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AMERICA'S CLIMATE SECURITY ACT OF 2007

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Mrs. BOXER, from the Committee on Environment and Public Works, submitted the following

R E P O R T

together with

MINORITY VIEWS

[To accompany S. 2191]

[Including cost estimate of the Congressional Budget Office]

The Committee on Environment and Public Works, to which was referred a bill (S. 2191) to direct the Administrator of the Environmental Protection Agency to establish a program to decrease emissions of greenhouse gases, and for other purposes, having considered the same, reports favorably thereon with an amendment, and recommends that the bill, as amended, do pass.

GENERAL STATEMENT AND BACKGROUND

INTRODUCTION

The past 20 years have seen a concerted global effort to grapple with the challenge of climate change, an effort that began with the creation of the Intergovernmental Panel on Climate Change (IPCC) to investigate and report on climate science. That period has also been marked by the U.S. ratification and international entry into force in 1994 of the UN Framework Convention on Climate Change (UNFCCC) and the entry into force in 2005 of the Kyoto Protocol for the reduction of greenhouse gas (GHG) emissions.

During the mid-1990's the United States played a leading role in the formulation and negotiation of the Kyoto Protocol and its implementing rules, lending the lessons of its experience under domestic environmental laws like the Clean Air Act to the process of

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crafting the GHG emissions reduction program embodied in the Kyoto Protocol. In recent years, the U.S. role in the international process receded. Domestic climate policies have been modest at best.

Perhaps the most striking development during this 20-year period, however, has been the ever-increasing urgency of the warnings issued by the worldwide scientific community acting through the IPCC that rapid manmade climate change unchecked by measures to reduce GHG emissions poses a grave and potentially catastrophic threat to both human society and unmanaged ecosystems.

Accordingly, in December 2007 the Environment and Public Works Committee reported comprehensive climate legislation aimed at responding to these warnings—by instituting both a robust GHG emissions reduction program and an equally robust program for developing and deploying new clean energy technologies. The Climate Security Act (S. 2191) would achieve substantial reductions in U.S. GHG reductions over a nearly 40-year period beginning in 2012 and culminating in 2050, with reductions in total U.S. GHG emissions below 2005 levels of as much as 66 percent.[1] In addition, S. 2191 would raise substantial resources from the industries responsible for GHG emissions and recycle those resources, largely to the private sector, including electric utilities and other businesses, in order to: (1) spur the rapid development and commercialization of clean energy, energy conserving, and other GHG emission-reducing technologies that will trigger substantial growth in domestic "green collar" jobs; (2) assist communities, individuals, and companies that could be affected by the costs of transitioning to lower GHG-emitting energy sources; and, (3) support efforts to protect people and ecosystems from the effects of rapid climate change.

A key feature of the GHG reduction program is its "cap and trade" architecture. Through cap and trade, S. 2191 will assure that the intended reductions in GHG emissions are actually achieved. At the same time, the program will enable GHG sources to engage in emissions trading; this will afford full flexibility for businesses operating under the program and create a dynamic market for GHG emissions reductions. Thanks to this market, GHG emitting businesses will be able to use the lowest cost GHG reductions to meet their obligations; indeed, the dynamics of the GHG market, like those of any other market, will ensure that overall reductions are achieved at the lowest possible cost.

A number of other features of the GHG reduction program created by the Climate Security Act, such as the timetable established for sources' compliance with their reduction obligations and the allocation of reduction obligations between and among industrial sectors, are aimed not only at reducing overall costs, but also at minimizing disruptions to energy and fuel markets and to consumers as the U.S. economy gradually transitions to full compliance with the required GHG reductions.

Coupled with the Climate Security Act's comprehensive GHG emissions reduction program is a similarly comprehensive program for fostering the development and commercialization of new, clean technologies, with particular focus on the electricity and transpor-

[1] http://www.nrdc.org/legislation/factsheets/leg__07121101A.pdf.

tation sectors. The Act establishes an Energy Technology Deployment Program as well as an Energy Transformation Acceleration Fund, which would be administered by the Advanced Research Projects Agency of the Department of Energy. These funds would operate through financial incentives to speed the development and commercialization of sustainable energy technologies, low-carbon electricity technologies, advanced biofuels like cellulosic ethanol, CO_2 capture and storage systems, electric and plug-in hybrid electric vehicles and high-efficiency consumer products.

Because technology innovation and deployment are central to long-term climate policy, and because certainty is essential to private investment as well as to public programs, the Act strives to ensure that funding for these programs will be forthcoming. In effect, the Act's technology policy will be "self-funding". The mechanics of the GHG emissions reduction program require each covered source of GHG emissions to hold one GHG emissions allowance for each ton of CO_2–equivalent the source generates. The Act creates these allowances, and they are distributed in part via allocation and in part via an auction conducted by the Climate Change Credit Corporation (Corporation). It is the Corporation that will be responsible for conducting the allowance auctions, collecting the proceeds and disbursing the proceeds to the technology programs created by the Act. Thus, the bill's GHG reduction program and its technology program function in a mutually reinforcing fashion, resulting in a comprehensive and a fully integrated policy approach to addressing GHG emissions and climate change.

Finally, the Committee recognized that a robust national climate policy must address several issues with which that policy is interlocked. As a result, the Act creates funds specifically aimed at assisting energy consumers in responding to potential new costs resulting from reducing GHG emissions; training and/or re-training workers affected by the GHG reduction program; assisting efforts to protect ecosystems and wildlife threatened by climate change; and providing resources to protect U.S. national security and economic interests by investing in certain key efforts to address climate change overseas.

CLIMATE CHANGE SCIENCE AND IMPACTS

In its work on climate change, the Committee turned to the premier body for analysis of climate change research: the IPCC. The IPCC was established in 1988 by the World Meteorological Organization to synthesize on an ongoing basis developing peer-reviewed climate research. Marshalling the active participation of thousands of scientists worldwide, the IPCC has released four major assessments of climate science since 1990, each relying on peer-reviewed work. The IPCC assessments have reported increasing certainty about the threat and causes of climate change. So great is the deference that policy-makers and the worldwide scientific community affords these assessments that in 2007, the IPCC was awarded the Nobel Peace Prize "for their efforts to build up and disseminate greater knowledge about man-made climate change, and to lay the

foundations for the measures that are needed to counteract such change."[2]

The IPCC's general finding that the emissions of greenhouse gases from human activities are warming the planet is also supported by the American Association for the Advancement of Science,[3] the American Geophysical Union,[4] the American Chemical Society,[5] the American Meteorological Society[6] and 13 National Academies (including the United States' National Academy of Sciences).[7]

The most recent Fourth Assessment Report (AR4) was released by the IPCC in 2007. AR4 represents six years of work from over 1,200 authors who are leading experts in their respective fields. An additional 2,500 experts reviewed drafts of the report, which was released when participant countries, including the U.S., had signed off on the results. AR4 Working Group I found that levels of carbon dioxide in the atmosphere "have risen from a pre-industrial value of about 280 ppm to 379 ppm in 2005."[8] This "exceeds by far the natural range over the last 650,000 years." Levels of methane, another greenhouse gas, have risen from 715 ppb to 1774 ppb, an increase also far greater than the natural range over the last 650,000 years. AR4 concluded that evidence of climate warming is now "unequivocal," and that it is more than 90 percent likely that human activities have caused "most of the observed increase in globally averaged temperatures since the mid-20th century." The extra energy trapped in the atmosphere by these greenhouse gases not only increases the global temperature ("global warming"), but also changes the amount and distribution of rainfall, increases severe weather and heat waves, melts polar and mountain ice caps, and causes sea levels to rise.

According to AR4, the specific impacts of continued warming in North America include the following:[9]

- Hot extremes, heat waves and heavy precipitation will become more frequent.
- "Coasts are projected to be exposed to increasing risks, including coastal erosion, due to climate change and sea-level rise, and the effect will be exacerbated by increasing human-induced pressures on coastal areas."
- Warming in North America's western mountains is projected to cause "decreased snowpack, more winter flooding and reduced summer flows, exacerbating competition for over-allocated water resources."
- "Disturbances from pests, diseases and fire are projected to have increasing impacts on forests, with an extended period of high fire risk and large increases in area burned."
- Heat waves increasing in frequency put the "growing number of the elderly population * * * most at risk."

Internationally, the impacts of climate change are likely to be even more severe. The IPCC predicts that by 2020, in Africa, 75

[2] http://nobelprize.org/nobel_prizes/peace/laureates/2007/.
[3] http://www.aaas.org/news/releases/2007/0202ipcc.shtml.
[4] http://www.agu.org/sci_soc/policy/positions/climate_change2008.shtml.
[5] http://portal.acs.org/portal/fileFetchC/WPCP_007661/pdf/WPCP_007661.pdf.
[6] http://www.ametsoc.org/POLICY/2007climatechange.html.
[7] http://www.nationalacademies.org/includes/G8Statement_Energy_07_May.pdf.
[8] IPCC, AR4, Working Group, Summary for Policy Makers.
[9] IPCC, AR4, Working Group II, Summary for Policy Makers.

million to 250 million people will be exposed to increased water stress as a result of climate change, and that the yield of some crops could decline by up to 50 percent. In Asia, climate change, combined with other factors, could lead to water stress for more than one billion people. Millions more worldwide will experience coastal flooding.

Within the range of temperatures that could result at the end of this century on a fossil-energy intensive trajectory, the IPCC predicts that there will be "significant extinctions around the globe"; "widespread coral mortality"; loss of about 30% of global coastal wetlands; decreased productivity of all cereal crops at low latitudes; and a "substantial burden on health services" as a result of malnutrition, heat stroke, diarrheal, cardio-respiratory, and infectious diseases.

In considering these impacts, it is important to note one way in which climate change differs from conventional air pollution. Air pollutants like ozone and particulates do not last very long in the atmosphere. As a result, aggressive reductions in the emissions of those pollutants and their precursors will lead to a rapid improvement in air quality. In general, policy responses that occur within the same timeframe in which damage from conventional pollution manifests itself are still timely. For GHG emissions, the virtual opposite is true, as GHG gases remain in the atmosphere for long time periods. Once damage from these pollutants emerges, policymakers simply do not have the option of adopting measures that can reduce atmospheric concentrations in the near term. By then, it is literally too late. Because of the long lifetime of GHGs in the atmosphere and the tremendous amount of physical inertia in the climate system, we will be unable to avert or reverse severe climate impacts if we wait until we observe those impacts. The current levels of greenhouse gases, for example, commit us to an increase of at least another 1–1.6 °F of warming, even if we could stop emitting GHGs tomorrow. Similarly, the rise of sea levels in response to emissions of GHGs will continue for hundreds of years as the heat from climate change slowly mixes through the ocean.

NATIONAL SECURITY AND CLIMATE CHANGE

In addition to the ecological and health impacts, rapid climate change poses potential national security challenges for the U.S. In April 2007 the Center for Naval Analysis Corporation (CNA) issued a report, *National Security and the Threat of Climate Change*, which detailed the numerous threats posed by climate change.[10] The military advisory board that oversaw the report was chaired by General Gordon R. Sullivan, U.S. Army (Ret.). It was comprised of a distinguished panel of retired military officers from all service branches.

The CNA report addressed three specific questions: (1) What conditions are climate changes likely to produce around the world that would represent security risks to the United States? (2) What are the ways in which these conditions may affect America's national security interests? (3) What actions should the nation take to address the national security consequences of climate change?

[10] http://www.SecurityAndClimate.cna.org.

The CNA report found that global climate change poses a significant threat to America's national security. The extreme weather and ecological conditions associated with climate change have the potential to "disrupt our way of life and to force changes in the way we keep ourselves safe and secure." [11] Some of the destabilizing impacts described in the report include: reduced access to fresh water, impaired food production, human health emergencies and mass population displacement. These outcomes will have security consequences on the United States. The CNA analysis predicted, for example, that these conditions will increase the potential for failed states, and thus the growth of global terrorism. Given that many of the countries likely to experience these conditions do not have governments in place capable of handling challenges posed by the effects of climate change, particularly conflicts over scarce resources, there is strong potential for extremists to fill the void.

If unchecked, climate change is expected to trigger mass migrations of people. Lack of water and food will force the movement of people, both within their own borders and internationally. In the United States,"the rate of immigration from Mexico to the U.S. is likely to rise because the water situation in Mexico is already marginal and could worsen with less rainfall and more droughts. Increases in weather disasters, such as hurricanes elsewhere, will also stimulate migrations to the U.S." [12] Storm damage and sea level rise in the Caribbean islands will also contribute to an increase in the flow of immigrants into the U.S.[13] The issue of immigration has become a seemingly intractable political and social issue in the U.S. that may not be resolved any time soon. An increased influx of "climate refugees" will only exacerbate the stress on the current U.S. immigration system.

In addition to these indirect risks to national security, there are also direct impacts on U.S. military infrastructure and operations. Climate change will stress our weapons systems, threaten U.S. bases throughout the world, and have a direct effect on military readiness.[14] Under catastrophic climate change scenarios, "the U.S. military's worldwide reach could be reduced substantially by logistics and the demand of missions near our shores." [15] In order to prepare for—or avoid—such impacts, the CNA report found that the national security implications of climate change should be incorporated into national security and national defense strategies. "As military leaders, we know we cannot wait for certainty. Failing to act because a warning isn't precise is unacceptable." [16]

Included in the CNA's recommendations for mitigating the impacts of climate change is a call for the U.S. to commit to both a national and international policy that will stabilize climate change at levels that will avoid the significant security impacts the report outlines. In addition, in order to prevent or lessen instability abroad, the U.S. should commit to global partnerships that help

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[11] National Security and the Threat of Climate Change, The CNA Corporation, 2007, page 6.

[12] Purvis, N, and J. Busby, 2004. The Security Implications of Climate Change for the UN System. ECSP Report, Issue 10.

[13] Campbell, Kurt M. et al., The Age of Consequences: The Foreign Policy and National Security Implications of Global Climate Change, November 2007, page 56.

[14] National Security and the Threat of Climate Change, The CNA Corporation, 2007, page 37.

[15] Campbell, Kurt M. et al., The Age of Consequences: The Foreign Policy and National Security Implications of Global Climate Change, November 2007, page 86.

[16] National Security and the Threat of Climate Change, The CNA Corporation, 2007, page 46.

less developed nations build the capacity and resiliency to better manager climate impacts.[17]

Furthermore, the Center for Strategic and International Studies and the Center for a New American Security found in their November 2007 report The Age of Consequences: The Foreign Policy and National Security Implications of Global Climate Change that "Climate stress may well represent a challenge to international security just as dangerous—and more intractable—than the arms race between the United States and the Soviet Union during the Cold War"[18] Clearly, climate change can be regarded as a "threat multiplier"[19] that will result in increased demands and stresses on the U.S. and the world. Addressing global climate change will help keep Americans and American interests abroad secure.

THE PATH TO AVOIDING SEVERE CLIMATE CHANGE

In order to stabilize greenhouse gases below 500 ppm (CO_2 equivalent), the safest stabilization scenario presented by the IPCC, the IPCC recommends that global carbon dioxide emissions must be stabilized by 2015 and reduced 50 to 85% below 2000 levels by 2050.[20] "For low and medium stabilization levels, developed countries would need to reduce their emission to below 1990 levels in 2020 * * * and to still lower levels by 2050 (40 to 95% below 1990 levels)."[21] The IPCC concludes that "mitigation over the next two or three decades will have a large impact on opportunities to achieve lower stabilization levels"—meaning that failure to start reductions now will commit the world to very high concentrations of greenhouse gases.

The Climate Security Act achieves reductions on the order of those recommended by the IPCC for stabilization of global greenhouse gas concentrations. For example, the Natural Resources Defense Council (NRDC) and World Resources Institute (WRI) predict that the bill will reduce emissions by up to 13% below 1990 levels by 2020 and up to 60% below 1990 levels by 2050.[22] Similarly, EPA predicts that cumulative U.S. GHG emissions from 2012–2050 will be 172 to 207 gigatons of carbon dioxide equivalent;[23] The Union of Concerned Scientists estimates that U.S. emissions should be held to 73–178 gigatons in order to stabilize GHG concentrations at levels in the range of 450 ppm., as needed to avoid worst effects of global warming. Importantly, the Act also provides for periodic review of the emissions targets by the National Academy of Sciences, including assessment of whether the targets need to be revised to provide sufficient protection.

In early 2008 EPA analyzed the effectiveness of the bill in reducing global CO_2 concentrations using the Mini-Climate Assessment Model (MiniCAM). In its analysis, EPA applied the conservative assumptions that the U.S. makes cuts in GHGs as laid out in S.2191; that other Annex I (developed) countries reduce emissions to 50% below 1990 levels; and that developing nations take no action until

[17] National Security and the Threat of Climate Change, The CNA Corporation, 2007, page 47.
[18] Campbell, Kurt M. et al., The Age of Consequences: The Foreign Policy and National Security Implications of Global Climate Change, November 2007, page 20–21.
[19] National Security and the Threat of Climate Change, The CNA Corporation, 2007, page 44.
[20] IPCC AR4 Working Group III Summary for Policy Makers.
[21] IPCC AR4 WGIII, page 775.
[22] http://www.nrdc.org/legislation/factsheets/leg_07121101A.pdf.
[23] http://www.epa.gov/climatechange/downloads/s2191_EPA_Analysis.pdf.

2025, at which point they move slowly to stabilize emissions at 2000 levels. Under these assumptions, EPA found that carbon dioxide concentrations would be kept to 488 ppm in 2100, rather than reaching levels of 718 ppm or higher as would occur under a "business as usual" scenario.[24] However, this projection may overestimate future CO_2 concentrations, as the European Union currently is planning for reductions on the order of 60–80% below 1990 levels[25] and the analysis by EPA makes the unlikely assumption that no additional reductions are achieved between 2050 and 2100. The EPA modeling demonstrates that U.S. climate legislation, under conservative assumptions about action by the rest of the world, will keep greenhouse gas concentrations from reaching the levels associated with the highest risks of severe climate impacts. Stated another way, early and aggressive action by the U.S. and other developed nations will leave successive generations of policy makers with the option of stabilizing greenhouse gases at much lower levels and a wider range of technologies—and lower cost exposures—with which to achieve the needed reductions. Because of the long lifetime of GHGs in the atmosphere, delayed action will commit all countries to moderate to high climate risks, regardless of aggressive actions they may seek to take at a later date. In the words of the IPCC: "Mitigation efforts and investments over the next two to three decades will have a large impact on opportunities to achieve lower stabilisation levels. Delayed emission reductions significantly constrain the opportunities to achieve lower stabilisation levels and increase the risk of more severe climate change impacts." [26]

TECHNOLOGIES ARE AVAILABLE TODAY TO COMBAT GLOBAL WARMING AND SPUR ECONOMIC GROWTH

The IPCC has determined that achieving the necessary emissions reductions will not require a "magic bullet," but that they can be realized using technologies that are currently available or expected to be commercialized in the next few decades. While the IPCC does not endorse specific policies, the IPCC's AR4 report observes that "an effective carbon-price signal could realize significant mitigation in all sectors." The report highlights the role of energy efficiency in meeting these goals, as well as a need for low-carbon energy sources. It also notes that non-CO_2 and CO_2 land-use and forestry mitigation measures provide additional flexibility and cost-effectiveness in reducing emissions.

Leading industry and public policy experts have conducted extensive analyses regarding how the emissions reductions necessary to combat the worst effects of global warming can be achieved.[27] They have reached a number of important conclusions:

- Our nation has the tools available now to address global warming.

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[24] http://www.epa.gov/climatechange/economics/economicanalyses.html.

[25] http://europa.eu/rapid/pressReleasesAction.do?reference=MEMO/08/35&format=HTML&aged=0&language=EN&guiLanguage=en.

[26] IPCC AR4 Synthesis Report.

[27] McKinsey & Company, Reducing Greenhouse Gas Emissions, How Much and at What Cost? (2007), available online at http://www.mckinsey.com/clientservice/ccsi/pdf/US_ghg_final_report.pdf; S. Pascala and R. Socolow, Stabilization Wedges: Solving the Climate Problem for the Next 50 Years With Current Technologies, Science (2004).

• Many of the needed technologies have already been proven, requiring only a market framework and incentives to achieve widespread adoption.

• Achieving these reductions at the lowest cost to the economy will require strong, coordinated economy-wide action that begins in the near future.

• The bill's cap and trade policy will create a market and financial incentives that will sustain U.S. leadership in the clean technology and energy efficiency industries.

U.S. companies and researchers have led the way in developing a broad spectrum of breakthrough technologies enabling substantial emissions reductions now. Many studies have identified and discussed the numerous emissions reduction technologies and practices that are available now. The AR4 Summary for Policy Makers on Climate Change Mitigation set forth a summary of selected technologies, listed in Figure 1.

FIGURE 1

Sector	Selected technologies and practices to reduce global warming pollution
Energy Supply	Improved supply and distribution efficiency; improved generation efficiency; renewable heat and power (hydropower, solar, wind, geothermal and bioenergy); combined heat and power; nuclear power; early applications of CCS (e.g. storage of removed CO_2 from natural gas).
Transport	More efficient vehicles; hybrid and plug-in hybrid vehicles; cleaner diesel vehicles; biofuels; modal shifts from road transport to rail and public transport systems; non-motorized transport (cycling, walking); land-use and transportation planning.
Buildings	Efficient lighting and day lighting; more efficient electrical appliances and heating and cooling devices; improved cook stoves; improved insulation; passive and active solar design for heating and cooling; alternative refrigeration fluids; recovery and recycle of fluorinated gases; geothermal energy.
Industry	More efficient end-use electrical equipment and processes; heat and power recovery; material recycling and substitution; control of non-CO_2 gas emissions; and a wide array of process-specific technologies.
Agriculture	Improved crop and grazing land management to increase soil carbon storage; improved fertilizer management and use; restoration of cultivated peaty soils and degraded lands; improved rice cultivation techniques and livestock and manure management to reduce methane emissions; dedicated energy crops to replace fossil fuel use; improved energy efficiency.
Forestry/forests	Afforestation; reforestation; forest management; reduced deforestation; harvested wood product management; use of forestry products for bioenergy to replace fossil fuel use.
Waste	Landfill methane recovery; waste incineration with energy recovery; composting of organic waste; controlled waste water treatment; recycling and waste minimization.

For many of these clean energy technologies, achieving broad market adoption can require substantial capital-intensive investments. The Committee heard testimony from many experts who stated that a high degree of certainty regarding the market framework will be a necessary prerequisite to the massive private sector investment that is needed. The bill provides this certainty, establishing a long term reduction path (and therefore market signal) and a framework that includes approximately 87% of our economy's global warming emissions in a single comprehensive cap and trade program.

The bill also provides major financial incentives supporting the widespread adoption of these technologies. It has been estimated that the allocation and auction of allowances under the bill could generate tens of billions of dollars annually that will be dedicated to funding of such green technology deployment.

A study by McKinsey and Company found similar benefits from energy efficiency measures.[28] The study found that the "United States could reduce emissions in 2030 by 3.0 to 4.5 gigatons of CO_2 equivalent using tested approaches and high-potential emerging technologies." Critically, the study found that "almost 40 percent of abatement could be achieved at 'negative' marginal costs"—that is, roughly 40 percent of the needed emissions reductions could be achieved with an efficiency measure which actually saves the economy money.[29]

The Advanced Coal Technology Work Group convened by EPA reported in January that:

> Widespread commercial deployment of [advanced coal and CCS] technologies likely will not occur without legislation that establishes a significant long-term market driver. National mandatory GHG reduction legislation, for example, can provide a carbon price signal that would encourage the widespread deployment of large-scale carbon dioxide capture and sequestration systems. It is critical that any national policy should include provisions that prioritize and encourage early deployment of [advanced coal technology]—particularly CCS.[30]

Other countries have recognized the tremendous economic opportunities presented and have adopted government policies to spur the necessary capital investments; the United States must not fall behind. For example, Japan now controls 43% of the market for solar power, an industry invented in America.[31] European nations control 90% of wind turbine production, and the United States is importing fuel cells from Canada.[32] By creating a new market for global warming emissions and directing tens of billions of dollars to commercialization of clean energy technologies, the bill will position the United States to continue its role as a global economic leader.

These technologies and practices represent more than just solutions to the challenge of reducing global warming emissions. There is widespread agreement that the United States must end our dependence on foreign oil. Renewable energy technology has the potential to displace a large portion of our current reliance on fossil fuels.

These views have been affirmed by leading U.S. businesses. The U.S. Climate Action Partnership, a group whose members include automakers, utilities and power producers, insurance companies, oil companies, and other businesses, has stated:[33]

> In our view, the climate change challenge, like other challenges our country has confronted in the past, will create more economic opportunities than risks for the U.S. economy. Indeed, addressing climate change will require innovation and products that drive increased energy efficiency, creating new markets. This innovation will lead directly to

[28] McKinsey, Reducing Greenhouse Gas Emissions, How Much and at What Cost? (2007).
[29] Id.

[30] http://www.epa.gov/air/caaac/coaltech.html.
[31] http://www.apolloalliance.org/downloads/resources__ApolloReport__022404__122748.pdf.
[32] Id.

[33] http://www.us-cap.org/USCAPCallForAction.pdf.

increased U.S. competitiveness, as well as reduced reliance on energy from foreign sources. Our country will thus benefit through increased energy security and an improved balance of trade.

CLEAN TECHNOLOGY CREATES AMERICAN GREEN COLLAR JOBS

The Committee received testimony from business leaders and experts who focused on the need to transform American industry by creating and growing new categories of "green collar" jobs. With the market incentives provided for in the bill, a number of green industry sectors are expected to experience major job growth. Witnesses highlighted the large potential for green jobs creation when the correct market signals are sent through the adoption of strong legislation to reduce greenhouse gas emissions.

For example, the Committee received testimony from Mr. Sigmar Gabriel, Federal Minister for the Environment, Nature Conservation and Nuclear Safety for the Federal Republic of Germany, that the expansion of the use of renewable energy sources in Germany shows how the nation "is benefiting from its role as a driving force for climate protection: Within just two years, from 2004 to 2006, employment in the renewables sector rose by 50 percent—to 235,000 jobs." Minister Gabriel testified that the German government projects that "renewables will create more than 400,000 jobs by 2020" in Germany, including many jobs dedicated to exporting manufactured products for such technologies.

Among the green collar jobs that are expected to be generated in the United States in response to the strong demand for reduced global warming pollution under S. 2191 are:[34]

• Renewable Electricity. Building the components that are used in solar, wind, geothermal, and other types of renewable energies will create jobs that can apply skills that are similar to those used in traditional manufacturing.

• Energy Efficiency and Green Building. Building and retrofitting structures will require workers in a variety of different areas, including heating, ventilation, air conditioning, windows, plumbing, lighting, insulation, and appliances. Many of these areas, in turn, can lead to job growth in other sectors, such as the manufacturing of energy efficient appliances, building materials, and other products.

• Renewable Biofuels and Transportation. Jobs associated with biofuels are related to feedstock production, refining, and distribution. Opportunities for feedstock production will be more concentrated in rural areas. New jobs associated with transportation include jobs developing and maintaining an improved rail and mass transit networks, and jobs developing, manufacturing, and providing parts for new vehicle technology, such as plug-in hybrids, electric vehicles and fuel cell vehicles.

• Retrofitting Urban Areas. Our major metropolitan areas can achieve substantial emissions reductions by retrofitting buildings with energy- and water-saving green technologies. Thousands of

[34] For a discussion of green jobs see, for example, Roger Bezdek, Management Information Services, Inc., for the American Solar Energy Society, Renewable Energy and Energy Efficiency: Economic Drivers for the 21st Century, 2007; Apollo Alliance, Community Jobs in the Green Economy, 2007; New Energy For America—The Apollo Jobs Report: Good Jobs and Energy Independence (2004).

new jobs will be created, supporting economic transformation in our inner-city areas.

In today's global marketplace, the U.S. faces a real risk of falling behind in the competition to serve the global market for clean energy—which is expected to be the largest new market ever created. The bill will provide a platform that not only will result in decisive action against global warming, but will also create the foundation for continued U.S. leadership in the global economy.

U.S. LEADERSHIP IS CRUCIAL IN THE FIGHT AGAINST GLOBAL WARMING

In reporting the bill, the Committee concluded that U.S. leadership—in the form of a comprehensive and binding emissions reduction program—is a necessary prerequisite to a global response that will avoid catastrophic warming impacts. The rest of the world is waiting to see whether the U.S. will act meaningfully. Given the risks to U.S. interests, including the massive costs and threats to our national security posed by unchecked global warming, the U.S. must take an active leadership role.

Some have argued that the U.S. should not act on its own, but should demand that rapidly developing countries such as China and India accept binding emissions caps as a precondition of U.S. action. This view misconstrues the international dynamics of the global warming challenge, and fails to recognize the importance of U.S. action and leadership in bringing these nations to the table for meaningful action.

It is because the U.S. has by far emitted the greatest cumulative amount of greenhouse gas emissions—and will remain the largest cumulative GHG emitter for some time—that U.S. leadership on this issue is crucial. Were the U.S. to continue the current Administration's voluntary approach to global warming solutions, there is no reason to believe these countries would change course. In the absence of U.S. policy action, international negotiation most likely will result in continued delay on the part of rapidly developing nations. Such delay would create unacceptable risk, jeopardizing the world's ability to reduce GHG concentrations to the levels necessary to stabilizing the climate.

By acting decisively, the U.S. will remove a primary rationalization for inaction by developing countries. The bill thus will provide an effective complement in our efforts to negotiate binding emissions reduction commitments by other major emitters.

The effectiveness of active U.S. leadership coupled with policy action on global environmental issues has been demonstrated before. In 1987, the developed countries, lead by the U.S., entered into the Montreal Protocol, to phase-out use of ozone-depleting chlorofluorocarbons (CFCs). Within three years, developing countries came on board. With the resulting global cooperative approach we have since reduced overall emissions of ozone-depleting substances by more than 95%.

Delaying U.S. action on account of the current inaction of rapidly developing economies would be ironic, precisely because such delay could result in additional costs to the U.S. itself. As the Environmental Defense Fund's detailed testimony before the Committee highlighted, if the bill is enacted with its current 2012 effective date, the emissions reduction schedule would result in an annual

reductions of just under 2% per year and, for covered sources, arrive at a reduction of 15% below current levels by 2020. But if the effective date is delayed by as little as two years while international negotiations are pursued, in order to achieve the same amount of cumulative emissions by 2020, the program would have to mandate that emissions fall by 4.3% every year, a rate more than double that of the current bill. Instead of a reduction of 15% in the annual emissions for the year 2020, two years of delay means 2020 emissions have to be reduced by 23%.

In our history, America has not shied away from taking decisive action in confronting crises, with or without the support of other countries. We have faced other threats to our security, and have not waited for multilateral treaties to take action. Just as we have acted as leaders in the global fights to end disease and promote democracy, America should not shirk from its leadership role now as we face another critical threat.

At the same time, the legislation includes specific measures aimed at promoting a comprehensive global response. To encourage other countries to reduce emissions and minimize unfair competition for affected companies in the U.S., the bill calls for the Executive Branch to intensify its efforts to convince other nations to begin reducing greenhouse-gas emissions. If a major emitting nation has not taken action analogous to that of the U.S. within eight years of the beginning of the program, the President is authorized to require importers of GHG-intensive manufactured products to submit emissions credits equivalent in value to the emissions allowances or emissions reduction credits the bill's GHG reduction program effectively requires of domestic manufacturers. The bill thus creates significant economic incentives for developing countries that are exporters to the U.S. to move forward with comparable programs.

The bill provides positive incentives to the international community. Countries that develop systems of comparable integrity will be able sell international emissions allowances to U.S. companies, creating a substantial potential economic reward for corresponding action.

Developing countries also will benefit from accelerated technology development that will result from the bill. The bill provides for substantial allocation of auction revenues to technology research and development. The bill supports the current U.S. policy of promoting trade in such technologies while eliminating tariffs and other trade barriers. In addition, approximately 20 percent of global greenhouse gas emissions are due to deforestation and land-use changes. The bill creates a special fund to help countries take steps to reduce deforestation and degradation of forests.

THE COST OF INACTION

While there will be economic consequences resulting from climate change legislation, the costs of compliance will be dwarfed by the costs imposed by unchecked climate change. All of the economic analyses to date, both those produced by government and those provided by private entities, compare the trajectory of the U.S. economy under climate legislation to a "business-as-usual (BAU)" scenario that does not account for the costs imposed on the U.S. by a rapidly changing climate. Thus, these BAU scenarios represent

a misleading fiction since they portray a world without climate legislation that is unaffected by climate change itself. In reality, policy makers do not have the option of choosing a world where failure to reduce greenhouse gases does not result in climate-driven economic impacts. Work by the IPCC and others makes it abundantly clear that climate change is already having effects on the global economy and that any future that does not involve rapid stabilization of GHG concentrations inevitably will involve increasingly severe climate impacts, with the potential for severe economic impacts.

Direct comparisons of climate policy (which reduces climate change impacts) to scenarios where no policy is adopted (and more severe climate change impacts occur) has been hindered by the difficulty of making precise predictions about the impacts of climate change. Although the IPCC assigns a very high likelihood to a long list of climate impacts like those described at the start of this report, the precise timing and magnitude of individual events remains difficult to predict. However, as is the case with the threat of terrorism, the fact that the timing and magnitude of any individual event or series of events is difficult to predict does not make the consequences of failing to prepare and mitigate any less severe.

