbon control policy, industries that must control their emissions or that find their feedstock or energy bills rising because of costs passed-through by suppliers may be less competitive and may lose global market share (and jobs) to competitors in countries lacking comparable carbon policies. In addition, this potential shift in production could result in some of the U.S. carbon reductions being diluted by increased production in more carbon-intensive countries (commonly known as "carbon leakage"). See CRS Report R40100, *"Carbon Leakage" and Trade: Issues and Approaches*, by (name redacted) and (name redacted).

[13] For a detailed comparison between the offset provisions in S. 2729 and H.R. 2454, see CRS Report R40994, *Agriculture and Forestry Provisions in Climate Legislation in the 111th Congress*, by (name redacted).

On May 12, 2010, Senators Kerry and Lieberman released a draft of new climate change legislation. A comprehensive energy and climate change policy proposal, the draft would set GHG reduction goals similar to those of H.R. 2454. Employing a market-based cap-and-trade scheme for electric generators and industry with a separate set-price mechanism to allocate allowances to cover transportation fuels, the proposal allocates a substantial percentage of the allowances created for the benefit of energy consumers and low-income households. As the program proceeds through the mid-2020s, it shifts to more government auctioning with most of the proceeds returned to households. The bill's allocation scheme includes free allowance allocations to energy-intensive, trade-exposed industries, and other measures to prevent carbon leakage. While it is expected that the Kerry-Lieberman proposal would be rolled into S. 1462, it does contain other energy initiatives, including incentives for nuclear power, carbon capture and storage technology, and natural gas vehicles.

Legislative Activity

H.R. 2454 (Waxman/Markey, introduced May 15, 2009) was subsequently modified (both technical and substantive changes) and offered as a "Manager's Amendment" on May 18, 2009. On that day, the bill began markup in the House Committee on Energy and Commerce. After making several amendments to the bill—most of which did not affect the cap-and-trade program—the committee reported the bill on June 5, 2009 (H.Rept. 111-137, Part I). The House of Representatives passed H.R. 2454 on June 26, 2009. The version summarized in **Table 1** reflects the bill as passed by the House.

On September 30, 2009, Senators Kerry and Boxer introduced S. 1733, which was referred to the Senate Committee on Environment and Public Works. The committee held hearings on the bill starting October 27, 2009, and markup of the bill began November 3. On November 5, the committee approved Senator Boxer's "Manager's Amendment" as a substitute, and ordered S. 1733 reported. The version summarized **Table 2** reflects the bill as amended by the Manager's Amendment released by Senator Boxer on October 30, 2009.[14]

[14] Available on the website of the Senate Committee on Environment and Public Works at http://epw.senate.gov/public/index.cfm?FuseAction=Files.View&FileStore_id=1d1bc826-beed-4eb3-933b-d7559bc61d4b.

Table 1. Comparison of Key Provisions of GHG Emission Control Bills in the House

Topic	H.R. 594 (Stark)	H.R. 1337 (Larson)	H.R. 1666 (Doggett)	H.R. 1683 (McDermott)	H.R. 1862 (Van Hollen)	H.R. 2380 (Inglis)	H.R. 2454 (Waxman-Markey)[a]
Emission reduction/ limitation scheme	Carbon-content tax on fossil fuels, starting at $10/ton[b] and increasing by $10/ton each year[c]	Carbon-content tax on fossil fuels, starting at $15/ton[b] and increasing by $10/ton each year; annual rate increase is $15/ton during years in which specified emissions target is not met[c]	Absolute cap on total greenhouse gas emissions from all covered entities	Hybrid cap/tax approach on GHG emissions; covered persons must purchase an emission permit when a GHG emission substance is produced or enters the United States; permits *may not* be sold or exchanged; Treasury determines (with consultation with EPA and DOE) the (annual) price for emission permits based on achieving annual emission allocations (caps) identified in bill; price schedules are published every 5 years, but may be modified (to a limited extent) within the 5-year periods; if permits sold exceed annual allocations, subsequent year allocations are reduced	Absolute cap on CO_2 emissions associated with fossil fuel inputs from covered entities	Carbon-content tax on fossil fuels, starting at $15/ton,[b] and increasing by approximately 6.5% real each year to reach $100/ton (in 2009 dollars) by 2040; tax rate to be further increased per cost-of-living adjustments	Absolute cap on total greenhouse gas (GHG) emissions from all covered entities

