



CONGRESSIONAL BUDGET OFFICE COST ESTIMATE

June 5, 2009

H.R. 2454 **American Clean Energy and Security Act of 2009**

*As ordered reported by the House Committee on Energy and Commerce
on May 21, 2009*

SUMMARY

H.R. 2454 would make a number of changes in energy and environmental policies largely aimed at reducing emissions of gases that contribute to global warming. The bill would limit or cap the quantity of certain greenhouse gases (GHGs) emitted from facilities that generate electricity and from other industrial activities over the 2012-2050 period. The Environmental Protection Agency (EPA) would establish two separate regulatory initiatives known as cap-and-trade programs—one covering emissions of most types of GHGs and one covering hydrofluorocarbons (HFCs). EPA would issue allowances to emit those gases under the cap-and-trade programs. Some of those allowances would be auctioned by the federal government, and the remainder would be distributed at no charge.

Other major provisions of the legislation would:

- Provide energy tax credits or energy rebates to certain low-income families to offset the impact of higher energy-related prices from the cap-and-trade programs;
- Require certain retail electricity suppliers to satisfy a minimum percentage of their electricity sales with electricity generated by facilities that use qualifying renewable fuels or energy sources;
- Establish a Carbon Storage Research Corporation to support research and development of technologies related to carbon capture and sequestration;
- Increase, by \$25 billion, the aggregate amount of loans DOE is authorized to make to automobile manufacturers and component suppliers under the existing Advanced Technology Vehicle Manufacturing Loan Program;

- Establish a Clean Energy Deployment Administration (CEDA) within the Department of Energy (DOE), which would be authorized to provide direct loans, loan guarantees, and letters of credit for clean energy projects;
- Authorize the Department of Transportation (DOT) to provide individuals with vouchers to acquire new vehicles that achieve greater fuel efficiency than the existing qualifying vehicles owned by the individuals; and
- Authorize appropriations for various programs under EPA, DOE, and other agencies.

CBO and the Joint Committee on Taxation (JCT) estimate that over the 2010-2019 period enacting this legislation would:

- Increase federal revenues by about \$846 billion; and
- Increase direct spending by about \$821 billion.

In total, those changes would reduce budget deficits (or increase future surpluses) by about \$24 billion over the 2010-2019 period.

In addition, assuming appropriation of the necessary amounts, CBO estimates that implementing H.R. 2454 would increase discretionary spending by about \$50 billion over the 2010-2019 period. Most of that funding would stem from spending auction proceeds from various funds established under this legislation.

CBO has determined that the non-tax provisions of H.R. 2454 contain intergovernmental and private-sector mandates as defined in the Unfunded Mandates Reform Act (UMRA). Several of those mandates would require utilities, manufacturers, and other entities to reduce greenhouse gas emissions through cap-and-trade programs and performance standards. CBO estimates that the cost of mandates in the bill would well exceed the annual thresholds established in UMRA for intergovernmental and private-sector mandates (in 2009, \$69 million and \$139 million respectively, adjusted annually for inflation).

PAGE REFERENCE GUIDE TO CBO COST ESTIMATE FOR H.R. 2454

Sections	Page
Major Provisions	4
Basis of Estimate	
Budgetary Treatment of Allowances, RECs, and Offset Credits	11
Revenues Resulting from Cap-and-Trade Programs	12
Other Revenues	20
Direct Spending	24
Spending Subject to Appropriation	28
Provisions with Budgetary Impacts That Began After 2019	34
Intergovernmental and Private-Sector Impact	35

Tables	Page
1. GHG Emission Allowances Under H.R. 2454 and the Percentage	
Auctioned and Freely Allocated	6
2. Estimated Budgetary Impact of H.R. 2454	10
3. CBO Estimates of Allowance Prices Under H.R. 2454	13
4. Estimated Changes in Revenues and Direct Spending Under H.R. 2454	25
5. Estimated Spending Subject to Appropriation Under H.R. 2454	29

Common Abbreviations Used in the Cost Estimate

CCS = Carbon capture and sequestration
CO₂ = Carbon dioxide
CEDA = Clean Energy Development Administration
CFC = Chlorofluorocarbon
mtCO₂e = Metric ton of carbon dioxide equivalent
GHG = Greenhouse gas
HFC = Hydrofluorocarbon
MWh = Megawatt hour
REC = Renewable electricity credit
RES = Renewable electricity standard

MAJOR PROVISIONS

The major provisions of H.R. 2454 are described in the following sections.

Cap-and-Trade Programs for Greenhouse Gases

This legislation would designate as GHGs: carbon dioxide, methane, nitrous oxide, sulfur hexafluoride, perfluorocarbons, nitrogen trifluoride, and HFCs from a chemical manufacturing process at a stationary industrial source. EPA would be required to establish two cap-and-trade programs aimed at reducing the emission of GHGs in the United States over the 2012-2050 period. One program would cover emissions of GHGs other than HFCs. A second program would cover the production and importation of HFCs and the importation of products containing HFCs. (Although HFCs are considered to be greenhouse gases, this cost estimate will subsequently refer to the larger program as the GHG cap-and-trade program and the smaller program specific to HFCs as the HFC cap-and-trade program).

A cap-and-trade program is a regulatory policy aimed at controlling pollution emissions from specific sources. The legislation would set a limit on total emissions for each year and would require regulated entities to hold rights, or allowances, to the emissions permitted under that cap. Each allowance would entitle companies to emit the equivalent of one metric ton of carbon dioxide equivalent (mtCO_{2e}).¹ After the allowances for a given period were distributed, entities would be free to buy and sell allowances.

Entities Covered By Cap-and-Trade Programs

Based on information from EPA, CBO estimates that about 7,400 facilities would be affected by the cap-and-trade programs established by the bill. The specific details regarding coverage, attribution of emissions to covered entities, and the timing of implementation vary by type of entity and sector of the economy:

- Beginning in 2012, all electricity generators would be required to submit allowances for all GHG emissions from their sites, with the exception of emissions from the combustion of liquid fuels, coke, and renewable biomass;
- Also beginning in 2012, any facility or entity that produces or imports petroleum- or coal-based liquids, petroleum coke, or natural gas liquids would be required to submit allowances for the GHG emissions that would result from the combustion of those fuels, if combustion of the fuel resulted in the emission of more than 25,000 mtCO_{2e} per year. Similarly, all facilities or entities that produce or import

1. A carbon dioxide equivalent is defined for each GHG as the quantity of that gas that makes the same contribution to global warming as one metric ton of carbon dioxide, as determined by EPA.

GHGs for direct use would be required to submit allowances for the emissions that would result when those gases were released into the atmosphere. Emissions from sites that geologically sequester CO₂ also would be covered beginning in 2012;

- Beginning in 2014, industrial facilities that manufacture a wide variety of products or that burn fossil fuels would be required to submit allowances for all GHG emissions from their sites—with the exception of emissions from the combustion of various types of liquid fuels, coke, and renewable biomass—if their activities result in more than 25,000 mtCO₂e of emissions;
- Beginning in 2016, natural gas distributors that deliver at least 460 million cubic feet of natural gas to customers that are not covered by the cap-and-trade provisions of the bill would need to submit allowances for the GHG emissions that would result from the combustion of the gas delivered to those customers; and
- Under a separate cap, beginning in 2012, producers and importers of HFCs, and importers of products containing HFCs, would be required to submit allowances for the carbon dioxide-equivalent tons of HFC they produce or import.

According to CBO’s estimates, the programs would cover about 72 percent of U.S. emissions of GHGs in 2012, about 78 percent in 2015, and about 86 percent in 2020.

Operation of the GHG Cap-and-Trade Program

H.R. 2454 would not restrict the types of entities or individuals who could purchase, hold, exchange, or retire emission allowances under the GHG cap-and-trade program. An unlimited number of allowances obtained in one year could be saved or “banked” by market participants indefinitely to be used or sold in future years. Limited borrowing of allowances (that is, the use in one year of an allowance that has been established for use in a future year) also would be permitted. The program would allocate to covered entities 4,627 million mtCO₂e allowances in 2012—about 97 percent of the amount of such emissions by covered entities in 2005. The number of allowances would increase to as high as 5,482 million mtCO₂e in 2016 to account for certain covered entities that would not begin compliance until that time, and then decline by 100 million to 150 million mtCO₂e per year—falling to 1,035 million mtCO₂e in 2050, about 14 percent of projected emissions from covered entities in the absence of regulation of such emissions.

The legislation also would require EPA to create a “strategic reserve” of about 2.7 billion allowances by setting aside a small number of allowances authorized to be issued each year. EPA would auction allowances from its strategic reserve only if the market price of allowances rose to unexpectedly high levels.

A portion of an entity’s compliance obligation under the bill could be met by purchasing domestic or international “offsets” in lieu of purchasing an allowance. An offset would be created by activities (as certified by EPA) that are not directly related to the emissions of the facilities covered under the bill, but would reduce GHG emissions or increase the amount of such gases that are captured from the atmosphere and stored (this process is referred to as sequestration). Examples of such offset activities include reducing emissions of methane gas from solid waste landfills, sequestering GHGs on agricultural lands, rangelands, and forests, altering agricultural tillage practices, planting winter crops, and reducing the use of nitrogen fertilizer. Under the bill, such offsets could occur domestically or in another country if the United States is a party to a bilateral or multilateral agreement or arrangement with the relevant country. Those international agreements or arrangements would specify the types of qualifying projects and methods for verifying the validity of offset activities. Covered entities could also purchase GHG emission allowances established by other countries or international organizations if approved by EPA.

The cap for the GHG cap-and-trade program would take effect in 2012. Of the emission allowances established for this program less the amount set aside for the strategic reserve (4,581 million mtCO_{2e} in 2012), 29.6 percent would initially be auctioned for sale from that vintage year (that is, the calendar year for which an allowance is established) to covered industries and other entities that wish to purchase them. Auctions would occur four times a year, with the first auction occurring no later than March 31, 2011. Emission allowances not specified for auction in the bill would be distributed free of charge to covered entities, states, and other specified recipients, who could then retire, sell, or use such allowances to meet the annual obligation for their own emissions. The percentage of emission allowances auctioned and freely allocated by vintage years 2012 through 2019 is provided in Table 1. By 2022, the percentage of allowances auctioned would increase to 18.4 percent and gradually increase to about 70 percent in 2031 and remain at that level through 2050.

TABLE 1. GHG EMISSION ALLOWANCES UNDER H.R. 2454 AND THE PERCENTAGE AUCTIONED AND FREELY ALLOCATED

	By Vintage Year							
	2012	2013	2014	2015	2016	2017	2018	2019
Quantity of Emission Allowances Less Amount Available for Strategic Reserve (In millions of metric tons)	4,581	4,499	5,048	4,953	5,427	5,321	5,216	5,110
Percentage Auctioned	29.6	29.6	17.9	17.9	17.5	17.5	17.5	17.5
Percentage Freely Allocated	70.4	70.4	82.1	82.1	82.5	82.5	82.5	82.5

Note: Vintage year is the calendar year for which an allowance is established.