The most comprehensive attempt to quantify the costs of inaction on climate change is the Stern Review on the Economics of Climate Change, authored by Sir Nicholas Stern, former Chief Economist of the World Bank.[35] The Review described climate change as the greatest and widest-ranging market failure ever seen and emphasized that ignoring the issue will ultimately undermine economic growth. The Review found that the impacts of climate change would be at least 5% of global GDP each year and that they could be as high as 20% of GDP or more. The report predicted that the poorest countries will suffer earliest and most and that it will be too late to reverse the process by the time the impacts appear. Impacts on the developed world may be relatively less damaging at first but are "likely to be very damaging for the much higher temperature increases expected by mid- to late-century under BAU scenarios."[36] As with the impacts on the developing world, by the time these impacts are clearly visible, it will be too late to reverse the process and more severe impacts will be on the way. The review estimated that, by contrast, action to keep GHGs at safer levels would be roughly 1% of global GDP.

A review conducted by the Center for Integrative Environmental Research at the University of Maryland recently examined the cost of inaction for the U.S.[37] The report found that the economic impacts of climate change will occur throughout the U.S. economy and impact essential infrastructures for reliable services and high standards of living. The study found that "Climate change impacts will place immense strains on public sector budgets" and that "Negative climate impacts will outweigh benefits for most sectors that provide essential goods and services to society." Another recent study by the Global Development and Environment Institute at Tufts University found that the impact of unchecked global warm-

[35] http://www.hm-treasury.gov.uk/independent_reviews/stern_review_economics_climate_change/sternview_index.cfm.
[36] Stern Review, Page viii.
[37] http://ww.cier.umd.edu/climateadaptation/index.html.

ing on Florida would be 2.8% of GSP by mid-century and 5% of GSP by 2100.[38]

COSTS

The Climate Security Act is designed to minimize the costs that individual businesses and the economy as a whole will incur in meeting the GHG reduction requirements imposed by the bill. First, the bill's cap and trade system for GHG reductions is designed to create a market for GHG reductions, a market in which GHG allowances, representing increments of GHG emissions reduced or avoided, will be purchased, sold and banked for future use. Thus, the price of GHG reductions will be subject to the dynamics of a market, dynamics that will drive prices down. Second, the schedule by which GHG sources will have to meet their GHG reduction requirements has been set to accommodate an affordable transition for businesses that must meet these requirements. In addition, during the early years of the program, the bill provides that a substantial, albeit declining, portion of the emissions allowances that sources need to cover their actual GHG emissions will be allocated free to those sources that will have GHG reduction obligations. Finally, the bill provides for substantial financial assistance in the form of new programs to support the development and commercial-scale deployment of new, clean technologies that will be instrumental in the economy's transition to the GHG reduction policies established under the bill.

The Committee's expectations that the power and dynamics of a GHG market, together with the program's GHG reduction timetable and the bill's technology programs, will result in manageable costs for the GHG reduction program and safeguard the health of the U.S. economy has been borne out by a detailed economic analysis performed by the Environmental Protection Agency (EPA) and Energy Information Administration (EIA). The EPA used a model—Applied Dynamic Analysis of the Global Economy (ADAGE)—that explicitly examined new technology deployment in the power sector of precisely the sort likely to emerge thanks both to the GHG reduction mandates established in the bill and the substantial financial resources that the bill itself provides to the development and commercialization of new technologies[39] ADAGE also models the global economy as well. The EIA modeled the bill using the National Energy Modeling System (NEMS) and produced the only authoritative analysis to date which has fully incorporated the projected impacts of the GHG emission reducing provisions of the Energy Independence and Security Act (EISA) of 2007 (in the Annual Energy Outlook 2008).[40] EPA, in the interests of timely reporting, was only able to approximate EISA in Scenario 10 of its analysis.

It should be noted at the outset that neither EPA's nor EIA's modeling seeks to evaluate the economic impacts of doing nothing to control global warming. However, as is discussed above, the costs of inaction are expected to be enormous and to far outweigh the costs of action. As the Stern Report found, global warming

[38] http://www.ase.tufts.edu/gdae/rp/FloridaClimate.html.
[39] http://www.epa/gov/climatechange/downloads/s2191__EPA__Analysis.pdf.
[40] http://www.eia.doe.gov/oiaf/servicerpt/s2191/index.html.

could shrink the global economy by 5% to 20%, and that taking action now would cost just 1% of global gross domestic product.[41]

Both EPA and EIA predict continued strong growth in the U.S. economy under S. 2191. EPA modeling found that under the bill, U.S. gross domestic product grows by 80% between 2010 and 2030—just one percentage point less than the model predicts for GDP growth in the absence of the bill. EIA similarly found that the GDP impact would be substantially less than one percent, even under "High Cost" assumptions with considerably less nuclear deployment. The overall picture is that, even with different model structures and differing assumptions about technology and economic growth, both EPA and EIA predict that the impact of climate legislation on the U.S. economy would be much smaller than variability between models or even year-to-year shifts in the projections of long term economic growth.

The EPA analysis examined key sectoral impacts of the bill. For coal, and coal-burning utilities, the analysis showed that the GHG reduction requirements—and the resulting price at which GHG allowances will trade in the emissions market, together with the financial support provided for carbon capture and sequestration (CCS) technology will make that technology a commercial reality by 2015. EIA also shows CCS deploying in 2015–17. This early deployment of CCS will ensure that coal can continue to play its current leading role in U.S. electricity production. At the same time, the expected in investment in, and deployment of, CCS will drive natural gas out of the electricity sector to the benefit of manufacturers who rely on natural gas. Thanks to a combination of elements—the free allocation of a substantial portion of allowances to power plants in the early years of the program, the schedule of required reductions, the flexibility and economic efficiency of the auction and trading market and the massive financial support directed to CCS and other energy technologies—according to EPA analysis, increases in average U.S. electricity prices are extremely gradual. The bill also directs more than an estimated $1 trillion to lowering and offsetting U.S. consumers' energy costs over that same period. Considering these and other factors, EIA found impacts on electricity prices similar to those found by EPA, with just "a 3-percent increase in consumers' total electricity costs" through 2030.[42] Evaluations by others using the EIA model indicate that "energy usage drops considerably, due to S. 2191's energy efficiency provisions and price response, and this drop in energy consumption results in lower monthly electrical bills for residential and commercial customers relative to the reference case."[43]

Finally, the EPA analysis addressed the impact of S. 2191 on U.S. global competitiveness. The analysis assumed that other industrialized nations reduced their GHG emissions by less than the U.S., and that developing countries did not even begin to make reductions until 2025. Even under these conservative assumptions, the legislation does not shift U.S. greenhouse gas emissions abroad; as the analysis put it: "no international emissions leakage occurs."

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[41] http://www.hm__treasury.gov.uk/independentreviews/stern__review__economics__climate/sternreview__index.cfm.

[42] http://www.eia.doe.gov/oiaf/servicerpt/s2191/pdf/sroiaf(2008)01.pdf.

[43] Clean Air Task Force, The Lieberman-Warner Climate Security Act—S.2191 Modeling Results from the National Energy Modeling System—Preliminary Results, January, 2008.

In addition, the analysis found that the legislation would lead to an increase in the export from the U.S. of energy-intensive products such as cement and steel. At the same time, U.S. imports of energy-intensive products from developing nations would decrease.

The EPA/EIA analyses included additional scenarios, several of which were performed at the request of critics of climate legislation. These runs, and still other scenarios included in the EPA/EIA analyses, show higher costs and greater dislocation in the energy sector and some industrial sectors. Many of the other scenarios artificially constrain the models in a way that is highly atypical of the American and global economies. They make highly pessimistic assumptions about constraints on technology deployment, the formation of natural gas cartels, and similar uneconomic strategies. In responding to requests for various modeling scenarios last October, the Energy Information Administration concluded that an analysis would be realistic even if it eschewed such pessimistic assumptions about economic and technological responses. For example, EIA found that reference case projections for coal-fired power were "realistic based on current construction activity" and described a hypothetical natural gas cartel as "unlikely to be as successful as an oil cartel due to the geographic distribution and relative abundance of natural gas resources compared to oil."[44] Many of these pessimistic scenarios assume that carbon capture and sequestration technology will not be available until 2030, even though the DOE National Energy Technology Lab[45], the Coal Utilization Research Council (CURC)[46], and the Electric Power Research Institute (EPRI)[47] predict that this technology can be available at least a decade sooner. The CURC and EPRI predict that, given adequate funding for research and development, CCS can provide the same cost and performance as current technology by 2020–2025.[48]

Some alternative cases provided by both EIA and EPA also highlight the importance of offsets (particularly international offsets), in reducing the cost of the program. EPA found that the offset provisions currently in the bill decrease the cost of the program 82%, and that further reducing limits on offsets could reduce the cost of the program 26–71%.

CAP AND TRADE

The reported bill, which, first and foremost, creates a GHG emissions reduction program relies on an approach commonly termed "cap and trade". The choice of cap and trade as the central feature of the emissions reduction program reflects both a broad consensus among stakeholders as well as growing experience in the U.S. in using cap and trade programs to reduce pollution.

Typical of the support for cap and trade systems is the report, "A Call for Action," issued by the U.S. Climate Action Partnership (US CAP), whose membership encompasses leading environmental advocacy organizations as well as leading American companies such as Ford, Caterpillar, Duke Energy, DuPont, Alcoa and Gen-

[44] http://www.eia.doe.gov/oiaf/servicerpt/biv/index.html.
[45] http://204.154.137.14/technologies/carbon_seq/overview/program_goals.html.
[46] http://www.coal.org/pdf/RD&DFactSheet.pdf.
[47] The Power to Reduce CO_2, Emissions in the U.S. Electric Sector, 1/2008 briefing.
[48] http://www.coal.org/pdf/RD&DFactSheet.pdf.

eral Electric.[49] In the report, US CAP, which calls for a mandatory, comprehensive climate policy, describes cap and trade as "essential" to such a policy. Similarly, in testimony before the Committee, the Pew Center on Global Climate Change (Pew), a consortium of 45 major companies promoting climate policy solutions, stated: "Cap-and-trade is the most cost-effective way of reducing greenhouse gas emissions."[50] For a more detailed discussion of some of the benefits of cap-and-trade, see the discussion for Title II.

DISCUSSION OF PROVISIONS AND SECTION-BY-SECTION ANALYSIS

Findings

The most central findings of the Act are: (1) Unchecked global climate change poses a significant threat to the national security and economy of the United States, public health and welfare in the United States, the well-being of other countries, and the global environment. (2) It is possible and desirable to cap greenhouse gas emissions from sources that together account for the majority of those emissions in the United States at or slightly below the current level in 2012, and to lower the cap each year between 2012 and 2050, on the condition that the system includes cost containment measures, periodic review of requirements, an aggressive program for deploying advanced energy technology, programs to assist low- and middle-income energy consumers, and programs to mitigate the impacts of any unavoidable global climate change.

Purposes

The purposes of the Act are: (1) To establish the core of a Federal program that will reduce United States greenhouse gas emissions substantially enough between 2008 and 2050 to avert the catastrophic impacts of global climate change; and (2) to accomplish that purpose while preserving robust growth in the United States economy, creating new jobs, and avoiding the imposition of hardship on United States citizens.

Definitions

The key definitions in the Act are as follows:

"Group I greenhouse gas" refers to carbon dioxide, methane, nitrous oxide, sulfur hexafluoride, and perfluorocarbons. Titles I through IX of the Act regulate emissions of group 1 greenhouse gases.

"Group II greenhouse gas" refers to hydrofluorocarbons. Titles I through IX of the Act regulate hydrofluorocarbon emissions that result from the manufacture of hydrochlorofluorocarbons. Title X of the Act regulates other hydrofluorocarbon emissions.

The term "carbon dioxide equivalent" means, for each greenhouse gas, the quantity of the greenhouse gas that the Environmental Protection Agency determines makes the same contribution to global warming as one metric ton of carbon dioxide.

The term "covered facility" means—

- any facility that uses more than 5,000 tons of coal in a year;

[49] http://www.us-cap.org/USCAPCallForAction.pdf.
[50] Testimony to EPW, November 15, 2007.

• any facility that is a natural gas processing plant or that produces natural gas in the State of Alaska, or any entity that imports natural gas (including liquefied natural gas);

• any facility that in any year manufactures, or any entity that in any year imports, petroleum- or coal-based liquid or gaseous fuel, the combustion of which will emit greenhouse gas, assuming no capture and sequestration of that gas;

• any facility that in any year manufactures for sale or distribution, or any entity that in any year imports, more than 10,000 carbon dioxide equivalents of greenhouse gas, assuming no capture and destruction or sequestration of that gas; and

• any facility that in any year emits as a byproduct of the manufacture of hydrochlorofluorocarbons more than 10,000 carbon dioxide equivalents of hydrofluorocarbons.

Title I—Capping greenhouse gas emissions

Background—The goal of the bill is to reduce U.S. GHG emissions to levels compatible with achieving a global atmospheric concentration of CO_2-equivalent GHG that prevents runaway climate change and the predicted, potentially catastrophic, damage that such a change would impose on human society and unmanaged ecosystems. The bill's approach is straightforward—to achieve overall reductions in U.S. GHG emissions by mandating that approximately 2,100 covered facilities of GHG emissions achieve actual reductions in their emissions under a regime that makes them legally accountable for limiting the total amount of GHG they may emit in each year from 2012 through 2050.

For sources obligated to limit their GHG emissions compliance is specified as a requirement for the source to hold a GHG emissions allowance for each of GHG emissions the source generates each year from 2012 through 2050. Since the total number of GHG emissions allowances created by the bill is finite, then the aggregate effect of this is to place a cap on U.S. GHG emissions generated by the three major GHG-emitting sectors of the U.S. economy. Each year, the number of GHG allowances created by the bill diminishes by 106 million tons or 1.8 percent. Thus, during the life of the program, overall GHG emissions of covered facilities must reach 2005 levels in 2012. In 2020 GHG emissions by covered facilities are brought to 15 percent below 2005 levels and in 2050 GHG emissions of these facilities are reduced to 71 percent below 2005 levels—a reduction that is projected to bring total U.S. GHG emissions to 66 percent below 2005 levels in that year.[51]

Title I establishes the system by which the EPA will track each source's GHG emissions and the number of GHG allowances it holds at the end of each year. In addition, the provisions of Title I specify the compliance obligations for major GHG-emitting sectors.

Summary

Subtitle A—Tracking emissions

Subtitle A requires each covered facility to submit to EPA periodic reports on the facility's emissions of greenhouse gases and on activities at the facility that affect its emissions. The subtitle re-

[51] http://www.nrdc.org/legislation/factsheets/leg__07121101A.pdf.

quires facilities to begin reporting in 2008, and to report emissions from as far back as 2004. The subtitle requires EPA to make the emissions data publicly available.

Sec. 1101. Purpose. Section 1101 states that the purpose of subtitle A is to establish a Federal greenhouse gas registry that is complete, consistent, and transparent.

Sec. 1102. Definitions. Section 1102 defines "affected facility" as a covered facility or other facility designated by EPA. The section prohibits EPA from designating, as an "affected facility," any small business or any facility that emits fewer than 10,000 carbon dioxide equivalents per year. The term "affected facility" is used to describe facilities that are required to file periodic emissions tracking reports under Subtitle A, a broader universe than "covered facilities," emissions of which are directly controlled in the bill's cap and trade program.

Sec. 1103. Reporting Requirements. Section 1103 directs each affected facility to submit data on its greenhouse-gas emissions to EPA electronically. The section requires annualized data for 2004 through 2007 and quarterly reports from 2008 onward.

Sec. 1104. Data Quality and Verification. Section 1104 directs EPA to develop comprehensive protocols and methods to ensure accurate, complete, consistent, and transparent data on greenhouse-gas emissions and fossil-fuel production and use. The section declares that the protocols shall require best practices, including continuous emissions monitoring where technically feasible.

Sec. 1105. Federal Greenhouse Gas Registry. Section 1105 directs EPA to establish and manage the greenhouse-gas registry. The section establishes an advisory body of stakeholders; provides for electronic submission, verification, and auditing of data; includes policies for calculating carbon content and emissions from fossil fuels; and requires EPA to publish data to the public on the Internet. The section declares that confidential business information not related to greenhouse-gas emissions shall not be made publicly available.

Sec. 1106. Enforcement. Section 1106 allows EPA to bring civil actions against facilities that fail to comply with registry requirements. The civil penalty for noncompliance is set at up to $25,000 per each day of each violation.

Discussion—This subtitle creates a key component for establishing, ensuring and enforcing sources' compliance with their GHG emissions limitation obligations. The provisions of this subtitle require affected GHG sources to monitor, quantify and report their total annual GHG emissions so that the EPA can establish and maintain a database for each source's GHG emissions. Since the quality, reliability, accuracy and timeliness of each source's GHG emissions data are crucial to the integrity of the compliance program, section 1106 authorizes EPA to bring civil actions for substantial penalties against sources that fail to meet their emissions reporting requirements. Finally, this subtitle permits the EPA some flexibility in promulgating rules so that even facilities that are not "covered facilities" subject to the GHG emissions limitation obligations of this Title can be required to report their emissions. Data from these facilities may be essential to determining the trajectory of overall U.S. GHG emissions or to designing complementary climate policies in future years.

Subtitle B—Reducing emissions

For each year from 2012 through 2050, subtitle B establishes an Emission Allowance Account containing a specific number of emission allowances. The subtitle requires each covered facility, at the end of each year from 2012 through 2050, to submit to EPA one emission allowance for each carbon dioxide equivalent of group I greenhouse gas (or hydrofluorocarbon emitted as a byproduct of hydrochlorofluorocarbon manufacture) that the facility emitted in that year.

Each year's Emission Allowance Account contains 106 million fewer emission allowances than the preceding year's Account. It is the increasing scarcity of emission allowances, together with the requirement that a covered facility submit one allowance for each carbon dioxide equivalent emitted, that causes the aggregate emissions of covered facilities to decrease over time. The number of allowances in the 2050 Account is 70 percent smaller than the number of allowances in the 2012 Account.

Sec. 1201. Emission Allowance Account. Section 1201 identifies, for each year from 2012 through 2050, the number of emission allowances in that year's Emission Allowance Account. The section identifies 5.775 billion as the number of emission allowances in 2012's Emission Allowance Account. The number of emission allowances set forth for each subsequent year is 106 million lower than the number set forth for the preceding year.

Sec. 1202. Compliance Obligation. Section 1202 declares that, not later than 90 days after the end of a calendar year, each covered facility shall submit to EPA an allowance for each carbon dioxide equivalent of:

- group I greenhouse gas that was emitted by that facility during the preceding year from the use of coal;
- group I greenhouse gas that will (assuming no subsequent capture and destruction or sequestration) be emitted from the use of any petroleum- or coal-based liquid or gaseous fuel that was produced or imported by that facility during the preceding year;
- group I greenhouse gas that was manufactured for sale or distribution or imported by that facility during the preceding year;
- group II greenhouse gas that was emitted by that facility during the preceding year as a byproduct of hydrochlorofluorocarbon manufacture; or
- group I greenhouse gas that will (assuming no subsequent capture and destruction or sequestration) be emitted from the use of any natural gas or natural-gas liquid that was, by that facility during the preceding year, processed, imported, or produced and not re-injected into the field.

The section directs EPA, when calculating the amount of group I greenhouse gas that was emitted by a facility in a given year from the use of coal, to subtract the number of metric tons of carbon dioxide that the owner or operator of the facility geologically sequestered during that year.

The section directs EPA to retire an allowance immediately upon its submission to EPA pursuant to one of the section's submission requirements.

The section directs EPA each year to establish and distribute, to each entity that uses petroleum- or coal-based product, natural gas, or natural-gas liquid as a feedstock, the quantity of allowances that were submitted for that feedstock by a covered facility, minus the number of carbon dioxide equivalents of greenhouse gas that the facility released to the atmosphere from the feedstock.

The section declares that, with regard to all allowance submission requirements other than the one stemming from the use of coal, if EPA determines that a covered facility has geologically sequestered carbon dioxide during any of years 2012 through 2050, EPA shall establish and distribute to that facility a quantity of emission allowances equal to the number of metric tons of carbon dioxide that the owner or operator of the facility geologically sequestered during that year.

The section declares that if EPA determines that an entity has destroyed greenhouse gas during any of years 2012 through 2050, EPA shall establish and distribute to that entity a quantity of emission allowances equal to the number of carbon dioxide equivalents of greenhouse gas that the entity destroyed during that year.

Sec. 1203. Penalty for Noncompliance. Section 1203 sets the penalties for failure to submit the appropriate number of allowances for a given calendar year. The penalty, per allowance, for noncompliance in a given year is three times the mean annual market value of an allowance or $200, whichever is greater. Proceeds from non-compliance are deposited into the Treasury. In addition to the fine, owners or operators of covered facilities must submit a plan to offset the excess emissions with allowances in the following calendar year. Facilities that are allocated allowances for transition assistance will have the excess allowances automatically deducted from the following year's allocation.

Sec. 1204. Rulemaking. Section 1204 directs EPA to expand, by rule, the definition of "covered facility" to capture all greenhouse-gas emissions from the flaring, processing, production, and sale of natural gas. The purpose of this provision is to account for greenhouse-gas emissions not accounted for under the original definition of covered facility. It is not the intent to regulate natural gas that is already directly regulated upstream. Ensuring an adequate and reasonably priced supply of natural gas is an important component to addressing global warming, especially in the short term.

Discussion—Subtitle B creates, via the EPA, an Emissions Allowance Account for each calendar year from 2012 through 2050 inclusive. The size of the Year 2012 Account is 5.775 billion allowances, which represents the quantity of GHGs, in CO_2 equivalents, emitted by all the covered facilities in 2005. For each of the 38 years of the program, the EPA will reduce the number of allowances in the Emissions Allowance Account by 106 million, or 1.8 percent of the initial 5.775 billion. The size of the Account for Year 2050 is 1.732 billion allowances, representing a 70 percent reduction in the GHG emissions generated in 2005. These reductions will be achieved by approximately 2100 sources that meet the definition of "covered facility". Sources that do not meet the terms of this definition—*e.g.*, farms, residential and commercial buildings have no GHG emissions limitation obligations.

This subtitle also establishes the sectors whose sources are subject to mandatory GHG emissions limitations. It exempts emissions

from coal combustion in circumstances in which those emissions are captured before release into the atmosphere and stored in underground reservoirs. The subtitle provides that natural gas processors are liable to GHG emissions limitations so that the entire natural gas sector is encompassed by the GHG emissions reduction program. At the same time, it specifies that the EPA is to allocate allowances to companies that use natural gas as a feedstock. This allocation is intended to offset the economic cost to manufacturers that they otherwise might bear if and when the costs of compliance with the emissions limitations on natural gas are passed on to these manufacturers.

Should the owners or operators of these facilities fail to turn into EPA an allowance for the CO_2 equivalent of each ton of GHG the facilities emit, they are subject to a series of automatic penalties. Following the highly successful precedent established by Title IV of the Clean Air Act, which established the SO_2 cap and trade program, the "automaticity" of these penalties is designed to ensure both the environmental and economic integrity of the GHG emissions cap and emissions market. First, for those non-complying sources for which EPA is required to allocate allowances in the year following the noncompliance, EPA must deduct from the next year's allocation the number of allowances equal to the number of tons the source emitted in excess of the allowances it held. This, of course, creates a built-in or automatic obligation for the source to offset its excess emissions immediately. Second, the source must pay an automatic fine equal to a multiple of the market price of an allowance; thus, sources will face a strong economic incentive to achieve timely compliance with their GHG emissions obligations. The size and "automaticity" of the penalty negates the prospect that sources otherwise might "arbitrage" noncompliance.

Title II—Managing and containing costs efficiently

Summary

Title II institutes, from the inception of the program, five mechanisms designed to reduce the amount of money that owners and operators of covered facilities otherwise would need to spend to ensure that the number of allowances they submit does not fall short of the number of carbon dioxide equivalents they have emitted. The five mechanisms are trading, banking, borrowing, offsets, and international credits. They are intended not only to reduce compliance costs, but also to minimize volatility in the market price of an emission allowance. Offsets additionally are intended to enlist the participation of non-covered facilities in the project of reducing greenhouse-gas emissions.

The title places no limitation on the use of trading and banking. It does limit the use of borrowing, offsets, and international credits, but it also creates a Carbon Market Efficiency Board that is empowered to authorize increased resort to those three mechanisms if the Board finds that the emission allowance market otherwise would pose a significant harm to the economy.

The Board is allowed to authorize increased use of borrowing, offsets, and international credits as early as two years after enactment. If, having done so, the Board then finds that more is needed to avoid significant economic harm, it is empowered to increase by

up to 5 percent the number of allowances comprising the next year's Emission Allowance Account. The Board is then required to decrease the size of subsequent years' Accounts, such that, within 15 years' time, the cumulative number of emission allowances issued up to that point is no larger than it would have been if the Board had never increased the size of a year's Account.

The Board is required to conduct the market-wide borrowing described immediately above if, 180 days after it has authorized increased resort to company-specific borrowing, the average daily market price of an emission allowance exceeds the upper range of a projection that the Congressional Budget Office is directed to have made by July 1, 2014.

Subtitle A—Trading

Subtitle A allows anyone to buy, hold, sell, and retire emission allowances. Because the allowances can be bought and sold freely, a market develops, and the price of an emission allowance becomes uniform across the market. The owner or operator of a covered facility that can reduce its own emissions at a cost lower than the market price will do so. If those reductions leave the owner or operator with more allowances than it needs to cover its own emissions at the end of the year, the owner or operator will sell the surplus on the market. An owner or operator of a covered facility that cannot reduce its own emissions without incurring a cost that exceeds the market price will purchase credits on the market in lieu of reducing its emissions. The market thus enables owners and operators of covered facilities to comply with the law at a cost lower than the one they would bear in the absence of trading.

Sec. 2101. Sale, Exchange, and Retirement of Emission Allowances. Section 2102 declares that the lawful holder of an emission allowance may, without restriction, sell it, exchange it, transfer it, submit it for compliance, or retire it.

Sec. 2102. No Restriction on Transactions. Section 2102 declares that the privilege of purchasing, holding, selling, exchanging, and retiring allowances shall not be restricted to covered facilities.

Sec. 2103. Allowance Transfer System. Section 2103 directs EPA to promulgate rules to carry out the provisions of the Act relating to emission allowances. The section declares that those regulations shall establish procedures whereby an entity may transfer an emission allowance before EPA has distributed that allowance to the entity.

Sec. 2104. Allowance Tracking System. Section 2104 declares that the rules promulgated under section 2103 shall establish a system for issuing, recording, and tracking emission allowances, and that the system shall specify all necessary procedures and requirements for ensuring an orderly and competitive market in allowances.

Subtitle B—Banking

Subtitle B allows owners and operators of covered facilities to hold onto allowances as long as they wish. An owner or operator thus will be able to maintain a reserve of allowances. Such reserves will reduce the number of allowances that owners and operators will need to purchase when market and auction prices are high.

Sec. 2201. Indication of Calendar Year. Section 2201 states that allowances submitted for compliance do not need to indicate the calendar year for which the allowance was submitted.

Sec. 2202. Effect of Time. Section 2202 clarifies that allowances do not expire or diminish in compliance value over time.

Subtitle C—Borrowing

Subtitle C directs EPA to promulgate regulations allowing the owner or operator of any covered facility to satisfy up to 15 percent of a given year's compliance obligation with allowances borrowed from future years. The subtitle specifies a 10 percent annual interest rate on such "loans" and imposes a five-year limit on the term of any loan.

Sec. 2301. Regulations. Section 2301 directs EPA to develop regulations allowing a covered facility to borrow allowances from future years and to submit them in satisfaction of up to 15 percent of the facility's annual compliance obligation.

Sec. 2302. Term. Section 2302 declares that allowances may not be borrowed from any farther than 5 years in the future.

Sec. 2303. Repayment with Interest. Section 2303 declares that the number of allowances that a covered facility must submit in a year from which it has borrowed allowances must be the number of allowances that it borrowed from that year, multiplied by 10 percent, multiplied by the number of years separating that year from the earlier year in which the borrowed allowances were submitted.

Discussion—Subtitles A, B and C set down the rules that create the structure—and dynamics—of the GHG emissions reduction market. By allowing sources to purchase and sell allowances, the bill permits the private sector to find and use the lowest-cost reductions for compliance with their GHG emissions limitations. Allowing sources to "bank" reductions—by making more reductions than required and saving unused allowances for compliance in future years—brings both economic and environmental benefits. Sources that create a supply of additional or excess reductions when they can achieve those reductions at lower cost, will, by using those banked allowances in later years, be able to curb their costs in later years should future reductions become more expensive. At the same time, because of the time lags associated with GHG emissions, the atmosphere benefits from reductions achieved earlier. Finally, by creating an explicit economic value for incremental GHG emissions reductions, the GHG emissions market also creates an incremental financial incentive for, and incremental financial return on, investment in innovations leading to GHG emissions reductions.

Another feature of the GHG allowance trading market created by these subtitles is the option afforded sources, under certain conditions, to "borrow" allowances or incremental GHG reductions from future years to offset for purposes of compliance GHG emissions in a current year. This option grants sources additional flexibility to manage their financial and compliance demands in the most economically efficient way possible. Of course, since "borrowing" allowances from future years represents a delay in achieving required reductions, the borrowing program in effect requires sources to "make the atmosphere whole" by achieving greater reductions in

later years than the GHG emissions from the added earlier years as a result of allowance-borrowing.

Together with Title I, these subtitles constitute a comprehensive "cap and trade" program for GHG. Cap and trade was first introduced in the U.S. in 1989 by then-President George H.W. Bush as an innovative strategy for reducing the pollutants that caused acid rain. With bipartisan support, the 101st Congress incorporated the Bush cap and trade proposal in the Clean Air Act Amendment of 1990. Since 1990, the cap and trade approach first used in the acid rain program has enjoyed continued bipartisan support, having been incorporated several times in legislative proposals and pollution control regulations put forward by both the Clinton administration and the current Bush administration. The GHG emissions reduction program in the Committee-reported bill sought to capture the benefits of the acid rain approach; thus the Committee bill incorporates almost all of the key elements of the acid rain program.

The success—and popularity—of the cap and trade approach reflects several factors. First, in contrast to other approaches (*e.g.,* taxes or technology standards or mandates), imposing a cap on emissions ensures that the full measure of required emissions reductions specified by Congress will be achieved. Second, businesses can operate with far more flexibility under a cap and trade program than under more traditional pollution control programs. Third, under cap and trade, businesses can buy and sell the difference between their actual emissions and their legally mandated emissions levels. Cap and trade literally creates a market for emissions reductions and what markets do best is drive costs down. As a result, individual businesses can find the lowest cost way to reduce their emissions—including by purchasing surplus reductions from other sources that can achieve them at lower cost. The overall cost of the program, in turn, will be that much lower. At the same time, markets are the single most effective driver of innovation; thus, a market for GHG emissions reductions is certain to spur significant innovations in reducing GHG emissions.

All of these factors informed the Committee's decision to rely on the cap and trade model because of the distinctive nature of the challenge confronting climate policy. GHG emissions are inextricably bound up in virtually the entire suite of modern activity, encompassing energy, manufacturing, transportation, land use and agriculture. As a result, a successful climate policy must put a premium not only on success in achieving the required emissions reductions, but on mobilizing the widest range of economic and social resources to minimize costs, maximize innovation and safeguard the growth of economic prosperity. Experience has taught that it is well-designed and appropriately regulated markets that are best suited for achieving these outcomes. Thus, the Committee set out to create an economy-wide market for GHG emissions reductions, one that spans and integrates all major sectors and businesses, and virtually all forms of economic activity that can contribute to the cost-effective net reduction of aggregate U.S. GHG emissions.

Under the GHG reduction program established by the reported bill, the Environmental Protection Agency (EPA) will distribute to each power plant a fixed number of emissions "allowances," each of which gives the owner the authorization to emit one ton of CO_2-equivalent in any one year. A plant may then sell the allowances

to another plant provided that at the end of the year it surrenders to the EPA enough allowances to cover its emissions for that year. Allowances that are not used to cover emissions in one year may be saved for use in later years, an option known as "banking." Because the number of emissions allowances the EPA distributes every year is fixed, then, by definition, an allowance remaining in excess of a plant's emissions represents an "extra" reduction that may be transferred to another plant to cover its incremental emissions. No matter how many or how few allowances are transferred total emissions always remain constrained by the cap.

Given the premium the Committee put on ensuring the economic viability of the GHG reduction program created by the bill, one of the key sets of features the bill creates is flexibility for businesses and efficiency in the regulatory process under which they will operate. With the enactment of the acid rain program in 1990, Congress created a new paradigm for combating pollution, a paradigm that overthrew the traditional discretionary powers of environmental regulators even while making it more certain that the full measure of promised emissions reductions would be delivered to the public and the environment. With the objective of ensuring business flexibility and regulatory efficiency, the Committee bill perpetuates and extends that same new paradigm.