Topic	H.R. 594 (Stark)	H.R. 1337 (Larson)	H.R. 1666 (Doggett)	H.R. 1683 (McDermott)	H.R. 1862 (Van Hollen)	H.R. 2380 (Inglis)	H.R. 2454 (Waxman-Markey)[a]
Responsible agency	Treasury	Treasury	Treasury Creates a Climate Program Oversight and Coordination Board (CPOCB) to administer allowance auctions to manage allowance price path	Treasury has primary oversight role; EPA determines amount of carbon dioxide equivalent emissions generated from combustion or GHG-emitting use of a GHG emission substance	Treasury	Treasury	EPA has primary oversight role; administers emission allowance auctions; Department of Agriculture implements domestic agriculture and forestry offsets program Federal Energy Regulatory Commission to regulate the cash allowance market Commodity Futures Trading Commission to oversee derivatives market
Greenhouse gases covered	Carbon dioxide	Carbon dioxide	GHGs not explicitly defined. Definition would be provided in separate legislation	GHGs defined in terms of emission substances, which includes fossil fuels (coal, oil, and natural gas), thus covering carbon dioxide, as well as the specific GHGs: methane, nitrous oxide, sulfur hexafluoride, perfluorocarbon, hydrofluorocarbon and any other substance determined by EPA to contribute to global warming	Carbon dioxide	Carbon dioxide	Carbon dioxide, methane, nitrous oxide, sulfur hexafluoride, hydro-fluorocarbons emitted as a byproduct, perfluorocarbon, and nitrogen trifluoride; and any other substance subsequently designated by EPA

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Specific emissions limits	NA; tax rate freeze if CO_2 emissions do not exceed 20% of U.S. 1990 CO_2 emissions	NA; EPA is to establish (five years after enactment) annual CO_2 emission targets in order to reach goal of 80% below 2005 carbon[d] emissions by 2050	In 2012, cap is set at 6.153 billion, declining steadily to 0.253 billion in 2050. If 2012-2019 cumulative emissions exceed expectations by more than 10%, the excess shall be made up through additional reductions in 2020. The remaining excess between 2012-2020 emissions shall be made up with reductions between 2021-2030	In 2011, allocation of emission permits equal to approximately 4% below 2005 GHG emissions; in 2020, allocation equal to 25% below 2005 GHG emissions; in 2050, allocation equal to 81% below 2005 GHG emissions	In 2012, CO_2 emission permits equal to 2005 CO_2 emissions; in 2020, permits equal to 25% below 2005 emissions; in 2030, permits equal to 45% below 2005 emissions; in 2040, permits equal to 65% below 2005 emissions; in 2050, permits equal to 85% below 2005 emissions	NA	In 2012, 3% below 2005 emissions from covered sources; in 2020, 17% below 2005 emissions from covered sources; in 2030, 42% below 2005 emissions from covered sources; in 2050, 83% below 2005 emissions from covered sources EPA may adjust cap if underlying assumptions (e.g., percentage of covered sources GHG emissions compared to national total) found to be incorrect

Topic	H.R. 594 (Stark)	H.R. 1337 (Larson)	H.R. 1666 (Doggett)	H.R. 1683 (McDermott)	H.R. 1862 (Van Hollen)	H.R. 2380 (Inglis)	H.R. 2454 (Waxman-Markey)[a]
Covered entities	Manufacturer, producer, or importer who sells a taxable fuel, which includes: coal, petroleum and petroleum products, and natural gas	Manufacturer, producer, or importer who sells a taxable carbon substance, which includes: coal, petroleum and petroleum products, and natural gas	Not explicitly defined. Definition would be provided in separate legislation	Coal producers, petroleum refineries; producers of other GHG emission substances (including natural gas, among others); importers of GHG emission substances Coverage generally applies at the point of sale GHG emission substances used for non-combustion agricultural purposes exempted	Person who makes the first sale in United States of a covered fuel, which includes coal, oil, natural gas, and any product derived therefrom for use as a combustible fuel	Manufacturer, producer, or importer who sells a taxable carbon substance, which includes: coal, petroleum and petroleum products, and natural gas	Electricity generators, various fuel producers and importers, fluorinated gas producers and importers, geological sequestration sites, various industrial sources, and local distribution companies (LDCs) that deliver natural gas; covered entity coverage is phased-in by category, so that all of the above are under the cap in 2016
Auction of allowances	NA	NA	100% of allowances sold through quarterly auctions. From 2012 through 2019, the CPOCB determines the necessary quantities to be auctioned to maintain a forecasted price path	All emission permits must be purchased, but trading is not allowed	100% of allowances sold through auctions (to be held at least quarterly) Only covered entities can participate in auction	NA	In 2016 (the conclusion of the emissions coverage phase-in),[e] approximately 17% of the allowances are auctioned; this percentage increases to 48% by 2030 Auction has a reserve price of $10/allowance (in $2009) that increases by 5% plus inflation each year