Operation of the HFC Cap-and-Trade Program

Beginning in 2012, producers and importers of HFCs as well as importers of products containing HFCs would be required to submit to EPA a consumption allowance or a destruction offset credit for each carbon dioxide-equivalent ton of HFC. EPA would be authorized to issue destruction offset credits to producers and importers of HFCs if those entities perform or arrange for the recovery and destruction of chlorofluorocarbons (CFCs) from products or equipment already in use in the United States. The allowances available would steadily decline from 90 percent of the baseline use of HFCs (defined in the legislation as the average annual consumption of HFCs plus the average annual quantity of HFCs contained in imported products over the 2004-2006 period) to 15 percent of that baseline after 2032. Destruction offset credits could be used by producers and importers to satisfy a portion of the requirement to submit consumption allowances.

The bill would allow entities to bank an unlimited number of HFC allowances for future use. In contrast to the GHG cap-and-trade program, only those entities that produce and import HFCs or import products containing HFCs would be permitted to purchase an allowance directly from EPA, although EPA would have the authority to establish certain exceptions. (The legislation, however, would not restrict which entities could hold, sell, transfer, exchange, or retire consumption allowances in any secondary market for HFC allowances.)

All of the consumption allowances established for the HFC cap-and-trade program would be either auctioned or offered through a fixed-price sale to producers and importers of HFCs and products containing HFCs. The legislation specifies how the HFC allowance price would be calculated for certain auctions and for all fixed-price sales.

Refundable Low-Income Energy Tax Credit and Energy Rebate Program

The bill would create a new refundable energy tax credit and rebate program aimed at offsetting the impact of the GHG cap-and-trade program on energy prices faced by low-income families. The credit would be based on the average loss of purchasing power for the poorest fifth of people caused by higher prices for energy and other goods. The credit would vary with family size, based on the average spending for families of different sizes at the bottom of the income scale. The credit amount would be calculated using the share of total expenditures made by those families, the GHG intensity of that spending, the amount of other relief provided to consumers under the bill, and how much of recipients' reduced purchasing power would be automatically offset by federal cost-of-living adjustments in other federal benefit programs.

Combined Energy Efficiency and Renewable Electricity Standard (RES)

H.R. 2454 would require that, starting in 2012, certain retail electricity suppliers provide a minimum percentage of their electricity sales from electricity generated by facilities that use qualifying renewable fuels or energy sources. That percentage would be measured relative to the portion of a supplier's base sales of electricity generated from sources specified in the bill and would need to equal or exceed 6 percent of such sales by each covered supplier in 2012 and increase to 20 percent by 2020. To meet the RES requirement, suppliers would have to generate their own qualifying renewable power, purchase renewable energy credits (RECs) from other firms, or make alternative compliance payments to the state in which they operate. Upon request from a state government, electricity suppliers in that state could satisfy up to 40 percent of their RES compliance obligation by demonstrating a reduction in their customers' electricity consumption through qualified energy-efficiency projects initiated after the date of the bill's enactment.

Under the bill, one federal REC would be created for each megawatt hour (MWh) of electricity generated from a renewable energy source (for example, wind, solar, or geothermal). RECs could be traded on a secondary market, enabling firms in regions where renewable energy sources are scarce or relatively expensive to purchase credits generated in regions with an excess supply of RECs. In the event an electricity supplier does not have the requisite number of RECs or sufficient reductions in customers' electricity consumption to comply with the proposed standard, such entities could choose to remit, to the state in which they operate, alternative compliance payments equal to \$25 per MWh needed to meet the suppliers' compliance requirement (those payments would be adjusted annually for inflation). The legislation would require states to use any amounts received from alternative compliance payments to support the deployment of technologies to generate renewable energy and the implementation of energy-efficiency programs.

Carbon Storage Research Corporation

The legislation would authorize utilities that distribute electricity generated from fossil fuels to establish, subject to approval in a referendum by members of the electricity distribution industry, a Carbon Storage Research Corporation. The corporation would levy annual assessments on distribution utilities based on certain electricity deliveries to retail consumers. Assessments would total between \$1.0 billion and \$1.1 billion annually and would support research and development of technologies related to carbon capture and sequestration (CCS). Although formation of the corporation would be voluntary, once it was created, assessments would be compulsory, enforced by the federal government's sovereign authority. Therefore, CBO believes the corporation should be considered governmental in nature and all of its activities should be included in the federal budget.

Loans to Manufacturers of Advanced Technology Vehicles

H.R. 2454 would increase the amount of direct loans the DOE is authorized to provide under section 136 of the Energy Independence and Security Act (EISA). That act authorizes DOE to provide up to \$25 billion in loans to automobile manufacturers and component suppliers to support capital investments in facilities designed to produce vehicles with greater fuel efficiency and reduced emissions. H.R. 2454 would amend EISA to authorize DOE to provide up to \$50 billion in loans. Under the Credit Reform Act of 1990, any spending for the additional \$25 billion in loans authorized under H.R. 2454 would be subject to appropriation.

Clean Energy Deployment Administration

H.R. 2454 would establish a Clean Energy Deployment Administration (CEDA) within DOE, which would be authorized to provide direct loans, loan guarantees, and letters of credit for privately sponsored projects using clean energy technologies. Such assistance would be available for investments in the energy, transportation, manufacturing, commodities, residential, commercial, and financial services sectors. The bill also would modify the terms of an existing loan-guarantee program administered by DOE.

Implementing this provision would affect discretionary spending. Under the Credit Reform Act, commitments for direct loans, loan guarantees, and similar credit assistance would be contingent on future appropriation action.

Fuel-Efficient Vehicle Vouchers

The bill would authorize a program within DOT that would provide vouchers for the purchase or lease of a new car or truck to individuals who trade in an eligible vehicle for one that is more fuel efficient. The bill defines an eligible vehicle as one that averages 18-miles-per-gallon or less and would set minimum fuel-economy requirements for vehicles purchased or leased with a voucher. The eligible vehicle would have to be subsequently dismantled. The vouchers would range in value from \$3,500 to \$4,500 depending on the characteristics of both the old and the new vehicles. CBO estimates that this provision would accelerate the rate at which some older, less fuel-efficient vehicles are replaced, and cause the fleet of new vehicles purchased under the program to be more fuel efficient than it would otherwise be. As a result, fewer taxes would be collected on the sale of fuel, reducing federal revenues.

ESTIMATED COST TO THE FEDERAL GOVERNMENT

The estimated budgetary impact of H.R. 2454 is shown in Table 2. The costs of this legislation fall within budget functions 270 (energy), 300 (natural resources and environment), 350 (agriculture), 370 (commerce and housing credit), 400 (transportation), 500 (education, training, employment, and social services), 550 (health), and 600 (income security). For this estimate, CBO assumes that H.R. 2454 will be enacted near the end of fiscal year 2009, that the amounts necessary to implement the bill will be appropriated each year, and that outlays will follow historical spending patterns for similar programs.

TABLE 2. ESTIMATED BUDGETARY IMPACT OF H.R. 2454

	By Fiscal Year, in Billions of Dollars											2010-	2010-	
	2010	2011	2012	2013	2014	2015	2016	2017	2018	2019	2014	2019		
CHANGES IN REVENUES														
Total Estimated Revenues	0.9	39.1	59.1	63.5	90.6	104.0	112.3	117.6	126.1	132.3	253.2	845.6		
CHANGES IN DIRECT SPENDING														
Estimated Budget Authority	1.0	33.4	51.9	67.5	88.7	102.1	110.0	116.1	122.9	128.8	242.6	822.6		
Estimated Outlays	0.3	32.9	51.6	67.7	88.8	102.2	110.0	116.1	122.9	128.8	241.3	821.2		
NET CHANGE IN THE BUDGET DEFICIT FROM CHANGES IN REVENUES AND DIRECT SPENDING														
Impact on Deficit ^a	0.6	6.1	7.5	-4.2	1.8	1.8	2.4	1.5	3.2	3.5	12.0	24.4		
CHANGES IN SPENDING SUBJECT TO APPROPRIATION														
Estimated Authorization Level	5.5	9.3	3.0	3.6	4.4	5.4	6.0	6.9	8.2	8.7	25.8	61.1		
Estimated Outlays	3.4	1.6	2.7	3.8	4.9	5.8	6.6	6.5	6.8	7.8	16.4	49.9		

Note: Components may not sum to totals because of rounding.

a. Positive numbers indicate decreases in deficits; negative numbers indicate increases in deficits.

BASIS OF ESTIMATE

CBO estimates that implementing this legislation would result in additional revenues, net of income and payroll tax offsets, of \$253.2 billion over the 2010-2014 period and \$845.6 billion over the 2010-2019 period. We estimate that direct spending would

increase by \$241.3 billion and \$821.2 billion over the same periods, respectively. Those changes in revenues and direct spending would mainly stem from the process of auctioning and freely distributing allowances under the cap-and-trade programs established under this legislation. In addition, CBO estimates that implementing this legislation would increase discretionary federal spending by \$49.9 billion over the 2010-2019 period, assuming appropriation of the amounts estimated to be necessary.

Budgetary Treatment of Allowances, RECs, and Offset Credits

Efforts to control GHG emissions in this legislation would be enforced through the federal government's sovereign powers and would alter the use of scarce economic resources. While similar in some ways to command-and-control approaches for regulating economic activities, the cap-and-trade system that would be established by the bill for GHG and HFC emissions is fundamentally different because it would create cash-like assets (allowances) whose supply and distribution would be determined by the federal government. As such, CBO believes it is appropriate to include all transactions involving GHG and HFC allowances (including those distributed at no cost) in the budget.

Under H.R. 2454, both firms and individuals would be eligible to trade GHG and HFC allowances acquired from the federal government in a secondary market that would exceed \$60 billion in value in 2012, CBO estimates. Within such a large and liquid market, allowances could be easily and immediately traded for cash. In addition, the legislation would allow the federal government to determine the supply of allowances by defining the scope of covered emissions and limiting the number of allowances to be issued. Under those circumstances, the free distribution of allowances by the federal government would be essentially equivalent to the distribution of cash grants, so CBO believes that such transactions should be treated as additional outlays. At the same time, those allowances would be valuable financial instruments, so CBO thinks that the creation of allowances by the federal government should be recorded as an increase in revenues.

That logic does not hinge on whether the federal government sells or, instead, gives away the allowances. Allowances would have significant value even if given away because the recipients could sell them or, in the case of a covered entity, use them to avoid incurring the cost of compliance. In either case, the recipient receives an asset of equivalent value with no estimated change in the policy effect (i.e., total GHG emissions). For example, the government could either raise \$100 by selling allowances and then give that amount in cash to an entity, or it could simply give \$100 worth of allowances to that same entity, which could immediately and easily transform the allowances into cash through the secondary market. Sound budgeting requires that the budget treat equivalent transactions in the same way, in CBO's view. Therefore, this estimate treats the creation of

allowances and their disposition as budgetary transactions, regardless of whether the allowances would be sold or distributed at no cost.