To understand the value of this approach, it is worth contrasting the Committee bill with other pollution control programs. Between 1970, when the "modern" Clean Air Act was first adopted, and 1990, programs to control air pollution were characterized by requirements focusing on how sources of emissions operated. State and federal regulators were empowered and called on to assess the cost, feasibility, and effectiveness of various technologies, methods, and processes for reducing emissions from the operations of various classes of sources. On the basis of those assessments, regulators would impose either specific technology requirements or operational parameters such as emissions rate requirements on plants and factories. Compliance was defined in terms of meeting those operational parameters, not in terms of meeting specified emissions reduction targets. Often, plants were subject to detailed operating permits, and enforcement resources went toward ensuring that plants developed and submitted compliance plans and met the operational milestones delineated in the plans, rather than focusing on actual emissions performance. To a significant extent the approach worked. According to many key indicators, air quality in the United States improved substantially.

By 1990, however, the performance of the traditional approach was often burdened by a broad range of flaws. In many cases, the full increment of pollution reductions that had been promised, predicted, or assumed when operational requirements were adopted had not been achieved. Because compliance was defined simply in terms of technologies or operating parameters, however, nobody, including the polluters themselves, was legally accountable for the failure to achieve the expected levels of total reductions. With fewer than the expected and needed pollution reductions achieved, key ambient air-quality standards were often not attained. Specifying technologies or operating parameters was not enough to limit total emissions discharges.

At the same time, the costs of these programs were high. The regulatory community's resources often were inadequate for collecting and processing the range of information needed to formulate operational requirements for whole classes of sources.

As a result, plants were forced to operate with limited flexibility. Once the requirements and implementing permits were put in place, the capacity to absorb new information and respond to inevitable and ongoing economic and other operational changes was virtually nonexistent. Although the characteristics of sources varied, requirements tended to be uniform and thus many sources were subject to expenses that could have been avoided in more flexible systems. Simultaneously, sources that could have adopted more effective or innovative control technologies had no incentive to do so. At the same time, regulators, mindful of the need to control costs, compromised the stringency of requirements either in setting the standards or in negotiating individual permits and "variances" to permits, all at the cost of total emissions reductions achieved.

In contrast, under the GHG program established by the Committee bill, each business, rather than outside regulators, will determine how the business meets its obligations. Under the bill's GHG program, the business is legally accountable for achieving a specified level of emissions reductions—with the options of using surplus reductions achieved in earlier years, or acquiring low-cost surplus reductions from other sources, to offset its own GHG emissions increases—and for little else save continually monitoring and reporting its actual emissions. The only job that EPA regulators have to do is ensure that each source meets its monitoring and reporting requirements and that its actual annual GHG emissions equal the number of allowances or offsets the source holds.

How businesses reduce their GHG emissions has been left completely to the discretion of the businesses themselves. As a result, it is up to them to manage the continually changing economic, technical, and other circumstances in which they are operating and to integrate their basic business activities with their obligation to meet their emissions cap. The burden and the opportunity of lowering costs are placed squarely on the businesses. At the same time, because of the built-in cap-based structure of the program, cost savings through emissions trading in no way lessens the amount of total emissions reductions or their environmental benefit.

Critical to the character and success (and not just the mechanics) of the program is the fact that the aggregate number of allowances circulated every year is fixed, or capped. As a result of this design, businesses must plan for economic growth and change while operating against a limit on their total GHG emissions. This cap and trade regime gives businesses a direct financial incentive to reduce emissions below required levels. Extra reductions, in the form of unused allowances, give companies flexibility to offset increases in emissions in one location with reductions in another. In addition, businesses, like electric utilities, can optimize control by reducing emissions when it is least expensive to do so and then bank the surplus allowances for future use or sale. Consequently, extra reductions give power plants and industrial sources the flexibility needed to respond to economic demands and opportunities while meeting their compliance obligations under the cap.

Furthermore, through emissions trading, businesses have the means, as well as the incentive, to find the lowest-possible-cost ways of achieving compliance anywhere within the entire economy and to reap financial rewards for developing those means. Under this program, each business can choose between and among various compliance alternatives, ranging from energy-efficient technologies, to capturing CO_2-emissions from smokestacks, to changing their materials or processes, to acquiring allowances or offsets from other businesses that can make reductions more cost-effectively. By including emissions trading in the full suite of compliance options open to companies, the program enhances the ability of the interlocking emissions, financial and commercial markets to find the most efficient responses. As has already been demonstrated in the acid rain emissions trading market, the GHG market will succeed in reducing costs by fostering implicit or "latent" emissions trading as well as active trading. Put another way, emissions trading places all compliance options in direct competition with each other. Of course, any program that permits flexibility in compliance choices does this. Because of emissions trading, however, that competition is geometrically expanded in the GHG market. Different compliance options do not compete with each other only at any one facility. Because emissions trading allows a facility operator to choose to apply a compliance option at its own site or, in effect, at any other affected facility that can make surplus emissions allowances or reductions available, the facility operator's range of choices are much broader, the competition among them much more intense, and the capacity of that competition to lower costs much, much greater. Again, as the acid rain market has shown, the different compliance alternatives will be forced to compete with one another even more vigorously. In the acid rain program, the expected result has occurred: Compliance costs have been driven steadily downward. The same result will prevail in the much larger, and even more dynamic, GHG market.

Subtitle D—Offsets

Subtitle D directs EPA, in conjunction with the Secretary of Agriculture, to promulgate regulations allowing the owner or operator of any covered facility to satisfy up to 15 percent of a given year's compliance obligation with offset allowances generated within the United States.

Offset allowances are in addition to the emission allowances that comprise the annual Emission Allowance Accounts. Offset allowances come into being when EPA certifies that a non-covered facility has done something that either has reduced the number of carbon dioxide equivalents that the facility otherwise would have emitted in that calendar year or has increased the number of carbon dioxide equivalents that the facility otherwise would have captured from the atmosphere in that calendar year and stored.

Subtitle D specifies procedures and standards that EPA must use in certifying, monitoring, and enforcing offsets. The procedures and standards established in the subtitle are intended to ensure that the emission reductions and sequestration increases certified as offsets by EPA will be real, verified, monitored, permanent, enforced, and additional to what would have happened in the absence of the offset certification.

Sec. 2401. Outreach Initiative on Revenue Enhancement for Agricultural Producers. Section 2401 directs USDA, with various agencies and outside stakeholders, to establish an outreach initiative to provide information to farmers and foresters about opportunities to earn income from offsets.

Sec. 2402. Establishment of Domestic Offset Program. Section 2402 directs EPA, in conjunction with USDA, to promulgate regulations authorizing the issuance and certification of offset allowances. For land-use related projects (agriculture and forestry), regulations are to ensure real, verifiable, additional, permanent, and enforceable reductions in emissions (or increases in sequestration) and to establish procedures outlined in the rest of the subtitle. Non-land use offsets must establish baseline emissions through the greenhouse gas registry (Sec. 1105) and generate real, verifiable, additional, permanent, and enforceable reductions below that baseline. Offset credits may be sold, traded or transferred.

Sec. 2403. Eligible Offset Project Types. Section 2403 lists projects eligible to generate offset allowances, including: Altered tillage practices, cover cropping, conversion of cropland to rangeland or grassland, reduction of fertilizer use, rice-paddy flood management, reduced carbon emissions from organic soils, afforestation, reforestation, forest management, and manure management. EPA can certify other terrestrial offset projects, including the capture of fugitive emissions and the capture/combustion of methane at non-agricultural facilities.

Sec. 2404. Project Initiation and Approval. Section 2404 details the procedures for the initiation and approval of offset projects. Project developers must submit a detailed monitoring and quantification plan and a certification of baseline greenhouse gas emissions (or carbon stock). EPA, in conjunction with USDA, is directed to develop standardized tools and methods for monitoring, quantification, accounting, discounting, additionality, baselines, uncertainty, and acquisition and review of new data and methods.

Sec. 2405. Offset Verification and Issuance of Allowances. Section 2405 directs EPA to develop regulations for third-party verification of offset projects. Verification reports quantify net emissions reductions (or increases in sequestration), which are adjusted to take into consideration a determination of additionality, a calculation of leakage, an assessment of permanence, and discounting for uncertainty.

Sec. 2406. Tracking of Reversals for Sequestration Projects. Section 2406 creates regulations for tracking reversals (for example, a forest fire in a planted forest). Offset projects must submit annual reports detailing the quantities of any unmitigated reversals. If a reversal has occurred, EPA declares the appropriate allowances invalid and requires the submission of an equal number of offsets and/or emission allowances.

Sec. 2407. Examinations. Section 2407 directs EPA to promulgate regulations examining and auditing offsets, including rights and privileges of an examined party and an appeals process.

Sec. 2408. Timing and the Provision of Offset Allowances. Section 2408 specifies that EPA may allow for the transition of pre-existing offsets projects and banked offset allowances if those projects satisfy the requirements of this subtitle.

Sec. 2409. Offset Registry. Section 2409 creates a registry for all certified offsets. The registry shall include verification reports, reversal certification reports, and any other necessary information.

Sec. 2410. Environmental Considerations. Section 2410 directs EPA, in conjunction with USDA, to avoid or minimize negative impacts that offset projects might have on human health or the environment. It requires a report by 2010 on policies associated with offsets that could benefit human health or the environment. It also creates regulations to ensure that native plants are given primary consideration in offset projects and that noxious weeds or invasive plants are not used.

Sec. 2411. Program Review. Section 2411 establishes periodic reviews of the regulations promulgated by this subtitle, beginning 5 years after enactment.

Sec. 2412. Retail Carbon Offsets. Section 2412 directs EPA to establish Energy Star certification for retail carbon offsets (*i.e.*, offsets that cannot be used for compliance under the Act).

Discussion—This subtitle expands the potential reach of the GHG/carbon equivalents reduction market to include sources and activities not otherwise captured in the mandatory reduction program if those sources and activities are able to achieve legitimate GHG/carbon equivalents reductions at a competitive cost. In fact, there is substantial evidence that the agriculture sector, which has no GHG/carbon equivalents emissions limitation obligations under the bill, could achieve cost-effective reductions or cost-effective carbon sequestration. Thus, in keeping with the underlying economic logic of the cap and trade program, this subtitle permits sources to extend their hunt for the lowest cost reductions—or incremental sequestration—to the agricultural sector. The subtitle includes provisions aimed at facilitating that search, and farmers' participation in the GHG/carbon equivalents reduction market.

In contrast to sources mandated to limit their GHG/carbon equivalents emissions via a requirement to match a portion of a fixed total of available emissions allowances, sources not included in the cap and trade program must demonstrate that their incremental reductions, or the increments of carbon sequestration they achieve, represent a genuine net excess reduction—as if they had been issued allowances as part of the cap and trade program. Thus, the requirements of this subtitle are intended to ensure that, via EPA rulemaking and implementation, reduction or sequestration activities proposed for the award of offset allowances truly represent the equivalent in terms of net reductions or sequestration of an allowance issued to a source under the cap and trade program. Such certainty benefits both the purchasers of allowances (by ensuring valid offsets) and the suppliers of offsets (by providing a solid, reliable market). At the same time, the Committee recognizes that the task of ensuring this equivalence may not produce reliable results in all cases. As a result, in order to safeguard both the environmental and economic integrity of the overall GHG/carbon equivalents cap and trade system and incentivize progressive reductions in all sectors, the subtitle imposes a numerical limit on the percentage of offset credits that a source may use in meeting its GHG/carbon equivalents emissions limitation obligations.

Subtitle E—International emission allowances

Subtitle E directs EPA to promulgate regulations allowing the owner or operator of any covered facility to satisfy up to 15 percent of a given year's compliance obligation with international allowances. An international allowance is an emission allowance purchased from a foreign greenhouse gas emissions trading market that EPA certifies as having comparable integrity to the U.S. market, and that exists by virtue of national emissions caps that EPA finds to be of comparable stringency to the caps established by the Act.

Sec. 2501. Use of International Emission Allowances. Section 2501 declares that a covered facility may submit, in satisfaction of up to 15 percent of its compliance obligation in a given year, allowances obtained on a foreign market that EPA has certified in accordance with the regulations promulgated pursuant to section 2502.

Sec. 2502. Regulations. Section 2502 directs EPA to promulgate regulations to implement section 2501. The regulations shall require that, in order to be approved for use, an international allowance shall have been issued by a foreign country pursuant to a governmental program that imposes mandatory absolute tonnage limits on greenhouse-gas emissions from one of more industrial sectors in the foreign country. The regulations shall also require that the foreign governmental program in question be of comparable stringency to the program established for the U.S. by the Act.

Sec. 2503. Facility Certification. Section 2503 requires covered facilities to ensure that international allowances have not been retired in the country of origin.

Discussion—Subtitle E permits sources with GHG/carbon equivalents emissions limitation requirements to reach into overseas GHG emissions trade markets in search of low-cost reductions. As in the case with offset allowances authorized under Subtitle D, this subtitle reflects the economic and environmental logic of GHG emissions trading—that sources should be granted the flexibility to seek and purchase the surplus emissions reductions at the lowest possible cost. By expanding the market, both subtitles D and E intensify the cost-reducing dynamics of the overall GHG emissions trading market created through the cap and trade program while offering sources that much greater flexibility in determining their respective paths to compliance.

Meanwhile, subtitle E requires EPA to ensure that the importation of offsets or allowances from overseas does not compromise the environmental or economic integrity of the cap and trade program. Overseas allowances must represent genuine surplus or excess GHG reductions in precisely the same way that allowance from the Emissions Allowance Account represents a genuine excess reduction. As a result, EPA is specifically mandated to certify that an overseas allowance is generated under a national program that incorporates a comprehensive cap on GHG emissions that is of comparable stringency to that of the cap established under the bill. In addition, the subtitle restricts the quantity of overseas allowances that a source may use as a backstop to the integrity of the overall program by ensuring that the predominant source of compliance by any given U.S. source are allowances issued by EPA from the Emissions Allowance Account.

Subtitle F—Carbon Market Efficiency Board

Subtitle F establishes a Carbon Market Efficiency Board, comprising seven members serving staggered, fourteen-year terms, plus a scientific advisor to ensure that steps taken by the Board are informed by expertise with climate change and its impacts on the environment. All members are appointed by the President with the advice and consent of the Senate. The Board is tasked with monitoring the emissions trading market, periodically reporting to the President and Congress on its operations, and employing specified cost-relief measures under specified circumstances.

Sec. 2601. Purposes. Section 2601 states that the purpose of the Carbon Market Efficiency Board is to implement and maintain a stable, functioning and efficient market in emissions allowances.

Sec. 2602. Establishment of Carbon Market Efficiency Board. Section 2602 establishes the Board and directs it to observe the national greenhouse gas emissions allowance market and submit quarterly reports on the status of the market, its economic costs and benefits, energy investment responses to the market, needed corrective measures, and any instances of fraud or market manipulation. The section directs the President to ensure fair representation of the financial, agricultural, industrial, commercial, and consumer interests, as well as fair representation with regard to geographic region and political party. The section also establishes pay rates for Board members and prohibits them from outside employment or pecuniary interests related to the Act. Board members can be removed by the President for cause. Not later than January 1, 2013, the Government Accountability Office shall begin conducting annual reviews of the efficacy of the Board.

Sec. 2603. Duties. and Sec. 2604. Powers. Section 2603 details information which should be gathered by the Board including: allowance allocation and availability; the price of allowances; macro and micro economic effects of market shifts; thresholds that could warrant cost relief measures; effects of cost relief measures on the market; appropriate levels of cost relief measures; the success of the market in promoting the purposes of the Act; and the functioning of other greenhouse gas markets.

During the first two years of the market's operation, if the average daily closing price of allowances during a 180-day period exceeds the upper range of a projection that the Congressional Budget Office is required to provide by July 2014, then the Board shall increase the quantity of emission allowances that covered facilities may borrow, and may additionally: (1) extend the term of allowance "loans;" (2) lower the interest rate that applies to such "loans;" (3) increase the quantity of international allowances and offset allowances that facilities may submit for compliance; and (4) increase the quantity of allowances in the next calendar year's Emission Allowance Account by as much as 5 percent, provided that the Board decreases the quantity of allowances in subsequent years' Accounts sufficiently to ensure that the cumulative emissions reductions over a fifteen-year period remain unchanged.

After the market has been operating for at least two years, the Board is authorized to employ the measures identified above as necessary to ensure functioning, stable, and efficient allowance markets. The Board is also directed, however, to exercise the meas-

ures incrementally, and only as needed to avoid significant economic harm.

Sec. 2605. Estimate of Costs to Economy of Limiting Greenhouse Gas Emissions. Section 2605 directs the Congressional Budget Office, no later than July 2014, to issue a report on projected emissions allowance prices and the impact of the market on the U.S. economy.

Discussion—The Carbon Market Efficiency Board, a proposal first crafted by a bipartisan quartet of Senators, was designed in effect to "backstop" the cost-reducing dynamics of the cap and trade market—and to do so in a way which avoids undermining the environmental and economic integrity of the cap and trade program. The Board's purpose is to provide relief against sustained, as opposed to short-term, high prices in the allowance market that threaten economic harm. The Board's key tool for serving this purpose would be to authorize different forms of borrowing—that is, by instituting temporary measures permitting additional emissions that were eventually offset by additional reductions in later years. This form of relief would allow prices to drop, while ensuring that over time the atmosphere was "made whole" by means of additional mandatory reductions.

Title III—Allocating and distributing allowances

Title III directs EPA to allocate specified percentages of the Emission Allowance Account to specified recipients for specified purposes.

Subtitle A—Auctions

Sec. 3101. Allocation for Early Auctions. Section 3101 directs EPA, not later than 180-days after enactment, to allocate the following percentages of the quantities of allowances in the 2012, 2013, and 2014 Emission Allowance Accounts to the Climate Change Credit Corporation for early auctioning in accordance with section 4301:

Year	*Percentage of Emission Allowance Account*
2012	5
2013	3
2014	1

Sec. 3102. Allocation for Annual Auctions. Section 3102 directs EPA, not later than April 1, 2011 and annually thereafter through 2049, to allocate a percentage of the quantity of allowances in the subsequent year's Emission Allowance Account to the Climate Change Credit Corporation for annual auctioning in accordance with section 4302. The percentages are as follows:

Year	*Percentage of Emission Allowance Account*
2012	21.5
2013	24.5
2014	27.5
2015	29.5
2016	30.5
2017	31.5
2018	33.5
2019	34.5

Year	*Percentage of Emission Allowance Account*
2020	36.5
2021	39.5
2022	41
2023	43
2024	45.75
2025	48.5
2026	51.5
2027	55.5
2028	58.5
2029	61.5
2030	62.75
2031–2050	69.5

Discussion—Subtitle A establishes the balance between the allocation of allowances without cost to covered entities as well as for other public benefit purposes, and the auction of allowances, presumably to the same universe of entities—that is, sources with mandatory GHG emissions limitations that are most likely to bid to purchase GHG allowances in annual auctions. By requiring a rising proportion of those allowances available to sources with emissions obligation to be auctioned, the subtitle is intended to enhance the economic efficiency of the program. By using the market dynamics of competitive bid auctions that characterize the trading market in the initial distribution of allowances, the bill ensures that the allowances themselves will go to high-value users at a price set competitively between and among businesses. Through the auction's setting of the initial price of allowances, the bill further reduces the overall cost of the emissions reduction program. In contrast, were the bill to allocate all allowances to sources throughout the life of the program, almost all economists agree that this would introduce substantial inefficiencies into the overall economy, and new entrants into the economy would be required to pay market "rents" to those existing stakeholders that had received the allowances originally at no charge. At the same time, the subtitle phases in the auction of allowances over an 18-year period in order to ensure that the major sectors covered by the GHG emissions reduction program are able to accommodate their GHG reduction obligation without undue economic disruption or dislocation.

Subtitle A also provides for the annual auction of allowances to begin immediately so that the Climate Change Credit Corporation can begin the immediate funding of the technology programs created by the bill. To achieve the full measure of GHG reductions mandated by the legislation will require extensive investment in the development and commercial scale deployment of clean technologies. Jump-starting this process is one of the key objectives of the bill's technology programs, and beginning the program as early as possible, even before the GHG reduction program begins, is instrumental to achieving this objective by opening up the technology pipeline.

Subtitle B—Early action

This subtitle provides allowance to companies which have taken early action to reduce greenhouse gas emissions.

Sec. 3201. Allocation. Section 3201 directs EPA, not later than two years after enactment, to allocate percentages of the quantities of allowances in the 2012, 2013, 2014, 2015, and 2016 Emission Al-

lowance Accounts to owners and operators of facilities that emit greenhouse gas, in recognition of actions that the owners and operators have taken since January 1, 1994 and that have resulted in verified and credible emission reductions. The percentages are as follows:

Year	*Percentage of Emission Allowance Account*
2012	5
2013	4
2014	3
2015	2
2016	1

The United Nations Framework Convention on Climate Change, which obligated the United States to reduce its greenhouse-gas emissions, took effect in 1994.

Sec. 3202. Distribution. Section 3202 directs EPA, not later than one year after enactment, to promulgate rules for distributing the allowances allocated under section 3201. The section requires that the rules provide for consideration of verified and credible emissions reductions registered before enactment under a voluntary EPA, Department of Energy, or Energy Information Administration program, a state or regional greenhouse-gas emissions reduction program, or a private voluntary program that resulted in entity-wide greenhouse-gas emissions reductions. Finally, the section directs EPA, not later than four years after enactment, to distribute all of the allowances allocated under section 3201.

Discussion—For the past several years a number of companies of adopted voluntary programs to reduce their GHG emissions. In some cases, these voluntary actions have helped speed along technology development and other GHG-friendly approaches. In recognition of these private sector achievements, this subtitle authorizes the allocation of a portion allowances to these companies.

Subtitle C—States

Subtitle C directs EPA, not later than April 1, 2011 and annually thereafter through 2049, to allocate 10.5 percent of the quantity of allowances in the subsequent year's Emission Allowance Account to states and 0.5 percent to Indian tribes.

Sec. 3301. Allocation for Energy Savings. Subsection 3301(a) directs EPA, not later than April 1, 2011 and annually thereafter through 2049, to allocate 2 percent of the quantity of allowances in the subsequent year's Emission Allowance Account to states that have, by the time of the allocation, adopted de-coupling rules for all natural-gas and electric utilities in those states. De-coupling rules do two things. First, they automatically adjust the rates charged by utilities to fully recover fixed costs of service without regard to whether their actual sales are higher or lower than the forecast of sales on which the rates are based. Second, they make cost-effective energy-efficiency expenditures by investor-owned utilities at least as rewarding to their shareholders as power purchases, energy purchases, and expenditures on new energy supplies, or expenditures on new energy infrastructure.

Subsection 3301(b) directs EPA, not later than April 1, 2011 and annually thereafter through 2049, to allocate 1 percent of the quantity of allowances in the subsequent year's Emission Allowance Ac-

count to states that have, by the time of the allocation, come into synch with the national model building energy codes and standards that are strengthened by section 5201.

Subsection 3301(c) directs EPA, not later than 2 years after enactment, to promulgate rules for distributing the allowances allocated under subsections (a) and (b).

Subsection 3301(d) declares that 90 percent of the allowances allocated to a state under section 3301 shall be retired or used for one or more of the purposes listed in paragraph (1) of subsection 3303(c). No restriction is placed on the use of the remaining 10%.

Sec. 3302. Allocation for States with Programs that Exceed Federal Emission Reduction Targets. Subsection 3302(a) directs EPA, not later than April 1, 2011 and annually thereafter through 2049, to allocate 2 percent of the quantity of allowances in the subsequent year's Emission Allowance Account to states that have, by the time of the allocation, imposed on covered facilities within their borders aggregate greenhouse-gas emissions limitations more stringent than those imposed on such facilities by the Act. The subsection limits the states that may receive such an allocation to ones that have, not later than enactment of the Act, enacted statewide greenhouse-gas emissions reduction targets more stringent than the nationwide targets established by the Act.

Subsection 3302(b) directs EPA, not later than 2 years after enactment, to promulgate rules for distributing the allowances allocated under subsection (a).

Subsection 3302(c) declares that 90% of the allowances allocated to a state under section 3302 shall be retired or used for one or more of the purposes listed in paragraph (1) of subsection 3303(c). No restriction is placed on the use of the remaining 10%.

Sec. 3303. General Allocation. Subsection 3303(a) directs EPA, not later than April 1, 2011 and annually thereafter through 2049, to allocate 4.5 percent of the quantity of allowances in the subsequent year's Emission Allowance Account to states.

Subsection 3303(b) declares that, each year, the allowances to be allocated under subsection (a) shall be divided into equal thirds. The number of allowances that an individual state receives from the first third shall be proportionate to that state's expenditures on the Low Income Home Energy Assistance Program in the preceding year. The number of allowances that an individual state receives from the second third shall be proportionate to that state's population in the most recent decennial census. The number of allowances that an individual state receives from the final third shall be proportionate to the quantity of carbon dioxide that would be emitted assuming that all of the coal mined, natural gas processed, and petroleum refined in that state in the preceding year were combusted, and that none of the resulting carbon dioxide were captured, as determined by the Department of Energy.

Subsection 3303(c) declares that 90% of the allowances distributed to a state under subsection (b) shall be retired or used for one or more of the following purposes:

- to mitigate impacts on low-income energy consumers;
- to promote energy efficiency (including support of electricity and natural gas demand reduction, waste minimization, and recycling programs);

- to promote investment in nonemitting electricity generation technology;
- to improve public transportation and passenger rail service and otherwise promote reductions in vehicle miles traveled;
- to encourage advances in energy technology that reduce or sequester greenhouse gas emissions;
- to address local or regional impacts of climate change, including by accommodating, protecting, or relocating affected communities and public infrastructure;
- to collect, evaluate, disseminate, and use information necessary for affected coastal communities to adapt to climate change (such as information derived from inundation prediction systems);
- to mitigate obstacles to investment by new entrants in electricity generation markets and energy-intensive manufacturing sectors;
- to address local or regional impacts of climate change policy, including providing assistance to displaced workers;
- to mitigate impacts on energy-intensive industries in internationally competitive markets;
- to reduce hazardous fuels, and to prevent and suppress wildland fires;
- to fund rural, municipal, and agricultural water projects that are consistent with sustainable use of water resources; or
- to fund any other purpose that the states determine to be necessary to mitigate any negative economic impacts as a result of global warming or new regulatory requirements resulting from the Act.

The subsection declares that half of the remaining allowances distributed to a state under subsection (b) (i.e., 5% of the allowances distributed to a state under that subsection) shall either be retired or be used for increasing recycling rates through activities such as improving recycling infrastructure; increasing public education on the benefits of recycling (particularly with respect to greenhouse gases); improving residential, commercial, and industrial collection of recyclables; improving recycling system efficiency; increasing recycling yields; and improving the quality and usefulness of recycled materials. No restriction is placed on the use of the remaining 5%.

The subsection declares that, by the start of a given calendar year, a state shall distribute or sell all allowances distributed to it for that year under Subtitle C. Any such allowances not distributed or sold by the state by the start of the year shall be returned to EPA not later than the 35th day of that year.

Subsection 3303(d) directs EPA each year to allocate 0.5% of the allowances in that year's Emission Allowance Account to Indian tribes within the United States pursuant to a program designed to alleviate disruption or dislocation experienced by those tribes as a result of global climate change. The subsection directs EPA, not later than three years after enactment and in consultation with the Department of the Interior, to promulgate rules establishing the program.

Sec. 3304. Allocation for Mass Transit. Subsection 3304(a) directs EPA, not later than April 1, 2011 and annually thereafter through

2049, to allocate 1 percent of the quantity of allowances in the subsequent year's Emission Allowance Account to each year to states.

Subsection 3304(b) declares that the allowances allocated to states under subsection (a) shall be distributed among individual states according to the formula previously established in statute for federal highway aid.

Subsection 3304(c) declares that states receiving emission allowances under this section shall use them (or the proceeds from selling them) only for: The operating costs of state and municipal mass transit systems; efforts to increase mass transit service and ridership in the state, including by adding new mass transit systems; and efforts to increase the efficiency of mass transit systems through the development of innovative technologies that reduce greenhouse-gas emissions. The subsection also declares that each such state shall ensure that at least 60 percent of the allowances or proceeds is used in urban areas and that at least 20 percent is used in non-urban areas.

Subsection 3304(d) declares that any state receiving allowances under the section shall return to EPA any such allowances that the state has failed to use in accordance with subsection (c) within 5 years of receiving them.

Subsection 3304(e) directs EPA to transfer immediately to the Climate Change Credit Corporation, for annual auctioning under section 4302, any allowances returned to EPA under subsection (d).

Discussion: While climate change is undeniably a global problem requiring federal action, many of the necessary policies to support reductions need to be executed at the state, tribal, or local level. During the last decade, while Congress has taken few steps to directly confront climate change, many states have filled the void of federal inaction with their leadership by setting emissions reduction targets and plans, energy efficiency policies, and a host of other innovative solutions to address the challenge. The Climate Security Act affords individual states allowances for use in tailoring programs that best recognize each states strengths, challenges, and opportunities in shifting to a low-carbon economy. In this way states can continue to be laboratories for innovation in climate policy.

States adopting optional but highly effective energy efficiency measures are directly rewarded for such policies under this subtitle. The first provision rewards states that "de-couple" natural gas and electricity markets—removing the perverse incentive for companies to sell as much power as possible and replacing it with an incentive for power companies to seek demand reduction measures that save consumers money over the long run and reduce the need for the construction of new power plants. To date, 13 states have adopted gas decoupling and another 11 have pending gas decoupling legislation while 4 states have adopted electric decoupling and another 6 have pending legislation.[52] The second provision rewards states that have adopted and implemented model building codes that increase the energy efficiency of buildings.

The second section acknowledges the leadership of states that have programs which exceed federal emissions reductions targets. Because state programs that overlap with a federal cap and trade

[52] NRDC.

program will offer unique policy challenges for enforcement and competitiveness, this section gives allowance value to states to allow them to find the best solution to those policy challenges.

The third section provides a large general fund to give states resources to cope with the effects of climate change. The allocation formula for funding in this section is designed to allocate resources between states with very large populations, states whose economies rely on the production of fossil fuels and may need extra assistance with the transition, and states with large low income population that need to be shielded from economic impacts that may arise from the legislation. The bulk of the allowance value may be used for a wide range of purposes related to climate change or impacts of the legislation. A small portion must be used for the improvement and development of recycling programs.

One of the uses for proceeds in the general allocation is for the protection of coastal communities. These provisions recognize that coastal communities in the United States should gather and utilize the most up-to-date information to plan for the impacts of climate change. This planning should be done primarily through state coastal zone management programs which acquire data through the most advanced technology. For example, key components of these programs will be data from inundation prediction systems such as storm surge models; detailed topographic and bathymetric measurements such as those taken using LIDAR; wave measurement systems; and associated visualization and delivery systems that will allow information to be provided in a timely manner and where appropriate down to a street-level scale.

The final section of this subtitle directs allowance value to states to support mass transit and the reduction of vehicle miles traveled. Congress has recently enacted standards to increase fuel economy and reduce the carbon content of fuels. However, it has taken fewer aggressive steps to address the "third leg" of the stool supporting reductions in gasoline demand and carbon emissions from transportation: Per capita vehicle miles travelled. Indeed, unchecked growth in per-capita vehicle miles could erase both the fuel savings and greenhouse gas reduction benefits of the recently enacted fuel economy standards. Increased and more efficient mass transit, combined with "smart growth" planning has the potential to drastically reduce greenhouse gas emissions. It also offers many co-benefits including less traffic, improved air quality, healthier communities, and preserved open space.

Subtitle D—Electricity consumers

Sec. 3401. Allocation. Section 3401 directs EPA, not later than April 1, 2011 and annually thereafter through 2049, to allocate 9 percent of the quantity of allowances in the subsequent year's Emission Allowance Account to the entities, whether public or private, that have a legal, regulatory, or contractual obligation to deliver electricity to retail consumers, and whose rates and costs are, except in the case of a registered electric cooperative, regulated by a State agency, regulatory commission, municipality, or public utility district.

Sec. 3402. Distribution. Section 3402 directs EPA to distribute among the individual entities described in section 3401 the allowances allocated to them under that section. The number of allow-

ances that an individual entity receives shall be proportionate to the amount of electricity that it delivered over the three years preceding the year of the allocation in question, adjusted upward for electricity not delivered as a result of consumer energy-efficiency programs implemented by the entity. The section declares that rural electric cooperatives receiving allowances under subsection 3903(a) shall not receive allowances under this section.

Sec. 3403. Use. Subsection 3403(a) directs each entity that receives allowances under section 3402 to sell each such allowance not later than 1 year after receiving it.

Subsection 3403(b) declares that all proceeds from the sale of emission allowances under subsection (a) shall be used solely: To mitigate economic impacts on low- and middle-income energy consumers, including by reducing transmission charges or issuing rebates; and to promote energy efficiency on the part of energy consumers.

Subsection 3403(c) prohibits any entity that receives allowances under section 3402 from using any proceeds from the sale of allowances to provide any consumer a rebate that is based on the quantity of electricity used by the consumer.

Sec. 3404. Reporting. Subsection 3404(a) directs each entity that receives allowances under section 3402 to submit to EPA each year a report describing: the date of each sale of each emission allowance during the preceding year; the amount of revenue generated from the sale of emission allowances during the preceding year; and how and to what extent the entity used the proceeds of the sale of allowances during the preceding year.