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Emission allowance value or revenue distribution strategy	No specific provision	Establishes a trust fund to distribute tax revenues to support (1) a payroll tax rebate; (2) affected industry transition assistance; and (3) clean energy technology. The vast majority of the revenue would support the payroll tax rebate	Establishes an Auction Revenue Trust Fund at Treasury to receive auction revenues. Precise use of trust fund is not specified	Establishes trust fund (within the IRS code, 26 USC Chapter 98) that would receive appropriations equal to revenue received by Treasury from selling emission permits Precise use of the revenue is not specified, except stating that revenue must be recycled to "facilitate economic growth and clean energy production and to protect the economic security of vulnerable families and communities"	100% of auction proceeds (minus no more than 0.5% for administrative purposes) are to be used to fund consumer dividend payments; each month, every person with a social security number would receive an equal payment	Tax revenue used to offset a corresponding reduction in payroll tax rates (employee, employer, and self-employed)	Emission allowance value (which can include auction revenue or free allowances) is distributed in the following manner in 2016:[g] 30% (at minimum) to electricity local distribution companies (LDCs); 0.5% for small electric LDCs; 9% to natural gas local distribution companies; 1.5% to states for home-heating oil consumers; 15% directly to low-income consumers; 13.4% to energy-intensive, trade-exposed industries; up to 3.5% to merchant coal units; 2% to petroleum refineries plus 0.25% for small business refineries; up to 1.5% for certain long-term power contract operators; 7.1% to states to support renewable energy and energy efficiency efforts; 6% to promote technological advances; 0.2% for deficit reduction; and roughly 10% to further other objectives

Topic	H.R. 594 (Stark)	H.R. 1337 (Larson)	H.R. 1666 (Doggett)	H.R. 1683 (McDermott)	H.R. 1862 (Van Hollen)	H.R. 2380 (Inglis)	H.R. 2454 (Waxman-Markey)[a]
Cost-limiting safety valve	NA	NA	Creates the CPOCB to manage allowance prices, at least from 2012 through 2019	NA	No specific provision	NA	No specific provision, but includes a strategic reserve allowance auction (described below)
Penalty for non-compliance	Not specified in legislation, but entities would be subject to the existing penalty framework within Title 26 of the U.S. Code	Not specified in legislation, but entities would be subject to the existing penalty framework within Title 26 of the U.S. Code	Excess emissions penalty equal to the tons of excess emissions times the higher of $200 or three times the mean market value of an allowance during that year	For each required permit that a covered person fails to purchase, the person will be subject to a penalty (described as a tax) equal to 300% of the cost of the permit	Penalty amount equals the number of allowances a covered entity failed to surrender by its deadline multiplied by three times the fair market price for allowances during the year the allowance was due	Not specified in legislation, but entities would be subject to the existing penalty framework within Title 26 of the U.S. Code	Excess emission penalties are equal to twice the market price for allowances in the relevant calendar year, plus covered entities must submit—in the following calendar year or other time period determined by EPA—allowances to cover the excess emissions from the previous year

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Offset treatment	NA	NA	No specific provision	NA	No specific provision	NA	In 2016, approximately 27% of an entity's allowance obligation can be satisfied with offsets; this percentage increases to 36% by 2030; if all entities maximize their use of offsets, the aggregate annual number of submitted offsets would total 2 billion tons Half of an entity's offsets can come from domestic sources and half from international sources; EPA can increase the allowable amount of international offsets (up to 1.5 billion), if the agency determines use of domestic offsets will not be maximized in a particular year The Department of Agriculture would implement the domestic offsets program for agriculture and forestry projects; EPA would oversee other domestic projects and all international projects

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Other flexible design elements	No specific provision	Instructs Department of Treasury (in consultation with Department of Energy) to submit a report of qualified offset projects, but does not allow for projects to generate tax credits[h]	No specific provision	No specific provision	Allows Treasury to auction additional allowances (borrowed from future years), if auction price is more than 100% above the average price for preceding two years' auction prices; additional auctioned allowances cannot exceed 8% of allowances otherwise available	No specific provision	Covered entity can submit international allowance from "qualifying programs;" use is unlimited unless otherwise determined by EPA Auction of allowances from strategic reserve, a pool of allowances borrowed from future years; auction would have reserve price of $28/allowance in 2012 (in $2009) that would increase annually in 2013 and 2014. Starting in 2015, the reserve price would be 60% above the 36-month rolling average allowance price
Banking	NA	NA	Banking allowed, but limited to 5% of a covered entity's emissions after meeting annual emissions limit	NA	Unlimited banking allowed across all vintage years	NA	Unlimited banking allowed across all vintage years