In contrast, CBO believes the creation and subsequent allocation of federal RECs under the legislation's combined efficiency and renewable electricity standard should not be included within the federal budget. While a large and liquid secondary market for RECs would make them cash-like in nature, the supply of credits would be determined by the amount of renewable energy generated, not by the federal government. Unlike a GHG or HFC allowance, the creation of an REC, and thus its value, would stem from actions undertaken by private entities. The federal government would be unable to achieve the same policy effect (in this case, a target percentage of energy generation from renewable sources) through the sale of RECs since the quantity of RECs needed to meet this target would be a function of business decisions about how much electricity to produce.

Domestic and international offset credits authorized to be used within the GHG cap-and-trade program have similar characteristics similar to those of RECs. Once created, such credits would have value because the firms that are covered by the cap could use them in lieu of allowances for a share of their compliance obligation. Unlike allowances, however, the government would not determine the supply of offsets; that supply would depend on the actions of private entities. Therefore, CBO believes offset credits should not be accounted for in the federal budget.

Revenues Resulting From Cap-and-Trade Programs

The impact of H.R. 2454 on net federal revenues would largely be determined by the value of allowances created by the bill less the resulting reductions in receipts from income and payroll taxes. Penalties for noncompliance and fees collected to administer the legislation would add a small amount to total revenues, and tax credits available to low-income individuals would reduce federal revenues. The following sections discuss how CBO estimated the allowance prices for GHG and HFC cap-and-trade programs and detail other revenue impacts of the bill.

Estimating the Prices for Emission Allowances. CBO estimates that the price of GHG allowances would rise from about \$15 per mtCO₂e of emissions in 2011 to about \$26 per mtCO₂e in 2019. Table 3 provides CBO's estimate of annual allowance prices for the separate GHG and HFC cap-and-trade programs that would be created by the bill.

TABLE 3. CBO ESTIMATES OF ALLOWANCE PRICES UNDER H.R. 2454

	By Fiscal Year, In Dollars								
	2011	2012	2013	2014	2015	2016	2017	2018	2019
Estimated GHG Allowance Price	15	16	17	18	19	21	22	24	26
Estimated HFC Allowance Price ^a	n.a.	2	3	4	10	12	13	19	20

Note: n.a. = not applicable.

a. Prices provided are the weighted average of the estimated auction prices and fixed-price sales.

To estimate the marginal cost of reducing GHG emissions—which ultimately would determine the price of allowances—CBO took several steps:

- First, CBO constructed a base case that includes projections of future GHG emissions in the absence of any federal policies to control them, as well as projections of future prices of fossil fuels, electricity, and other products and services closely associated with such emissions;
- Next, we developed estimates of how firms and households would respond to increases in prices for fossil fuels and other sources of GHG emissions;
- Finally, CBO assessed the impact of other features of the legislation that would influence the market price of allowances. Such other provisions include regulations that would influence GHG emissions and electricity consumption, subsidies for various GHG emission-reducing activities, opportunities for firms to bank allowances in one year and use them in another, and the availability of domestic or international offsets.²

CBO began with its estimate of the emissions that would occur in the absence of the bill and lowered that baseline to reflect the extent to which the bill would require particular methods of reducing emissions (such as using renewable energy sources or increasing energy efficiency) to be used to a greater extent than they otherwise would have under the cap-and-trade program. We then estimate the price of allowances that would be necessary to generate the remaining reduction in emissions necessary to meet the cap. This estimate uses a “middle of the road” estimate of price responsiveness, which indicates how much firms and households would reduce their emissions for any given allowance price (and its implied effect of fossil fuel energy prices). In making that

2. For a more detailed discussion of the methods CBO used to estimate the price for carbon allowances for previous legislation, see *How CBO Estimates the Costs of Reducing Greenhouse-Gas Emissions*, CBO Background Paper (April 2009).

calculation CBO simultaneously estimated the extent to which firms would comply by purchasing domestic or international offsets (in lieu of purchasing allowances or reducing their emissions). Our estimate of the allowance price accounts for the fact that firms might find it profitable to exceed their emission reductions in the early years of the policy and bank their excess allowances to use in later years. To do so, we estimate emissions reductions and allowance prices during the full duration of the program through 2050.

Base Case Emission Projections. For its base case of GHG emissions, CBO relied primarily on projections of energy use, fossil fuel prices, and GHG emissions from the April 2009 update of the *Annual Energy Outlook 2009* (AEO 2009) published by the Energy Information Administration (EIA). EIA's inventory of emissions is based on a slightly different methodology than used by EPA, whose inventory is considered the official U.S. estimate for purposes of international negotiations and agreements.³ CBO adjusted the EIA data to align with EPA estimates for the most recent year where actual data is published, while retaining EIA's projected growth rates. CBO assumes that emissions per dollar of the nation's gross domestic product (GDP) will grow (or decline) at the same rate beyond 2030 as they are projected to grow in the preceding decade.⁴

Response by Firms and Households. A key factor in determining the price of an allowance is how quickly and cheaply firms and households can decrease CO₂ emissions by reducing their use of fossil fuels (either directly or indirectly via the goods and services that they consume). The easier it is for firms and households to cut their emissions, the lower the allowance price would need to be to reach a given cap. Available economic models differ considerably in their estimates of how much emissions would decrease for a given allowance price (and its implied effect on fossil fuel prices) because they make different assumptions about the long-run ability of businesses to substitute low-carbon fuels and more efficient technology for high-carbon fuels; the long-run sensitivity of energy usage to higher energy prices; and the speed at which those responses unfold. CBO generated a "middle of the road" response to allowance prices by examining available peer-reviewed models and calculating an average response, measured across multiple models and across different types of end users (households, electric utilities, and manufacturers, for example).⁵

3. See U.S. Environmental Protection Agency, *Inventory of U.S. Greenhouse Gas Emissions and Sinks: 1990-2007* (EPA 430-R-09-004, April 2009). CBO also used information provided by EPA to project the consumption of HFCs.

4. EIA reports projections of GHG emissions in the AEO 2009 only through 2030.

5. The models analyzed include the EIA's National Energy Modeling System (NEMS), the Emissions Prediction and Policy Analysis (EPPA) model used by climate researchers at the Massachusetts Institute of Technology, the Applied Dynamic Analysis of the Global Economy (ADAGE) model developed at RTI International and used by EPA, the Second Generation Model (SGM) and MiniCAM models developed and used by the Joint Global Change Research Institute, the Model for Evaluating the Regional and Global Effects of GHG Reduction Policies (MERGE) developed by Stanford University and EPRI, and the Multi-region National-North American Electricity and Environment (MRN-NEEM) model developed and used by CRA International.

Using those models, CBO concludes that the response to price increases (that is the decrease in emissions that would result from any given allowance price) would rise substantially over time as firms and households replace existing vehicles, equipment, structures, and electricity-generating capacity with newer items that use less energy or emit smaller quantities of carbon emissions.⁶ CBO's approach provides an estimate of the quantity of emission reductions that would occur at various allowance prices but does not specify how they would occur. That is, it does not provide detail about the timing or magnitude of the adoption of specific technologies, such as nuclear power or CCS, or the quantity of reductions in specific parts of the economy, such as the transportation sector.

CBO estimates that, in 2015, a price on emissions of CO₂ that raised the average price of end-use energy produced from fossil fuels by 10 percent would induce about a 5 percent reduction in such emissions. By 2025, a similar increase in price would result in a 9 percent reduction in emissions, with the response continuing to increase over time at a gradually decreasing rate.

Response to Opportunities for Banking of Emission Allowances. If covered entities were required to use all of their emission allowances in the year for which they were originally designated, the price of allowances would rise at a rate that was dictated by the speed at which the cap became more stringent (relative to the growth of emissions in the absence of the policy). Given the rate at which the cap on emissions would become more stringent over time under H.R. 2454, the inflation-adjusted price of allowances would rise at a rate that is significantly greater than CBO's estimate of the rate of return that firms might obtain on alternative investments, which CBO assumed to be the after-tax long-run inflation-adjusted rate of return to capital in the U.S. nonfinancial corporate sector (5.6 percent) that CBO is currently using to project the long-run budget outlook.

If firms were allowed to bank unlimited amounts of allowances, as they are under H.R. 2454, then profit-maximizing behavior by firms would cause the price of an allowance to increase at the same rate as the return that firms might receive on alternative investments. Specifically, firms would have an incentive to exceed their emission reduction requirements in the initial years of the program (when the cost of meeting the annual caps would be relatively low) and to bank their excess allowances to use in future years when the cost of meeting the cap would be much higher. Because banking would increase the demand for allowances in the early years (pushing up the allowance price) and increase the supply of allowances in later years (pushing down the allowance price), it would reduce the rate of increase in the price of allowances. Firms would continue to bank allowances up to the point where the rate of increase in the price of allowances was 5.6 percent, the rate of return that they might receive by making alternative investments.

6. For a more detailed discussion of the techniques CBO used to develop this assessment, see Mark Lasky, *The Economic Costs of Reducing Emissions of Greenhouse Gases: A Survey of Economic Models*, CBO Technical Paper (May 2003). See also *How CBO Estimates the Costs of Reducing Greenhouse-Gas Emissions*, CBO Background Paper (April 2009).

In the early years of the cap-and-trade program, the banking provision included in the bill would have a significant impact on the amount of emissions reductions, and thus on the allowance price. CBO estimates that by 2019, covered entities would undertake significantly more mitigation than necessary to meet their annual emission caps, banking about 2 billion mtCO₂e of allowances and raising the allowance price by 13 percent, compared with a policy that prohibited banking.

Response to Offset Credits. H.R. 2454 would allow covered entities to substitute offset credits in lieu of up to two billion GHG allowances each year. CBO expects covered entities would take advantage of this provision when costs are less than other methods of compliance. CBO finds that this provision would have a significant effect on allowance prices. As discussed below, by reducing the cost of complying with the cap, offsets are likely to lower the price of allowances by a substantial amount.

Under the bill, domestic offset credits could be used in lieu of up to one billion allowances per year. Based on EPA data on the available supply of domestic offsets at different prices, CBO estimates that covered entities would use domestic offsets to substitute for about 230 million allowances in 2012 and about 300 million allowances in 2020.

Covered entities may use international offsets in lieu of either one billion allowances, or depending on whether or not domestic offsets are used up to their full potential, up to 1.5 billion allowances in a given year. In no case could domestic and international offsets substitute for more than two billion allowances.