Subsection 3403(b) directs EPA to make the reports described in subsection (a) publicly available on the Internet.

Discussion: Local distribution companies for electricity (also known as load serving entities) provide a convenient platform for distributing the economic benefits of a cap and trade system back to consumers. Electric local distribution companies are closest to consumers—they are the ones which deliver monthly electrical bills. They are also under the guidance and oversight of state public utility commissions—giving states oversight of how the funds directed through this title are spent.

The allowance value in this subtitle must be directed to consumers through one of two mechanisms. The first is through rebates. These rebates may not be tied to energy usage so as to avoid creating a perverse incentive for higher energy consumption. The second mechanism is support for energy efficiency measures, which are needed because consumers strictly speaking do not pay energy prices, they pay energy bills. Policies which increase energy efficiency both reduce the impact of any climate policy on the consumer and simultaneously reduce overall emissions and load on the electrical grid. Local distribution companies around the country are already deploying a wide range of innovative policies which might be supported by this program including the distribution of free energy efficient lighting, subsidies for the purchase of more energy efficient appliances, and free home energy audits.

At the same time, an analysis of the provisions of S.2191 by Pacific Gas & Electric (PG&E), Public Service Enterprise Group (PSEG), the Ceres investor coalition, and the Natural Resources Defense Council (NRDC) found that the combination of allocation

to emitters (described in more detail below), very modest efficiency gains, and the allocation to local distribution companies can protect ratepayers by completely eliminating the impact of the carbon price signal on a typical home energy bill.[53]

Subtitle E—Natural gas consumers

This subtitle sets up a program for natural gas consumers parallel to the one for electricity consumers in Subtitle D.

Sec. 3501. Allocation. Section 3501 directs EPA, not later than April 1, 2011 and annually thereafter through 2049, to allocate 2 percent of the quantity of allowances in the subsequent year's Emission Allowance Account to natural gas local distribution companies.

Sec. 3502. Distribution. Section 3502 directs EPA to distribute among the individual natural gas local distribution companies described in section 3501 the allowances allocated to them under that section. The number of allowances that an individual such company receives shall be proportionate to the amount of natural gas that it delivered over the three years preceding the year of the allocation in question, adjusted upward for natural gas not delivered as a result of consumer energy-efficiency programs implemented by the company.

Sec. 3503. Use. Subsection 3503(a) directs each natural gas local distribution company that receives allowances under section 3502 to sell each such allowance not later than 1 year after receiving it.

Subsection 3503(b) declares that all proceeds from the sale of emission allowances under subsection (a) shall be used solely: to mitigate economic impacts on low- and middle-income energy consumers; and to promote energy efficiency on the part of energy consumers.

Subsection 3503(c) prohibits any natural gas local distribution company that receives allowances under section 3502 from using any proceeds from the sale of allowances to provide any consumer a rebate that is based on the quantity of natural gas used by the consumer.

Sec. 3504. Reporting. Subsection 3504(a) directs each natural gas local distribution company that receives allowances under section 3502 to submit to EPA each year a report describing: the date of each sale of each emission allowance during the preceding year; the amount of revenue generated from the sale of emission allowances during the preceding year; and how and to what extent the entity used the proceeds of the sale of allowances during the preceding year.

Subsection 3504(b) directs EPA to make the reports described in subsection (a) publicly available on the Internet.

Discussion: Because the Climate Security Act also covers the natural gas sector in addition to the electrical sector, this subtitle sets up a parallel program to reduce any price impacts on natural gas consumers.

[53] http://www.nrdc.org/air/pollution/benchmarking/default.asp.

Subtitle F—Bonus allowances for carbon capture and geological sequestration

Subtitle F directs EPA, within three years of enactment, to take 4 percent of the quantity of allowances established for each year from 2012 through 2030 and place them into a Bonus Allowance Account. The subtitle directs EPA to distribute those allowances to firms that inject carbon dioxide into geological formations.

Sec. 3601. Allocation. Section 3601 directs EPA to establish a Bonus Allowance Account not later than 3 years after enactment. The section directs EPA to allocate to that account 4 percent of the quantity of allowances established for each year from 2012 through 2030.

Sec. 3602. Qualifying Projects. Subsection 3602(a) defines the terms "commenced" and "construction."

Subsection 3602(b) declares that, in order to be eligible to receive allowances under this subtitle, a carbon capture and sequestration project shall: comply with criteria and standards promulgated by EPA; sequester captured carbon dioxide in a geological formation permitted for that purpose by EPA under part C of the Safe Water Drinking Act; and have begun operation in the period from 2008 through 2035.

Subsection 3602(c) declares that a carbon capture and sequestration project shall be eligible to receive allowances under this subtitle only if the project achieves 1 of the following performance standards: (1) for an existing electric generation unit, an annual emissions rate of not more than 1,200 pounds of carbon dioxide per megawatt-hour of net electricity generated, after subtracting the carbon dioxide that is captured and sequestered; (2) for a new electric generation unit on which construction commenced prior to July 1, 2018, an annual emissions rate of not more than 800 pounds of carbon dioxide per megawatt-hour of net electricity generation, after subtracting the carbon dioxide that is captured and sequestered; (3) for a new electric generation unit for on which construction commenced on or after July 1, 2018, an annual emissions rate of not more than 350 pounds of carbon dioxide per megawatt-hour of net electricity generation, after subtracting the carbon dioxide that is captured and sequestered; (4) for any unit at a covered facility that is not an electric generation unit, an annual emissions rate that is achieved by the capture and sequestration of a minimum of 85 percent of the total carbon dioxide emissions produced by the unit.

Subsection 3602(d) authorizes the Climate Change Credit Corporation to adjust a performance standard set forth by subsection (c) for any electric generation unit that uses subbituminous coal, lignite, or petroleum coke in significant amounts.

Sec. 3603. Distribution. Subsection 3603(a) directs EPA to distribute allowances from the Bonus Allowance Account to qualifying projects. The subsection declares that the quantity of bonus allowances distributed to a project for each metric ton of carbon dioxide that the project geologically sequesters shall equal the bonus allowance rate that is assigned to the year in which the metric ton of carbon dioxide is sequestered, multiplied by the bonus allowance adjustment ratio. The bonus allowance rates are as follows:

Year	*Bonus allowance rate*
2012	4.5

Year	*Bonus allowance rate*
2013	4.5
2014	4.5
2015	4.5
2016	4.5
2017	4.5
2018	4.2
2019	3.9
2020	3.6
2021	3.3
2022	3.0
2023	2.7
2024	2.4
2025	2.1
2026	1.8
2027	1.5
2028	1.3
2029	1.1
2030	0.9
2031	0.7
2032	0.5
2033	0.5
2034	0.5
2035	0.5
2036	0.5
2037	0.5
2038	0.5
2039	0.5

Subsection 3603(b) directs EPA to determine the bonus allowance adjustment ratio by dividing a carbon dioxide emissions rate of 350 pounds per megawatt-hour by the annual carbon dioxide emissions rate that a qualifying project at the electric generation unit achieved during a particular year, except that: the factor shall be equal to 1 in the case of a project that qualifies under paragraph (1) of subsection 3602(c) during the first 4 years that emission allowances are distributed to the project; and the factor shall not exceed 1 for any qualifying project.

Sec. 3604. 10-Year Limit. Section 3604 declares that a qualifying project may receive allowances under this subtitle only for the first 10 years of its operation or, if the unit in question began operating before 2012, for the period from 2012 through 2021.

Sec. 3605. Exhaustion of bonus allowance account. Section 3605 declares that if, at the beginning of a year, EPA determines that the quantity of bonus allowances remaining in the Bonus Allowance Account will be insufficient to distribute the total quantity of bonus allowances that otherwise would be distributed in that year under section 3603, then EPA shall discontinue the program after distributing the remaining bonus allowances on a pro rata basis to projects that were already qualifying projects in the preceding year.

Discussion: Many electric utilities have identified the early deployment of carbon capture and sequestration (CCS) as a key step in a transition to a low-carbon economy that involves minimal economic disruption. Deployment of the first 5–10 commercial scale CCS projects will allow for scale issues to be resolved, costs to be reduced, and the groundwork laid for massive deployment of CCS plants either as new facilities or as retrofits. Currently, the lack of market certainty has prevented significant investment in either new pulverized coal or new CCS coal plants. For example, 54 percent of coal capacity ordered since 2000 has been canceled or put on hold in the last two years, in part because of uncertainties con-

cerning the enactment of climate legislation, which most in the private sector view as likely or inevitable.[54] A cap and trade market, especially one in which the market and the market alone sets prices (as opposed to a legislated price cap), provides greater assurance to investors that CCS projects will yield an financially adequate return. The bonus allowances provided in this section offer further assurance that CCS is a good investment because it offers early adopters assurance of a stream of allowance value once they commence sequestering CO_2. Modeling by the EPA of both S. 1766 and S. 2191 shows that CCS bonus allowances can speed the deployment of CCS technology by roughly 5 years.[55]

Multiple capture standards, like those in this subtitle, are needed for several reasons. First, while 85% capture is technically feasible for gasification-based units, available information indicates that equipment vendors are not willing today to provide guarantees for capture above 65%. The gas streams in systems where capture exceeds 65% are rich in hydrogen and there is limited experience with burning this hydrogen-rich gas in combustion turbines. Second, a requirement fixed at 85% capture from the entire generating unit gas stream, would have made a number of retrofit capture projects ineligible. These retrofit projects will capture 85% of CO_2 from only a portion of the existing unit's gas stream because they involve testing concepts that have not been commercially demonstrated. The standard for existing power plants to be eligible provided they meet a performance standard equivalent to capturing 85% from at least one-half of the unit's gas stream. Given the large number of existing coal plants that will likely keep running for some time even under the bill, encouraging early demonstrations of retrofit capture approaches is important. Following 2018, any new plants are required to meet the strictest standard. For industrial facilities, where the gas stream is not used in a turbine, it is reasonable to attain an 85% capture rate.

Subtitle G—Domestic agriculture and forestry

Sec. 3701. Allocation. Section 3701 directs EPA, not later than April 1, 2011 and annually thereafter through 2049, to allocate 5 percent of the quantity of allowances in the subsequent year's Emission Allowance Account to the Department of Agriculture for use in achieving reductions in greenhouse-gas emissions and increases in greenhouse-gas sequestration from the agriculture and forestry sectors of the United States economy.

Sec. 3702. Agricultural and Forestry Greenhouse Gas Management Research. Subsection 3702(a) directs the Department of Agriculture to prepare a report on the status of research on greenhouse-gas management in the agricultural and forestry sectors.

Subsection 3702(b) directs the Department of Agriculture to establish a standardized system of carbon measurement and certification for the agricultural and forestry sectors.

Subsection 3702(c) directs the Department of Agriculture to conduct any additional research that is necessary.

Sec. 3703. Distribution. Subsection 3703(a) directs the Department of Agriculture to establish, by rulemaking, a program under

[54] *http://www.eenews.net/eenewspm/2008/02/19/3/.*
[55] *http://www.epa.gov/climatechange/downloads/s2191*_EPA_Analysis.pdf.

which emission allowances allocated under section 3701 are distributed to entities that carry out projects on agricultural and forest land that achieve greenhouse-gas emission mitigation benefits.

Subsection 3703(b) directs the Department of Agriculture to ensure that, over the course of any 5-year period, 0.5 is the average annual percentage of the quantity of emission allowances in the Emission Allowance Account distributed to entities under subsection (a) for reducing nitrous oxide emissions through soil management or for reducing methane emissions through enteric fermentation.

Subsection 3703(c) directs the Department of Agriculture to distribute allowances under this section in a manner that maximizes the mitigation of greenhouse-gas emissions.

Discussion: Because emissions from agriculture and forestry are not directly capped under S.2191, complimentary provisions are needed to help reduce emissions in the uncapped sectors. The first complementary program is domestic offsets as described in Title II. Second is a set aside program which allows USDA to administer programs that seek further reductions in greenhouse gas emissions and increases in the storage of carbon in plants and soils. Farmers and foresters would participate in the program which works best for the circumstances of the particular activity where emissions reductions/sequestration increases are being achieved.

Subtitle H—International forest protection

Sec. 3801. Findings. Section 3801 makes certain findings, first among them that land-use change and forest-sector emissions account for approximately 20 percent of global greenhouse-gas emissions.

Sec. 3802. Definition of Forest Carbon Activities. Section 3802 declares that the term "forest carbon activities" refers to activities directed at reducing greenhouse-gas emissions from deforestation and forest degradation in countries other than the United States, and to activities directed at increasing sequestration of carbon through restoration of forests and degraded lands in countries other than the United States.

Sec. 3803. Allocation. Section 3803 directs EPA, not later than April 1, 2011 and annually thereafter through 2049, to allocate 2.5 percent of the quantity of allowances in the subsequent year's Emission Allowance Account for use in carrying out forest carbon activities.

Sec. 3804. Definition and Eligibility Requirements. Section 3804 directs EPA, not later than 2 years after enactment, and in consultation with the Department of the Interior, the Department of State, and the Department of Agriculture, to promulgate eligibility requirements for forest carbon activities.

Sec. 3805. International Forest Carbon Activities. Subsection 3805(a) directs EPA, in consultation with the Secretary of State, to periodically update a list of countries that have demonstrated capacity to participate in forest carbon activities, capped greenhouse gas emissions or otherwise established a national emission reference scenario, and commenced an emissions reduction program for the forest sector.

Subsection 3805(b) declares that a verified reduction in greenhouse-gas emissions from deforestation and forest degradation

under a cap or from a nationwide emissions reference scenario shall be eligible for distribution of allowances under this section. The subsection directs EPA, in consultation with the Department of State, to identify and periodically update a list of countries that have: achieved national-level reductions of deforestation and degradation below a historical reference scenario, taking into consideration the average annual deforestation and degradation rates of the country and of all countries over a period of at least 5 years; and demonstrated those reductions using remote sensing technology that meets international standards. Finally, the subsection declares that a forest carbon activity other than a reduction in deforestation or forest degradation shall be eligible for distribution of emission allowances under this section, subject to the quality criteria for forest carbon activities identified in the Act or in implementing regulations.

Subsection 3805(c) declares that, with respect to counties other than those described under subsection (a), EPA shall recognize forest carbon activities subject to the quality criteria referenced in subsection (b).

Sec. 3806. Reviews and Discount. Subsection 3806(a) directs EPA to conduct a review of the program established by this subtitle not later than 3 years after enactment and 5 years thereafter.

Subsection 3806(b) authorizes EPA, beginning 10 years after enactment, to apply a discount to the distribution of emissions allowances under this subtitle to countries that, in the aggregate, account for more than 0.5 percent of global greenhouse-gas emissions and that have not, by that time, capped those emissions, established emissions reference scenarios based on historical data, or otherwise reduced total forest emissions.

Discussion: While emissions from fossil fuels make up the bulk of current human-caused greenhouse gas emissions, emissions from land use change, particularly deforestation and degradation, account for approximately 20% of global emissions. In the aggregate, an area larger than the state of Pennsylvania is cleared globally every year.[56] Many of these emissions come from nations which, in the absence of forest sector emissions, would have a very small contribution to climate change and progress against the global problem of climate change cannot be made without steps to control forest sector emissions.

The roadmap adopted at the December 2007 UNFCCC conference in Bali, Indonesia contained new provisions laying the groundwork for policy approaches to reduce deforestation.[57] This provision is designed to direct funds towards the many low-cost reductions which exist in the international forestry sector. Measures to protect international forest carbon also have the co-benefits of protecting wildlife habitat and supporting more sustainable development models. The program seeks national-level reductions in deforestation—to assure that funding does not simply shift deforestation patterns within the country.

[56] http://www.fao.org/newsroom/en/news/2006/1000385/index.html.
[57] UNFCCC Decision 2/CP.13.

Subtitle I—Transition assistance

Subtitle I directs EPA to allocate set percentages of the allowances in the Emission Allowance Accounts for years 2012 through 2030 to facilities and entities within different industrial sectors.

Sec. 3901. General allocation and distribution. Subsection 3901(a) directs EPA, not later than April 1, 2011 and annually thereafter through 2029, to allocate percentages of the quantity of allowances in the subsequent year's Emission Allowance Account as follows:

Calendar Year	Fossil fuel-fired electric power generating facilities	Rural electric cooperatives	Owners and operators of energy intensive manufacturing facilities	Facilities that produce or import petroleum based fuel	HFC producers and importers
2012	19	1	10	2	2
2013	19	1	10	2	2
2014	19	1	10	2	2
2015	19	1	10	2	2
2016	19	1	10	2	2
2017	19	1	10	2	2
2018	18	1	9	2	2
2019	17	1	9	2	2
2020	16	1	8	2	2
2021	14	1	7	2	2
2022	13	1	7	1.75	1.75
2023	12	1	6	1.75	1.75
2024	11	1	5	1.5	1.5
2025	10	1	4	1	1
2026	8	1	3	1	1
2027	6	1	2	0.5	0.5
2028	4	1	1	0.5	0.5
2029	2	1	0.5	0.25	0.25
2030	1	1	0.25	0.25	0.25

Subsection 3901(b) directs EPA, not later than 1 year after enactment, to promulgate rules for distributing the allowances allocated under subsection (a) to individual entities within the industrial sectors identified in that subsection.

Subsection 3901(c) declares that the rules promulgated under subsection (b) shall ensure that if a facility permanently shuts down, then (1) EPA shall not distribute any more allowances for that facility; (2) the facility shall return to EPA any allowances distributed to that facility for any subsequent years; and (3) the facility shall also return to EPA any allowances that EPA determines the facility will no longer need to submit under subsection (a) of section 1202 due to the shut-down.

Sec. 3902. Distributing Emission Allowances to Owners and Operators of Fossil Fuel-Fired Electric Power Generating Facilities. Subsection 3902(a) directs EPA, as part of the system promulgated under subsection (b) of section 3901, to set aside, from the allocation to fossil fuel-fired electric power generating facilities, a quantity of allowances for distribution to new-entrant fossil fuel-fired electric power generating facilities. The subsection declares that the quantity of allowances distributed to an individual new-entrant facility shall be equal to the product obtained by multiplying the average greenhouse gas emission rate of all fossil fuel-fired electric power generating facilities that were in operation 5 years before enactment by the electricity generated by the facility during the calendar year, adjusted downward pro rata if insufficient allowance are available.

Subsection 3902(b) directs EPA, as part of the system promulgated under subsection (b) of section 3901, to distribute the quantity of allowances remaining of the allocation to fossil fuel-fired electric power generating facilities among fossil fuel-fired electric power generating facilities that were operating in the year preceding enactment. The number of allowances for each facility is determined by the ratio between the annual average carbon dioxide equivalents of emissions over the 3 years preceding enactment and the average aggregate emissions from all fossil fuel-fired electric power generators over the same period.

Sec. 3903. Distributing Additional Emission Allowances to Rural Electric Cooperatives. Subsection 3903(a) directs EPA to distribute 15 percent of the allowances allocated to rural electric cooperatives by subsection (a) of section 3901 among such entities in Montana and Virginia.

Subsection 3903(b) directs EPA to distribute the remaining 85 percent of the allowances allocated to rural electric cooperatives by subsection (a) of section 3901 among individual such entities in all states other than Montana and Virginia, in proportion to those individual entities' electricity sales. Such entities in all states other than Montana and Virginia shall also receive allowances under sections 3402 and 3902.

Subsection 3903(c) declares that rural electric cooperatives in Montana and Virginia shall not receive any allowances under section 3402 or under section 3902.

Subsection 3903(d) directs EPA, not later than January 1, 2015 and every 3 years thereafter, to submit to Congress a report on: the benefits conferred on ratepayers of Montana and Virginia rural electric cooperatives by the pilot program established under sub-

section (a); and the use by those rural electric cooperatives of advanced, low greenhouse gas-emitting electric generation technologies.

Sec. 3904. Distributing Emission Allowances to Owners and Operators of Energy Intensive Manufacturing Facilities. Subsection 3904(a) defines certain terms used in the section. Most notably, it defines "eligible manufacturing facility" as a manufacturing facility located in the United States that principally manufactures iron, steel, aluminum, pulp, paper, cement, chemicals, or such other products as EPA may determine by rule to be at risk of being significantly disadvantaged in competitive international markets absent a distribution of allowances under this section.

Subsection 3904(b) directs EPA, as part of the system promulgated under subsection (b) of section 3901, to distribute each year among currently operating facilities 96 percent of the quantity of allowances available for distribution to energy-intensive manufacturing facilities under subsection (a) of section 3901.

Subsection 3904(c) directs EPA, as part of the system promulgated under subsection (b) of section 3901, to distribute allowances among individual categories of currently operating energy-intensive manufacturing facilities in proportion to each category's share of all energy-intensive manufacturing facilities' direct and indirect carbon dioxide emissions in the year preceding the allocation.

Subsection 3904(d) directs EPA, as part of the system promulgated under subsection (b) of section 3901, to distribute allowances among individual facilities, within each category identified pursuant to subsection (c) of this section, in proportion to each facility's average number of production employees over the 3 years preceding promulgation of the system established under subsection (b) of section 3901.

Subsection 3904(e) directs EPA, as part of the system promulgated under subsection (b) of section 3901, to distribute each year among new-entrant energy-intensive manufacturing facilities 4 percent of the quantity of allowances available for distribution to energy-intensive manufacturing facilities under subsection (a) of section 3901.

Sec. 3905. Distributing Emission Allowances to Owners and Operators of Facilities and Other Entities That Produce or Import Petroleum-Based Fuel. Section 3905 directs EPA, as part of the system promulgated under subsection (b) of section 3901, to distribute the allowances allocated for facilities that produce or import petroleum-based fuel under subsection (a) of section 3901 among individual such facilities in proportion to each such facility's average amount of petroleum product produced or imported over the 3 years preceding the distribution.

Sec. 3906. Distributing Emission Allowances to Hydrofluorocarbon Producers and Importers. Section 3906 directs EPA to distribute the allowances allocated for hydrofluorocarbon producers and importers under subsection (a) of section 3901 in accordance with section 10005.

Discussion: This subtitle of the Act was informed by the guidelines described in "A Call To Action" by the US Climate Action Partnership, a coalition of automakers (GM, Ford) utilities and power producers (PG&E, Duke Energy), insurance companies (AIG, Marsh), oil companies (Shell, Conoco Phillips, BP), chemical compa-

nies (Dow, Dupont), other leading businesses, and environmental organizations (Environmental Defense, Natural Resources Defense Council, National Wildlife Federation, The Nature Conservancy). They advised that:

> An emission allowance allocation system should seek to mitigate economic transition costs to entities and regions of the country that will be relatively more adversely affected by GHG emission limits or have already made investments in higher cost, low-GHG technologies, while simultaneously encouraging the transition from older, higher-emitting technologies to newer, lower-emitting technologies. A significant portion of allowances should be initially distributed free to capped entities and to economic sectors particularly disadvantaged by the secondary price effects of a cap including the possibility of funding transition assistance to adversely affected workers and communities. Free allocations to the private sector should be phased out over a reasonable period of time.[58]

The transition assistance in this section is structured in fashion consistent with these guidelines, beginning as a significant portion of the allowance account (34%) and declining to zero in 2031. The amount of allowance value directed to each sector depends upon that sector's ability to accommodate the carbon price signal and the vulnerability of that sector to competition from un-capped foreign markets. For example, energy intensive industries receive significant transition assistance because they must keep the prices of their products low due to foreign competition.

Subtitle J—Reducing methane emissions from landfills and coal mines

Sec. 3907. Allocation. Section 3907 directs EPA, not later than April 1, 2011 and annually thereafter through 2049, to allocate 1 percents of the quantity of allowances in the subsequent year's Emission Allowance Account to a program for achieving real, verifiable, additional, permanent, and enforceable reductions in emissions of methane from landfills and coal mines.

Sec. 3908. Distribution. Subsection 3908(a) directs EPA, not later than 1 year after enactment, to promulgate rules for distributing to individual entities the allowances allocated under section 3907.

Subsection 3908(b) directs EPA to distribute the allowances allocated under section 3907 in a manner that maximizes the avoidance or reduction of greenhouse-gas emissions.

Discussion: EPA has already invested resources in investigating ways to reduce methane emissions from landfills and coal mines through voluntary reduction programs.[59] They find that all of the technically recoverable methane from coal mines can be recovered at costs lower than predicted allowance prices in the second decade of the program. At a similar cost, landfill emissions could be reduced 41%. Because EPA already has expertise in reducing methane emissions from these sources and (in many cases) more than one ton of emissions reduction can be achieved for the value of a

[58] http://www.us-cap.org/USCAPCallForAction.pdf.
[58] http://www.epa.gov/methane/reports/methaneintro.pdf.

single allowance, this program provides an easy way for the Act to achieve additional reductions in GHG emissions.

Title IV—Auctions and uses of auction proceeds

Title IV establishes a Climate Change Credit Corporation and directs it to auction allowances and to deposit the proceeds into funds in the Treasury. The title then specifies the uses to be made of those funds.

Subtitle A—Funds

Sec. 4101. Establishment. Section 4101 establishes seven new funds in the Treasury: (1) the Energy Assistance Fund; (2) the Climate Change Worker Training Fund; (3) the Adaptation Fund, (4) the Climate Change and National Security Fund; (5) the Bureau of Land Management Emergency Firefighting Fund; (6) the Forest Service Emergency Firefighting Fund; and (7) the Climate Security Act Management Fund.

Sec. 4102. Amounts in Funds. Section 4102 declares that each fund established by section 4101 shall consist of the amounts deposited into it pursuant to subtitle C of this title.

Subtitle B—Climate Change Credit Corporation

Sec. 4201. Establishment. Subsection 4201(a) establishes the Climate Change Credit Corporation as a nonprofit corporation without stock.

Subsection 4201(b) declares that the Corporation shall not be considered to be an agency of the federal government.

Sec. 4202. Applicable laws. Section 4202 declares that the Corporation shall be subject to this title and, to the extent consistent with the title, to the District of Columbia Business Corporation Act.

Sec. 4203. Board of Directors. Subsection (a) declares that the Corporation shall have a board of directors composed of 5 individuals who are United States Citizens, and that each year one of the directors shall be elected to serve as the Corporation's chairperson during that year.

Subsection (b) declares that not more than 3 members of the Corporation's board serving at any one time may be affiliated with the same political party.

Subsection (c) declares that the President appoints members of the Corporation's board, by and with the advice and consent of the Senate. The subsection also declares that the term of office for a member of the Corporation's board is 5 years.

Subsection (d) declares that 3 members of the Corporation's board shall constitute a quorum for a meeting of the board.

Subsection (e) prohibits members of the Corporation's board from having conflicts of interest.

Subsection (f) declares that a vacancy on the board shall not affect the Corporation's powers so long as it retains enough members to convene a quorum. The subsection also declares that a member of the Corporation's board shall continue to serve until a replacement is appointed.

Subsection (g) empowers the President to remove a member of the Corporation's board for cause, provided the President notifies the Congress at least 30 days in advance of the removal.

Sec. 4204. Review and Audit by Comptroller General. Section 4204 directs the Comptroller general of the United States, not later than January 1, 2013 and annually thereafter, to review and audit each expenditure made by the Corporation to determine the efficacy of those expenditures and the programs and projects funded with them.

Discussion: Instrumental to meeting both the emissions reduction and technology development and deployment objectives of the legislation is the mobilization of massive levels of private sector investment in the technologies and strategies needed to reduce U.S. GHG emissions in an economically efficient way. Crucial to private sector investors is certainty and stability in the conditions under which they are making their investments. The substantial levels of public funding for technology provided by the bill are aimed at eliciting and facilitating such investment.

Subtitle C—Auctions

Sec. 4301. Early Auctions. Section 4301 directs the Corporation, within one year of enactment, to begin auctioning the allowances allocated to it for early auctioning under subtitle A of Title III. It directs the Corporation to have completed auctioning the last of those allowances by the end of 2011. The subtitle directs the Corporation to devote all the proceeds of the early auctions to the Energy Technology Deployment Program established under subtitle D of Title IV.

Sec. 4302. Annual auctions. Subsection 4302(a) directs the Corporation, 330 days before the start of each calendar year, to auction all of the allowances allocated to it under subtitle A of Title III for annual auctioning that year.

Subsection 4302(b) directs the Corporation each year to deposit into the Bureau of Land Management Emergency Firefighting Fund and the Forest Service Emergency Firefighting Fund auction proceeds sufficient to ensure that the amounts in those funds equal $300 million and $800 million, respectively. The subsection directs the Corporation each year to deposit into the Climate Security Act Management Fund auction proceeds in an amount that EPA determines sufficient for itself and other affected federal agencies to administer the Act. The subsection declares, however, that expenditures may be made from the Climate Security Act Management Fund only subject to an appropriations act of Congress. The subsection then directs the Corporation each year to dispose of the remaining proceeds of annual auctioning as follows:

- 52 percent to carry out the programs established under subtitle D of this title;
- 2 percent deposited into the preexisting Treasury fund for the Advanced Research Projects Agency within the Department of Energy;
- 18 percent deposited into the Energy Assistance Fund;
- 5 percent deposited into the Climate Change Worker Training Fund;
- 18 percent deposited into the Adaptation Fund; and
- 5 percent deposited into the Climate Change and National Security Fund.

Discussion: Auctions under the act will be conducted at least annually. As discussed above, under Title III, the early auction will

provide technology deployment funds from shortly after the date of enactment through 2011 to speed the deployment of technologies in advance of the caps. In 2011, the Corporation will begin regular auctioning of allowances. Funds from the auction will first be used to ensure adequate funding for EPA and other agencies to administer the Act and to ensure that sufficient funds exist in two Emergency Firefighting funds. The bulk of the proceeds are then distributed according to the percentages outlined in this title.

Subtitle D—Energy Technology Deployment

Subtitle D spells out in detail a series of financial incentive programs, administered by the Climate Change Credit Corporation, to accelerate the development and deployment of sustainable energy technologies, low-carbon electricity technologies (including engineering integration costs), advanced bio-fuels such as cellulosic ethanol, carbon dioxide capture and storage systems, electric and plug-in hybrid electric vehicles, and high-efficiency consumer products.

Sec. 4401. General Allocations. Section 4401 directs the Corporation, each calendar year, to use as follows the proceeds of any early auctioning still occurring and the 52 percent of annual auctioning proceeds allocated by subsection (b) of section 4302:

- 32 percent to carry out the Zero- or Low-Carbon Energy Technologies Program under section 4402;
- 25 percent to carry out the Advanced Coal and Sequestration Technologies Program under section 4403;
- 6 percent to carry out the Fuel From Cellulosic Biomass Program under section 4404;
- 12 percent to carry out the Advanced Technology Vehicles Manufacturing Incentive Program under section 4405; and
- 25 percent to carry out the Sustainable Energy Program under section 4406.

Sec. 4402. Zero- or Low-Carbon Energy Technologies Deployment. Section 4402 directs the Corporation to competitively award financial incentives for three categories:

Awards for the production of electricity from new zero- or low-carbon generation will be based on the bid of each producer in dollars per megawatt-hour generated. Awards come as a production payment for each year during the first 10 years of service based on the amount bid by the producer and the power output of the unit.

Awards for the manufacture of high efficiency consumer products are based on the bid of each manufacturer in terms of dollars per megawatt-hour or dollars per BTU saved. The awards are distributed as lump-sum payments equal to the manufacturer's bid multiplied by the energy savings during the useful life of the product (but not more than 10 years).

Awards for new-facility establishment or conversion by manufacturers and component suppliers of zero- or low- carbon technology will go to those manufacturers and suppliers that document the greatest use of domestically sourced parts and components, return to productive service existing idle capacity, are located in states with the greatest availability of unemployed workers, compensate workers at a minimum amount equal to 100 percent of the state average manufacturing wage (plus health benefits), demonstrate a high probability of commercial success, and other appropriate criteria. Manufacturers can receive not more than 30 percent of the

cost of establishing, reequipping or expanding a facility, engineering integration costs, and equipment acquired or constructed primarily for the construction or operation of the facility.

At least 25 percent of the funds must be used for awards for the manufacturing of zero- and low-carbon generation technology.

Sec. 4403. Advanced Coal and Sequestration Technologies Program. Section 4403 declares that, in order to qualify for funding, an advanced coal technology project must meet one of the following performance standards (which are parallel to those set forth in section 3602):

- For existing electricity generating units, emissions of less than 1,200 pounds of carbon dioxide per megawatt-hour of net electricity generation, after subtracting sequestered carbon. That corresponds to roughly 42 percent capture of carbon dioxide.
- For new electricity generation whose construction began before July 1, 2018, emissions of less than 800 pounds of carbon dioxide per megawatt-hour of net electricity generation, after subtracting sequestered carbon. That corresponds to roughly 65 percent capture of carbon dioxide.
- For new electricity generation whose construction began after July 1, 2018, emissions of less than 350 pounds of carbon dioxide per megawatt-hour of net electricity generation, after subtracting sequestered carbon. That corresponds to roughly 85 percent capture of carbon dioxide.

The Corporation is authorized to adjust these performance standards for units that use coal, lignite or petroleum coke in significant amounts, provided that the emissions rule results in an equivalent reduction in carbon dioxide emissions.