Topic	H.R. 594 (Stark)	H.R. 1337 (Larson)	H.R. 1666 (Doggett)	H.R. 1683 (McDermott)	H.R. 1862 (Van Hollen)	H.R. 2380 (Inglis)	H.R. 2454 (Waxman-Markey)[a]
Borrowing	NA	NA	No specific provision	NA	No specific provision	NA	Allows entities to borrow (without interest) emission allowances from the calendar year (vintage) immediately following the compliance year, effectively creating a rolling two-year compliance period In addition, covered entities may borrow (at 8% interest) allowances from two to five vintage years in the future, to satisfy 15% of it emissions
Early reduction credits and bonus credits	NA	NA	No specific provision	NA	No specific provision	NA	California or Regional Greenhouse Gas Initiative (RGGI) allowances can be exchanged for an amount of Title III allowances; amount of Title III allowances provided in exchange will be "sufficient to compensate" for the cost of obtaining and holding a RGGI or California allowance Offsets generated through other programs may be used (under specific conditions and limitations) for compliance purposes

Topic	H.R. 594 (Stark)	H.R. 1337 (Larson)	H.R. 1666 (Doggett)	H.R. 1683 (McDermott)	H.R. 1862 (Van Hollen)	H.R. 2380 (Inglis)	H.R. 2454 (Waxman-Markey)[a]
Trade-exposed industries and competitiveness issues	No specific provision	Department of Treasury imposes a carbon equivalency fee on imported carbon-intensive goods, including steel, aluminum, and paper; fee based on emissions associated with production of carbon-intensive goods	No specific provision	Department of Treasury imposes a GHG emission permit equivalency fee on imported carbon-intensive goods, including steel, aluminum, and paper	Department of Treasury imposes a carbon equivalency fee on imported carbon-intensive goods, including steel, aluminum, and paper	Imposes a tax on "imported taxable products" in relation to fossil fuels used or the CO_2 emissions generated during the product's manufacturing process; the taxable products include materials produced from carbon-intensive industries; only products from the most carbon-intensive industries are subject to the tax in the first 3 years of the program; after that time period, the tax is imposed on a wider array of carbon-intensive products	Trade-exposed, carbon-intensive industries to receive allowances at no cost, based on a specific formula related to emissions intensity and energy use Requires EPA to promulgate rules establishing an international reserve allowance system for covered goods from the eligible industrial sector, including allowance trading, banking, pricing, and submission requirements. Allowances will be required for importation into the United States of any covered good of an eligible industrial sector from a covered country. Exemptions are provided for (1) least developed countries, (2) countries that emit less than 0.5% of global greenhouse gas emissions, and (3) countries meeting the specific criteria

Topic	H.R. 594 (Stark)	H.R. 1337 (Larson)	H.R. 1666 (Doggett)	H.R. 1683 (McDermott)	H.R. 1862 (Van Hollen)	H.R. 2380 (Inglis)	H.R. 2454 (Waxman-Markey)[a]
Interaction with existing state or regional GHG control programs	No specific provision	No specific provision	No specific provision	No specific provision	No specific provision	No specific provision	States may not implement or enforce a GHG emission cap that covers any (federally) capped emissions during the years 2012 through 2017; a cap does not include fleet-wide motor vehicle emission requirement or life-cycle fuel standards; However, states may implement more stringent standards for GHG emissions at stationary sources

Topic	H.R. 594 (Stark)	H.R. 1337 (Larson)	H.R. 1666 (Doggett)	H.R. 1683 (McDermott)	H.R. 1862 (Van Hollen)	H.R. 2380 (Inglis)	H.R. 2454 (Waxman-Markey)[a]
Other key provisions	Directs Department of Treasury (in consultation with Department of Energy) to prepare—every five years—a study on the environmental, economic, and revenue impacts of the tax	Directs EPA to submit annual report to Congress on total carbon emissions from previous year	The CPOCB is to review the managed price program by October 1, 2017, and make recommendations to Congress on any adjustments for 2020 and beyond	Directs Treasury to submit annual report describing performance of program and providing estimates (or range of estimates) for permit prices for 10-year period following the current 5-year period	Directs Treasury to report to Congress if (after consultation with EPA) it determines emission targets need to be revised to avoid catastrophic climate impacts	In 2010, social security recipients are to receive a payment increase that reflects the average costs (energy price increases) imposed by the carbon tax;[j] Requires a supermajority (two-thirds) vote in either the House or Senate to pass legislation that would alter the "revenue neutrality"—tax revenues from the carbon tax offsetting the payroll tax reductions—created by this proposal	Supplemental reductions from avoided deforestation activities in other countries; projects supported through set-aside allowances (5% in early years); goal is to generate a cumulative reduction of 6 billion tons by 2025 Establishes mandatory GHG emission reporting program, run by EPA; first data submission is in 2011 National Academy of Sciences provides a periodic review of science, technology, and mitigation efforts, and makes recommendations Establishes a separate cap-and-trade program that controls hydro-fluorocarbons