To calculate the supply of offsets from international sources, CBO used information from EPA and made adjustments based on provisions in the legislation, assumptions about demand from other countries, and an estimate of the transactions costs associated with creating and verifying offsets. Based on information from the Department of State, EPA, and outside experts, CBO expects that the agreements necessary to generate offsets with certain countries would take significant time to negotiate. Over the period covered by this bill, the number of agreements and the scope of their coverage is assumed to increase. CBO also assumed that other developed countries (for example, those in the European Union) would seek offsets for their own emissions reduction programs, thereby reducing the supply available to U.S. entities.

CBO estimates that covered entities would use international offsets in lieu of about 190 million allowances in 2012 and in lieu of about 340 million allowances in 2020. Together, the provisions allowing the use of domestic and international offsets would decrease the price of GHG allowances by \$35 (69 percent) in 2012.

Response to Emissions Allowances from Other Markets. H.R. 2454 also would allow covered entities to submit an unlimited number of emissions allowances obtained from

other cap-and-trade markets of “comparable stringency” in lieu of GHG allowances issued by EPA. For this estimate, CBO assumed that a market of “comparable stringency” would essentially be equivalent to a cap-and-trade market where allowances sell for a comparable price. Therefore, this provision would have no effect on the U.S. GHG allowance price.

Sensitivity of the GHG Allowance Price Estimates to Changes in Assumptions. In cap-and-trade systems such as the one established by this legislation, the most important assumptions affecting the price of allowances involve:

- Base-case projections of GHG emissions and energy prices;
- The responsiveness of households and firms to changes in the prices of goods and services associated with emissions;
- The discount rate that allowance holders apply to decisions about whether to bank allowances and how many to bank;
- The availability of offsets from domestic and international sources and the extent to which they are allowed to meet compliance obligations; and
- Other regulatory programs included as part of an overall emissions-reduction policy.

CBO examined each of those parameters to evaluate how sensitive the estimated allowance prices might be to alternative assumptions about how the program might operate into the future. Changes in the allowance prices under those alternative assumptions are made by holding the other parameters constant. (Note: it is not possible to determine the effect of changing multiple parameters simultaneously by simply adding together the independent effects of changing one parameter assumption while keeping other parameters constant.)

Base-Case Projections. Energy-related emissions from the U.S. economy are projected in the AEO 2009 to be almost 3 percent lower in 2012 and 7 percent lower in 2030 compared with those made by EIA last year.⁷ All else constant, a lower baseline for emissions from a covered sector will result in lower allowance prices.

Responsiveness. CBO’s estimates of the responsiveness of firms and households to changes in energy prices strongly influences its estimates. If that responsiveness were

7. See discussion of the differences in the *EIA Annual Energy Outlook* (2009), available online at: <http://www.eia.doe.gov/oiaf/aeo/forecast.html>

10 percent stronger (or weaker), on average, allowance prices would be roughly 8 percent lower or 9 percent higher.⁸

Discount Rate. The discount rate that firms would use when deciding whether or not to bank allowances is important in determining the allowance price because it affects the supply and demand for allowances in a given year. A higher discount rate would suggest that a firm would be more willing to put off expenses in the near term and pay them in the future, causing firms to bank fewer allowances. Assuming a lower discount rate of 5 percent (the rate used by EPA), firms would choose to lower emissions more in the near term (that is, bank more allowances) and less in future years. Use of a 5 percent rate would increase CBO's estimate of initial year prices by 13 percent and decrease projected prices in 2050 by 9 percent.

Availability of Offsets. Allowance prices would be lower if firms were allowed to use more offset credits to meet the bill's compliance obligations and if those offsets were cheaper than the costs of lowering emissions. Under the bill, the use of offsets lowers the allowance price by about 70 percent. Doubling the extent to which international offsets could be used in lieu of allowances in each year would decrease the allowance price by about 30 percent more.

Regulatory Programs. Other programs or standards that influence GHG emissions would affect the price of allowances by affecting the magnitude of the emission reductions necessary to meet the cap. For example, a regulatory program that requires increasing amounts of electricity generation to come from renewable energy sources (for example, wind, solar, and biomass) could lower emissions from the electricity sector that would be subject to the cap-and-trade program. Allowances prices could therefore be lower than they otherwise might have been in the absence of that regulation.

The effect that such programs and standards would have on emissions will vary with the base price of allowances and the stringency of those standards. If allowance prices are high, consumers and firms would have more incentives to undertake actions to lower emissions. In that case, it is less likely that a separate regulatory program would affect the allowance price because the behavior that the regulatory program is intended to achieve would occur in any event as a result of the relatively high allowance price. Conversely, when allowance prices are relatively low, and/or regulatory standards are relatively stringent, those standards would be more likely to motivate additional emission reductions through the use of the regulated technology (by using renewable energy, for example) beyond those that would result under the cap. In that case, the standards would reduce the emissions reductions that must be achieved to meet the cap and the price of allowances would be lower. Using one example from the legislation, CBO finds that

8. EPA's analysis of S. 2191 showed that initial allowance prices were 80 percent higher when nuclear, biomass, and CCS technologies were constrained. Such an effect would be equivalent to lowering the projected sensitivity of the U.S. economy by more than 50 percent.

distributing allowances to those facilities that invest in CCS technology, the price of allowances is reduced by 9 percent. In other cases, such as the RES, CBO estimates that the response to the GHG cap-and-trade program would result in enough renewable electricity generation on a national level to satisfy the new RES.

Estimating the Price of Consumption Allowances for HFCs. CBO estimates that the average price of consumption allowances for HFCs would be in the vicinity of \$2 beginning in 2012 and would rise to approximately \$20 by 2019. The cap would reduce HFC emissions by about 50 percent by 2020 from about 500 million mtCO₂e to about 250 million mtCO₂e.

For this estimate, CBO constructed a base-case projection of HFC consumption through 2025 similar to a base case produced by EPA. After consulting with industry sources, CBO concluded that the growth in HFC consumption after 2025 would be equal to the population growth rate in the United States, an assumption similar to that made by the International Panel on Climate Change. Using engineering cost data for HFC alternatives provided by EPA, CBO estimated the supply of HFC reductions as a function of price and year. From this data, CBO concluded that the ability to replace HFCs with lower-cost chemical alternatives would increase over time.

As prices for HFC allowances increase, firms would find it more profitable to recycle those chemicals and develop alternatives to these products. To the extent those changes occur, the price of HFC allowances would be different than would otherwise occur.

Net Revenue Calculation. CBO estimates that gross receipts to the federal government from the auction and free allocation of allowances under the bill would total \$298 billion over the 2010-2014 period and \$973 billion over the 2010-2019 period. This estimate is based on the projected prices of allowances for both the GHG and HFC cap-and-trade programs.

However, the cost of purchasing allowances, whether from the government or from other entities that would receive allowances under the bill, would become an additional business expense for companies that would have to comply with that cap on emissions. Those additional expenses would result in a decrease in taxable income, resulting in a loss of government revenue from income and payroll taxes referred to as a “revenue offset”. The amount of this revenue offset would be equal to 25 percent—an approximate marginal tax rate on overall economic activity—of the gross receipts from the auction and free allocation of allowances.⁹

9. Two previous letters on this subject can be found on CBO’s website at:
<http://www.cbo.gov/ftpdocs/102xx/doc10236/BartonCapnTradeLtr.pdf> and
<http://www.cbo.gov/ftpdocs/102xx/doc10232/5-15-WaxmanLetter.pdf>

Depending on the manner in which the proceeds or allowances are used by the government or conveyed to private entities, this reduction in taxable income (the revenue offset) might be accompanied by a matching increase in taxable income elsewhere in the economy. In such cases, CBO views the distribution of allowances or allowance proceeds as offsetting the revenue offset—that is, compensating for the initial loss of tax revenues associated with the acquisition of the allowances. In those cases, the distribution and use of the allowances or the auction proceeds would be budget neutral. For this estimate, CBO applied this offsetting offset to some of the revenues arising from the distribution of allowances, depending on who would receive those allowances (or auction proceeds) and what they would be used for.

In general, allowances provided under section 321 to businesses (merchant coal generators, generators with long-term power purchase agreements, petroleum refiners), and some of the allowances provided to natural gas distributors would fit in the category of transactions that would be budget neutral because they would generate taxable income. In contrast, allowances provided to nonbusiness entities—such as states to support specific activities, or to other countries to support efforts to reduce greenhouse gases—would not be budget neutral because they would not generate taxable income.

On balance, CBO estimates that the auction of GHG and HFC allowances and distribution of GHG allowances at no cost would generate revenues, net of income and payroll tax offsets, of about \$254 billion over the 2010-2014 period and \$858 billion over the next 10 years (see Table 4).

Other Revenues

Refundable Low-Income Energy Tax Credit. H.R. 2454 would create a refundable energy tax credit, aimed at offsetting the impact of higher energy prices on low-income families. The credit would be based on the average loss of purchasing power for the poorest fifth of people caused by higher prices for energy and other goods under the bill. The credit would vary with family size, based on the average spending of different size families at the bottom of the income scale. The credit amount would be based on the share of total expenditures made by those families, the GHG intensity of that spending, the amount of other relief provided under the bill, and how much of their reduced purchasing power would be automatically offset with federal cost-of-living adjustments. In 2012, CBO estimates that the credit would range from \$161 for a single person to \$359 for a five-person household. By 2019, those credit amounts would rise by roughly 75 percent.

Only taxpayers with income below certain levels would receive the credit. The level at which a family would become ineligible for the credit depends on the family structure. In 2012, CBO estimates that single people with no children would be ineligible if their income exceeded \$23,000, while families with at least two children would be ineligible if

their income exceeded \$42,000. The credit would be refundable, meaning that taxpayers would not need to owe any tax in order to receive the credit. Taxpayers who would participate in the energy rebate program for low-income consumers would not be eligible for that credit.

The Joint Committee on Taxation estimates that the credit would cost \$83 billion over the 2009-2019 period. Of that amount, about \$22 billion would be recorded in the budget as a reduction in tax receipts and about \$61 billion as an increase in direct spending in the amount in excess of taxes owed.

In addition, people who participate in other federal benefits programs could receive a cash rebate under another provision (see Direct Spending section below).

Increased Use of Production Tax Credits. By increasing electricity production through renewable sources, H.R. 2454 would result in businesses claiming increased business tax credits for the renewable electricity production credit (section 45 of the Internal Revenue Code) and the energy credit which applies primarily to investments in solar and geothermal energy production (section 48 of the Internal Revenue Code). JCT estimates that increased use of those credits would reduce revenues by \$1.1 billion over the 2010-2019 period. This estimate reflects one aspect of the revenue consequences of a shift in economic activity away from use of fossil fuels.