At least 25 percent of the funds each year must be used for demonstration projects that use advanced coal technology. At least 25 percent of the funds for demonstration projects must go toward retrofits on exiting electricity generating units that meet the performance standard described above.

At least 25 percent of the funds for advanced coal technology each year must be used as financial incentives to facilitate the deployment of not more than 20 gigawatts of advanced coal technology meeting at least one of the performance standards for new units. The Corporation is to ensure that a range of domestic coal types is employed in facilities that receive those incentives, including by setting aside 25 percent of the financial incentive funds for coal with an energy content of not more than 10,000 BTU/lb. Incentives can take the form of a loan guarantee, a cost sharing grant to cover the incremental cost of installing and operating carbon capture and sequestration equipment, or production payments of not more than 1.5 cents per kilowatt-hour during the first 10 years of service.

The remaining half of the funds for each year must be used for large-scale geological carbon storage projects that store carbon dioxide captured from electric generation units. The Corporation will reimburse the project owner for a percentage of the incremental project capital and operating costs, attributable to carbon capture and sequestration. Up to 25 percent of the funds for geologic storage may be made available to projects that meet the emissions performance standards for exiting units.

Projects may not receive funding in this section if they receive an award under the program in section 4402. Projects must also have a binding storage agreement for the geologic storage of carbon dioxide.

Sec. 4404. Fuel from Cellulosic Biomass. Section 4404 directs the Corporation will use the funds for this program to encourage domestic production of fuels from cellulosic biomass, relying on different feedstocks from different regions of the United States. Incentives under this section are provided to projects that meet United States fuel and emission specifications, help diversify domestic transportation energy supplies and improve or maintain air, water, soil and habitat quality. These incentives can take the form of loan guarantees for the construction of production facilities and infrastructure or production payments set up through a reverse auction.

Sec. 4405. Advanced Technology Vehicles Manufacturing Incentive Program. This program is designed to provide funds to automobile manufacturers and component suppliers for the conversion of facilities to produce advanced technology vehicles or qualifying components for those vehicles. Advanced technology vehicles are electric vehicles, fuel cell-powered vehicles, hybrids or plug-in hybrid electric vehicles, or an advanced diesel light-duty motor vehicle that meets the Tier II Bin 5 (or a lower Bin number) emission standards under the Clean Air Act, new emissions standards for particulate matter under the Clean Air Act, and achieves at least 125 percent of the average base year combined fuel economy for vehicles of a similar nature and footprint.

Funding under this program may cover up to 30 percent of the cost of re-equipping or expanding manufacturing facilities or the engineering integration of qualifying vehicles and components. Awards for facilities are available between enactment and 2030 and for integration costs at after enactment.

The maximum amount of all awards under this section is limited to $40 million. Awards may not go to manufacturers that are either directly or indirectly out of compliance with Corporate Average Fuel Economy standards. Manufacturers must also certify that they will maintain a workforce for the next seven years that: maintains at least 90 percent of the number of employees maintained before the receipt of the award, maintains an equal or greater proportional share of that United States workforce with respect to the global workforce for that manufacturer, or ensures that the decrease in workforce is not greater than the percentage decline in market share for that firm. Each year they must provide documentation to recertify that they have met one of these employment standards. If they fail to make the recertification, they must repay one seventh of the award for each remaining year in the 7–year period.

Sec. 4406. Sustainable Energy Program. The Sustainable Energy Program funds "sustainable energy technology" (solar including solar water heating, wind, ocean, geothermal energy, biomass, landfill gas, or incremental hydropower), including in distributed energy systems. At least 25 percent of the funds must be used for demonstration projects and at least 25 percent must be used for financial incentives to facilitate the deployment of sustainable energy. Incentives can take the form of a loan guarantee, a cost sharing grant to cover the incremental cost of installing and operating

equipment, or production payments of not more than 1.5 cents per kilowatt-hour during the first 10 years of service.

Projects may not receive funding in this section if they receive an award under the program in section 4402.

Discussion: Technological innovation and the rapid movement of technologies from the pilot stage to full-scale commercial deployment will be key to meeting long-term greenhouse gas reduction targets. The centerpiece of the Act's technology deployment strategy is the cap and trade market itself. By increasing the value of technologies which reduce GHG emissions, the Act will trigger trillions of dollars in private sector investment in clean technology. However, many new technologies need Federal assistance to develop from pilot projects to industry-wide technologies. Federal support for such projects, in the form of loan guarantees, production payments or cost-sharing grants can help overcome investor concerns about risk, resolve issues at the prototype/pilot stage and move the market more quickly toward economies of scale. In deploying these funds, this subtitle aims to use competitive, performance-based metrics in distributing funds and to ensure that the funds go to support domestic manufacture of products and components.

The first fund in this subtitle, the Zero- or Low Carbon Energy Technologies Program, is directed to supporting both electricity generation technologies and consumer products. The Program will subsidize the manufacture of very high efficiency consumer products which reduce energy use. It will also give awards to manufacturers for new facilities which make zero- or low-carbon technology, or components for those technologies. Zero- or low-carbon generating technology such as wind, nuclear, solar or coal with carbon capture and storage also qualify for funding under this program, although a project may not receive funding from this Program and another Program under this subtitle.

The Advanced Coal and Sequestration Technologies Program supports the role of coal as our Nation's primary source for electrical power and the need to rapidly deploy technologies to burn coal with minimal generation of greenhouse gases. Facilities must meet the same performance standards outlined under Section 3602(c) for CCS bonus allowances.

The Fuel from Cellulosic Biomass Program supports the rapid development of second-generation biofuels. The corn-based ethanol industry has rapidly expanded under Federal support. However, support is still needed for technologies which can utilize non-food crops and waste to produce transport fuels. The Program contains protections to ensure that air, water, soil and habitat quality are protected during the production of feedstocks used to make the fuel.

The Advanced Technology Vehicles Manufacturing Incentive Program assists automobile manufacturers (and component manufacturers) in retooling to produce new advanced technology vehicles such as electric vehicles, fuel cell-powered vehicles, hybrids or plug-in hybrid electric vehicles, or advanced diesel light-duty motor vehicles. The Program will help automobile manufacturers to deliver vehicles which reduce greenhouse gas emissions and reliance on imported oil. By promoting further increases in the fuel economy of the US transportation fleet, this Program will reduce pressure

on the transportation sector of the allowance market and potentially reduce the overall cost of the program.

The Sustainable Energy Program is designed to provide support to new and existing renewable energy technologies such as solar including solar water heating, wind, ocean, geothermal energy, biomass, landfill gas, or incremental hydropower. This program also supports distributed renewable energy systems which make the US grid more resistant to disruption. At least 25% of the funds under this title go towards demonstration projects of new sustainable energy technologies, creating a pathway for sustainable energy technologies not yet mature enough to be reflected in forecasts of the future US energy mix.

Subtitle E—Energy Consumers

Subtitle E funds several programs to help protect low-income energy consumers from impacts that the Act may have on energy bills.

Sec. 4501. Proportions of Funding Availability. Section 4501 directs funds deposited into the Energy Assistance Fund under Subtitle A of Title IV to the Low Income Home Energy Assistance Program (LIHEAP) (50 percent), the Weatherization Assistance Program for Low-Income Persons (25 percent), and a new Rural Energy Assistance Program (25 percent).

Sec. 4502. Rural Energy Assistance Program. Section 4502 creates a rural energy assistance program to provide financial assistance to promote the availability of reasonably priced distributed electricity in off-grid rural regions with high electricity prices.

Discussion: Although modeling of S.2191 projects very modest price impacts which emerge slowly over time, these provisions are intended to protect consumers, especially low-income consumers currently struggling to meet their energy costs, from any adverse price impacts as a result of climate legislation. Significant funding is directed towards low (and middle) income consumers through the allocation to local electricity and gas distribution companies under Subtitles D and E of Title III. However, additional funds to assist, specifically, low income consumers are provided through this program under the auction. Together, the electricity and gas consumer allocations plus the energy consumer fund represent 15% of the allowance value in the first year of the program, rising to roughly 20% over time. The Center for Budget and Policy Priorities estimates that at least 14% of allowance value should be directed to low income consumers in the bottom quintile specifically to offset fully any increased energy costs.[60] States that believe that additional resources are needed for consumer assistance are encouraged to direct allowance value from Subtitle C, Title III to further supplement consumer assistance programs.

Subtitle F—Climate Change Worker Training Program

Subtitle F directs the creation of several programs to collect data on shifts and new demands in the workforce and to provide training for workers in clean technology sectors which grow as a result of S. 2191 and other legislation such as the Energy Independence and Security Act of 2007.

[60] http://www.cbpp.org/pubs/climate.htm.

Sec. 4601. Funding. Section 4601 directs that all funds deposited into the Climate Change Worker Training Fund under Subtitle A of Title IV shall be used by the Department of Labor to fund a new workforce education, training, and placement program spelled out in the subtitle.

Sec. 4602. Purposes. Section 4602 lists the purposes of this subtitle:

- to create a sustainable, comprehensive public program that provides quality training linked to jobs in low-carbon and sustainable energy, as well as energy efficiency;
- to satisfy industry demand for a skilled workforce, to support economic growth, boost U.S. competitiveness in the global economy for clean technology, and provide family-sustaining jobs through quality training and placement; and
- to provide funds for Federal and State research, labor market information and labor exchange programs, and the development of Federal- and State-administered training programs.

Sec. 4603. Establishment. Section 4603 directs the Department of Labor to establish the Climate Change Worker Training program, in consultation with EPA and the Department of Energy.

Sec. 4604. Activities. Subsection 4604(a) creates a National Research Program to provide assistance in developing labor market data and tracking workforce trends related to this subtitle.

Subsection 4604(b) creates a National Energy Training Partnership to provide competitive grants to entities that carry out training that leads to economic self-sufficiency and develop a clean technology workforce.

Subsection 4604(c) creates a State Labor Market Research, Information, and Labor Exchange Research Program to provide competitive grants to States for labor market and labor exchange informational programs. These programs will identify job openings in clean energy and energy efficiency, administer skill and aptitude testing for workers, and provide counseling, case management and referral to qualified job seekers.

Subsection 4604(d) creates a State Energy Training Partnership Program to provide competitive grants to States to fund eligible State energy sector partnerships.

Sec. 4605. Worker Protections and Nondiscrimination Requirements. Section 4605 clarifies that the program is covered by Sections 181 and 188 of the Workforce Investment Act of 1998. Labor organizations must also be provided with an opportunity to submit comments on proposals where there are a substantial number of organized workers engaged in similar work or training.

Sec. 4606. Workforce Training and Safety. Subsection 4606(a) directs 25 percent of the funds in this subtitle to University Programs within the Department of Energy to ensure a supply of scientists, engineers, health physicists and energy workforce employees.

Subsection 4606(b) directs the Department of Labor to provide technical assistance and funds to non-profit employee organizations, voluntary emergency response organizations and joint labor-management organizations that demonstrate experience in running health and safety training and education programs.

Subsection 4606(c) directs the Department of Labor, in cooperation with DOE, to promulgate regulations for programs related to

zero- and low-carbon technology that: provide workforce training to supply skilled workers, certify electrical crafts, create career and technology awareness, create pre-apprenticeship technical education, generate training for technicians, develop construction management personnel, ensure the safety of workers, and provide regional grants for integrated workforce development programs.

Discussion: Any program to drive the U.S. towards cleaner, low-carbon technology will trigger shifts and new demands in the workforce. While many of these new demands will be met from traditional occupations, programs to collect and disseminate workforce information and provide training will speed the rate at which the U.S. workforce can capitalize upon these new opportunities. For example, a study by the National Renewable Energy Lab identified a shortage of skills and training as a key barrier to renewable energy and energy efficiency growth.[61] The programs in this subtitle are intended to help meet existing and growing demands for jobs in the clean technology and energy efficiency sectors.

While estimating the job impacts of any policy or legislation is challenging, several studies point to the job creation potential of climate policy. A 2004 report by the Apollo Alliance found that investments in low-carbon and green technology, as is expected to occur under S. 2191, could create over three million new American jobs over a ten-year period, while also stimulating $1.4 trillion in new gross domestic product and producing over $280 billion in net energy cost savings.[62] At the state level, the Arizona Climate Change Advisory Group (CCAG) and the Center for Climate Strategies estimated that the CCAG action plan for Arizona would lead to the creation of 285,000 jobs.[63] On an international level, Britain has reduced its greenhouse gas emissions by about 15 percent since 1990, while its economy has grown by over 40% and environmental industries grew from about 135,000 to over 500,000 jobs in the last five years.

Wherever possible, this program is designed to work with existing workforce development strategies in place at the state and federal level.

Subtitle G—Adaptation program for natural resources in United States and territories

Subtitle G directs that all funds deposited into the Adaptation Fund under Subtitle A of Title IV be used for activities that assist fish and wildlife, fish and wildlife habitat, plants and associated ecological processes in becoming more resilient, adapting to, and surviving the impacts of climate change and ocean acidification.

Sec. 4701. Definitions. Section 4701 defines certain key terms used in this subtitle.

Sec. 4702. Adaptation Fund. Subsection 4702(a) directs funds from the Adaptation Fund to federal agencies for the activities described above.

Subsection 4702(b) makes 35 percent of the Adaptation Fund available to the Department of the Interior, and subsequently made available to states and tribal governments, through the Wildlife

[61] Margolis and Zuboy. Nontechnical Barriers to Solar Energy Use: Review of Recent Literature (NREL, 2006)

[62] New Energy for America, The Apollo Jobs Report.

[63] http://www.azclimatechange.gov/.

Conservation and Restoration Account established under the Pittman-Robertson Wildlife Restoration Act. It makes 19 percent of the Adaptation Fund available to the Interior Department for use in funding endangered species, migratory bird, and other fish and wildlife programs. It makes 5 percent of the Adaptation Fund available to the Interior Department for adaptation activities carried out under various cooperative grant programs. Finally, it makes 1 percent of the Adaptation Fund available to Indian tribes to carry our adaptation activities through the tribal wildlife grants program of the Fish and Wildlife Service. States or Indian tribes which receive grants under this subsection must provide 10 percent of the costs.

Subsection 4702(c) makes 10 percent of the Adaptation Fund available for wildlife adaptation through the Land and Water Conservation Fund.

Subsection 4702(d) makes 5 percent of the Adaptation Fund available to the Department of Agriculture for use in funding adaptation activities carried out on national forests and national grasslands under the jurisdiction of the United States Forest Service or pursuant to the cooperative Wings Across the Americas Program.

Subsection 4702(e) makes 5 percent of the Adaptation Fund available to EPA for use in restoring large-scale freshwater and estuarine ecosystems.

Subsection 4702(f) makes 10 percent of the Adaptation Fund available to the Army Corps of Engineers for use in restoring large-scale freshwater and estuarine ecosystems.

Subsection 4702(g) makes 10 percent of the Adaptation Fund available to the Department of Commerce for use in funding adaptation activities to protect, maintain, and restore coastal, estuarine, and marine resources, habitats, and ecosystems.

Subsection 4702 (i) directs the President to develop a national strategy for assisting fish and wildlife, fish and wildlife habitat, plants, and associated ecological processes in adapting to climate change.

Subsection 4072 (j) declares that funds going to states must be consistent with a federally approved state comprehensive adaptation strategy.

Discussion: America's rich natural resources are a foundation of our country. Natural resources are estimated to provide our country with billions of dollars of services each year: Wetlands purify our water and protect our coasts, forests clean our air and water and provide income to the timber industry, and the great outdoors provide the recreational opportunities like hunting and fishing that fuel the economy of many rural areas. All of these services are essential to sustain our robust economy and to support our way of life. However, climate change places many of our natural resources at severe risk. Dale Hall, the director of the U.S. Fish and Wildlife Service has said: "The warming of the earth could potentially have more far-reaching impacts on wildlife and wildlife habitat than any challenge that has come before us."[64] Even if we begin to cut global warming pollution today, climate change will drastically impact natural resources for many decades as wildlife and plant populations are subjected to changes in temperature, precipitation,

[64] http://www.fws.gov/home/climatechange/.

stream flow, and the timing and frequency of severe weather events.

The IPCC reports that 20–30% or potentially more plant and animal species will be placed at risk of extinction by climate change.[65] For changes over 2.5 °C, the IPCC predicts that there will be major changes in ecosystem structure and function with "predominantly negative consequences for biodiversity and ecosystem goods and services, e.g., water and food supply."[66] Global warming could, for example lead to the destruction of many wetlands, including up to 90% of wetlands in the prairie potholes region.[67] Increased fire risk due to drought, seasonal shifts, and increased pest load can significantly increase fire risk in the western U.S.[68,69] Water levels in Lake Erie, already below average, could decrease 4–5 feet by the end of this century, disrupting shoreline habitat.[70]

The Climate Security Act invests critical funding to help our natural resources survive this period of climatic change. Investment now will help avoid impacts that will be difficult or impossible to reverse. Currently, resource managers are without the financial means to address the many challenges of climate change. The Adaptation Fund will provide natural resource managers with the ability to safeguard existing natural resources and wildlife and take steps to increase resilience to climate change. Under the Climate Security Act, federal, state, and tribal agencies will receive funding to carry out natural resource adaptation activities that help with survival of fish and wildlife, fish and wildlife habitats, plants, and associated ecological processes threatened by climate change or ocean acidification. Scientific research and education are among the conservation activities eligible for funding if they support this objective. The natural resources conservation funding in this title amount to a conservative estimated annual investment of 1 percent of the annual economic benefits that forests, wetlands and outdoor recreational activities alone provide to the U.S.[71]

Subtitle H—International Climate Change Adaptation and National Security Program

Subtitle H directs that all funds deposited into the Climate Change and National Security Fund under Subtitle A of Title IV shall be made available to a program established by the State Department and administered by the U.S. Agency for International Development for the purposes described below.

Sec. 4801. Findings. Congress finds that:

- global climate change represents a potentially significant threat multiplier for instability around the world as changing precipitation patterns may exacerbate competition and conflict over agricultural, vegetative, and water resources and displace

[65] IPCC AR4 Working Group 2, Section 4 ES, and Section 4.4.11.

[66] IPCC AR4 Working Group 2, Summary for Policy Makers, p. 11.

[67] M.G. Anderson and L.G. Sorenson. 2001. "Global Climate Change and Waterfowl: Adaptation Face of Uncertainty." Transaction of the 66th North American Wildlife and Natural Resources Conference (Washington, DC: Wildlife Management Institute, 300–319.

[68] Westerling, A.L., H.G. Hidalgo, D.R. Cayan, and T.W. Swetnam. 2006. Warming and earlier spring increases Western U.S. forest wildfire activity. Science 313: 940–43.

[69] http://www.usgcrp.gov/usgcrp/Library/nationalassessment/overviewforests.htm.

[70] Lofgren, B.M., Quinn, F.H., Clites, A.H., Assel, R.A., Eberhardt, A.J., Luukkonen, C.L. 2002. Evaluation of Potential Impacts on Great Lakes Water Resources Based on Climate Scenarios of Two GCMs, Journal of Great Lakes Research, 28(4):537–554.

[71] National Wildlife Federation. 2008. Investing in America's Natural Resources—The Urgent Need for Global Warming Legislation. Reston, Virginia.

people, thus increasing hunger and poverty and causing increased pressure on least developed countries;

• the strategic, social, political, and economic consequences of global climate change could have disproportionate impacts on least developed countries, which have fewer resources and thus, often fewer emissions;

• the strategic, social, political, and economic consequences of global climate change are likely to have a greater adverse effect on less developed countries;

• the consequences of global climate change could pose a danger to the security interest and economic interest of the United States; and

• it is in the national security interest of the United States to recognize, plan for, and mitigate the international strategic, social, political, and economic effects of a changing climate.

Sec. 4802. Purposes. The purposes of this subtitle are:

• to protect the national security of the United States where such interest can be advanced by minimizing, averting, or increasing resilience to potentially destabilizing climate change impacts;

• to support the development of national and regional climate change adaptation plans in least developed countries;

• to support the deployment of technologies that would help least developed countries reduce their greenhouse gas emissions and respond to destabilizing impacts of climate change;

• to provide assistance to least-developed countries and small island developing states with national or regional climate change adaptation plans in the planning, financing, and execution of adaptation projects;

• to support investments and capital to reduce vulnerability related to climate change and its impacts, including but not limited to drought, famine, floods, sea level rise, shifts in agricultural zones or seasons, shifts in range that affect economic livelihoods, and refugees and internally displaced persons;

• to support climate change adaptation research in or for least developed countries; and

• to encourage the identification and adoption of appropriate low-carbon and efficient energy technologies in least-developed countries.

Sec. 4803. Establishment. Subsection 4803(a) directs the Department of State, working with the Agency for International Development and EPA, to establish an International Climate Change Adaptation and National Security Program.

Subsection 4803(b) directs the program to submit annual reports to the president and relevant congressional committees that describe: the extent to which other countries are committing to reducing greenhouse gas emissions through mandatory programs; the extent to which climate change will threaten, cause, or exacerbate political instability or international conflict in least developed countries; and the ramification of climate change on armed conflicts or the creation of refugees. This report would also detail how funds under this section were spent to enhance national security and assist in avoiding the destabilizing impacts of climate change in volatile regions of the world.

Sec. 4804. Funding. Section 4804 states that the Administrator of USAID will oversee the expenditures of the program. No more than 10 percent of the funds may be spent in any single country in any single year.

Discussion: A key finding of the IPCC and other groups is that climate change will have is most severe impacts in many of the least developed parts of the world, often the same countries that have made the smallest contributions to the emissions of greenhouse gases. For example, people living in developing countries are more than 20 times as likely to be affected by climate-related disasters[72]. Drought prone regions in Africa, low-lying countries in Southeast Asia, and glacier-water dependent parts of South America and Asia may be particularly vulnerable. Because many of these regions already suffer from instability and limited resources, climate change has the potential to greatly magnify instability, competition and conflict. As described in the background section of this report, these changes have the potential to significantly impact the national security of the U.S.

Some impacts of climate change will occur even if global efforts to reduce emissions begin immediately and are highly successful. For example, World Health Organization estimates that climate change may already contribute to 150,000 deaths each year and the IPCC projects that by 2020, long before high concentrations of greenhouse gases are reached, 75 to 250 million people in Africa will be exposed to increased water stress as a result of climate change.[73,74] Assistance to reduce water scarcity, reduce impacts of flooding and sea-level rise, improve agricultural practices, and improve health systems to address climate-related health impacts will help least developed nations deal with the impacts of unavoidable climate change and reduce the degree to which climate change creates or exacerbates threats to national security.

Subtitle I—Emergency firefighting programs

Subtitle I directs that all auction proceeds deposited into the emergency firefighting funds established under Subtitle A shall be used to pay for Bureau of Land Management and Forest Service wildland fire suppression activities in excess of normal, non-emergency fire suppression.

Sec. 4901. Findings. Congress finds that:

- since 1980, wildfires in the United States have burned almost twice as many acres per year on average than the average burned acreage during the period beginning on January 1, 1920, and ending on December 31, 1979;
- the wildfire season in the western United States has increased by an average of 78 days during the 30-year period preceding the date of enactment of this Act;
- researchers predict that the area subject to wildfire damage will increase during the 21st century by up to 118 percent as a result of climate change;

[72] Oxfam America. Adaptation 101.

[73] WHO, "Climate and health," Fact Sheet No. 266, August 2007, www.int/mediacentre/ factsheets/fs266/en/index.html.

[74] IPCC AR4 Working Group II, Summary for Policymakers.

- the annual budget of the Forest Service, the Forest Service used for wildfire suppression activities was 13 percent in 1991 and 45 percent in 2007; and
- 1 percent of the largest escaped fires burn 95 percent of all burned acres and consume 85 percent of all wildfire fighting costs.

Sec. 4902. Bureau of Land Management Emergency Firefighting Program. Section 4902 directs that the funds deposited into the Bureau of land Management Emergency Firefighting Fund be made available without further appropriation to pay for emergency fire suppression activities. The Department of the Interior is directed to establish an accounting and reporting system for the use of these funds and submit monthly and annual reports to Congress on expenditures from the fund.

Sec. 4903. Forest Service Emergency Firefighting Program. Section 4903 directs that the funds deposited into the Forest Service Emergency Firefighting Fund be made available without further appropriation to pay for emergency fire suppression activities. The Secretary of Agriculture is directed to establish an accounting and reporting system for the use of these funds and submit monthly and annual reports to Congress on expenditures from the fund.

Discussion: Climate change is a significant contributor to the increasing severity and duration of wildfires throughout the United States. Research indicates that in the last twenty years there has been a four fold increase in the number of major wildfires [75]. This increase in wildfire activity has in turn impacted the ability of federal land management agencies to adequately fund and address wildfire suppression and mitigation efforts. In 1991 the Forest Service spent 13% of its budget on wildfire. As of 2007, it spent 45% of its budget on wildfire.[76] This provision directs up to $1.1 billion annually to ensure that efforts by the Forest Service and Bureau of Land Management to address wildfire have adequate funds.

Title V—Energy efficiency

Title V updates energy efficiency standards for residential boilers, space heaters and air conditioners. It also sets the updated building code standards that qualify a state for a 1 percent set-aside of allowances under Subtitle C of Title III.

Subtitle A—Appliance efficiency

Subtitle A incorporates strengthened energy efficiency standards for residential boilers, space heaters, and air conditioners.

Sec. 5101. Residential Boilers. Section 5101 sets updated standards for residential boilers including such energy saving measures such as no constant burning pilot and automatic means for adjusting the temperature.

Sec. 5102. Regional Variations in Heating or Cooling Standards. Section 5102 allows the Department of Energy to establish regional standards for space heaters and air conditioners (excluding window unit air conditioners and portable space heaters).

[75] Science 18 August 2006: Vol. 313. no. 5789, pp. 927–928.
[76] http://www.nytimes.com/2007/06/26/us/26fire.html.

Discussion: Efficiency standards can achieve efficiency gains and emissions reductions in some sectors far more quickly and efficiently than the price signal from a cap and trade system. Updated standards for residential boilers, space heaters and air conditioners were recently enacted as part of the Energy Independence and Security Act of 2007 (H.R. 6, P.L. 110–140).

Subtitle B—Building efficiency

Sec. 5201. Updating State Building Energy Efficiency Codes. Subsection 5201(a) amends the Energy Conservation and Production Act to direct the Department of Energy to update the national model building codes and standards at least every three years. The standards are designed to achieve energy savings compared to the International Energy Conservation Code (IECC) of 2006 for residential buildings and the American Society of Heating Refrigeration and Air Conditioning Engineers (ASHRAE) Standard 90.1 (2004) for commercial buildings. These model codes shall be 30% improvements through 2019 and 50% improvements after 2020. The DOE is also directed to update codes in response to changes in the underlying IECC or ASHRAE standard or if the model codes fail to meet the energy savings goals.

Subsection 5201(b) states that adoption of these codes must certify compliance with the Department of Energy.

Subsection 5201(c) defines compliance as when at least 90 percent of new and renovated buildings covered by the state code substantially meet all of the requirements of the code or when excess energy use of new, non-code-compliant buildings is not more than 10 percent of all energy use by buildings covered by the code.

Subsection 5201(d) allows the Department of Energy to extend deadlines for states that are making significant progress under good faith efforts.

Subsection 5201(e) directs the Department of Energy to provide assistance, including incentive funding, to States to implement updated codes and otherwise promote energy efficient buildings.

Sec. 5202. Conforming amendment. Section 5202 amends the Energy Conservation and Production Act (42 U.S.C 6832) with a definition of the IECC.

Discussion: This subtitle creates model building codes.[77] Buildings consume about 40 percent of the total energy used in the United States. Efficient buildings avoid global warming, reduce demand on the power grid and stress on natural gas supplies, improve local air quality, and save consumers money. A 2006 report by the McKinsey Global Institute found that energy use in new and existing buildings could be reduced by more than one quarter by 2020 with measures that pay for themselves within ten years. A 2007 study by McKinsey estimated that changes in the design of new building shells cost, on average, negative $42/ton carbon dioxide equivalent.[78] That is, they save $42 per ton of reduction.

Building design and construction provide by far the best and most cost-effective opportunity to build in energy-efficient features that will last for the lifetime of the building. Building energy codes overcome market barriers, which otherwise result in underinvest-

[77] This text was adapted from the Alliance to Save Energy Fact sheet on Building Codes in S.2191.

[78] http://www.mckinsey.com/__clientservice/__ccsi/pdf/__US-ghg-final-report.pdf.

ment in building energy efficiency. For example, builders have little incentive to invest in energy efficiency since they pay the upfront costs but not the energy bills of the buildings they develop, and buyers cannot easily see how efficient a new building will be. Building energy codes save consumers money. While there may be modest initial costs for energy efficiency improvements those costs are more than offset through lower energy bills. As the total monthly cost to the homeowner-mortgage payments plus utility bills is lower, energy efficiency makes homes more affordable.

The building codes in this section are carefully designed to leave states and local governments in charge of setting their own building codes and to leave independent organizations primary responsibility for setting the national models. States must meet building efficiency codes in this title only if they wish to qualify for the allowances under Section 3301(b).

Title VI—GLOBAL effort to reduce greenhouse gas emissions

Title VI closely tracks the international trade measure that appears in the Bingaman-Specter climate bill, S.1766. Under this provision, the Executive Branch is directed, upon enactment, to intensify its efforts to convince other nations to start reducing their greenhouse-gas emissions. If, eight years after the enactment of the U.S. program, it is determined that a given major emitting nation has not taken comparable action, the President at that time is authorized to require that importers of greenhouse-gas-intensive manufactured products (steel, aluminum, etc.) from that nation submit emissions credits of a value equivalent to that of the credits that the U.S. system effectively requires of domestic manufacturers.

Sec. 6001. Definitions. Section 6001 defines the baseline emissions level as the total average greenhouse gas emissions attributed to the production of a category of covered goods produced in a foreign country during the period 2012 to 2014. Covered goods are primary products (iron, steel, aluminum, cement, bulk glass, paper, etc.) whose manufacture emits a significant amount of greenhouse gases (both directly and through electricity consumption) and whose cost of domestic production is impacted by the Act.

Sec. 6002. Purposes. The purposes of this title are:

- to promote a strong global effort to significantly reduce greenhouse gas emissions;
- to ensure, to the maximum extent practicable, that greenhouse gas emissions occurring outside the United States do not undermine the objectives of the United States in addressing global climate change; and
- to encourage effective international action to achieve those objectives through agreements negotiated between the United States and foreign countries; and measures carried out by the United States that comply with applicable international agreements.

Sec. 6003. International Negotiations. Section 6003 begins with the finding that the purposes described above can be most effectively addressed and achieved through international negotiations. It clarifies that Congress intends that the negotiating intent of the U.S. shall be to focus multilateral and bilateral international agreements on the reduction of greenhouse gas emissions to advance these purposes.

Sec. 6004. Interagency review. Section 6004 directs the President to establish an interagency group to carry out this section, chaired by the Secretary of State. This group will determine whether, and the extent to which, each country has taken comparable action to limit greenhouse gas emissions and issue reports on their findings to the President.

Sec. 6005. Presidential Determinations. Section 6005 states that, before 2019, the President shall determine whether foreign countries subject to review have take comparable action, taking into consideration baseline emission levels, and applicable reports submitted by the interagency group.

Sec. 6006. International Reserve Allowance Program. Subsection 6006(a) directs EPA to establish a program to offer international reserve allowances for sale to importers. These allowances are wholly independent from the cap in section 1201 but the price of these allowances may not exceed the current price of auctioned allowances from the main cap in the Act. These reserve allowances will have a system for tracking, sale, exchange, banking, etc. Proceeds from the sale of these allowances go to the International Climate Change and Adaptation and National Security Program.

Subsection 6006(b) directs the President to publish annually a list in the Federal Register of foreign countries as to whether they are covered or excluded from this program. Countries are excluded if they have taken "action comparable to that taken by the United States" to limit greenhouse gas emissions or if their emissions are not more than 0.5 percent of global greenhouse gas emissions (taking into account deforestation emissions). All other countries are covered under this program.

Subsection 6006(c) declares that, starting in 2020, any importer of a covered good will need to submit a declaration to U.S. Customs and Border Protection in order to enter the customs territory of the U.S. This declaration will certify that the good is either from an excluded country or is accompanied by the appropriate number of international reserve allowances. Declarations are not necessary for goods from excluded countries, or from the least-developed of developing countries.

Subsection 6006(d) directs EPA to establish, by rule, a method for calculating the required number of reserve allowances for each unit of covered good for each country. For the initial year, this shall be equal to the increase in emissions due to that covered good for the most recent year divided by the total quantity of the covered good produced in that year. This amount will be adjusted for allowances which were allocated to domestic manufacturers in the same sector for that year and the level of economic development of the foreign country. EPA will revise the adjustments annually, as needed and adjust them to comply with any international agreements.

Subsection 6006(e) adds that, in lieu of an international reserve allowance, an importer may submit a credit from a commensurate foreign cap and trade program certified under Title II.

Sec. 6007. Adjustment of International Reserve Allowance Requirements. Section 6007 directs the President, in 2023, to submit a report to Congress assessing the effectiveness of the international reserve allowance program. If he determines that the requirement is not adequate, he is directed to adjust the requirement or take

other actions to improve the effectiveness, in accordance with all international agreements.