a. The provisions identified in the table reflect the version that passed the House on June 26, 2009.

b. For H.R. 594, H.R. 1337, and H.R. 2380, a ton refers to a short ton (2,000 pounds), rather than a metric ton (or tonne), which is approximately 2,205 pounds.

c. Dollar figures in nominal dollars.

d. It is unclear whether "carbon emissions" refers to CO_2 emissions or GHG emissions that contain carbon atoms, which would include methane. It is likely the former, because the annual targets set by EPA are specified as CO_2 emission targets.

e. The emissions cap coverage is phased-in by entity category. By 2016, all of the covered entity categories are subject to the emissions cap. For this reason, 2016 is arguably the most appropriate year to include in the table for comparison purposes. A greater percentage of allowances are auctioned in 2012 (approximately 30%)

than in 2016, when the phase-in is complete. From 2012 to 2016, the auction percentage declines to 20%, because newly covered entities (e.g., natural gas local distribution companies) begin to receive allowances at no cost.

f. In 2009 dollars.

g. As mentioned above, 2016 is the first year in which all covered entity categories are subject to the cap. Thus, for comparison purposes, this is the first year described in the table.

h. Representative Larson's carbon tax proposal in the 110th Congress (H.R. 3416) would have allowed offset projects to generate tax credits.

i. In 2009 dollars.

j. The title of this particular subsection—"Increase in Payments to Social Security Recipients for 2010 to Offset Cost of Carbon Tax before Tax Reflected in Cost-of-Living Adjustments"—suggests that the bill drafters expect that after 2010, social security payments would (per adjustments made under pre-existing processes) increase to account for tax-related price increases.

Table 2. Comparison of Key Provisions of GHG Emission Control Bills in Senate

Topic	S. 1733 (Kerry-Boxer)	S. 2877 (Cantwell)	Kerry-Lieberman Discussion Draft (May 12, 2010, Version)
Emission reduction/limitation scheme	Absolute cap on total greenhouse gas (GHG) emissions from all covered entities	Hybrid cap/tax approach requiring fossil fuel producers (e.g., coal mines, wellheads) and importers to submit "carbon shares" for the carbon dioxide (CO_2) emissions associated with the use of the fossil fuels	Absolute cap on total greenhouse gas (GHG) emissions from all covered entities
Responsible agency	EPA has primary oversight role; administers emission allowance auctions; implements international offsets program President implements domestic offsets program Market oversight responsibility is not specifically designated; presumably would be determined by other Senate Committees	Department of Treasury implements carbon share program, including oversight of derivatives market President determines quantity of carbon shares initially available Energy Information Administration shall prepare analyses of carbon shares' impacts on fossil fuel prices	EPA has primary oversight role; administers emission allowance auctions; implements international offsets program Department of Agriculture implements domestic agriculture and forestry offsets program Commodity Futures Trading Commission regulates the allowance market Department of the Treasury administers the consumer refund program
Greenhouse gases covered	Carbon dioxide, methane, nitrous oxide, sulfur hexafluoride, hydro-fluorocarbons emitted as a byproduct, perfluorocarbon, and nitrogen trifluoride; and any other substance subsequently designated by EPA	Direct limitation applies only to carbon dioxide emissions	Carbon dioxide, methane, nitrous oxide, sulfur hexafluoride, hydro-fluorocarbons emitted as a byproduct, perfluorocarbon, and nitrogen trifluoride; and any other substance subsequently designated by EPA
Specific emissions limits	In 2012, 3% below 2005 emissions from covered sources; in 2020, 20% below 2005 emissions from covered sources; in 2030, 42% below 2005 emissions from covered sources; in 2050, 83% below 2005 emissions from covered sources EPA may adjust cap if underlying assumptions (e.g., percentage of covered sources GHG emissions compared to national total) found to be incorrect	Directs President to establish (in 2011) a 2012 CO_2 emissions limit that equals the expected emissions for 2012; limit begins to decline in 2015 at an increasing rate of decline each year; in 2020, CO_2 limit would be approximately 9% below 2005 CO_2 levels;[a] in 2030, 32% below 2005 levels; in 2050, 83% below 2005 levels Under certain conditions and subject to Congressional approval, the President may adjust the number of carbon shares available	In 2013, 4.75% below 2005 emissions from covered sources; in 2020, 17% below 2005 emissions from covered sources; in 2030, 42% below 2005 emissions from covered sources; in 2050, 83% below 2005 emissions from covered sources EPA may adjust cap if underlying assumptions (e.g., percentage of covered sources GHG emissions compared to national total) found to be incorrect
Covered entities	Electricity generators, various fuel producers and importers, fluorinated gas producers and importers, geological sequestration sites, various industrial sources, and local distribution	Fossil fuel producers (e.g., mines, wells) and importers, who introduce "fossil carbon" into the United States economy; described as "first sellers" in the bill	Electricity generators, various fuel producers and importers, fluorinated gas producers and importers, geological sequestration sites, various industrial