Carbon Storage Research Corporation. Section 114 would authorize utilities that distribute fossil fuels to establish, by a referendum involving members of the electricity distribution industry, a Carbon Storage Research Corporation. The corporation would levy annual assessments on distribution utilities based on the volume of certain electricity deliveries to retail consumers. Assessments would amount to at least \$1 billion, but not more than \$1.1 billion each year. While formation of the corporation would be voluntary, once it was created, assessments would be compulsory, enforced by the federal government's sovereign authority. As such, CBO believes the corporation should be considered governmental in nature, and all of its activities should be included in the federal budget.

For this estimate, CBO assumes that the corporation would be created and would collect assessments totaling \$1 billion in 2010 and \$1.1 billion each year thereafter through 2019. Those amounts should be recorded in the budget as revenues, and subsequent expenditures should be considered direct spending.

Additionally, the cost of those assessments would become an additional business expense for utilities, resulting in a loss of other federal tax revenue (primarily income and payroll taxes). The amount of this revenue loss would be equal to about 25 percent of the assessments. However, half of the funds collected by the corporation would go back to electric utilities in the form of grants to subsidize the operations of existing electricity

generation units that use integrated CCS or conversion. Those grants would generate new taxable income which would increase federal revenues. Consequently, the net loss in tax revenue would equal about one-eighth of the income from the assessments, resulting in an overall increase in revenues from this provision of \$4.7 billion over the 2010-2014 period and \$9.5 billion over the next 10 years.

Commodity Futures Trading Commission. H.R. 2454 would authorize the Commodity Futures Trading Commission (CFTC) to charge and collect fees on transactions executed on certain exchanges. The fee would be calculated to recover the annual cost of the commission's supervision and regulation of futures markets (the cost of CFTC's enforcement activities would not be included in this amount). Fees would be deposited into a special account and would be authorized to be appropriated to fund the commission's activities. CBO estimates that enacting these provisions would increase revenues by about \$400 million over the 2010-2014 period, and by about \$800 million over the 2010-2019 period, net of income and payroll tax losses.

Alternative Compliance Payments for the Renewable Electricity Standard (RES). Section 101 would establish a new federal standard requiring an increasing percentage of electricity sold by certain retail electricity suppliers to be generated from renewable sources beginning in 2012. Covered suppliers of retail electricity would meet this requirement by submitting a federal renewable energy credit (REC) or by making an alternative compliance payment equal to \$25 (in 2009, adjusted for inflation) for each megawatt hour of renewable electricity necessary to comply with the standard. Under the bill, alternative compliance payments would be paid directly to states; nevertheless, because they would result from an exercise of the federal government's sovereign power to regulate industry, CBO believes that collections and subsequent expenditures of alternative compliance payments should be considered governmental in nature and included in the federal budget.

CBO estimates that the response to the GHG cap-and-trade program would result in the generation of enough renewable electricity, on a national level, to satisfy the federal standard. However, based on information from DOE, CBO expects that some regions of the country—particularly the southeast—would probably not generate sufficient RECs to satisfy the federal standard. Thus, covered electricity suppliers in those areas would have to either purchase RECs generated elsewhere or make alternative compliance payments to the states in which they operate.

CBO expects that, in some cases, covered electricity suppliers would choose to make alternative compliance payments rather than purchase RECs. H.R. 2454 would require states to use any alternative compliance payments received pursuant to the federal RES to promote the development of renewable energy resources. To the extent that electricity suppliers that are subject to the RES would benefit from states' spending of alternative

compliance payments, H.R. 2454 might provide an incentive for suppliers to favor those payments over REC purchases as a means of complying with the federal RES.

CBO believes that this incentive would most likely affect the behavior of electricity suppliers in instances where the price of a REC is at or only slightly below the compliance payment. Based on information from DOE about estimated prices of RECs under H.R. 2454, however, CBO expects that most suppliers would use RECs to comply with the federal RES. We estimate that alternative compliance payments would probably not exceed \$500 million over the 2012-2019 period. The volume of electricity associated with estimated payments is small—less than one-tenth of one percent of all electricity generation.

In addition, the cost of the alternative compliance payments would become an additional business expense for utilities, thus reducing federal tax revenue. The amount of this revenue offset would be equal to 25 percent of the payments, resulting in an overall increase in revenues from this provision of about \$100 million over the 2010-2014 period and nearly \$400 million over the next 10 years.

Fuel-Efficient Vehicle Vouchers. CBO expects that the issuance of vouchers to individuals who replace existing vehicles with new ones of greater fuel efficiency would result in a slight increase in the overall fuel efficiency of the domestic vehicle fleet. New vehicles purchased as a result of the program would generally be more fuel efficient than ones that would otherwise be purchased as replacements. This increase in fuel efficiency would cause a slight decline in gasoline consumption, thereby reducing federal revenues generated by excise taxes on motor fuels. CBO estimates that this provision of the legislation would reduce federal revenues by \$16 million over the 2010-2014 period and \$28 million over the 2010-2019 period.

Penalties. Under H.R. 2454, civil penalties would be assessed on those owners and operators who fail to meet their compliance obligation on time. The penalty would equal the emissions generated by an entity in excess of the allowances they held multiplied by twice the fair market value of emission allowances in the relevant year. In addition, the covered entities would be required to submit, in the following year or other time period determined by EPA, emission allowances to cover excess emissions from the previous year. The legislation also would establish penalties for those entities that violate any of the rules associated with the regulation of the allowance market. Such penalties could be as high \$1 million per day under certain circumstances. This legislation also includes various other penalties, including penalties for nonpayment of allowances and for fraud.

Because many of the penalties could be substantial, CBO expects most firms would comply with the requirements of the bill. However, the number of entities covered by this legislation is large, and thus it is likely that some entities would not comply. Penalties collected on emissions of sulfur dioxide and nitrogen oxides in excess of submitted

allowances under EPA's Acid Rain Program, a similar program, are usually small, though there have been two large collections over the past few years totaling about \$4 million. Based on that information, CBO estimates that penalty collections under H.R. 2454 would total between \$25 million and \$50 million dollars annually, beginning in 2012.

Effect on Unemployment Compensation. The bill would create a program to compensate workers who lose their jobs as a result of the bill's provisions. That program would provide cash benefits, job training, and a subsidy for health care costs. Individuals who collect benefits under that program would not be eligible to receive unemployment compensation; consequently, outlays of that program would be reduced. Because such outlays are paid from state employment taxes, CBO estimates that states would reduce their taxes (which are recorded as revenues on the federal budget) accordingly. Over the 2012-2019 period, CBO estimates that the reduction in tax revenues to be less than \$100 million.

Direct Spending

CBO estimates that enacting this legislation would increase direct spending by \$821 billion over the 2010-2019 period. Outlays would primarily stem from spending of auction proceeds and giving GHG allowances to states and other entities free of charge. Also, substantial amounts of auction proceeds would be available for other spending programs that would be subject to appropriation action. A more detailed description of those programs is included under the discussion of spending subject to appropriation.

Worker Assistance. A portion of the revenues from the auction of emission allowances for the GHG cap-and-trade program would fund a program for Climate Change Worker Adjustment Assistance (CCWAA), which would be administered by the Department of Labor (DOL). Under that program, workers who lose their jobs as a result of measures their employers take to comply with provisions of the bill could be certified to receive up to 156 weeks of benefits, including cash benefits equal to 70 percent of their average weekly wage, job training and employment search assistance, and an 80 percent subsidy of the cost of continuing health insurance. Funding for the program would be capped at a specified portion of auction proceeds actually received, which CBO estimates would total \$4.3 billion over the 2011-2019 period. Gross outlays for CCWAA would total \$4.2 billion over that period, CBO estimates.

Individuals receiving CCWAA would not be eligible to receive unemployment compensation. Thus, CBO estimates outlays for unemployment benefits would drop by about \$0.1 billion over the 2011-2012 period. (That drop in outlays would be offset over time by a corresponding reduction in unemployment tax revenues, as discussed in the revenue section of this estimate.)

TABLE 4. ESTIMATED CHANGES IN REVENUES AND DIRECT SPENDING UNDER H.R. 2454

	By Fiscal Year, in Billions of Dollars											2010-	2010-	
	2010	2011	2012	2013	2014	2015	2016	2017	2018	2019	2014	2019		
CHANGES IN REVENUES														
Net Revenues Resulting from Cap-and-Trade Programs ^a	0	38.0	58.6	64.8	92.2	105.9	114.4	120.1	128.6	134.9	253.6	857.6		
Refundable Low-Income Energy Tax Credit	0	0	-0.6	-2.3	-2.5	-2.9	-3.1	-3.4	-3.5	-3.6	-5.5	-22.0		
Increased Production Tax Credit Use	0	0	*	-0.1	-0.1	-0.1	-0.1	-0.2	-0.2	-0.2	-0.2	-1.1		
Carbon Storage Research Corporation	0.9	1.0	1.0	1.0	1.0	1.0	1.0	1.0	1.0	1.0	4.7	9.5		
Alternative Compliance Payments for the RES	0	0	*	*	*	*	*	*	0.1	0.1	0.1	0.4		
Commodity Futures Trading Commission	0.1	0.1	0.1	0.1	0.1	0.1	0.1	0.1	0.1	0.1	0.4	0.8		
Fuel-Efficient Vehicle Vouchers	*	*	*	*	*	*	*	*	*	*	*	*		
Penalties and Other Revenue Changes	0	0	*	*	*	*	*	*	*	*	0.1	0.2		
Total Changes in Revenues	0.9	39.1	59.1	63.5	90.6	104.0	112.3	117.6	126.1	132.3	253.2	845.6		
CHANGES IN DIRECT SPENDING														
Worker Assistance ^b														
Estimated Budget Authority	0	0.2	0.3	0.4	0.4	0.5	0.5	0.6	0.6	0.6	1.3	4.2		
Estimated Outlays	0	0	0.1	0.6	0.5	0.5	0.6	0.6	0.6	0.6	1.3	4.1		
Outlays Associated with Emission Allowances Freely Allocated														
Estimated Budget Authority	0	32.2	46.3	54.4	74.5	86.0	92.7	96.4	102.7	107.5	207.4	692.7		
Estimated Outlays	0	32.2	46.3	54.4	74.5	86.0	92.7	96.4	102.7	107.5	207.4	692.7		
Refundable Low-Income Energy Tax Credit Payments														
Estimated Budget Authority	0	0	0	6.1	6.5	8.0	8.4	10.4	10.5	11.2	12.6	61.1		
Estimated Outlays	0	0	0	6.1	6.5	8.0	8.4	10.4	10.5	11.2	12.6	61.1		
Low-Income Energy Rebates														
Estimated Budget Authority	0	0	4.1	5.4	6.1	6.4	7.2	7.5	7.8	8.2	15.7	52.8		
Estimated Outlays	0	0	4.1	5.4	6.1	6.4	7.2	7.5	7.8	8.2	15.7	52.8		
Carbon Storage Research Corporation														
Estimated Budget Authority	1.0	1.1	1.1	1.2	1.2	1.2	1.2	1.2	1.2	1.2	5.6	11.4		
Estimated Outlays	0.3	0.7	1.0	1.1	1.1	1.2	1.2	1.2	1.2	1.2	4.3	10.1		