Discussion: Concerns over U.S. competitiveness have emerged as one of the key issues in the design of U.S. climate policy. This title recognizes that the best way for the U.S. to ensure its long term competitive position is to re-engage in the international negotiation process. International treaties are the most effective policy tool to ensure that climate policies do not simply shift emissions (and production) from regulated countries to unregulated ones ("leakage").

EPA examined the potential for "leakage" of emissions or trade under S. 2191, using the ADAGE model. The Agency examined a highly conservative scenario where developed nations reduce to only 50% below 1990 levels by 2050 (significantly weaker targets than those actually being discussed by the EU and other nations) and developing nations take no action before 2025 (leveling their emissions at 2015 levels through 2034). Under those conservative assumptions, EPA found "no international emissions leakage occurs."[79] Indeed, the analysis found that even this modest international action on climate change leads to a decline in U.S. imports of energy-intensive manufactured goods from developing nations and an increase in the export of such goods from the U.S. to developing nations.

However, S. 2191 also contains a backup provision to further protect U.S. manufacturers in the event that the U.S., EU and others fail to convince some countries to reduce greenhouse gas emissions. The President may require importers of greenhouse-gas-intensive manufactured products to submit emissions credits if those products come from a nation which has not taken comparable action. The price of these credits will insure that foreign manufacturers of energy-intensive goods will not gain a price advantage. Modeling of this provision by the EPA demonstrates that international reserve allowance requirements strongly limit any increase in imports which would otherwise occur. Several experts testified in a hearing before the Senate Finance committee that they believed that this international trade provision was written in a way expected to be compliant with the policies of the WTO.[80]

Title VII—Reviews and Recommendations

Title VII directs EPA to commission from the National Academy of Sciences (NAS) a report to be delivered to Congress every three years. The report is designed to detail the latest scientific information and data relevant to global change and various aspects of the performance of the Act. This report will include recommendations for changes to the Act. EPA must submit to Congress recommendations for further action based on each NAS study.

Title VIII also directs EPA to submit to Congress in 2012 a report on air pollution and air pollution control technology, as it relates to the Act.

In 2020, President must submit to Congress a bill derived from a consensus report by a task force of agency heads, based on the recommendations submitted by EPA in 2019. This title also directs EPA, in consultation with several other agencies, to perform re-

[79] http://www.epa.gov/climatechange/downloads/s2191__EPA__Analysis.pdf.
[80] Senate Finance Hearing 2/14/08.

gionally-specific analyses of the new infrastructure, safety, health, land-use planning, and coastal inundation prediction policies that will be necessary to enable the U.S. to adapt to the degree of climate change that is now inevitable. Finally, it commissions a National Academy of Sciences study on greenhouse gas emissions from aviation.

Sec. 7001. National Academy of Sciences Reviews. Section 7001 directs EPA to commission NAS reviews for Congress every three years. The report will contain a broad review of the latest scientific information on the current and future emissions and concentrations of greenhouse gases, temperature trends, and impacts of climate change. It will describe the extent to which the Act, in concert with other policies, will prevent dangerous concentrations of greenhouse gases or increases in global average temperature.

The review will examine the impact that the Act's technology deployment programs are having and determine whether advanced climate-friendly energy technologies are deploying quickly enough to enable the U.S. economy to comply with Act's emissions caps without suffering hardship. Finally, the review will also address a number of questions about the Act's effectiveness and possible changes to the legislation.

Sec. 7002. Environmental Protection Agency Review. Section 7002 directs EPA to submit a report to Congress detailing the latest information on the health effects of mercury, technology to reduce mercury emissions from coal combustion, and the extent to which the Act assists with reducing particulate matter and ozone levels.

Sec. 7003. Environmental Protection Agency Recommendations. Section 7003 directs EPA to submit a report to Congress within one year of each NAS review, suggesting recommendations for action based on the NAS reviews. The report must include an explanation of any inconsistencies between the recommendations and NAS reviews.

Sec. 7004. Presidential Recommendations. Subsection 7004 directs the President to establish an Interagency Climate Change Task Force, composed of EPA Administrator and the relevant Cabinet Secretaries. Not later than April 1, 2019 the Task Force will submit a consensus report in response to reports from EPA under Section 7003, including specific legislative recommendations and an explanation of any inconsistencies. By July 1, 2020 the President is directed to submit to Congress the text of proposed legislation based on the Task Force recommendations.

Sec. 7005. Adaptation Assessments and Plan. Section 7005 directs EPA to develop estimates of regional infrastructure costs associated with climate change. EPA is also directed to develop an adaptation plan for the U.S. with a list of vulnerable systems, requirements for co-ordination between agencies, anticipated costs of adaptation and needs for climate change technology and inundation prediction systems. EPA must also conduct research on the impact of climate change on low income populations and identify measures to assist those populations.

Sec. 7006. Study by Administrator of Aviation Sector Greenhouse Gas Emissions. Section 7006 directs the EPA to commission a National Academy of Sciences study on greenhouse gas emissions associated with aviation.

Discussion: The rapid pace at which scientists have developed a deeper understanding of the causes and consequences of climate change has been a major driver in the case for U.S. action on climate change. Because climate science is rapidly evolving, this section is designed to ensure that Congress receives the most current science possible when evaluating future climate-related legislation. The National Academy studies will update Congress on the latest science regarding the sources and concentrations of greenhouse gases and their anticipated impact on the climate. It will also provide an unbiased, technical examination of the performance of this legislation and ways in which it might be expanded or improved.

The EPA report is intended to respond to these findings and recommendations and provide Congress with a framework for improvement to the legislation. Ultimately, the responsibility for improving or altering the legislation rests with Congress, but a Climate Change Task Force—convened by the President—ensures that Congress will consider a package of legislation in 2020 to improve the effectiveness of the legislation.

Title VIII—Framework for geological sequestration of carbon dioxide

Title VIII initiates a series of rulemakings, geological surveys, technical reviews, and panels of legal experts designed to pave the way for the rollout of a national infrastructure for taking carbon dioxide from power plants, through pipelines, to injection wells, and then deep underground.

Sec. 8001. National Drinking Water Regulations. Section 8001 amends the Safe Drinking Water Act to include regulations related to carbon dioxide. It directs EPA to promulgate regulations for the permitting of commercial scale injection of carbon dioxide for geologic sequestration, including provisions to monitor and control storage and clarify long-term liability associated with the storage. The regulations are to avoid, to the extent practicable, carbon dioxide release into the atmosphere, and are to ensure that underground sources of drinking water, human health, and the environment are protected. EPA is directed to report on the effectiveness of the regulations every five years, and update them accordingly.

Sec. 8002. Assessment of Geological Storage Capacity for Carbon Dioxide. Section 8002 directs the USGS to develop a methodology for assessing the potential capacity for the geologic storage of carbon dioxide. The methods shall be coordinated with the Department of energy and EPA, subjected to external review, and updated every 5 years. By 2011, the USGS shall complete a national assessment of carbon dioxide storage capacity.

Sec. 8003. Study of the Feasibility Relating to Construction of Pipelines and Geological Carbon Dioxide Sequestration Activities. Section 8003 directs the Department of Energy, in coordination with other agencies, to promptly assess the feasibility of constructing pipelines and facilities for the sequestration of carbon dioxide. The report will examine: (1) barriers and market risks to the construction of pipelines or storage of carbon dioxide; (2) regulatory, financing or siting options that may mitigate those risks; (3) means to ensure safe handling and transportation of carbon dioxide; and (4) measures to ensure the integration of pipelines for geologic sequestration and enhanced oil recovery.

Sec. 8004. Liabilities for Closed Geological Storage Sites. Section 8004 establishes a public-private task force to study the implications (environmental, safety and financial) of federal assumption of liability for closed geologic storage sites.

Discussion: Carbon capture and storage technology will present new challenges for regulation and safety related to the underground injection of carbon dioxide. As such, this issue will require the sustained attention of Congress over the next decade. Title VIII is designed to put into place a few key steps towards a national framework for carbon dioxide sequestration. This includes ensuring that carbon dioxide sequestration does not harm drinking water quality, identifying barriers to the development of the necessary pipelines, and developing recommendations for ways to deal with liability risks.

Title IX—Miscellaneous

The first section of Title IX authorizes the President to suspend the provisions of the bill in the event of a national security emergency. The second section makes the actions that EPA takes pursuant to the Act subject to the Administrative Procedure Act and the Clean Air Act. The third section makes clear that states are not preempted from enacting and enforcing greenhouse gas emission reduction requirements that are at least as stringent as the federal ones. This title also designates coal and biofuel research centers.

Sec. 9001. Paramount Interest Waiver. Section 9001 authorizes the President to modify any requirements under the Act if the President determines, in consultation with the NAS, DOE, and EPA, that a national security crisis exists. This determination is subject to judicial review under the Clean Air Act.

Sec. 9002. Administrative Procedure and Judicial Review. Section 9002 clarifies that all rules and regulations in the Act, with the exception of the proportions of the allocation scheme, are subject to the rulemaking procedure described in the Clean Air Act. It also gives the EPA the same powers and authority for enforcement, recordkeeping, monitoring, entry, subpoenas and judicial review which are laid out in the Clean Air Act.

Sec. 9003. Retention of State authority. Section 9003 clarifies that the Act does not preclude or abrogate the right of states to adopt standards, caps, limitations, prohibitions, or any other requirements that are more stringent than those in the Act.

Sec. 9004. Tribal Authority. Section 9004 allows the EPA to treat any federally recognized Indian tribe as a state.

Sec. 9005. Rocky Mountain Centers for Study of Coal Utilization. Section 9005 designates the University of Wyoming and Montana State University as "Rocky Mountain Centers for the Study of Coal Utilization" and authorizes the appropriation of funds.

Sec. 9006. Sun Grant Center Research on Compliance with Clean Air Act. Section 9006 designates Sun Grant research centers for studies of biofuels and biomass, and authorizes appropriations.

Sec. 9007. Authorization of Appropriations. Section 9007 authorizes funds necessary to carry out this Act.

Discussion: The first provision in this title ensures that the president can modify the Act if a major national security crisis should exist and modification of the Act is necessary to allow an appropriate response.

Section 9003 protects the right of States to serve as laboratories of innovation on climate legislation. This savings clause is intended to preserve regional, state, and local efforts to reduce greenhouse gas emissions. Many states, counties, cities, and communities have been leaders on global warming, trying innovative approaches in advance of the federal government. Within our federal system these laboratories of innovation, found across our country, are vital to our ability to minimize and mitigate the consequences of global warming. These local, state and regional efforts are consistent with and further the purposes of this statute. Thus, in other parts of this bill, state and local laws are integrated into the cap-and-trade approach of this bill.

The purpose of this section is to make it absolutely clear that this bill does not affect the validity of these state and local greenhouse gas emissions laws and regulations (and any related laws or regulations), so long as these laws require state and local reductions of greenhouse gas emissions at least as stringent as those required by federal law. There will be no express, implied, field, or conflict preemption of these regional, state, and local efforts. These regional, state, and local efforts include (but are not limited to) the Regional Greenhouse Gas Initiative, the Western Climate Initiative, the Midwestern Greenhouse Gas Reduction Accord, California's Global Warming Solutions Act of 2006, renewable fuels programs, low carbon fuel standards, motor vehicle greenhouse gas emission standards (adopted under Clean Air Act section 209(b)), renewable energy portfolio standards, electricity generation emission performance standards, climate action plans, greenhouse gas monitoring, reporting and verification statutes, energy and appliance efficiency standards, and labeling and information requirements. In interpreting the scope of this savings clause, the courts should follow the applicable precedent that calls for a narrow reading of federal preemption of state and local authority and a broad reading of this savings clause.

The intention of the authors of this legislation was that the proceeds from the sale of emissions allowances would cover the cost of programs under the Act, making it budget neutral. After the committee reported the bill, the Congressional Budget Office informed the staff that it would apply new criteria to the scoring of allowances. In response to this new information, the committee crafted an amendment to ensure the bill remained budget neutral. CBO's analysis of this amendment confirmed that this amendment would restore the original intent of the legislation and that, over the 2009–2018 period, "revenues would exceed the new direct spending by an estimated $78 billion, thus decreasing future deficits (or increasing surpluses) by that amount over the next 10 years."

Title X—Control of hydrofluorocarbon consumption

Title X places a separate declining cap on the consumption and importation of hydrofluorocarbons (HFCs) into the U.S. HFCs are synthetic industrial gases, primarily used in refrigeration and air conditioning as substitutes for ozone-depleting chlorofluorocarbons (CFCs).

Sec. 10001. Applicability. Section 10001 makes it illegal to produce or import HFCs except in accordance with this title.

Sec. 10002. Definitions. Section 10002 defines parallel definitions to those in the overall Act. It also adds a new type of allowance for the certified destruction of HFCs.

Sec. 10003. Cap on Hydrofluorocarbon Consumption and Importation Into United States. Section 10003 directs the EPA to establish the cap in section 10004.

Sec. 10004. Hydrofluorocarbon Consumption Allowance Account. Section 10004 creates a separate account of allowances for the consumption of HFCs. This account begins at 300 million metric tons carbon dioxide equivalent in 2010 (two years before the cap in section 1201) and declines to 70 percent below that level by 2037 (13 years ahead of the cap in section 1201).

Sec. 10005. Allocation of Hydrofluorocarbon Consumption Allowances. Section 10005 directs EPA to distribute HFC allowances to HFC producers or importers, in proportion to their share of HFC and HCFC production. EPA also auctions a portion of the allowances, shown in the table below:

Year	*Percentage of HFC Consumption Allowance Account*
2010	5
2011	10
2012	10
2013	10
2014	15
2015	20
2016	25
2017	30
2018	35
2019	40
2020	45
2021	50
2022	55
2023	60
2024	65
2025	70
2026	75
2027	80
2028	85
2029	90
2030	95
2031–2050	100

The proceeds of the auction are used to support the following purposes: (1) a program to recover and destroy the maximum amount of economically recoverable chlorofluorocarbons, halons, and other substances under Title VI of the Clean Air Act that have significant ozone depletion potential and global warming potential; (2) a program of incentives for consumer purchases of energy-efficient refrigeration and cooling equipment that contains refrigerants with no or low global warming potential; (3) a program to support the development and deployment of hydrofluorocarbons with low global warming potential, and energy efficient technologies, equipment, and products containing or using hydrofluorocarbons; and (4) the programs receiving auction proceeds under Title IV.

Sec. 10006. Compliance Obligation. Section 10006 states that companies must submit a combination of HFC consumption allowances or allowances from the destruction of HFCs (section 10010) equal to the HFCs produced or imported in the preceding year. Companies that fail to comply are subject to the same penalties as

in section 1203—three times the market value of an allowance or $200, whichever is greater.

Sec. 10007. Sale, exchange, and other uses of hydrofluorocarbon consumption allowances. Section 10007 allows HFC producers and importers to sell, trade and exchange HFC allowances. These allowances may not be traded or exchanged for allowances in the rest of the Act.

Sec. 10008. Allowance transfer system. Section 10008 directs the EPA to develop a system for tracking the issuance and transfer of HFC allowances.

Sec. 10009. Banking and borrowing. Section 10009 allows banking of both consumption and destruction allowances. It allows borrowing of HFC destruction allowances. Borrowing may be used for up to 15 percent of a compliance obligation in any calendar year and is subject to a 10 percent interest rate.

Sec. 10010. Hydrofluorocarbon Destruction Allowances. Section 10010 directs the EPA to issue allowances for recovery and destruction of HFCs from products or equipment. Allowances are not granted for the destruction of HFCs which are a byproduct of production processes.

Discussion: Because of the extremely high global warming potential (GWP) for HFC's (up to 14,800 times that of carbon dioxide), HFCs would experience extremely strong price pressure if included in a cap and trade program with carbon dioxide. The resulting upward price pressure on allowances related to HFC's could force the closure of these facilities simply because in a GHG emissions trading market that included both HFCs and CO_2, the economic value of selling the allowances would compete with that of consuming them in the continued manufacture of a chemical important for a variety of economic use, including the manufacture of energy efficient appliances.[81] The separate market for HFCs is designed to reduce emissions of these gases while safeguarding the economic and environmental value of manufacturers of continuing to produce energy efficient refrigerators and air conditioners.

This program sets up a parallel structure to the one in main titles, with a declining cap and a phase-out of allocation to producers over time. However, because HFC manufacturers anticipate finding complete replacements for HFCs in the future, the cap reaches a 70% reduction 13 years sooner. Unlike the main cap and trade system, this title creates two kinds of allowances. The first kind is a consumption allowance—required to produce an amount of HFC equal to a ton of carbon dioxide. These consumption allowances function very much like allowances under Title II. The second type of allowances is a destruction allowance—which certifies that an amount of HFCs equal to a ton of carbon dioxide has been recovered and destroyed. Manufacturers of HFCs can submit a combination of the two types of allowances for their compliance obligation.

The proceeds from the auction under this title are directed primarily towards programs related to high GWP gases. These programs are designed to reduce the impact of high GWP synthetic gases on the atmosphere and speed the development and deployment of less damaging replacements. The auction funds a program

[81] Assessment of HFC Consumption Trading Approaches for the United States, ICF International, 2008.

to recover and destroy high GWP gases, a program to provide consumer incentives for the purchase of energy-efficient refrigeration and cooling equipment that contains refrigerants with no or low global warming potential, and a program to support the development and deployment of low global warming potential substitutes.

Title XI—Amendments to Clean Air Act

Title XI includes two sections that extend to HFCs the Clean Air Act policies for chlorofluorocarbons (CFCs) and hydrochlorofluorocarbons (HCFCs), ozone depleting substances (and greenhouse gases) with similar applications. The first such policy is a national recycling and emission reduction program for the chemicals. The second policy relates to the servicing of motor vehicle air conditioners.

The final section of Title XI amends the Clean Air Act with a low carbon fuel performance standard that will achieve a 5 percent reduction in aggregate lifecycle greenhouse gas emissions per unit of energy in U.S. fuel by 2015, and a 10 percent reduction by 2020.

Sec. 11001. National Recycling and Emission Reduction Program. Section 11001 updates the Clean Air Act to clarify regulation of HFCs used to replace ozone depleting gases (CFCs and HCFCs). It directs the EPA to promulgate regulations establishing standards for sale, distribution, use, recycling and disposal of HFCs within 1 year of enactment.

Sec. 11002. Servicing of Motor Vehicle Air Conditioners. Section 11002 extends the Clean Air Act requirements governing small containers of CFCs and HCFCs (used for motor vehicle air conditioners) to HFCs.

Sec. 11003. Carbon Dioxide Reduction. Subsection 11003(a) finds that: (1) oil used for transportation contributes significantly to air pollution, including global warming pollution, and other adverse impacts on the environment; (2) to reduce emissions of global warming pollutants, the United States should increasingly rely on advanced lean fuels for transportation; and (3) a comparison of lifecycle greenhouse gas emissions of conventional transportation fuels and low carbon transportation fuels should be based on comparable fuels, such as a comparison of gasoline to gasoline and diesel fuel to diesel fuel.

Subsection 11003(b) amends the Clean Air Act to include a performance-based Low Carbon Fuel Standard. This Low Carbon Fuel Standard considers the aggregate quantity of greenhouse gas emissions per unit energy associated with the fuel, from production through use (the "lifecycle greenhouse gas emissions").

Subsection 11003(c) directs EPA to establish methodologies for determining lifecycle greenhouse gas emissions and emissions associated with baseline fuels (the fuels used in 2008). It then establishes a fuel certification and marketing process to ensure that each provider produces a fuel mix which is at the baseline by 2011, 5 percent below the baseline by 2015 and 10 percent below the baseline by 2020. EPA shall revisit the fuel standard every 5 years to provide the maximum practical reduction in lifecycle greenhouse gas emissions, using the best available science and guarding against air pollution, water pollution, and noxious plants.

Producers of electricity used for transport fuel (e.g. plug-in hybrids) can participate in the program and receive credits, as do fuel

producers who exceed the targets. These credits can be traded, banked or sold to other fuel providers.

Discussion: The first two sections promulgate rules for HFCs, recognizing that they are used as replacements for ozone-depleting gases and need to be tracked through a similar framework. Section 11002 also ensures that only qualified technicians will service motor vehicle air conditioners, to prevent the accidental release of HFCs into the atmosphere.

A Low Carbon Fuel Standard is an effective complimentary policy with a cap and trade program. By setting a performance-based and technology-neutral standard for the greenhouse gas intensity of fuels, it encourages diversification of the fuel mix. For example, producers of fuels can blend in more low-carbon ethanol, develop hydrogen or natural gas fueling capacity, purchase credits from electric utilities which power plug-in vehicles, or seek other innovative solutions. This both decreases reliance on (largely imported) petroleum and loosens pressure on the carbon market by reducing demand for allowances.

The Low Carbon Fuel Standard relies on a full life cycle analysis to determine the greenhouse gas intensity of a fuel. By considering the greenhouse gas emissions from production through use, including land-use impacts, the LCFS ensures that these alternate fuels not only shift U.S. fuel use away from petroleum but also result in real climate benefits.

LEGISLATIVE HISTORY AND ROLL CALL VOTES

The America's Climate Security Act (S. 2191) was introduced by Senators Lieberman, Warner, Harkin, Coleman, Dole, Collins, Cardin, Klobuchar, and Casey on October 18, 2007. Senators Nelson of Florida, Schumer, and Wyden later joined as cosponsors. The bill was considered by the Subcommittee on Private Sector and Consumer Solutions to Global Warming and Wildlife Protection on November 1, 2007, and a substitute amendment (with amendments thereto) was passed by a vote of 4–3 (Senators Baucus, Lautenberg, Warner, and Lieberman voting aye, Senators Barrasso, Isakson, and Sanders voting no).

On December 5, 2007, the full Committee on Environment and Public Works considered and ordered favorably reported a substitute amendment (with amendments thereto) by a vote of 11–8 (Senators Boxer, Baucus, Lieberman, Carper, Clinton, Lautenberg, Sanders, Cardin, Whitehouse, Klobuchar, and Warner voted yea, and Senators Inhofe, Voinovich, Isakson, Vitter, Craig, Alexander, Barrasso, and Bond voted nay).

HEARINGS

The Committee on Environment and Public Works and its subcommittees held over 20 hearings at which a wide array of global warming related issues were discussed, including four legislative hearings on S. 2191, the America's Climate Security Act. These hearings included: "Senators' Perspectives and Global Warming," on January 30, 2007; "Global Warming and Wildlife," on February 7, 2007 (Subcommittee); "Hearing on U.S. Climate Action Partnership Report," on February 13, 2007; "State, Regional, and Local Perspectives on Global Warming," on March 1, 2007; "Vice Presi-

dent Al Gore's Perspective on Global Warming," on March 21, 2007, "Reducing Government Building Operational Costs through Innovation and Efficiency: Legislative Solutions," on March 28, 2007; "The Implications of the Supreme Court's Decision Regarding EPA's Authorities with Respect to Greenhouse Gases under the Clean Air Act," on April 24, 2007; "Emerging Technologies and Practices for Reducing Greenhouse Gas Emissions," on May 9, 2007 (Subcommittee); "Green Buildings: Benefits to Health, the Environment, and the Bottom Line," on May 15, 2007; "Examining the Case for the California Waiver," on May 22, 2007; "The Issue of the Potential Impacts of Global Warming on Recreation and the Recreation Industry," on May 24, 2007; "An Examination of the Views of Religious Organizations Regarding Global Warming," on June 7, 2007; "Examining Global Warming Issues in the Power Plant Sector," June 28, 2007; "Economic and International Issues in Global Warming Policy," on July 24, 2007 (Subcommittee); "Examining of the Case for the California Waiver: An Update from EPA," Field Hearing "Green Job Growth and Global Warming," on August 14, 2007; "Green Jobs Created by Global Warming Initiatives," on September 25, 2007; "An Examination of the Impacts of Global Warming on the Chesapeake Bay," on September 26, 2007; "Examining the Human Health Impacts of Global Warming," on October 23, 2007; "A Hearing to Examine America's Climate Security Act of 2007," on October 24, 2007 (Subcommittee); and three Full Committee hearings entitled "Legislative Hearing on America's Climate Security Act of 2007, S. 2191," on November 8, November 13, and November 15, 2007. In addition, the Committee held numerous informal briefings on global warming related issues, including two briefings by some of the world's leading global warming scientists from the Intergovernmental Panel of Climate Change.

REGULATORY IMPACT STATEMENT

In compliance with section 11(b) of rule XXVI of the Standing Rules of the Senate, the committee notes, based on CBO's estimates discussed in detail below, that S. 2191 would require certain types of private entities to participate in the cap-and-trade programs for GHG emissions created by the bill. CBO estimates that the cost of those requirements would amount to more than $90 billion each year during the 2012–2016 period.

MANDATES ASSESSMENT

Based upon the CBO cost estimate below, the Committee notes that S. 2191 contains several intergovernmental mandates as defined in the Unfunded Mandates Reform Act (UMRA). CBO estimates that, during the first five years following enactment, states would realize a net benefit as a result of this bill's enactment (resulting from the allowances they would receive). Therefore, the annual threshold for intergovernmental mandate costs established in UMRA ($68 million in 2008, adjusted annually for inflation) would not be exceeded.

In addition, as detailed below, the Committee notes that according to CBO S. 2191 also would impose private-sector mandates as defined in UMRA. The mandates would require certain types of private-sector entities to participate in the cap-and-trade programs for

GHG emissions created by the bill. CBO estimates that the cost of those mandates would amount to more than $90 billion each year during the 2012–2016 period, and thus substantially exceed the annual threshold established in UMRA for private-sector mandates ($136 million in 2008, adjusted annually for inflation).

CONGRESSIONAL BUDGET OFFICE COST ESTIMATE

In compliance with the Standing Rules of the Senate, below are CBO estimates of the costs of this legislation.

S. 2191—America's Climate Security Act of 2007

Summary: S. 2191 would set an annual limit or cap on the volume of certain greenhouse gases (GHGs) emitted from electricity-generating facilities and from other activities involving industrial production and transportation. Under this legislation, the Environmental Protection Agency (EPA) would establish two separate regulatory initiatives known as cap-and-trade programs—one covering most types of GHGs and one covering hydrofluorocarbons (HFCs).

EPA would distribute allowances to emit specific quantities of those gases. Some of the allowances would be allocated to the Climate Change Credit Corporation (the Corporation), an entity created by this bill. The Corporation would auction those allowances and use the proceeds to finance various initiatives, such as developing renewable technologies, assisting in the education and training of workers, and providing energy assistance for low-income households. EPA would distribute the remaining allowances at no charge, to states and other recipients, which could then sell, retire, use, or give them away. Over the 40 years that the proposed cap-and-trade programs would be in effect, the number of allowances and emissions of the relevant gases would be reduced each year.

CBO estimates that enacting S. 2191 would increase revenues by about $1.19 trillion over the 2009–2018 period, net of income and payroll tax offsets. Over that period, we estimate that direct spending from distributing those proceeds would total about $1.21 trillion. The additional direct spending would exceed the added revenues by an estimated $15 billion, thus increasing future deficits (or decreasing surpluses) by that amount over the next 10 years. In addition, assuming appropriation of the necessary amounts, CBO estimates that implementing S. 2191 would increase discretionary spending by about $3.7 billion over the 2009–2018 period. Most of that funding would be used to support EPA personnel, contractors, and information technology necessary to implement this legislation.

In years after 2018, annual direct spending would continue to exceed the net revenues attributable to the legislation each year, resulting in increased deficits (or decreased surpluses). Pursuant to section 203 of S. Con. Res. 21, the Concurrent Resolution on the Budget for Fiscal Year 2008, CBO estimates that changes in direct spending and revenues from enacting the bill would cause an increase in the on-budget deficit greater than $5 billion in at least one of the 10-year periods after 2018.

S. 2191 contains several intergovernmental mandates as defined in the Unfunded Mandates Reform Act (UMRA). CBO estimates that, during the first five years following enactment, states would realize a net benefit as a result of this bill's enactment (resulting from the allowances they would receive). Therefore, the annual

threshold for intergovernmental mandate costs established in UMRA ($68 million in 2008, adjusted annually for inflation) would not be exceeded.

S. 2191 also would impose private-sector mandates as defined in UMRA. The most costly mandates would require certain types of private-sector entities to participate in the cap-and-trade programs for GHG emissions created by the bill. CBO estimates that the cost of those mandates would amount to more than $90 billion each year during the 2012–2016 period, and thus substantially exceed the annual threshold established in UMRA for private-sector mandates ($136 million in 2008, adjusted annually for inflation).

Major provisions: S. 2191 would require EPA to establish two cap-and-trade programs aimed at reducing the emission of GHGs in the United States over the 2010–2050 period. 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 one ton of carbon dioxide or to have one ton of carbon in the fuel that they sold.) After the allowances for a given period were distributed, entities would be free to buy and sell allowances among themselves.

One program would cover emissions of carbon dioxide, methane, nitrous oxide, sulfur hexafluoride, and perfluorocarbons—defined in the legislation as group I GHGs. The other program would cover sales of HFCs—defined as group II GHGs. In addition, this legislation would require EPA to establish a cap-and-trade program for importers of certain carbon-intensive goods, such as steel and aluminum, beginning in 2020. Because this program for importers would begin outside the 10-year estimating period, CBO did not include any costs from this program. The details for the other programs are described below.

Cap-and-Trade Program for Group I Greenhouse Gases

Beginning in 2012, facilities covered by the legislation would be required to submit to EPA one emission allowance for each ton[1] of regulated GHGs emitted each year. Based on information from EPA, CBO estimates that between 2,000 and 3,000 facilities would be affected by this requirement. Specifically, covered facilities include the following:

- Any facility that uses more than 5,000 tons of coal each year;
- Plants producing natural gas or any facility that produces natural gas in Alaska or imports natural gas;
- Any facility or entity that produces or imports petroleum or coal-based liquid, or gaseous fuel that, when combusted, emits a group I GHG, assuming no capture and sequestration of that gas;
- Any facility or entity that produces or imports more than 10,000 carbon dioxide equivalents of chemicals that are group I GHGs, assuming no capture and sequestration of that gas; or

[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.

- Any facility that emits as a byproduct of the production of HFCs more than 10,000 carbon dioxide equivalents of HFCs.

This legislation would not restrict the types of entities or individuals who could purchase, hold, exchange, or retire emission allowances for this group of GHGs. An unlimited number of allowances obtained in one year could be saved or "banked" indefinitely to be used 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 limit domestic U.S. emissions of group I GHGs by covered entities to 5,775 million metric tons of carbon dioxide equivalent in 2012—about 93 percent of the level of such emissions by covered entities in 2005—and the cap would decline by about 106 million metric tons per year, falling to 1,732 million metric tons in 2050.

A portion of an entity's compliance obligation under the bill could be met by purchasing "offsets." An offset is created by activities (as certified by EPA) that are not directly related to the emissions of the facilities covered under the bill, but that reduce GHG emissions or increase the amount of such gases that are captured from the atmosphere and stored (known as sequestration). Examples of such activities include reducing emissions from landfills, sequestering GHGs on agricultural and rangelands, altering tillage practices, planting winter crops, and reducing the use of nitrogen fertilizer. Covered entities could also purchase emission allowances through international markets if approved by EPA.

The cap for the group I GHGs cap-and-trade program would take effect in 2012. Of the emission allowances established for this program (5,775 million metric tons of carbon dioxide equivalent), 21.5 percent would be offered for sale that year to covered industries and other entities that wish to purchase them. Some allowances would be available for sale as early as 2009 as part of an early auction. The percentage of emission allowances auctioned each year would increase steadily, reaching about 70 percent around 2030, and would remain at that level through 2050, the last year of the program. Emission allowances not auctioned 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 covered emissions.

Cap-and-Trade Program for Group II Greenhouse Gases

Beginning in 2010, producers and importers of HFCs would be required to submit to EPA a consumption allowance for each carbon dioxide equivalent ton of HFC produced or imported in the United States during the preceding calendar year. This program would only cover HFCs, which under this legislation would be measured in terms of carbon dioxide equivalents as reported in the Fourth Assessment Report of the Intergovernmental Panel on Climate Change.

Beginning in 2012, EPA would be permitted to issue destruction allowances to producers and importers of HFCs that perform, or arrange for, the recovery and destruction of HFCs from products or equipment already in place. Such destruction allowances—the functional equivalent of offset allowances for group I GHGs—could be used by producers and importers to satisfy a portion of the submission requirement for consumption allowances. Similar to the group

I GHGs program, this program would permit unlimited banking and limited borrowing of consumption and destruction allowances, though the lifetime of an allowance for HFCs would be no more than five years after the calendar year in which the allowance is allocated. In contrast to the group I program, only those entities that produce and import HFCs would be permitted to hold, sell, transfer, exchange, and retire consumption or destruction allowances.

Of the consumption allowances established for the group II program, 5 percent would be auctioned to importers and producers of HFCs in 2010. The percentage auctioned would increase steadily in subsequent years, reaching 100 percent by 2031 and continuing at that level through 2050, the last year of the program. Those consumption allowances not auctioned would be distributed to importers and producers of HFCs free of charge, and could then be retired, sold to other producers or importers of HFCs, or used to meet their annual obligations.