Topic	S. 1733 (Kerry-Boxer)	S. 2877 (Cantwell)	Kerry-Lieberman Discussion Draft (May 12, 2010, Version)
	companies (LDCs) that deliver natural gas; covered entity coverage is phased in by category, so that all of the above are under the cap in 2016		sources, and local distribution companies (LDCs) that deliver natural gas; covered entity coverage is phased in by category, so that all of the above are under the cap in 2016
Auction of allowances	In 2016 (the conclusion of the emissions coverage phase-in), approximately 32% of the allowances are auctioned; this percentage increases to 75% by 2030 Auction has a reserve price of $11/allowance (in $2009) that increases by 5% plus inflation each year	All carbon shares sold in monthly auctions; auction has a price floor of $7/carbon share and price ceiling of $21/share in 2012; both the floor and ceiling increase annually by a rate related to inflation and capital investment Only first sellers may participate in auctions	Beginning in 2013, quarterly auctions have a reserve price of $12/allowance (in $2009) that increases by 3% above the rate of the Consumer Price Index (CPI). A separate set-aside of allowances is available to petroleum refiners to cover GHG emissions from transportation fuels and refined products at a price set quarterly by EPA. (Petroleum refiners must make payments under this system—neither allowances traded from other entities nor offsets may be used.) Only covered entities and regulated greenhouse market participants may participate in auctions and hold allowances
Emission allowance value or revenue distribution strategy	Emission allowance value (which can include auction revenue or free allowances) is distributed in the following manner in 2016: 25.8% (at minimum) to electricity local distribution companies (LDCs); 0.94% for small electric LDCs; 7.7% to natural gas local distribution companies; 1.3% to states for home-heating oil consumers; 12.9% directly to low-income consumers; 12.1% to energy-intensive, trade-exposed industries; up to 3.0% to merchant coal units; 0.64% to petroleum refineries plus 0.86% for small business refineries and 0.43% for medium refineries; up to 1.3% for certain long-term power contract operators; 5.97% to states to support renewable energy and energy efficiency efforts;	75% of the auction revenue would be allotted (subject to the appropriations process) to the Carbon Refund Trust Fund, which would be used to distribute monthly (non-taxable) dividends to all (legally residing) individuals in the United States 25% would be allotted (subject to the appropriations process) to the Clean Energy Reinvestment Trust Fund (CERT Fund), which could be used to support a myriad of policy objectives: e.g., worker transition assistance, adaptation, technology development, energy efficiency, biological sequestration, and deficit reduction Revenue from carbon shares purchased at the price ceiling ("safety valve") would be devoted to supporting *domestic* (1) efforts to reduce non-CO_2 GHG emissions; and (2) biological	Emission allowance value (which can include auction revenue or free allowances) is distributed in the following manner in 2016: 30% (at minimum) to electric LDCs; 9% for natural gas LDCs; 1.5% to states for home-heating oil and propane consumers; 12.3% directly to low-income consumers; 15% to trade-exposed industries; up to .5% to merchant coal units; 3.75% to petroleum refineries; up to 4.5% to long-term power contract operators; 2% to states to support renewable energy and energy efficiency efforts; 4% to promote technological advances; 9.2% to support transportation infrastructure and efficiency;