Continued

TABLE 4. Continued

	By Fiscal Year, in Billions of Dollars											2010-	2010-
	2010	2011	2012	2013	2014	2015	2016	2017	2018	2019	2014	2019	
Spending of Alternative Compliance Payments													
Estimated Budget Authority	0	0	*	*	*	*	0.1	0.1	0.1	0.1	0.1	0.1	0.5
Estimated Outlays	0	0	*	*	*	*	0.1	0.1	0.1	0.1	0.1	0.1	0.5
Total Changes in Direct Spending													
Estimated Budget Authority	1.0	33.4	51.9	67.5	88.7	102.1	110.0	116.1	122.9	128.8	242.6	822.6	
Estimated Outlays	0.3	32.9	51.6	67.7	88.8	102.2	110.0	116.1	122.9	128.8	241.3	821.2	
Net Change in the Budget Deficit from Changes in Revenues and Direct Spending													
Impact on Deficit ^c	0.6	6.1	7.5	-4.2	1.8	1.8	2.4	1.5	3.2	3.5	12.0	24.4	
Memorandum—Details on Auction Revenues:													
Gross Revenues from Auctioned Allowances	0	9.9	21.5	19.7	30.1	33.7	37.0	39.6	42.9	45.4	81.2	279.9	
Net Revenues from Auctioned Allowances	0	7.4	16.2	14.8	22.6	25.3	27.7	29.7	32.2	34.1	60.9	209.9	
Gross Revenues from Allowances Freely Allocated	0	32.2	46.3	54.4	74.5	86.0	92.7	96.4	102.7	107.5	207.4	692.7	
Net Revenues from Allowances Freely Allocated	0	30.6	42.5	50.1	69.6	80.6	86.7	90.4	96.4	100.8	192.7	647.7	

Notes: RES = renewable electricity standard, * = between -\$50 million and \$50 million.

Numbers may not sum to totals because of rounding.

- a. Revenues are net of income and payroll tax offsets.
- b. Includes \$0.1 billion reduction in other unemployment benefits over the 2010-2019 period.
- c. Positive numbers indicate decreases in deficits; negative numbers indicate increases in deficits.

Outlays Associated with Emission Allowances Freely Allocated. CBO estimates that direct spending would increase by about \$693 billion over the 2010-2019 period when the government distributes emission allowances free of charge to various recipients. Most of this distribution would begin in 2012. Recipients, such as states, natural gas distributors, and federal agencies, would use the allowances to fund programs to encourage energy efficiency and other types of government initiatives.

Refundable Low-Income Energy Tax Credit Payments. H.R. 2454 would create a refundable energy tax credit for low-income families. (See section on “Other Revenues.”) Taxpayers would receive any credit amount in excess of their income tax liability as a direct payment. The JCT estimates that direct spending would increase by \$61 billion over the 2010-2019 period.

Low-Income Energy Rebates. The bill would create a new energy rebate, aimed at offsetting the impact of the GHG cap-and-trade program on energy prices for low-income families. The rebate would complement the low-income energy tax credit program, reaching families who may not file tax returns. The rebate amount would be the same as the tax credit amount, equaling the average loss of purchasing power caused by higher prices for energy and other goods for the poorest fifth of people. Like the credit, the rebate would vary with family size. In 2012, CBO estimates the rebate would be \$161 for a single person, ranging up to \$359 for a five-person household. By 2019, those credit amounts would rise by roughly 75 percent.

Families who participate in the Supplemental Nutrition Assistance Program or the Medicare Part D low-income subsidy would automatically be enrolled in the rebate program. Other families with income below 150 percent of the poverty level could apply for the rebates through their state benefit agencies. Enrolled families would receive one-twelfth of the annual rebate amount each month. Families would not be eligible to receive both the rebate and the tax credit. State benefit agencies would notify both credit recipients and the Internal Revenue Service of the amounts of rebate received each year, and the amount of the tax credit a family receives would be reduced by any rebate they receive.

CBO estimates that this rebate program would increase direct spending by \$53 billion over the 2012-2019 period. CBO expects that all families receiving the low-income subsidy or participating in the Supplemental Nutrition Assistance Program would receive the rebate. CBO expects minimal participation from eligible families not enrolled in those programs, as the rebate amounts are not large enough to induce many to participate in a new program. CBO also expects that the coordination mechanism between the state benefit agencies and the Internal Revenue Service would be effective in minimizing the number of families that receive both the tax credit and the rebate.

Carbon Storage Research Corporation. As previously discussed in the section on revenues, H.R. 2454 would authorize a governmental corporation to levy and spend assessments on distribution utilities totaling between \$1.0 billion and \$1.1 billion a year over the 2010-2019 period. Under the bill, the corporation could invest those assessments in interest-bearing securities, thereby generating additional funding for its activities. Expenditures of assessments and interest, which would be considered direct spending, would support research and development of technologies related to CCS. Based on historical spending patterns for similar activities, CBO estimates that expenditures by the

proposed corporation would total about \$300 million in 2010 and \$10.1 billion over the 2010-2019 period.

Spending of Alternative Compliance Payments Under the RES. The legislation would require states to use any amounts received from alternative compliance payments under the proposed RES to support the deployment of technologies to generate renewable energy and to implement energy-efficiency programs. Based on historical spending patterns for similar activities, CBO estimates that such spending would total about \$500 million over the 2012-2019 period.

Spending Subject to Appropriation

Assuming appropriation of the necessary amounts, CBO estimates that implementing this legislation would increase discretionary spending by \$49.9 billion over the 2010-2019 period (see Table 5). Most of that amount would stem from provisions that authorize spending of revenues from the auction of emission and consumption allowances. These funds would be used to support a variety of programs by federal agencies. Additional spending would support:

- Certain credit-related activities of the proposed Clean Energy Deployment Administration;
- Federal loans to manufacturers of certain types of vehicles;
- Federal agencies' costs to administer programs established under the bill;
- A wide array of activities to improve energy efficiency throughout the nation;
- Federal costs to provide vouchers to individuals who purchase or lease certain fuel-efficient vehicles; and
- Programs to promote clean energy technologies.

TABLE 5. ESTIMATED SPENDING SUBJECT TO APPROPRIATION UNDER H.R. 2454

	By Fiscal Year, In Billions of Dollars										2010-	2010-
	2010	2011	2012	2013	2014	2015	2016	2017	2018	2019	2014	2019
CHANGES IN SPENDING SUBJECT TO APPROPRIATION												
Spending of Auction Proceeds												
Estimated Authorization												
Level	0	0.2	0.9	1.4	1.8	2.9	3.5	4.0	5.1	5.6	4.4	25.5
Estimated Outlays	0	*	0.3	0.8	1.3	2.1	2.9	3.5	4.3	5.1	2.3	20.1
Clean Energy Deployment Administration												
Estimated Authorization												
Level	*	*	0.1	0.2	0.4	0.6	1.0	1.5	1.5	1.6	0.8	6.9
Estimated Outlays	*	*	*	0.1	0.1	0.2	0.4	0.6	0.9	1.2	0.3	3.6
DOE Loans to Manufacturers of Advanced Technology Vehicles												
Estimated Authorization												
Level	0	7.5	*	*	*	*	*	*	*	*	7.5	7.6
Estimated Outlays	0	0.4	0.8	1.1	1.5	1.5	1.5	0.8	*	*	3.8	7.5
Administrative Costs to Federal Agencies												
Estimated Authorization												
Level	0.5	0.5	0.8	0.8	0.8	0.8	0.9	0.9	0.9	1.0	3.3	7.8
Estimated Outlays	0.4	0.5	0.7	0.8	0.8	0.8	0.8	0.9	0.9	0.9	3.1	7.5
Energy-Efficiency Programs												
Estimated Authorization												
Level	0.7	0.8	0.8	0.9	1.1	0.8	0.4	0.4	0.4	0.4	4.3	6.7
Estimated Outlays	0.3	0.6	0.7	0.8	0.9	0.9	0.7	0.5	0.5	0.4	3.2	6.2
Vouchers to Purchase or Lease Fuel-Efficient Vehicles												
Authorization Level	4.0	0	0	0	0	0	0	0	0	0	4.0	4.0
Estimated Outlays	2.6	*	0	0	0	0	0	0	0	0	2.6	2.6
Clean Energy Programs												
Estimated Authorization												
Level	0.3	0.3	0.3	0.3	0.3	0.3	0.2	0.2	0.2	0.2	1.5	2.6
Estimated Outlays	0.1	0.2	0.3	0.3	0.3	0.3	0.3	0.2	0.2	0.2	1.1	2.4
Total Changes												
Estimated Authorization												
Level	5.5	9.3	3.0	3.6	4.4	5.4	6.0	6.9	8.2	8.7	25.8	61.1
Estimated Outlays	3.4	1.6	2.7	3.8	4.9	5.8	6.6	6.5	6.8	7.8	16.4	49.9

Note DOE = Department of Energy; * = between -\$50 million and \$50 million.

Numbers may not sum to totals because of rounding.

Spending of Auction Proceeds. Under the legislation, about \$25.5 billion in revenues from the auction of emission and consumption allowances over the 2011-2019 period would be deposited into three funds established by the Department of the Treasury. Spending from those funds would require further appropriation action. None of the amounts subject to appropriation would be directly offset by revenues generated under the bill. CBO's estimate of the spending by funds over the 2010-2019 period is as follows:

- \$5.3 billion would be credited to the Natural Resources Climate Change Adaptation Fund and used to support adaptation activities, such as activities to assist fish and wildlife in adapting to the impacts of climate change, by various federal agencies, including the Department of the Interior, the Department of Commerce, and EPA;
- \$900 million would be credited to the Climate Change Health Protection and Promotion Fund and would primarily support efforts by the Department of Health and Human Services to assist health professionals in preparing for and responding to the impacts of climate change on public health; and
- \$19.3 billion would be credited to the Stratospheric Ozone and Climate Protection Fund and would be used to support DOE's best-in-class appliances deployment program, an EPA program to encourage the recovery, recycling, and reclamation of HFCs, and any multilateral agreement related to HFCs that includes the United States.

Assuming appropriation of amounts estimated to be credited to the proposed funds, CBO estimates that discretionary spending of revenues from auctions would total \$20.1 billion over the 2010-2019 period. That estimate is based on historical spending patterns in agencies that would administer the new programs funded with auction proceeds.

Clean Energy Deployment Administration. The bill would establish a Clean Energy Deployment Administration (CEDA) within DOE, which would be authorized to provide direct loans, loan guarantees, and letters of credit for clean energy projects. Such assistance would be available for investments in the energy, transportation, manufacturing, commodities, residential, commercial, and financial services sectors.