Estimated cost to the Federal Government: The estimated budgetary impact of S. 2191 is shown in Table 1. The costs of this legislation fall within budget functions 300 (natural resources and environment), 270 (energy), and 050 (defense). For this estimate, CBO assumes that S. 2191 will be enacted by the end of fiscal year 2008, that the amounts necessary to implement the bill will be appropriated each year, and that outlays will follow historical spending patterns for similar programs.

Basis of estimate: CBO estimates that implementing this legislation would result in additional revenues, net of income and payroll tax offsets, of $304 billion over the 2009–2013 period, and about $1.19 trillion over the 2009–2018 period. We estimate that direct spending would increase by $281 billion and about $1.21 trillion over the same periods, respectively. Those changes in revenues and direct spending would stem almost entirely from the process of auctioning and freely distributing allowances under the cap-and-trade programs established under this legislation. In addition, CBO estimates that enacting this legislation would increase discretionary spending by about $3.7 billion over the 2009–2018 period, assuming appropriation of the estimated amounts.

TABLE 1.—ESTIMATED BUDGETARY IMPACT OF S. 2191

	By fiscal year, in billions of dollars—											
	2009	2010	2011	2012	2013	2014	2015	2016	2017	2018	2009–2013	2009–2018
CHANGES IN REVENUES												
Auction of Allowances	1.0	3.2	5.7	26.5	31.9	37.9	43.1	47.1	51.4	57.7	68.3	305.5
Free Allocation of Allowances	0	1.4	4.5	119.0	111.0	117.4	124.1	131.1	138.5	141.7	235.9	888.6
Other Revenues	0	*	*	*	*	*	*	0.1	0.1	0.1	0.1	0.3
Total Estimated Revenues	1.0	4.6	10.2	145.5	142.9	155.3	167.2	178.2	189.9	199.5	304.3	1,194.4
CHANGES IN DIRECT SPENDING												
Spending from Auction Proceeds:												
Estimated Budget Authority	1.3	4.3	7.6	35.3	42.5	50.6	57.4	62.8	68.5	77.0	91.0	407.3
Estimated Outlays	0.1	0.4	1.4	10.2	18.8	28.1	38.6	47.9	55.5	62.3	30.9	263.3
Spending from Freely Allocated Emission Allowances:												
Estimated Budget Authority	0	1.4	4.5	125.8	118.2	125.0	132.2	139.6	147.5	151.2	250.0	945.5
Estimated Outlays	0	1.4	4.5	125.8	118.2	125.0	132.2	139.6	147.5	151.2	250.0	945.5
TVA and Other Spending:												
Estimated Budget Authority	0	*	*	*	*	*	0.1	0.1	0.3	0.5	*	1.0
Estimated Outlays	0	*	*	*	*	*	0.1	0.1	0.3	0.5	*	1.0
Total Changes:												
Estimated Budget Authority	1.3	5.7	12.1	161.1	160.8	175.6	189.7	202.5	216.3	228.7	341.0	1,353.7
Estimated Outlays	0.1	1.8	6.0	136.1	137.0	153.1	170.9	187.6	203.3	214.0	280.9	1,209.7
NET CHANGE IN THE BUDGET DEFICIT OR SURPLUS FROM CHANGES IN REVENUES AND DIRECT SPENDING												
Impact on Deficit/Surplus [1]	0.9	2.8	4.3	9.4	5.9	2.2	−3.7	−9.4	−13.3	−14.5	23.4	−15.4
CHANGES IN SPENDING SUBJECT TO APPROPRIATION												
Estimated Authorization Level	0.2	0.3	0.4	0.4	0.4	0.4	0.5	0.5	0.5	0.5	1.7	4.1
Estimated Outlays	0.1	0.2	0.3	0.4	0.4	0.4	0.5	0.5	0.5	0.5	1.3	3.7

[1] Positive numbers indicate decreases in deficits (or increases in surpluses); negative numbers indicate increases in deficits (or decreases in surpluses).

Notes: * = less than $50 million;; TVA = Tennessee Valley Authority. Components may not sum to totals because of rounding.

Budgetary treatment of the activities of the Climate Change Credit Corporation

The Corporation created by this legislation would be responsible for auctioning the allowances created by the federal government and for spending the resulting proceeds on various initiatives, including research and development to support renewable energy technologies, workforce development programs, wildlife adaptation programs, and programs providing financial assistance to low-income energy consumers. The Corporation effectively would be part of the federal government, and the cash flows associated with auctioning the allowances and spending the proceeds should be recorded in the federal budget. Those auctions would be carried out as part of an exercise of the government's sovereign power. Consequently, CBO would consider the funds generated from the annual sale of emission and consumption allowances to be federal revenues and the spending of the auction proceeds to be federal outlays.

Budgetary treatment of freely allocated allowances

The value of the group I allowances created and then given away at no charge should also be recorded in the budget as revenues and outlays, in CBO's view. The government is essential to the existence of the allowances and is responsible for their readily realizable monetary value through its enforcement of the cap on emissions. The allowances would trade in a liquid secondary market since firms or households could buy and sell them, and thus they would be similar to cash. CBO estimates that the value of the market created by the group I cap-and-trade program would be large, exceeding $100 billion in 2012. Therefore, CBO considers the distribution of such allowances at no charge to be functionally equivalent to distributing cash.

That type of scoring approach best illuminates the trade-offs between different policy choices. Distributing allowances at no charge to specific firms or individuals is, in effect, equivalent to collecting revenue from an auction of the allowances and then distributing the auction proceeds to those firms or individuals. In other words, the government could either raise $100 by selling allowances and then give that amount in cash to particular businesses and individuals, or it could simply give $100 worth of allowances to those businesses and individuals, who could immediately and easily transform the allowances into cash through the secondary market. Treating allowances that were issued at no charge as both a revenue and an outlay would mean that those two equivalent transactions were reflected in parallel ways in the scoring process.

In contrast, the proceeds associated with the allowances allocated for free to producers and importers of HFCs should not be recorded on the budget in CBO's view, primarily because we expect that the market created for such allowances would be relatively small and illiquid. This legislation would limit the entities that could hold, sell, retire, or use consumption allowances to the importers and producers of HFCs covered under the bill. Based on information from industry representatives, CBO estimates that fewer than 30 entities would be considered covered entities. Given the estimate of the price for consumption allowances, which is described below, CBO expects that the size and value of the overall market created

by the cap-and-trade program for HFCs would be small—less than $2 billion annually in most years. Therefore, unlike the allowances for group I GHGs, these allowances would not be sufficiently cash-like to merit inclusion in the federal budget, in CBO's view.

Revenues

The impact of S. 2191 on federal revenues would largely be determined by the value of allowances created by the bill. Penalties for noncompliance and fees collected to administer the legislation would add a very small amount to total revenues. The following sections discuss how CBO estimated the auction prices for group I and group II allowances.

Estimating the Prices for Emission Allowances for Group I GHGs. CBO estimates that the auction price of emission allowances for the group I GHGs would rise from about $23 per metric ton of carbon dioxide equivalent (mt CO_2e) emissions in 2009 to about $44 per mt CO_2e in 2018. (In 2006 dollars, the auction price per mt CO_2e would rise from about $21 in 2009 to $35 in 2018.) Covered emissions of group I gases would decline by 7 percent in 2012 and by 17 percent in 2018 from base-case emissions; over the entire 2012–2050 period, they would decline by 42 percent from the base case. Table 2 provides CBO's estimates of annual allowance prices for group I and group II cap-and-trade programs.

TABLE 2.—ESTIMATED ALLOWANCE PRICES

	By fiscal year, in dollars—									
	2009	2010	2011	2012	2013	2014	2015	2016	2017	2018
Estimated Emission Allowance Price (Group I)	23	24	26	28	30	33	35	38	41	44
Estimated Consumption Allowance Price (Group II)	n.a.	7	7	8	8	9	9	9	9	9

Note: n.a. = not applicable.

Estimating the price for those allowances required several steps:

- A forecast (or base case) of GHG emissions expected in the United States 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;
- An estimate of how firms and households would respond to increases in prices for fossil fuels and other sources of GHG emissions. CBO used those estimated responses to determine the changes in prices that would be required to induce firms and households to change their behavior and reduce their demand for electricity and other energy-intensive goods and services sufficiently to meet the proposed caps on GHGs; and
- An evaluation of provisions that would influence the market-clearing price of allowances, notably the opportunity for firms to bank allowances in one year and use them in another.

Base Case. For its base case, CBO relied primarily on projections of energy use, fossil fuel prices, and GHG emissions from the Annual Energy Outlook 2007 (AEO 2007) and Annual Energy Outlook 2008 (AEO 2008) published by the Energy Information Administration (EIA). CBO adjusted those projections to align them with estimates of historical emissions published by EPA, and extended the

projections from 2030 to 2050.[2] We also adjusted the projections to take into account recent changes in how emissions of non-carbon-dioxide gases are measured in terms of carbon dioxide equivalents.[3]

Under current law, CBO projects that, over the 2009–2050 period, total U.S. emissions of GHGs covered under group I would increase by 42 percent, from 6,274 mmt CO_2e[4] to about 8,900 mmt CO_2e.

Responses by Firms and Households. CBO drew from a variety of sources to estimate the responses of firms and households to changes in fossil fuel prices. To estimate how much firms and households would reduce their use of fossil fuels and fuel-intensive products under different allowance prices, CBO reviewed economic models currently used in the United States to analyze energy use and GHG emissions, including models used by EIA and EPA as well as those used by academic researchers.[5] The sensitivity of energy use by households and businesses to changes in the price of fossil fuels varies significantly among the models. Three factors influence that price sensitivity: the long-run ability of businesses to substitute low-carbon fuels for high-carbon fuels; the long-run sensitivity of energy usage to higher energy prices; and the speed at which those long-run responses unfold.

Following that review, CBO developed its own assessment of the sensitivity of carbon dioxide emissions to changes in the price of allowances.[6] The price sensitivities that CBO used in this analysis reflect those in the reviewed models, with adjustments to assumptions about the pace at which the energy-using capital stock is likely to be replaced. CBO concluded that the response to price increases 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 GHGs.

According to CBO's estimates, in 2015, a 10 percent increase in the average price of end-use energy produced from fossil fuels would induce about a 5 percent reduction in CO_2 emissions. With sustained increases in allowance prices over time, however, by 2025, a 10 percent increase would result in a nearly 9 percent reduction in emissions, with the sensitivity 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 allow-

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[2] See U.S. Environmental Protection Agency, Inventory of U.S. Greenhouse Gas Emissions and Sinks: 1990–2005 (EPA 430–R–07–002, April 2007). CBO also used information provided by EPA to project the consumption of HFCs.

[3] EPA's current practice, consistent with international treaty, is to use the carbon dioxide equivalent measures of the warming potential of other gases from the Second Assessment Report of the Intergovernmental Panel of Climate Change, published in 1996. By 2012, however, it is very likely that the relevant domestic and international agencies will adopt the updated measures reported last year in the Fourth Assessment Report.

[4] mmt CO_2e = a million metric tons of carbon dioxide equivalent.

[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.

[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).

ances in the year for which they were originally designated, the inflation-adjusted price of allowances would rise at a rate that is significantly greater than CBO's estimate of the expected long-run inflation-adjusted rate of return to capital in the U.S. nonfinancial corporate sector (5.8 percent). As a result, banking as allowed under S. 2191 would create opportunities for covered entities to earn greater-than-normal profits by undertaking extra GHG mitigation efforts in the initial years of the program when the prices were relatively low, banking the additional allowances, and submitting those allowances in later years, when the increasing stringency imposed by the program's declining caps would drive prices considerably higher. CBO assumed that investing in allowances would have roughly the same risk characteristics as typical investments in the U.S. nonfinancial corporate sector and that, as a consequence, covered entities would bank allowances up to the point at which the expected rate of return for doing so—that is, the expected rate of increase of mitigation costs over time—was equal to the expected rate of return from firms' alternative investment opportunities in that sector (5.8 percent).

In the early years of the program, the opportunity for banking allowances would have a significant impact on the amount of emissions reduced, and thus on the emissions allowance price. CBO estimates that by 2018, covered entities would undertake significantly more mitigation than necessary to meet their annual emission caps, banking about 1.3 million mt CO_2e of allowances and raising the allowance price by about 27 percent, compared with a policy that prohibited banking. Assuming that covered entities bank allowances in such a way as to have no allowances left at the end of 2050—the last year of the program—banked allowances would be roughly equivalent to the annual emissions cap for group I gases for much of the 2030s.

Response to Offsets. CBO assumed that covered entities would take as full advantage of opportunities to obtain domestic offsets as is economically sensible, with a significant effect on allowance prices. We also assumed that the opportunity to obtain international emission allowances from markets of "comparable stringency" would not influence the price of domestic allowances. CBO is uncertain at this time about whether comparable markets would exist over the next 10 years, whether EPA would determine that any other markets for GHG emission allowances were of "comparable stringency," or whether allowance prices in such markets would be higher than, similar to, or lower than the price of domestic allowances at any given time.

Estimating the Price of Consumption Allowances for HFCs. CBO estimates that the auction price of consumption allowances for HFCs would be in the vicinity of $7 per mt CO_2e beginning in 2010. The cap would reduce group II emissions by about 40 percent in 2015, from about 450 mmt CO_2e to about 270 mmt CO_2e. For this estimate, CBO constructed a base-case projection of HFC production similar to a base case produced by EPA and consulted with industry sources, including a manufacturer and a recycler of HFCs. Based on information provided by those sources, CBO concluded that the price for the allowances is likely to be driven by responses to increasing prices of HFCs, by prices paid for the recycling of HFCs, and, over time, by prices of less harmful substitutes.

By restricting the domestic supply of new HFCs below demand, the cap would tend to raise the price of HFCs, reducing the quantity demanded. CBO assumed that in the short term, demand for HFCs would be roughly as responsive to price increases as the demand for gasoline is, but that demand would become increasingly responsive over time as alternatives became available and equipment was replaced. Higher prices also would encourage recyclers to meet some of the demand by removing existing HFCs from older products, processing them, and making them available for sale. Over time, the cap for HFCs also would encourage the development and deployment of new types of HFCs and products designed around them. However, such innovations would take time to penetrate markets, and it is difficult to estimate the extent to which they are likely to displace the demand for existing products over the next decade. Thus, CBO anticipates that in the early years of the program, importers and exporters of HFCs would most likely turn to recycling their HFCs—currently costing roughly $8 per pound—as a primary means of meeting the restrictions imposed by the cap set under this legislation. In later years, alternative products of roughly similar costs would likely displace the supply for HFCs in new equipment. Given the likely price trajectory for HFC allowances, CBO did not find that it would be profitable for firms to bank allowances for future use.

Net Revenue Calculation. Based on the estimated auction price of allowances discussed above for both cap-and-trade programs, we estimate that auctioning the allowances would generate revenues net of income and payroll tax offsets of about $68 billion over the 2009–2013 period and $306 billion over the 2009–2018 period. In addition, creating and freely distributing the emission allowances for the group I GHGs to various recipients would generate revenues, net of income and payroll tax offsets, of about $236 billion and $889 billion over the same periods, respectively, by CBO's estimate.

The receipts from selling or giving allowances away would be indirect business charges that reduce the federal tax base for income and payroll taxes. Except in certain cases, CBO estimates that a portion of the gross gain to the federal government from such receipts would be offset by reductions in those other revenues; we assume that offset totals 25 percent—an approximate marginal tax rate on overall economic activity.

That longstanding methodology is widely used in the federal budget process to estimate the effects of legislation and assumes that overall economic activity (GDP) is held constant. Under that assumption, higher amounts of indirect business charges reduce other income in the economy. For example, if firms that must purchase allowances would be unable to pass those costs along, their profits would fall. More likely, some substantial portion would be passed along to others in the economy, such as consumers and employees, and other income would fall. Either way, the result would be lower taxable income in the economy, which would reduce federal revenues from income and payroll taxes.

For this estimate, CBO did not apply the 25 percent reduction to all of the gross revenues, however, depending on how those revenues would be used. To the extent that the revenues would be used in ways that would generate new taxable income, such uses would

offset the loss of income and payroll taxes that would result from the initial purchase of allowances.

Therefore, CBO did not apply the 25 percent reduction to any revenues that would be used to make transfer payments to taxable entities without any conditions placed on the recipient regarding the use of those payments. While such transfer payments do not directly affect GDP because they are not made in exchange for goods or services, they are typically taxable. Thus, providing transfers to taxable entities generates additional federal revenue that would essentially offset the 25 percent reduction in revenue collections. Most of the estimated revenues from allowances given away under S. 2191 would be used for such purposes.

CBO also did not apply the 25 percent reduction in revenues to any allowances that would be given away under the bill and would not be immediately taxable to the individuals or businesses that receive them, but would generate taxable income when they were used or sold to others. Such allowances include those given away to facilities that generate electric power from fossil fuels and to facilities that produce or import petroleum-based fuel.

In contrast, we applied the 25 percent reduction to any revenues that would be spent by the government on goods and services (for example, on research and development activities) because such government spending would substitute for other economic activity (under the assumption that GDP is unchanged by the bill). As a result, revenue used in this way would not generate any new taxable income. All of the proceeds from the auction of allowances would be used for those purposes.

Other Revenues. Under S. 2191 civil penalties would be assessed at $25,000 per day for those owners and operators who fail to meet the reporting requirements for the federal registry established under this legislation. Penalties also would be assessed at the greater of $200 or three times the market rate for an emission allowance for those owners and operators who fail to submit the adequate number of allowances for the pollutants covered under the bill. Because those fees would be substantial, we would expect most firms to 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 noncompliance would occur. 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 those factors, CBO estimates that penalty collections under S. 2191 would total between $25 million and $50 million dollars annually, beginning in 2012.

This legislation also would establish a Carbon Market Efficiency Board, which would be responsible for monitoring the emissions trading market, periodically reporting to the President and the Congress on its operations, and implementing cost-relief measures, such as increasing the amount of allowances that covered entities may borrow and lengthening the payback period of such loans, to ensure that the market for allowances is stable, functioning, and efficient. The board would consist of seven members appointed by the President with the advice and consent of the Senate, and would have the authority to levy on owners and operators of covered fa-

cilities an assessment sufficient to pay the board's estimated expenses, including the salaries of the board members. CBO estimates that over the next 10 years, the board would levy assessments totaling $2 million to $4 million annually; those amounts would be recorded on the budget as revenues.

Direct spending

CBO estimates that enacting this legislation would increase direct spending by $1.2 trillion over the 2009–2018 period. Outlays would stem from both spending of auction proceeds on several ongoing government programs and new federal initiatives that would be established by the legislation and from giving allowances to states and other entities free of charge. The components of the estimated direct spending are discussed below.

Spending of Auction Proceeds. Revenues from the auction of emission allowances for the group I GHGs would be deposited into seven funds established by the Department of the Treasury. Spending from those funds would not require any further appropriation action. CBO's estimate of direct spending by funds over the 2009–2018 period is as follows:

- The Energy Assistance Fund ($64 billion) would support various energy assistance programs for low-income persons and other initiatives;
- The Climate Change Worker Training Fund ($12 billion) would primarily support training programs for workers;
- The Adaptation Fund ($31 billion) would primarily support research and education activities by the Department of the Interior to assist fish and wildlife in adapting to the impacts of climate change;
- The Climate Change and National Security Fund ($16 billion) would finance steps to implement recommendations stemming from the International Climate Change Adaptation and National Security Program established under this legislation;
- The Bureau of Land Management Emergency Firefighting Fund ($2 billion) would support fire suppression activities on federal wildlands;
- The Forest Service Emergency Firefighting Fund ($6 billion) would support fire suppression activities on federal wildlands; and
- The Energy Independence Acceleration Fund ($6 billion) would support research activities by the Department of Energy.

In addition, auction proceeds would be allocated to the Energy Deployment Program, and the Corporation would have the authority to spend a specified percentage of the auction proceeds on that program without further appropriation action. CBO estimates that spending for that program would total about $123 billion over the next 10 years. In total, CBO estimates that spending from those funds and on the Energy Deployment Program would increase direct spending by about $30 billion over the 2009–2013 period and by about $260 billion over the 2009–2018 period. In addition, some proceeds would be deposited into the Climate Security Act Management Fund; however, spending from this fund could not occur without further appropriation action.

Revenues from the auction of consumption allowances for the group II GHGs also would be spent by the Corporation without further appropriation to support various initiatives. Those initiatives would include efforts to recover and destroy the maximum economically recoverable amount of chlorofluorocarbons and halons from existing and obsolete equipment and products and a program to provide incentives for consumers to purchase refrigeration and cooling equipment that contains refrigerants with no or low global-warming potential. We estimate that those provisions would increase direct spending by about $400 million over the 2009–2013 period and by about $3 billion over the 2009–2018 period.

Outlays Associated with Emission Allowances Freely Allocated. CBO estimates that direct spending would increase by about $250 billion over the 2009–2013 period and by $946 billion over the 2009–2018 period when the government distributes the emission allowances free of charge to various recipients, beginning in 2010.

Spending by the Tennessee Valley Authority (TVA) and Other Outlays. Implementing this bill would increase net direct spending by TVA by about $1 billion over the 2009–2018 period, but CBO estimates such spending should have no net impact on the budget over time. TVA is one of the nation's largest electricity marketers and currently accounts for about 5 percent of the country's coal-generation capacity. For this estimate, CBO assumes that TVA would retire existing coal plants faster than under current law, possibly replacing about 10 percent of its coal capacity by 2020. Given the time needed to plan and build new plants, we assume that such investments would begin after 2013 and total about $1 billion over the 2013–2018 period. TVA is required to recover all of its costs over time through proceeds from electricity sales and typically recovers the cost of such capital investments over a 30-year period after the plant goes into service. Thus, CBO estimates that the additional capital spending necessary to comply with this bill would have no net effect on direct spending over time. Similarly, we estimate that purchases of allowances would have no net impact on TVA's direct spending because such operating expenses should be recovered immediately through higher receipts from sales of electricity.

CBO estimates that direct spending by the Carbon Market Efficiency Board would total about $17 million over the 2009–2013 period and $37 million over the 2009–2018 period. Such spending would stem from the fees collected by the board to cover its administrative costs.

Budgetary Impact After 2018

After 2018 and through 2050, annual direct spending would continue to exceed net revenues attributable to this legislation, CBO estimates. Consequently, in each of the three 10-year periods after 2018, the difference between revenues and direct spending would cause an increase in the on-budget deficit greater than $5 billion. The estimated on-budget deficits after 2018 stem from the budgetary consequences of auctioning allowances and spending the proceeds on government activities. As discussed in the earlier section entitled Net Revenue Calculation, net receipts to the government from those auctions, after accounting for their impact on receipts from income and payroll taxes, would equal about 75 percent of the

amounts paid for the allowances that are auctioned. At the same time, the legislation would specify the spending of 100 percent of those proceeds. Thus, new direct spending under the legislation would exceed new revenues attributable to its enactment.

Spending Subject to Appropriation

Assuming appropriation of the necessary amounts, CBO estimates that implementing this legislation would increase discretionary spending by about $3.7 billion over the 2009–2018 period.

Funding for the Environmental Protection Agency. S. 2191 would authorize the appropriation of whatever amounts are necessary from the Climate Security Act Management Fund established by the legislation for EPA to implement the bill's requirements, beginning in 2012. EPA could also distribute funds to various federal agencies that would help administer the proposed cap-and-trade programs.

Based on our analysis of how similar large government programs have been implemented, CBO estimates that implementing S. 2191 would require the appropriation of $200 million in 2009 and $1.7 billion over the 2009–2013 period. Such funding would primarily cover costs associated with hiring up to 400 additional personnel, developing rules, implementing programs to monitor air quality programs, and reporting to the Congress on the pollution control programs that would be established by the bill.

Funding for the Department of Energy. Under this legislation, the Department of Energy (DOE) would establish standards for increasing the energy efficiency of certain appliances, products, and buildings. In coordination with other federal agencies, DOE would also be required to assess the feasibility of constructing pipelines and other facilities related to the sequestration of carbon dioxide. Assuming appropriation of the necessary amounts, CBO estimates that those activities would cost $2 million in 2009 and $10 million over the 2009–2013 period, particularly for the cost of providing financial and technical assistance to states to update and enforce building codes. That estimate is based on historical costs for similar DOE activities.

Funding for the Department of the Interior. Section 8002 would require a national assessment by the U.S. Geological Survey of geological formations in the United States and their potential capacity for storing carbon dioxide. Section 8003 would require the Secretary of Energy, in coordination with other agencies, to conduct a study to assess the feasibility of constructing pipelines to transport carbon dioxide for the purpose of sequestration or enhanced oil recovery. CBO estimates that carrying out the studies would cost $31 million over the 2009–2013 period.

Estimated impact on State, local, and tribal governments: S. 2191 contains several intergovernmental mandates as defined in the Unfunded Mandates Reform Act. CBO estimates that states would realize a net benefit as a result of the bill's enactment and that the threshold for intergovernmental mandates established in UMRA ($68 million for intergovernmental mandates in 2008, adjusted annually for inflation) would not be exceeded.

Specifically, the bill would require covered facilities, including electric power plants, to participate in a cap-and-trade program for

GHGs. State and local governments own roughly 10 percent of those electric power facilities and would be required to:

- Submit an emission allowance to EPA for each metric ton of carbon dioxide equivalent produced, imported, or emitted;
- Reduce emissions of GHGs annually though 2050;
- Participate in the Federal Greenhouse Gas Registry by submitting periodic reports to EPA, including annual and quarterly data regarding GHG emissions and production; and
- Provide information to EPA to verify the accuracy of data on fossil fuels and GHGs.

As part of the requirement to submit emission allowances, the bill would give state, local, and tribal governments free allowances to offset the costs associated with the bill. CBO estimates that the number of allowances given to those governments collectively would exceed the amount they need to satisfy the requirements under the cap-and-trade program. In addition, states would be allowed to sell the surplus allowances at market value. CBO estimates that the proceeds from selling excess allowances would more than offset the costs of the mandates and would result in a net benefit to state, local, and tribal governments totaling approximately $33 billion from fiscal year 2012 (the first year the mandates are effective) through fiscal year 2016.

Although the bill would result in a net benefit to state, local, and tribal governments, variations among regions and among levels of government are likely. Utilities in some parts of the country rely more on technologies that emit high levels of carbon than those in other regions. In those cases, publicly owned power plants would face higher costs and might not have excess credits to sell. Similarly, local governments are more likely than state governments to own and operate utilities. Consequently, they could face costs while the benefits would accrue to state governments. Nationwide, however, state, local, and tribal governments would receive a net benefit from enacting the bill.

S. 2191 also contains several smaller mandates. Some reporting requirements would begin in 2009, and covered facilities, including those owned and operated by state, local, and tribal governments, would incur costs before the start of the cap-and-trade programs in 2012. According to EPA, the majority of the electric energy sector is already required to report similar data to EPA under the Clean Air Act. In addition, the bill would require each state to certify that it has reviewed and updated the provisions of residential and commercial building codes for energy efficiency. CBO estimates that the costs associated with those mandates would be small.

In addition, S. 2191 would give state governments free allowances in exchange for implementing voluntary regulations, assisting mass transportation systems, and augmenting recycling programs. CBO estimates the value of those additional allowances, which could be sold, would be approximately $58 billion through 2016.

Finally, the bill would create several grant programs for workforce training, state energy adaptation strategies, and research and development of energy efficiency technologies. 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.

Estimated impact on the private sector: S. 2191 would impose several private-sector mandates as defined in UMRA. Those mandates would require entities in the private sector to comply with various measures to reduce emissions of GHGs. The most costly mandates would require certain types of private-sector entities to participate in the cap-and-trade programs for GHGs created in the bill. CBO estimates that the direct cost of the mandates in the bill would substantially exceed the annual threshold established in UMRA for private-sector mandates ($136 million in 2008, adjusted annually for inflation).

Cap-and-Trade Programs

Group I Greenhouse Gases. The cap-and-trade program for group I GHG emissions would require covered facilities to submit one allowance per metric ton of carbon dioxide equivalent emitted beginning in 2012. The direct cost to the private sector would be equal to the cost to covered facilities to acquire allowances beyond the amount allocated to them for free under the bill, to purchase offsets to cover their emissions, and to directly reduce their emissions of GHGs. Based on the estimated allowance prices in Table 2, CBO estimates that the total cost of this requirement would amount to about $90 billion in 2012 and more in subsequent years. The allowance prices, purchases, and emission reductions used in estimating those costs account for the banking of allowances.

While covered facilities would be responsible for the initial cost, CBO estimates that most of that cost would ultimately be passed on to consumers in the form of higher prices for energy and energy-intensive goods and services.[7] The bill would create several mechanisms to mitigate some of the costs to consumers. The bill would provide allowances to electricity and natural gas companies that sell to retail consumers to mitigate the costs to low- and middle-income consumers or to promote energy efficiency. States also would receive allowances and could use the funds from the sale of those allowances to lessen the costs to low-income consumers. In addition, funds from auctioned allowances deposited into the Energy Assistance Fund would help mitigate the costs to low-income consumers.

In addition to submitting allowances, covered facilities would be required to report GHG emissions data to the federal registry. Based on information from EPA, CBO expects that the cost to comply with this reporting requirement would be small. Covered facilities also would be required to pay a fee to the Carbon Market Efficiency Board to cover the operating costs of the board. CBO estimates that the fees would total $2 million to $4 million annually.

Group II Greenhouse Gases. The cap-and-trade program for HFC consumption would require producers and importers of HFCs to submit consumption or destruction allowances annually, beginning in 2010, for each carbon dioxide equivalent of HFC produced or imported in the United States during the preceding calendar year. The direct cost to the private sector would be the cost to those entities to acquire consumption allowances beyond the amount allocated to them for free, to purchase destruction allowances, and to

[7] See Congressional Budget Office, *Trade-Offs in Allocating Allowances for CO_2 Emissions* (April 25, 2007) and *Shifting the Burden of a Cap-and-Trade Program* (July 2003).

recycle HFCs. Based on the estimated consumption allowance prices in Table 2, CBO estimates that the cost to HFC producers and importers to purchase the auctioned allowances in 2010 would be about $100 million and would increase in subsequent years.

Carbon-Intensive Goods. The bill would direct EPA to establish a program for certain carbon-intensive goods that would require importers of those goods, beginning in 2020, to submit international reserve allowances. Specifically, this provision would target carbon-intensive goods imported from countries that do not have equivalent carbon-reduction policies in place. International reserve allowances could be purchased from the federal government or acquired through a trading system if one is established. Importers also could submit approved foreign allowances or credits. Because of uncertainty about the number of allowances that would be required per product and the countries whose goods would be required to be covered by allowances, CBO cannot estimate the cost of this mandate.

Other mandates

S. 2191 would impose several other mandates on private-sector entities. The bill would direct EPA to regulate the sale, distribution, use, and disposal of HFC refrigerants with a high global-warming potential used in appliances or industrial refrigeration equipment. It also would prohibit the sale of small containers of HFC refrigerants with a high global-warming potential for the servicing of motor vehicle air conditioners except to certified technicians. Based on information from EPA analyses of proposed rules to regulate HFC refrigerants, CBO expects that the cost of each of those mandates would be small relative to the threshold in UMRA.

The bill also would impose a mandate by requiring fuel providers to reduce the average lifecycle GHG emissions in transportation fuel. The cost of that mandate would depend on the method used by EPA to measure lifecycle GHG emissions from all transportation fuels. Lastly, the requirement that state governments certify updates of building codes related to energy efficiency could impose a mandate on developers. Because of uncertainty about the number of buildings affected by those state codes, CBO cannot estimate the cost of that mandate.

Comparison with other estimates: Estimates of the cost to purchase allowances created for a program to restrict GHG emissions can vary for many reasons. The most important differences among estimates of the price of those allowances are:

- *Base case projections* of GHG emissions and energy prices;
- The assumed *responsiveness* of households and firms to changes in prices of goods and services associated with emissions;
- The *discount rate* that allowance holders are assumed to apply to decisions about whether to bank allowances and how many to bank. The lower the assumed discount rate, the more emission reductions covered entities are likely to undertake in early years of the program so that they can have somewhat higher emissions in later years. Thus, a lower discount tends

to raise the estimated allowance price in early years but lower it in later years;[8] and

- The *availability of offsets.* The more domestic or international offsets that would be available, and the cheaper those offsets would be, the lower the allowance price would be.

CBO is not aware of any published analysis of S. 2191 that presents a 10-year estimated impact on federal revenues and expenditures. Three analyses of S. 2191 as ordered reported by the Senate Committee on Environment and Public Works are currently publicly available. Those studies report different estimates of allowance prices for group I GHGs than does CBO. That allowance price is perhaps the most important determinant of the estimated budgetary impact of the legislation.

One of the analyses, published by the Massachusetts Institute of Technology's (MIT's) Joint Program on the Science and Policy of Global Change, uses the Emissions Prediction and Policy Analysis (EPPA) Model to estimate allowance prices.[9] The MIT analysis reports an emission allowance price, measured in 2005 dollars, of nearly $48 per mt CO_2e equivalent for the year 2015. In comparison, CBO's estimate of the allowance price in 2015 is about $29 in 2005 dollars. The difference in price occurs largely because:

- The MIT analysis assumes higher emissions in its base case than CBO does, requiring higher allowance prices to reach the cap.
- MIT uses a much lower discount rate than CBO, resulting in more banking and thus higher allowance prices in the early years of the program.
- MIT does not allow for the possibility of offsets from domestic agriculture and forestry activities, also resulting in higher allowance prices.