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	5.6% to promote technological advances; 1.92% for greenhouse gas reductions in the transportation sector; 10.3% for deficit reduction; and roughly 8% to further other objectives.	sequestration activities, such as agriculture or forestry projects	6.75% for deficit reduction; and 1.5% auctioned to help mitigate against high allowance prices.
Cost-limiting safety valve	No specific provision, but includes a strategic reserve allowance auction (described below)	Auction would have a price ceiling (and price floor), starting at $21/share in 2012; the ceiling would increase annually by a rate related to inflation and capital investment; if price ceiling is reached in a given auction, additional carbon shares would be sold to accommodate all bids	No specific provision, but includes a cost containment reserve of allowances available at a set price (described below)
Penalty for non-compliance	Excess emissions penalty is equal to twice the average "fair market value" for the year in question. Fair market value is defined as the average daily closing price on registered exchanges	If first sellers (i.e., covered entities) fail to submit carbon shares by appropriate time, they would be subject to penalty of five times the carbon share price from the most recent auction; penalties seems unlikely as most would pay the safety-valve price	Excess emission penalties are equal to twice the market price for allowances in the relevant calendar year, plus covered entities must submit—in the following calendar year or other time period determined by EPA—allowances to cover the excess emissions from the previous year
Offset treatment	If all entities maximize their use of offsets, the aggregate annual number of submitted offsets would total 2 billion tons; 75% of an entity's offsets can come from domestic sources and 25% from international sources; EPA can increase the allowable amount of international offsets (up to 1.25 billion), if the agency determines use of domestic offsets will not be maximized in a particular year The percentage allowed for compliance purposes is based on covered entities' actual emissions—which would depend on multiple factors, including banking and offset use/supply—and can only be determined using emission projections. Using EPA's estimates of covered entity emissions (results from the agency's H.R. 2454 analysis), the percentages would be 35% in 2016, 41% in 2030 and 48% in 2050	Offsets are not allowed for compliance purposes; however, if the price ceiling is reached during an auction—the possibility of which is increased by not allowing offsets—the revenues from the additional carbon shares would be used exclusively on domestic emission mitigation projects outside of the covered sectors, including agriculture and forestry-related activities (i.e., offset-type projects)	If all entities maximize their use of offsets, the aggregate annual number of submitted offsets would total 2 billion tons; 75% of an entity's offsets can come from domestic sources and 25% from international sources; EPA can increase the allowable amount of international offsets (up to 1 billion), if the agency determines use of domestic offsets will not be maximized in a particular year The percentage allowed for compliance purposes is based on covered entities' actual emissions—which would depend on multiple factors, including banking and offset use/supply—and can only be determined using emission projections. Using EPA's estimates of covered entity emissions (results from the agency's H.R. 2454 analysis), the percentages would be 35% in

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	The President would administer the domestic offsets program; EPA would implement the international offsets program		2016, 41% in 2030 and 48% in 2050. EPA to make a separate determination for new facilities that commence operation after 2012 The Secretary of Agriculture would administer the domestic agricultural and forestry offsets program; EPA would oversee programs covering other domestic projects and all international projects
Other flexible design elements	Covered entities can submit international allowance from "qualifying programs;" use is unlimited unless otherwise determined by EPA Auction of allowances from strategic reserve, a pool of allowances borrowed from future years; auction would have reserve price of $28/allowance in 2012 (in $2005); between 2013 and 2017, the reserve price grows at 5% real annually, and 7% real annually from 2018 onward		Covered entities can submit international allowances from "qualifying programs;" use is unlimited unless otherwise determined by EPA Sale of allowances from cost containment reserve, a pool of allowances borrowed from future years at $25/allowance in 2013 (in $2009); the cost containment price grows at 5% real annually thereafter. A covered entity may meet up to 15% of its allowance obligation using allowances from this reserve, with certain other restrictions