The budgetary accounting for CEDA's activities would be largely governed by the Federal Credit Reform Act of 1990, which requires appropriations for subsidy costs in advance of commitments for loans and loan guarantees. Under that act, the subsidy cost is the estimated long-term cost to the government of the transactions (excluding administrative expenses), calculated on a present-value basis. Subsidy costs are typically expressed as a percentage of the loan principal (the subsidy rate) multiplied by the amounts being loaned or guaranteed.

The potential budgetary impact of CEDA programs is difficult to predict for several reasons. The amount and timing of any spending would depend on investment decisions made by private firms and nonfederal entities in response to market and other conditions. The subsidy rate for participating projects would vary depending on their particular technological and market risks. Finally, some of the activities eligible for assistance under this bill may also be eligible for federal loan guarantees under existing law, especially those involving advanced energy and automotive technologies.

CBO estimates that implementing this provision would increase discretionary spending by \$3.6 billion over the 2010-2019 period, assuming appropriation of the amounts necessary to cover the program's subsidy and administrative costs. According to the Conference Board and other private-sector analysts, approximately \$1 trillion could be invested over the 2010-2030 period to achieve cost-effective reductions in carbon emissions in the United States, over half of which could be spent by the energy and transportation sectors. For this estimate, CBO assumes that CEDA would provide direct loans or loan guarantees for about 5 percent of those projected investments or a total volume of about \$50 billion through 2019. (Those amounts would be in addition to the tens of billions of dollars authorized to be guaranteed under existing law.) CBO estimates that the subsidy rate for CEDA's portfolio would average 13 percent, which is similar to the credit risk posed by speculative-grade bonds.

Although certain letters of credit and changes to DOE's existing loan guarantee program could affect direct spending, CBO estimates that the net effect of those provisions would be negligible over the 2010-2019 period.

DOE Loans to Manufacturers of Advanced Technology Vehicles. Under the existing Advanced Technology Vehicles Manufacturing (ATVM) loan program, DOE is currently authorized to provide up to \$25 billion in direct loans to automobile manufacturers and component suppliers to support capital investments in manufacturing facilities designed to produce vehicles with greater fuel efficiency and reduced emissions. The agency currently has \$7.5 billion available to cover the anticipated subsidy cost of such loans.

H.R. 2454 would increase, to \$50 billion, the amount of loans DOE is authorized to make under the ATVM loan program. CBO estimates that funding an additional \$25 billion in such loans under that program would require appropriations totaling \$7.6 billion over the 2010-2019 period. That amount includes \$7.5 billion to cover anticipated subsidy costs of loans and \$0.1 billion for the agency's administrative costs. Estimated subsidy costs take into account the financial condition of borrowers and reflect factors such as default risk, anticipated recoveries in the case of a default, and statutorily specified terms and conditions of ATVM loans.

Based on information from DOE about the anticipated rate of disbursement for ATVM loans that the agency can support with existing funding as well as historical spending patterns for other federal credit programs, CBO expects that DOE would not approve any new loans pursuant to H.R. 2454 before 2011. Starting in 2011, CBO estimates that expenditures for ATVM loans would occur gradually, over several years, as loans are disbursed. We further estimate that DOE's administrative costs associated with additional loans authorized under the legislation would amount to about \$10 million annually over the 2011-2019 period.

Administrative Costs to Federal Agencies. Several federal agencies, including EPA, the Federal Energy Regulatory Commission (FERC), the Department of State, DOE, and others would be responsible for administering programs under H.R. 2454. Major new initiatives—particularly the proposed GHG cap-and-trade program and related activities, the proposed energy-efficiency and renewable electricity standard, and rebates for low-income individuals—would significantly expand agencies' workloads. In addition, many other provisions of H.R. 2454 would require federal agencies to undertake a variety of rulemakings, conduct studies and assessments, prepare reports, and carry out other activities related to new programs authorized under the bill. Finally, under the bill certain agencies, particularly EPA and the Department of Labor, would have to establish and administer programs to distribute proceeds from auctions of emissions and consumption allowances to state and local governments, private-sector firms, and certain individuals.

In total, CBO estimates that fully funding federal agencies' administrative costs would require gross appropriations totaling \$540 million in 2010 and \$8.2 billion over the 2010-2019 period. That estimate is based on historical information on how large regulatory programs have been implemented and on information provided by EPA, FERC, and other agencies with significant administrative responsibilities under the bill. Assuming appropriation of the necessary amounts, we estimate that gross spending by affected agencies would total \$430 million in 2010 and \$7.9 billion over the next 10 years.

In some cases, agencies would charge fees to offset a portion of their administrative costs. In particular, FERC, which has authority to offset 100 percent of its administrative costs through fees on regulated entities, would levy additional fees sufficient to offset any increased administrative costs incurred under H.R. 2454. Based on information from FERC, CBO estimates that increased user fees to that agency would offset roughly \$40 million of annual estimated costs under H.R. 2454. Consistent with current budgetary treatment, such fees would be recorded as offsetting collections, thus reducing the net appropriations that would be necessary to implement the legislation to roughly \$7.8 billion over the next 10 years. CBO estimates that net outlays resulting from that amount of funding would total \$390 million in 2010 and \$7.5 billion over the 2010-2019 period.

Energy-Efficiency Programs. H.R. 2454 would establish new programs and requirements aimed at improving the energy efficiency of major sectors of the economy. Most of those activities would be administered by DOE and EPA. (Those agencies' costs to implement energy-efficiency programs are included in our estimate of funding for administrative costs.) CBO estimates that fully funding programmatic elements of energy efficiency programs under the bill—including a wide array of grants and other forms of assistance to nonfederal entities—would require \$6.7 billion over the 2010-2019 period. That amount includes:

- \$3.1 billion for activities to increase lighting efficiency;
- \$2.1 billion to improve the energy efficiency of federal and nonfederal buildings; and
- \$1.5 billion for energy-efficiency programs aimed at industry and certain state and local governments and for other related activities.

Assuming appropriation of the necessary amounts, CBO estimates that implementing energy-efficiency programs under H.R. 2454 would cost about \$300 million in 2010 and \$6.2 billion over the 2010-2019 period.

Vouchers to Purchase or Lease Fuel-Efficient Vehicles. H.R. 2454 would authorize the appropriation of \$4 billion for DOT to operate a one-year program to provide vouchers for the purchase or lease of a new car or truck to individuals who trade in an eligible vehicle for one that is more fuel efficient. The eligible vehicle would have to be subsequently dismantled. The vouchers would range in value from \$3,500 to \$4,500 depending on the type of vehicle being purchased and the difference in the fuel economy from the eligible vehicle.

Based on information from DOT, CBO estimates that up to 77 million vehicles sold over the 1990-2006 period could fall below the 18-mile-per-gallon threshold specified in the bill. Of those, CBO expects that fewer than 25 million would both still be registered and be worth less than the voucher amounts. The vast majority of those vehicles are trucks. Information from the automotive industry suggests that most owners of those vehicles are not currently in the market for a new vehicle and that a relatively small voucher—the average light-duty truck costs more than \$25,000—is unlikely to induce them to purchase or lease new vehicles. Current cash incentives from manufacturers and dealers have not significantly increased car sales. Sales of new vehicles in the United States are projected to total about 10 million in calendar year 2009, down from 16 million in 2007, a portion of which are fleet sales and would not be eligible for the program. In addition, financial constraints in the form of credit availability and additional monthly payments by the consumer would play a role in limiting the use of the vouchers. At the same time, it is

likely that most vouchers would be used by individuals with eligible vehicles who are currently in the market for a new vehicle or soon will be.

Further, CBO does not expect a significant number of vouchers to be used on purchases that occurred before the enactment of the bill. As a result of the combination of these factors and the limited time that the program would be available, CBO estimates that about 625,000 vouchers would be used, that it would cost DOT about \$55 million to administer the program, and that the program would cost about \$2.6 billion in 2010 and the same amount over the 2010-2014 period.

Clean Energy Programs. H.R. 2454 would establish new programs and requirements aimed at promoting clean energy. CBO estimates that fully funding those activities, which would be implemented primarily by DOE, EPA, and the Department of Education, would require appropriations totaling \$2.6 billion over the 2010-2019 period. That amount includes:

- \$1.5 billion for activities related to modernizing the nation's electricity infrastructure, including \$550 million for rebates on purchases of certain appliances;
- \$870 million to establish centers to focus on research and development of clean energy technologies;
- \$250 million for the Department of Education to award grants educational agencies, postsecondary institutions, and representatives from the community to develop programs of study focusing on emerging careers and jobs in renewable energy, energy efficiency, and climate-change mitigation; and
- \$22 million for other activities.

Assuming appropriation of the necessary amounts, CBO estimates that implementing clean energy programs under H.R. 2454 would cost \$92 million in 2010 and \$2.4 billion over the 2010-2019 period, with additional spending occurring in later years.

Provisions with Major Budgetary Impacts That Begin After 2019

No later than 2022, the President would be required to assess the extent to which the distribution of emission allowances has mitigated or addressed carbon leakage. (Carbon leakage is defined in the legislation as any substantial increase in GHG emissions by industrial entities located in other countries if such increase is caused by an incremental cost of production increase in the United States resulting from the implementation of the GHG cap-and-trade program.) Specifically, if the President determines that more than 70 percent of global output for each eligible sector is produced or manufactured in

countries that meet certain criteria, such as being a party to an international agreement to which the United States is a party, then the President may implement an International Reserve Allowance Program within two years of that determination. Under such a program, foreign manufacturers and importers would be required to pay for and hold allowances to cover the carbon contained in U.S.-bound products. CBO expects that revenues generated from this program could be significant.

Under this legislation, starting in 2025 proceeds from auctions of allowances would be deposited into the Climate Change Consumer Rebate Fund. The Secretary of the Treasury would provide tax refunds on a per-capita basis to each household in the United States that would collectively equal the amount deposited into that fund.

INTERGOVERNMENTAL AND PRIVATE-SECTOR IMPACT

CBO has determined that the non-tax provisions of H.R. 2454 contain intergovernmental and private-sector mandates as defined in the Unfunded Mandates Reform Act. Several of those mandates would require utilities, manufacturers, and other entities to reduce greenhouse gas emissions through cap-and-trade programs and performance standards. CBO estimates that the aggregate cost of mandates in the bill would well exceed the annual thresholds established in UMRA for intergovernmental and private-sector mandates (in 2009, \$69 million and \$139 million respectively, adjusted annually for inflation). In some cases, because of a lack of information about future regulations, CBO has no basis for estimating the costs of the mandates.