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Banking	Unlimited banking allowed across all vintage years	Carbon shares must be redeemed within 10 years of issuance to original owner; first sellers limited by the quantity of carbon shares they may accumulate	Unlimited banking allowed across all vintage years. However, neither cost containment allowances nor set-price allowances bought by refiners may be banked.
Borrowing	Allows entities to borrow (without interest) emission allowances from the calendar year (vintage) immediately following the compliance year, effectively creating a rolling two-year compliance period In addition, covered entities may borrow (at 8% interest) allowances from two to five vintage years in the future, to satisfy 15% of their emissions	Borrowing not allowed, but the bill creates a rolling two-year compliance period for submitting carbon shares	Allows entities to borrow (without interest) emission allowances from the calendar year (vintage) immediately following the compliance year, effectively creating a rolling two-year compliance period In addition, covered entities may borrow (at 8% interest) allowances from two to five vintage years in the future, to satisfy up to 15% of their emissions
Early reduction credits and bonus credits	California or Regional Greenhouse Gas Initiative (RGGI) allowances can be exchanged for an amount of Title III allowances; amount of Title III allowances provided in exchange will be "sufficient to compensate" for the cost of obtaining and holding a RGGI or California allowance Offsets generated through other programs may be used (under specific conditions and limitations) for compliance purposes	No specific provision	California, Regional Greenhouse Gas Initiative (RGGI), or Western Climate Initiative (WCI) allowances can be exchanged for an amount of Title III allowances; amount of Title III allowances provided in exchange will be "sufficient to compensate" for the cost of obtaining and holding a RGGI, WCI, or California allowance Offsets generated through other programs may be used (under specific conditions and limitations) for compliance purposes
Trade-exposed industries and competitiveness issues	Trade-exposed, carbon-intensive industries to receive allowances at no cost, based on a specific formula related to emissions intensity and energy use Includes placeholder regarding border adjustment measures, stating: "It is the sense of the Senate that this Act will contain a trade title that will include a border measure that is consistent with our international obligations and designed to work in conjunction with provisions that allocate allowances to energy-intensive and trade-exposed industries."	Authorizes Treasury to impose fees for the "production process carbon" associated with commodities imported into the United States Among other policy objectives, Treasury may use auction revenues in the CERT Fund to provide financial support to parties in sectors that are economically and competitively disadvantaged by the program	Trade-exposed, carbon-intensive industries to receive allowances at no cost, based on a specific formula related to emissions intensity and energy use Unless the President determines that such a program would not be in the nation's economic or environmental interest, EPA is required to establish an international reserve allowance system for covered goods from the eligible industrial sector, including allowance trading, banking, pricing, and submission requirements. Allowances will be required for importation into the

Topic	S. 1733 (Kerry-Boxer)	S. 2877 (Cantwell)	Kerry-Lieberman Discussion Draft (May 12, 2010, Version)
			United States of any covered good of an eligible industrial sector from a covered country. Exemptions are provided for (1) least developed countries, (2) countries that emit less than 0.5% of global greenhouse gas emissions, and (3) countries meeting the specific criteria
Interaction with existing state or regional GHG control programs	States may not implement or enforce a GHG emission cap that covers any (federally) capped emissions during the years 2012 through 2017 (assuming the scheduled March 2011 auction occurs on time); a cap does not include fleet-wide motor vehicle emission requirement or life-cycle fuel standards; however, states may implement more stringent standards for GHG emissions at stationary sources	No specific provision	States may not implement or enforce a GHG emission cap that covers any (federally) capped emissions; a cap does not include fleet-wide motor vehicle emission requirements or life-cycle fuel standards; however, states may implement more stringent standards for GHG emissions at stationary sources

Topic	S. 1733 (Kerry-Boxer)	S. 2877 (Cantwell)	Kerry-Lieberman Discussion Draft (May 12, 2010, Version)
Other key provisions	Supplemental reductions from avoided deforestation activities in other countries; projects supported through set-aside allowances (5% in early years); goal is to generate a cumulative reduction of 6 billion tons by 2025 Establishes mandatory GHG emission reporting program, run by EPA; first data submission is in 2011 National Academy of Sciences provides a periodic review of science, technology, and mitigation efforts, and makes recommendations Establishes a separate cap-and-trade program that controls hydro-fluorocarbons	Trading of carbon shares is restricted to a dedicated exchange established by Treasury First sellers may not create, purchase, or sell carbon share derivatives	Trading of allowances restricted to covered entities and regulated greenhouse gas market participants, and can only be executed on a registered exchange and cleared through a registered clearing organization. Trades in greenhouse gas financial instruments that do not require the physical delivery of the allowances (i.e., cash settlement) are not restricted to covered entities and regulated greenhouse gas participants, but must be executed on a designated contract market (like a futures exchange) Establishes mandatory GHG emission reporting program, run by EPA; first data submission is in 2011 National Academy of Sciences provides a periodic review of science, technology, and mitigation efforts, and makes recommendations Establishes a separate cap-and-trade program that controls hydro-fluorocarbons Creates new or expanded incentives to encourage nuclear power; offshore oil and gas development; natural gas vehicle deployment; and deployment of carbon capture and sequestration technologies

a. Calculation based on Energy Information Administration's projections for CO_2 emissions in 2012 (5,706 million metric tons) and estimate of CO_2 emissions in 2005 (5,975 million metric tons)—EIA, *Annual Energy Outlook 2010* (December 2009).

b. The Carbon Refund Trust Fund would receive funding through the appropriations process.

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