Mandates That Apply to Both Public and Private Entities

Cap-and-Trade Program for Greenhouse Gases. The cap-and-trade program for GHG emissions (excluding HFCs) would require covered facilities to submit one allowance per metric ton of carbon dioxide equivalent emitted beginning in 2012. The compliance costs for covered facilities would be the expenditures made in acquiring allowances, the cost of purchasing offset credits, and the cost of directly reducing their emissions of GHGs. Based on estimates of those costs and accounting for the initial allocation of free allowances, CBO estimates that the cost of this requirement would amount to tens of billions of dollars annually for private-sector entities and about \$1 billion annually for public entities.

Although not available to cover the mandate costs of the cap-and-trade requirements, about \$50 billion in allowances would be provided to states over the 2012-2016 period for specific purposes, including programs for improving energy efficiency, implementing regulations, and supporting other climate change programs (see additional discussion under “Other Impacts on State and Local Governments” below).

Reporting Requirements. Public and private entities also would be required to report information on greenhouse gases to a federal registry. Assuming EPA’s proposed rule for a federal registry of greenhouse gases is adopted under current law, CBO expects that most public entities and some private entities would already be required to report, and therefore the public sector would incur minimal costs. However, CBO expects that additional private-sector entities would be required to report information to the registry under the bill. Based on information about compliance costs from EPA’s impact analysis of the proposed rule, CBO estimates that the reporting requirements could increase costs to private entities by about \$50 million per year.

The bill also would impose reporting requirements on public and private entities to assist with implementing the cap-and-trade program. CBO expects that the cost to comply with those mandates would be small.

Carbon Capture and Sequestration Assessments. Section 114 would authorize the Carbon Storage Research Corporation to collect annual assessments on public and private utilities following a referendum by the affected utilities. The funds collected along with an allocation of emission allowances would be used to support the development of technologies related to CCS. The bill also would require state regulatory authorities to indicate whether they support or oppose the creation of the corporation. Assuming that the referendum is approved, all utilities would be required to pay the assessments. The assessments would be based on the amount of electricity delivered to retail customers, and would generate between \$1.0 billion and \$1.1 billion annually. CBO estimates the annual cost to be between \$150 million and \$175 million for public utilities and \$850 million and \$925 million for private utilities. The cost of the requirement to regulatory authorities would be small.

Performance Standards for Coal-fueled Power Plants. Section 116 would establish performance standards for new sources of power from coal power plants. Those requirements would compel owners and operators of new units of electric generation (EGUs) to reduce annual CO₂ emissions and would apply to both public and private power plants. Beginning in 2020 or 2025, at the latest, EGUs would be required to reduce annual emissions of CO₂ by 50 percent or 65 percent, depending on when the EGU received a preconstruction permit. The cost of the mandate would be either the cost of adopting CCS or switching to a different fuel source. Because EGUs would likely use CCS technology, along with other measures, to comply with the cap-and-trade program established in the bill, CBO cannot determine the extent to which EGUs would adopt additional CCS technology due to the performance standard alone. Consequently, the cost of the mandate is uncertain.

Emission Reduction Standards. Section 331 would direct EPA to publish an inventory of stationary sources that emit greenhouse gases that are not covered by the federal cap-and-trade program. The inventory would include categories of sources responsible for a

certain percentage of uncapped emissions. Based on information from EPA, those categories could include landfills, natural gas systems, and small fuel combustion sources. The bill would require EPA to establish performance standards for those categories, which could include standards for work practices as well as technological standards. Section 333 would authorize EPA to propose regulations to reduce emissions of black carbon or to publish a finding that existing regulations adequately control such emissions. Because the costs to comply with the new standards established by sections 331 and 333 would depend on future regulatory action, CBO has no basis for estimating the cost of these mandates.

Limitations on Transactions in Commodities. Subtitle E of Title III would impose several mandates on participants in certain commodities markets. Those mandates would include limits on the number of contracts that can be held (known as “position limits”) as well as transaction and reporting requirements, with respect to energy commodities, on public and private entities such as pension funds and swap dealers. The bill would impose other requirements on transactions, including fees for transactions executed on certain exchanges. Because of limited information about the transactions in the affected markets, the position limits that would be established, and the extent to which position limits would result in lower returns, CBO has no basis for estimating the cost of the mandates to public or private-sector entities.

Combined Energy Efficiency and Renewable Electricity Standard. Section 101 would create a renewable portfolio standard for certain electricity suppliers. Covered entities would have to submit credits to certify that a minimum percentage of their base sales came from renewable sources. Approximately 21 public and 105 private utilities would be subject to those requirements. As noted earlier in the discussion of federal effects, CBO anticipates electricity generated from renewable sources on a national level to be greater than the amount that would be required by the standard in the first five years that mandate is in effect. Therefore, CBO expects the costs associated with this mandate to be small in those years.

Other Mandates. The bill contains several mandates that would affect both public and private entities, but CBO estimates that the costs of those mandates would be small:

- Sections 121 and 152 would require state regulatory authorities and nonregulated utilities to consider implementing certain standards relating to electric vehicle infrastructure and the ability of federal agencies to generate electricity and sell it back to utilities;
- Section 144 would require both public and private electric utilities to publish goals for reducing peak demand reduction and to prepare a plan that demonstrates their ability to meet those goals; and

- Section 332 would authorize EPA to establish new requirements governing the repair of air conditioners in motor vehicles.

Mandates That Apply to Public Entities Only

The bill would impose some mandates solely on public entities, some of which would be preemptions of state and local authority. CBO estimates that the costs of those intergovernmental mandates would be small:

- Section 216 would require the District of Columbia to purchase certain products and services designated to be water efficient by EPA or DOE.
- Section 224 would direct the Secretary of Energy to revise the list of vehicles available for states to comply with an existing mandate that a certain percentage of fleet purchases be alternative fueled vehicles.

Preemptions of State and Local Authority. In addition to the mandates discussed above, H.R. 2454 contains several preemptions of state and local authority. Because preemptions limit the authority of state and local governments, they are considered intergovernmental mandates under UMRA, but CBO estimates that those preemptions would not impose significant additional costs on state, local, or tribal governments as regulators.

- Section 161 would expand an existing preemption of state laws that set energy standards for appliances to include walk-in coolers and freezers as well as commercial refrigerators, freezers, and ice makers.
- Section 211 would preempt state and local laws governing the energy efficiency of certain outdoor luminaires.
- Section 619 would preempt state laws relating to the production and import of certain hydrofluorocarbons.
- Section 861 would preempt state authority to enforce a cap-and-trade program that covers any capped emissions during the years 2012 through 2017.

Other Impacts on State and Local Governments

The bill would provide allowances to states for a number of specific purposes. States would create State Energy and Environment Development (SEED) accounts for implementing building regulations and programs to retrofit buildings. SEED accounts could also be used to provide rebates to low-income individuals for the purchase of energy efficient homes and to fund grants to community development organizations for

energy efficiency programs. States could also use SEED allowances for transportation planning, smart grid development, and financial incentives to convert or construct manufacturing facilities and expand renewable energy. Other allowance allocations would be available for natural resource adaptation, infrastructure improvements, and programs to benefit low-income consumers of home heating oil or propane. CBO estimates that the allowances would total about \$50 billion through 2016.

In addition, the bill would authorize several grant programs for workforce training, transportation planning, environmental protection, research initiatives, and energy efficiency. Those grant programs would benefit participating state, local, and tribal governments, and any costs would be incurred voluntarily as a condition of receiving federal assistance.

Mandates That Apply to Private Entities Only

Hydrofluorocarbon Restrictions. The cap-and-trade program for HFCs would require any entity that produces or imports HFCs, or imports a product containing HFCs, to hold one consumption allowance or destruction offset credit per metric ton of carbon dioxide equivalent beginning in 2012. The direct cost would be equal to the cost of purchasing allowances and offset credits, and the cost of reducing the use of HFCs. The bill also would impose several other requirements for the use of HFCs including restrictions on HFCs used in refrigeration and labeling and reporting requirements.

Based on the price of a consumption allowances established in the bill, CBO estimates that the cost of this requirement would amount to about \$600 million in the first year the mandates are in effect.

Lighting and Appliance Efficiency Standards. The bill would establish new requirements for lighting and appliances. CBO estimates that the aggregate cost of those mandates would exceed the threshold in at least one of the first five years the mandates are in effect. Those requirements include:

- Efficiency standards for outdoor luminaries, portable light fixtures, art work fixtures, incandescent reflector lamps, and certain base lamps;
- Efficiency standards for appliances including commercial hot food holding cabinets, water dispensers, portable electric spas, and commercial furnaces; and
- Inclusion of Smart Grid capability on Energy Guide labels for appliances, if required by the Federal Trade Commission.

Allowances for Carbon-Intensive Goods. The bill would establish two programs to mitigate the costs to manufacturers of carbon-intensive goods. The bill would provide rebates in the form of allowances to those manufacturers and authorize EPA to

implement an international reserve allowance program. If implemented, that program would require importers of carbon-intensive goods to purchase and submit international reserve allowances for those goods beginning in 2025. The cost of the mandate would depend on the price of an international reserve allowance and the number of international reserve allowances required to be submitted for those goods.

Motor Vehicle Standards. The bill would authorize the Secretary of Transportation to establish a standard for the manufacture of vehicles capable of using alternative fuels such as ethanol, methanol, and biodiesel. The bill also would direct the EPA to establish emissions standards for new heavy-duty vehicles and engines. Because both standards would depend on future regulatory action, the costs of the mandates are uncertain.

ESTIMATE PREPARED BY:

Federal Revenues: Mark Booth, David Weiner, Pamela Greene, Edward Harris, Kevin Perese, and Grant Driessen.

Federal Costs: Susanne S. Mehlman and Daniel Hoople (cap-and-trade programs), Megan Carroll (RES, clean energy programs, energy efficiency programs), Kathleen Gramp (CEDA), Christi Hawley Anthony (Department of Labor), Sarah Puro and Matthew Pickford (vouchers for fuel-efficient vehicles), and Susan Willie (CFTC)

Allowance Prices: Robert G. Shackleton Jr., Rob Johansson, Terry Dinan, and Natalie Tawil

Impact on State, Local, and Tribal Governments: Ryan Miller

Impact on the Private Sector: Amy Petz

ESTIMATE APPROVED BY:

Theresa Gullo
Deputy Assistant Director for Budget Analysis

Frank J. Sammartino
Acting Assistant Director for Tax Analysis

Joseph Kile
Assistant Director for Microeconomic Studies

Robert A. Dennis
Assistant Director for Macroeconomic Analysis

June 5, 2009

Honorable Henry A. Waxman
Chairman
Committee on Energy and Commerce
U.S. House of Representatives
Washington, DC 20515

Dear Mr. Chairman:

The Congressional Budget Office has prepared the enclosed cost estimate for H.R. 2454, the American Clean Energy and Security Act of 2009.

If you wish further details on these estimates, we will be pleased to provide them. The CBO staff contact is Susanne S. Mehlman, who can be reached at 226-2860.

Sincerely,

Douglas W. Elmendorf

Enclosure

cc: Honorable Joe Barton
Ranking Member