Those differences are partially offset by the fact that the EPPA model used by MIT assumes more price responsiveness among households and firms than CBO's analysis, tending (all else being equal) to reduce the estimated allowance price.

A second analysis, released by EPA, uses several different models to estimate allowance prices, including the Intertemporal General Equilibrium Model (IGEM) and Applied Dynamic Analysis of the Global Economy (ADAGE) models.[10] That analysis reports a wide range of estimates for emission allowance prices in 2015—from $11 to $77 per mt CO_2e, measured in 2005 dollars—based on varying assumptions about baselines and the projected availability of technologies and offsets as well as on different models. That range brackets CBO's estimate for 2015 of $29 per mt CO_2e. Differences between EPA's estimates of allowance prices and those of CBO can be traced to several sources:

- EPA's reference case assumes more emissions than CBO's base case. (For one scenario, EPA assumes an alternative ref-

[8] All else being equal, changing the assumed discount rate by one percentage point would change CBO's permit price for group I emissions in 2015 by roughly $6 to $7.

[9] See Paltsev and others (2008), "Appendix D: Analysis of the Cap and Trade Features of the Lieberman-Warner Climate Security Act (S. 2191), available at *http://web.mit.edu/globalchange/www/MITJPSPGC*_Rpt146_AppendixD.pdf.

[10] See U.S. Environmental Protection Agency, *EPA Analysis of the Lieberman-Warner Climate Security Act of 2008 S. 2191 in 110th Congress* (March 14, 2008). Available at *http://www.epa.gov/climatechange/downloads/s2191*_EPA_Analysis.pdf.

erence case that appears to be roughly comparable to CBO's base case.)

- One of EPA's models (ADAGE) assumes more responsiveness to changes in prices of goods and services associated with emissions than does CBO's analysis, while the other (IGEM) appears to assume less. For any given policy proposal, all else being equal, CBO's estimate of the allowance price should fall between estimates from EPA's models.
- EPA assumes a somewhat lower discount rate than CBO, and that assumption results in more banking and higher allowance prices in the early years of the program.
- For different scenarios, EPA assumes domestic and international offsets ranging from zero to unlimited. In its standard scenarios, EPA assumes that domestic and international offsets can each equal 15 percent of the total number of submitted allowances in each year, tending to moderate the price of emission allowances.

A third analysis, by the Clean Air Task Force (CATF), uses a version of the National Energy Modeling System (NEMS) to estimate allowance prices.[11] That analysis reports an emission allowance price (measured in 2005 dollars) of about $16 per mt CO_2e for the year, about 44 percent lower than CBO's cost estimate of $29 per mt CO_2e. That difference in prices largely occurs because:

- CATF uses a higher discount rate than CBO, resulting in no emissions banking before 2018 and much lower allowance prices.
- CATF assumes that domestic and international offsets will each equal 15 percent of the number of emission allowances in each year, also tending to reduce allowance prices.

A fourth analysis, by CRA International, uses the MRN–NEEM Model to estimate allowance prices.[12] The CRA analysis indicates an emission allowance price, measured in 2007 dollars, of about $50 per mt CO_2e for 2015. In comparison, CBO's estimate of the allowance price in that year is about $30 in 2007 dollars. The difference in price occurs largely because CRA uses a much lower discount rate than CBO, resulting in more banking and thus higher allowance prices in the early years of the program.

Previous CBO estimate: On April 10, 2008, in addition to this estimate, CBO provided a cost estimate for S. 2191 with a proposed amendment transmitted to CBO on April 9, 2008. That amendment would change the allocation of emission allowances that would be auctioned and given away at no charge. Compared with the version of S. 2191 including the proposed amendment, CBO estimates that, over the 2009–2018 period, the reported bill would result in $15 billion less in revenues, $79 billion more in direct spending outlays, and $81 billion less in spending subject to appropriation. Those differences result from provisions in the amendment that would increase the portion of allowances that would be auctioned, deposit a portion of auction proceeds into a Climate Change Deficit Reduc-

[11] See Clean Air Task Force, The Lieberman-Warner Climate Security Act—S. 2191: A Summary of Modeling Results from the National Energy Modeling System (February 2008). Available at http://www.catf.us/publications/presentations/CATF_LWCSA_short–Hill_Briefing_with_CAFE.pdf

[12] See Montgomery and Smith (2008), "Economic Analysis fo the Lieberman-Warner Climate Security Act of 2007 Using CRA's MRN–NEEM Model," available at http://www.nma.org/pdf/040808_crai_presentation.pdf.

tion Fund, and make spending from that fund subject to appropriation.

Estimate prepared by: Federal Revenues: Mark Booth; Direct Spending: Susanne S. Mehlman; All Other Federal Costs: Deborah Reis, Megan Carroll, Kathleen Gramp, and Tyler Kruzich. Allowance Prices: Robert G. Shackleton Jr. and Mark J. Lasky, and Terry Dinan and Natalie Tawil. Impact on State, Local, and Tribal Governments: Neil Hood. Impact on the Private Sector: Amy Petz.

Estimate approved by: Theresa Gullo, Deputy Assistant Director for Budget Analysis; G. Thomas Woodward, Assistant Director for Tax Analysis; Robert A. Dennis, Assistant Director for Macroeconomic Analysis.

S. 2191—America's Climate Security Act of 2007

S. 2191 would set an annual limit or cap on the volume of certain greenhouse gases (GHGs) emitted from electricity-generating facilities and from other activities involving industrial production and transportation. Under this legislation, the Environmental Protection Agency (EPA) would establish two separate regulatory initiatives known as cap-and-trade programs—one covering most types of GHGs and one covering hydrofluorocarbons (HFCs).

EPA would distribute allowances to emit specific quantities of those gases. Some of the allowances would be allocated to the Climate Change Credit Corporation (the Corporation), an entity created by this bill. The Corporation would auction those allowances and use the proceeds to finance various initiatives, such as developing renewable technologies, assisting in the education and training of workers, and providing energy assistance for low-income households. EPA would distribute the remaining allowances at no charge, to states and other recipients, which could then sell, retire, use, or give them away. Over the 40 years that the proposed cap-and-trade programs would be in effect, the number of allowances and emissions of the relevant gases would be reduced each year.

The proposed amendment would change the allocation of those emission allowances that would be auctioned and given away at no charge. A larger portion of the available allowances each year would be auctioned, and some of the proceeds would be deposited into a Climate Change Deficit Reduction Fund in the Treasury, established by the amendment. Spending from this fund would be subject to appropriation.

CBO estimates that enacting S. 2191, as amended, would increase revenues by about $1.21 trillion over the 2009–2018 period, net of income and payroll tax offsets. Over that period, we estimate that direct spending from distributing those proceeds would total about $1.13 trillion. The additional revenues would exceed the new direct spending by an estimated $78 billion, thus decreasing future deficits (or increasing surpluses) by that amount over the next 10 years (see attached table). In addition, assuming appropriation of the necessary amounts, CBO estimates that implementing S. 2191 would increase discretionary spending by about $84 billion over the 2009–2018 period.

In years after 2018, annual direct spending would be less than the net revenues attributable to the legislation each year.

S. 2191 contains several intergovernmental mandates as defined in the Unfunded Mandates Reform Act (UMRA). CBO estimates

that, during the first five years following enactment, states would realize a net benefit as a result of this bill's enactment (resulting from the allowances they would receive). Therefore, the annual threshold for intergovernmental mandate costs established in UMRA ($68 million in 2008, adjusted annually for inflation) would not be exceeded.

S. 2191 also would impose private-sector mandates as defined in UMRA. The most costly mandates would require certain types of private-sector entities to participate in the cap-and-trade programs for GHG emissions created by the bill. CBO estimates that the cost of those mandates would amount to more than $90 billion each year during the 2012–2016 period, and thus substantially exceed the annual threshold established in UMRA for private-sector mandates ($136 million in 2008, adjusted annually for inflation).

On April 10, 2008, CBO transmitted a cost estimate for S. 2191 as ordered reported by the Senate Committee on Environment and Public Works on December 5, 2007. Compared with the version of S. 2191 including the proposed amendment, CBO estimates that, over the 2009–2018 period, the version of the bill that was ordered reported would result in $15 billion less in revenues, $79 billion more in direct spending outlays, and $81 billion less in spending subject to appropriation. Those differences result from provisions in the amendment that would increase the portion of allowances that would be auctioned, deposit a portion of auction proceeds into a Climate Change Deficit Reduction Fund, and make spending from that fund subject to appropriation.

The staff contact for this estimate is Susanne S. Mehlman. The estimate was approved by Theresa Gullo, Deputy Assistant Director for Budget Analysis.

ESTIMATED BUDGETARY IMPACT OF S. 2191, WITH A PROPOSED AMENDMENT TRANSMITTED TO CBO ON APRIL 9, 2008

	By fiscal year, in billions of dollars—											
	2009	2010	2011	2012	2013	2014	2015	2016	2017	2018	2009–2013	2009–2018
CHANGES IN REVENUES												
Proceeds from Auctioning Allowances:												
Allocated for Government Activities	0.9	3.0	5.4	24.9	29.9	35.4	40.2	43.8	47.7	53.3	64.1	284.5
Allocated for Deficit Reduction	0	0	0	9.9	10.9	12.0	13.1	14.3	15.6	17.5	20.9	93.4
Free Allocation of Allowances	0	1.3	4.3	114.7	104.0	109.7	115.7	121.9	128.4	130.8	224.3	830.7
Other Revenues	0	*	*	*	*	*	*	0.1	0.1	0.1	0.1	0.3
Total Estimated Revenues	0.9	4.4	9.6	149.5	144.8	157.1	169.0	180.0	191.8	201.7	309.3	1,208.9
CHANGES IN DIRECT SPENDING												
Spending from Auction Proceeds:												
Estimated Budget Authority	1.2	4.0	7.2	33.1	39.8	47.3	53.5	58.4	63.6	71.1	85.4	379.4
Estimated Outlays	0.1	0.4	1.4	9.7	17.7	26.4	36.1	44.7	51.7	57.9	29.1	245.9
Spending from Freely Allocated Emission Allowances:												
Estimated Budget Authority	0	1.3	4.3	121.1	110.8	116.8	123.2	129.8	136.8	139.5	237.4	883.6
Estimated Outlays	0	1.3	4.3	121.1	110.8	116.8	123.2	129.8	136.8	139.5	237.4	883.6
TVA and Other Spending:												
Estimated Budget Authority	0	*	*	*	*	*	0.1	0.1	0.3	0.5	*	1.0
Estimated Outlays	0	*	*	*	*	*	0.1	0.1	0.3	0.5	*	1.0
Total Changes:												
Estimated Budget Authority	1.2	5.4	11.4	154.3	150.6	164.1	176.8	188.3	200.7	211.2	322.9	1,264.0
Estimated Outlays	0.1	1.7	5.6	130.8	128.4	143.2	159.4	174.7	188.8	197.9	266.6	1,130.5
NET CHANGE IN THE BUDGET DEFICIT OR SURPLUS FROM CHANGES IN REVENUES AND DIRECT SPENDING												
Impact on Deficit/Surplus [1]	0.9	2.6	4.0	18.8	16.4	13.9	9.6	5.4	3.0	3.8	42.7	78.4
CHANGES IN SPENDING SUBJECT TO APPROPRIATION												
Estimated Authorization Level	0.2	0.3	0.4	10.3	11.3	12.4	13.5	14.7	16.0	18.0	22.7	97.5
Estimated Outlays	0.1	0.2	0.3	4.3	9.2	11.6	12.7	13.8	15.1	16.6	14.3	84.3

[1] Positive numbers indicate decreases in deficits (or increases in surpluses); negative numbers indicate increases in deficits (or decreases in surpluses).
Notes: * = less than $50 million; TVA = Tennessee Valley Authority. Components may not sum to totals because of rounding.

MINORITY VIEWS OF SENATORS INHOFE, CRAIG, ISAKSON, AND VOINOVICH

The Climate Bill, S. 2191 should be opposed and returned to the Environment and Public Works Committee by the full Senate because the Committee failed to address the important issues that are needed in order to craft a workable cap and trade system to control greenhouse gases, including protecting the American people from higher energy prices (and other adverse economic impacts) and ensuring that global greenhouse gas emissions actually decline.

The Chairman spent the majority of the hearings leading up to the Committee markup exploring and defining the problem and almost no time examining the issues surrounding the potential solutions. The final legislative product reflects the process.

Instead of focusing on the real issues necessary for the Committee to craft meaningful legislation, the Chairman chose to focus most of the legislative hearings on so-called impacts issues. A perfect example of this was a hearing held on May 24, 2007 titled "The Issue of the Potential Impacts of Global Warming on Recreation and the Recreation Industry." The apparent point of this hearing was to show that if there is no snow in fifty years that the skiing industry might suffer. A fact that while no one would dispute, can hardly be helpful in informing the Committee how to craft a cap and trade program.

Contrast this Committee process with the process currently underway in the House Committee on Energy and Commerce. This Committee, which has jurisdiction over climate change and environmental issues in the House, is pursuing the issue under a much more methodical and deliberative process, as any legislation of this magnitude demands. Acknowledging the complexity of the issues surrounding any mandatory greenhouse gas reduction policy, the Committee has held a series of hearings and has released several White Papers. The topics have included the fundamental aspects of greenhouse gas cap and trade policy, including the point of regulation and the benefits of auction versus allocation schemes, the interaction of climate change policy with other environmental laws like the Clean Air Act, the Endangered Species Act and the National Environmental Policy Act, state and federal preemption issues, international competitiveness and how to engage the developing world, and technology barriers. These are only threshold issues, as each one lends itself to further examination.

In addition to failing to consider issues studied by the House Committee, the Chairman also failed to examine several other major aspects of the legislation. Unfortunately, the list of issues unaddressed by this Committee is longer than the actual list of hearings the Chairman did hold. These topics, which were never explored by the Committee prior to drafting the legislation include;

how to draft a Cap and Trade system, how to allocate credits, how to design an auction system, how many credits to assign each industrial sector, how to create the Climate Change Credit Corporation, the impact of hydrofluorocarbons, how to structure the Carbon Market Efficiency Board, how to create a domestic graphic offset program, what to do with international offsets, what the impacts would be on fuel switching, whether carbon capture and storage technologies will be available by 2030, whether the number of nuclear power plants can be built in time to provide the necessary electricity, how the impact on the natural gas supply will affect other industries, how many jobs will be sent overseas, how much world-wide emissions will increase, when U.S. jobs will be sent overseas, what the international provisions' impacts will be on trade and particularly exports, how to effectively contain costs through a transparent mechanism, and how a low carbon fuel standard interacts with other programs, including the recent revisions to the Renewable Fuels Standard in the Energy Independence and Security Act of 2007.

While there are too many issues outlined above to detail comprehensive minority views in the time allotted by the Majority, there are several that are highlighted below. During the mark-up of S. 2191, "America's Climate Security Act of 2007", a mandatory low carbon fuels amendment was offered and accepted. This provision would place new and unrealistic requirements on refiners to change the formulation of transportation fuels. This standard could significantly raise fuel prices and limit supply. The effects will depend on the ability of suppliers to produce those alternatives. Subsequent to the Committee mark-up of S. 2191, Congress passed and the President signed the "Energy Independence Security Act of 2007" (P.L.110–140) which mandates a Renewable Fuels Standard (RFS) and includes carbon reduction requirements for fuels. In essence, the RFS as enacted is a low carbon fuels standard which requires technology advancement and use of cellulosic ethanol. Cellulosic ethanol is key and could potentially be one of the lowest carbon fuels when the technology becomes viable. The provision in S. 2191 now directly conflicts with the new energy law. For example, targets, timing and scope conflict with the RFS requirements as well as not providing realistic mechanisms to move the technology forward.

The inclusion of this fuels provision in S. 2191 sends the wrong signal at a time when refiners are deeply concerned about being able to implement and meet the requirements of the new law and consumers are facing record energy prices. The Renewable Fuels Standard in the new law will achieve the goals of this provision. Developing and advancing technology is a superior approach to meeting the challenges of providing affordable and clean fuels that American consumers need. This approach is already provided under the new law and no additional fuel requirements are needed. Given the enactment of the RFS, this provision should now be eliminated from the bill.

Concerning electricity, for any carbon policy to reduce GHG emissions effectively and protect the U.S. economy, compliance time frames must correspond to the availability of technologies needed to reduce emissions, which the legislation fails to accomplish. To

help meet and mitigate rising electricity demand, electric utilities are expanding the use of renewable energy and energy-efficiency measures. Yet, electric utilities also must be able to build more baseload generation with new, cleaner coal-based power plants and new nuclear facilities in order to provide reliable electricity. However, significant deployment of new nuclear plants is at least 10 years away, and CCS technologies are not expected to be commercially deployable on a large scale until around 2025.

To make significant near-term emissions reductions without these technologies, electric utilities would be forced to switch from using coal to using large amounts of natural gas. This massive fuel switching would drive up natural gas prices, exposing consumers to sharply higher heating bills, and would constrain natural gas supply. Likewise, industries that use natural gas would be less competitive in global markets, making it even more likely that U.S. jobs would be exported overseas.

Concerning natural gas, the bill as amended in Committee regulates natural gas-related emissions via a "midstream" approach that makes natural gas processors and importers the point of regulation. This midstream option creates a number of coverage and cost-pass-through complexities, and arguably creates a situation where natural gas processors would be compelled to seek reimbursement—without any mechanism to ensure recovery—for the cost of emission allowances from customers (largely natural gas producers) contracting for processing services. Furthermore, even if gas processors succeeded in passing such costs upstream to gas producers, the net effect would be to reduce the capital available to producers for investment in new natural gas exploration and production activities, thereby reducing domestic natural gas supply availability. This up front expenditure of cash for allowances would be required of producers even if the costs ultimately could be recovered as part of the commodity price for the sale of natural gas. Finally, there is no guarantee of 100 percent recovery of such costs incurred by producers, because the price of natural gas is established in a competitive market and not pursuant to any kind of cost-plus pricing.

Concerning nuclear energy, one result of climate change legislation is increasingly certain: reductions in carbon are contingent on the construction of extensive numbers of new nuclear plants. Of the many analyses conducted on S. 2191, the result of each analysis depends upon new nuclear development in order to achieve the emissions reductions mandated by S. 2191. EIA's analysis showed that merely limiting the construction of new nuclear plants dramatically increased allowance costs and electricity costs, while decreasing reductions in carbon emissions. This clearly indicates that nuclear energy is the key to reducing carbon emissions and mitigating the costs of any such effort. And yet, this bill fails to incorporate any provisions to address the challenges confronting new construction including financial and regulatory uncertainty, waste management, and supply infrastructure development.

Attached is a White Paper detailing the severe economic impacts of S. 2191. This paper outlines more specific concerns with the legislation, including why the Kyoto Protocol set a bad precedent for carbon cap and trade and how economic stability is necessary for

new clean energy technologies to develop. It also surveys several government and private sector economic analyses to establish why the legislation is a dramatic expansion in the size and scope of government that hurts families, including the poor who bear the biggest costs, jobs, and the economy. Finally, it explains how international action is not adequately addressed through the legislation. Climate change is a global issue which requires a global response. All major emitting countries, including developing nations, must participate in order for any U.S. program to produce meaningful reductions in atmospheric concentrations of greenhouse gases.

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The Economics of America's Climate Security Act of 2007

S.2191, Lieberman-Warner Climate Bill

White Paper

Senator James M. Inhofe
Ranking Member
United States Senate Committee on
Environment and Public Works

May 2008

Introduction

The issue of climate change is now at the forefront of American environmental policy. While the science behind the causes of recent warming trends has been argued vigorously in the past, the debate over the economic costs of addressing this issue has been relatively quiet until now. However, on this issue there is little to debate at all. Leaders from both sides of the aisle agree that curbing greenhouse gas emissions will be an expensive endeavor. [1] What some proponents are masking and others fail to comprehend, is that the economic costs of action are likely to be unbearable if the approach in S. 2191, America's Climate Security Act (Lieberman-Warner), is enacted into law. Such policy will require a complete economic overhaul with wide-reaching ramifications. It is time that the debate over the cost of attempting to achieve reductions is brought to the attention of the American public so they may gain a full and complete understanding of the direct financial impact that they will bear under this proposal. With the current state of the economy, it is even more imperative to have a frank discussion on the cost of potential actions set for debate in Congress and about who will shoulder the burden. This White Paper will seek to frame that debate by setting out why the Kyoto Protocol established a bad precedent for cap-and-trade, surveying current cost estimates of the Lieberman-Warner approach and its impacts on families, and finally establishing why this approach undermines economic stability. This is key to the development of the new technology needed that will lead our country to reduce air pollution, expand our energy supply, increase trade, and reduce greenhouse gas emissions.

Background

What is a Cap-and-Trade System?

Most climate change legislative proposals in Congress attempt to place a price on greenhouse gas emissions (mostly carbon dioxide) in an effort to reduce the amount of these gasses released into the atmosphere. The most common of these efforts is a mandatory "cap-and-trade" system. This system works by placing a cap on the amount of greenhouse gasses emitted from various sources. Covered businesses or entities are allocated

[1] Senator Lieberman conceded that S. 2191, the Lieberman-Warner cap-and-trade legislation, would cost "hundreds of billions of dollars" to the electrical and industrial sectors of the economy. "It's hard to imagine that [Lieberman-Warner] will not cost - over time - these two sectors [electric power and industrial], hundreds of billions of dollars to comply with the demands of this bill." Senator Joseph Lieberman, Statement for the Senate Committee on Environment and Public Works, November 1, 2007

allowances to permit them to emit a certain amount of greenhouse gases. If the company reduces emissions to below their cap level, they are allowed to sell those allowances to businesses that have gone over their limit.[2]

The mechanism that drives the reductions is the price of carbon. This price is a market-driven price that fluctuates with supply of allocations and demand for emitting greenhouse gases. In order to gain reductions, the amount of allowances is reduced yearly. While the caps are aimed specifically at major polluters in an effort to incite reduction of emissions, the costs born of such policy will reach down to the poorest Americans and affect the whole of American economic growth. Economists Arthur Laffer and Wayne Winegarden have stated that "the costs of reducing GHGs through cap-and-trade regulations are not trivial. If implemented, cap-and-trade policies would add significant costs to production and would likely have a severe negative impact on the long-term U.S. growth."[3]

The most recent attempt to regulate greenhouse gases in America through a cap-and-trade proposal is a Senate bill introduced by Senators Joseph Lieberman and John Warner. S. 2191, America's Climate Security Act (Lieberman-Warner) was introduced October 18, 2007, and passed out of the Senate Committee on Environment and Public Works. The bill caps (or sets) an annual limit of greenhouse gasses emitted from three sectors: electric generation; industrial; and transportation. Unlike the EU Emissions Trading Scheme (EU ETS), where small emitters of GHGs such as a local hospital are covered, Lieberman-Warner focuses on more upstream sources of emissions. Specifically, the cap is set at 5775 million metric tons of CO_2 in 2012. The cap is then lowered yearly until 2050, which is estimated to reduce emissions 18-25% below 2005 levels in 2020 and is proposed to end at 62-66% below 2005 levels in 2050.

EPA would be tasked with distributing allowances to the regulated community to emit specific quantities of GHGs. Some of the allowances would be allocated to the Climate Change Credit Corporation, where they would be auctioned and the proceeds used to fund various initiatives. Other allowances would be allocated for free. These allocations are then traded in order for businesses to comply with the law. Businesses are able to bank, as well as sell these emissions permits if they are able to significantly reduce their own emissions. Up to 15% of a company's allowances may be purchased from international allowances and another 15% may be purchased from the use of carbon offsets.

Kyoto: A Bad Precedent for Carbon Cap-and-Trade

The Kyoto Protocol, an international cap-and-trade system to control and reduce greenhouse gas emissions, has become a worldwide failure. Aside from constraining growth in all developed countries and allowing unrestricted development in countries such as China and India, Kyoto would not help to stop global warming. Dr. Tom Wigley, a senior scientist at the National Center for Atmospheric Research (NCAR), found that if the Kyoto Protocol were fully implemented by all signatories, it would reduce temperatures by a mere 0.07 degrees Celsius by 2050. An American-only cap-and-trade system would be largely the same as Kyoto, with environmental symbolism bringing no benefits at an enormous cost.

The European Union Emissions Trading Scheme has also been a devastating failure, as jobs have moved outside of Europe and families are feeling the effects. Dr. Gabriel Calzada, Associate Professor of Economics at King Juan Carlos University in Madrid, submitted testimony to a Senate EPW Committee hearing last September. Dr. Calzada stated that paper mills, ceramic tile manufacturers, and a glass maker had been closed by the Valencia province government for not possessing GHG permits. Dr. Calzada lamented on the dreary state of his country

[2] CRS Definition of Cap-and-Trade: A cap-and-trade program is based on two premises. First, a set amount of pollutant emitted by human activities can be assimilated by the ecological system without undue harm. Thus, the goal of the cap-and-trade program is to impose a ceiling (i.e., an emissions cap) on the total emissions of that pollutant at a level below the assimilative capacity. Second, a market in pollution licenses (i.e., allowances) between polluters is the most cost-effective means of reducing emissions to the level of the cap. This market in allowances is designed so that owners of allowances can trade those allowances with other emitters who need them or retain (bank) them for future use or sale.

[3] Laffer and Winegarden, 2007. The Adverse Economic Impacts of Cap-and-Trade Regulations. *Arduin, Laffer & Moore Econometrics.*

because of the EU ETS, stating "Kyoto's 'cap-and-trade' model is costing Spaniards a fortune even while their chances of complying with the Protocol are [nonexistent], as is typical throughout Europe and most of Kyoto's few covered countries."[4] Europe's cap-and-trade system has cut growth and moved production offshore.

If losing jobs was not a big enough deterrent for cap-and-trade, Europe has shown that the EU ETS has only reduced emissions in two of the EU 15 (major industrial countries). The European Environmental Agency has predicted that those countries' collective emissions will be 7.4 percent above 1990 levels in 2010. The Kyoto Protocol called for an 8 percent cut below 1990 levels. Europe has had a rough time with cap-and-trade as its emissions have continually risen since 1998. In the first year of operation of the EU ETS (2005-2006), the EU saw its covered emissions rise 3.6 percent. Europe's job losses and higher emissions are a direct product of a failed policy. Meanwhile, since the Kyoto Protocol was negotiated in 1997, U.S. emissions have increased more slowly in percentage terms than have emissions in the European Union, Canada, and Japan. In 2006, U.S. carbon dioxide emissions declined. [5]

SO_2 Caps Differ Greatly from CO_2

Many have tried to link a greenhouse gas cap and trade program with the generally accepted success of a cap-and-trade program in reducing emissions that cause acid rain. However, this linkage between sulfur dioxide and greenhouse gas regulation cannot be made. When the acid rain program went into effect, the technology was already available to limit the amount of SO_2 emissions. The same cannot be said for CO_2 as technology is lacking, and imposing a cap now will strain businesses for years before the technology is available. United Nations Secretary General Ban Ki-Moon recently warned that clean energy sources for climate change could require investments of $15 trillion to $20 trillion over two decades. Additionally, whereas SO_2 is a singular gas and regulation was limited only to utility plants, greenhouse gas regulation will cover thousands of emitters across all industrial sectors. This added complexity would make the regulation process incredibly difficult and more costly.

The Lieberman-Warner Bill

Economic Stability Necessary for New Technology

The inability to compare the current acid rain program to the proposed greenhouse gas cap-and-trade program in Lieberman-Warner rightly focuses the debate on where it should be: technology. Technology required for lowering greenhouse gas emissions is still many years away. Contrarily, supporters of cap-and-trade legislation argue that while the technology is not currently in place, the necessity to reduce greenhouse gases will spur invention creating the necessary tools. However, this assumption makes the faulty conclusion that technology can quickly be adopted, produced, and installed, and that a cap-and-trade regime will bring about business certainty.

The investment in and enhancement of new technology is crucial to future energy security and must be developed fully to create market certainty before regulations and restrictions are placed on the emissions of greenhouse gases. Ted Nordhaus and Michael Shellenberger suggest that economic growth and development will come from new technologies spurred by marketplace incentives. They state that the very thing to reduce greenhouse gas emissions is "the very thing environmentalists have long imagined to be the driver of pollution in the first place: economic development."[6] Given time, stability, and incentives to invest in the correct technologies, the American marketplace will create the right tools to lower emissions; however, the Lieberman-Warner bill assumes technology will answer the calls for reductions earlier than possible. What the bill will create is an incentive for utility generators to switch from coal to natural gas generation, and bypass the

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[4] Calzada, Dr. Gabriel. Statement for the Record. United States Senate Committee on Environment and Public Works, Hearing on "Green Jobs Created by Global Warming Initiatives." September 25th, 2007

[5] U.S. EPA National Greenhouse Gas Inventory, April 15, 2008

[6] Ted Nordhaus and Michael Shellenberger, *Break Through: From the Death of Environmentalism to the Politics of Possibility*. 2007

necessary research and development of clean technologies. Economist Margo Thorning describes this consequence:

> Caps on emissions are not likely to promote new technology development because caps will force industry to divert resources to near-term, "end of pipe" solutions rather than promote spending for long-term technology innovations that will enable us to reduce GHGs and increase energy efficiency. An emission trading system will send exactly the wrong signals to investors because it will create uncertainty about the return on new investment.[7]

While economic theory provides a grim look at what can be expected, modeling of the provisions of Lieberman-Warner has affirmed the notion that the bill hinders the growth and well-being of the nation. Many new economic models have been produced since the legislation has passed out of committee. Studies conducted by the United States Environmental Protection Agency (EPA), CRA International, and Science Applications International Corporation (SAIC) have overwhelmingly shown the ill effects this bill would have on many facets of the American economy.

Certainty Problem

At the root of these economic problems is that cost increases for companies will be inevitable under a cap-and-trade system. Companies will have to invest in questionable technology that helps them to reduce emissions and meet the cap. Businesses that are unable to reduce emissions within their cap will have to purchase more allowances. Models of carbon allowance prices have ranged from $20 per metric ton of CO_2 in 2020[8] to up to $83 per metric ton of CO_2 in 2030.[9]

As the EU ETS has shown, market dynamics shift the price of carbon substantially and hinder economic certainty. If the price of purchasing greenhouse gas allowances was static, then businesses would be able to plan future investments based on predicted future prices. Laffer and Winegarden highlight this problem: "Significant price volatility emerges in the market because the supply-and-demand curves are not known to policymakers when initial cap-and-trade policies are established. Furthermore, the supply-and-demand curves will shift over time, and oftentimes in unpredictable ways."[10]

Therefore, while Lieberman-Warner establishes a price for CO_2, it removes all certainty from business forecasting, which will limit investments. Neil O'Brien, director of London-based think tank Open Europe, acknowledged the problem businesses will have making plans for future investments because of price volatility:

> "That's bad because it means that business can't have any kind of ability to plan or have any kind of certainty about what the price of making emission reductions is worth. So either you don't do anything and you don't get emissions reductions, which is what's happened in Europe, or even if you are making investments, it's going to cost

[7] Thorning, Margo. Written Testimony to the Senate Committee on Environment and Public Works. November 8, 2007.
[8] CRA International report "Economic Modeling of the Lieberman Warner Bill." January 31, 2008.
[9] EPA Analysis of the Lieberman Warner Climate Security Act of 2008. March 14, 2008
[10] Laffer and Winegarden, 2007. The Adverse Economic Impacts of Cap-and-Trade Regulations. *Arduin, Laffer & Moore Econometrics.* p.4

> you more because there will be firms that are investing when they shouldn't be and there will be firms that won't be investing when they should."[11]

O'Brien made this statement after witnessing the workings of the EU ETS in person. Many in this country refuse to acknowledge that cap-and-trade mandates will not bring certainty, as the EU has demonstrated. Uncertainty in Europe has been a hindrance to economic progress as the price of carbon has fluctuated from €33 to only a few cents per ton. Subsequently, industrial plants across Europe have closed, and some have even expanded into America. The Spanish company Acerinox S.A., the world's second largest stainless steel producer, recently decided to expand investments into Kentucky because of the harm EU ETS has caused Europe. According to Dr. Calzada's testimony, Acerinox plans to invest €270 million in Kentucky compared to just €41 million in Spain. While holding back at home, Acerinox helped add 175 jobs in Carroll County, Kentucky.

Lieberman-Warner Hurts Families, Jobs, and Economy

National Economy

Lieberman-Warner, if enacted, would likely devastate national and local economies in addition to putting a severe strain on the American family. The bill would reduce the nation's Gross Domestic Product by 2.3% by only 2015 as modeled by CRA International.[12] EPA finds that in 2030, GDP would be reduced by $983 billion and lowered even further by as much as $2.8 trillion in 2050.[13]

While these initial numbers on the loss of GDP are massive, they are not unexpected, as they have been predicted by one of the most notable American economists, Alan Greenspan. He has stated, "There is no effective way to meaningfully reduce emissions without negatively impacting a large part of an economy." Greenspan continues, "Net, it is a tax. If the cap is low enough to make a meaningful inroad into CO_2 emissions, permits will become expensive and large numbers of companies will experience cost increases that make them less competitive. Jobs will be lost and real incomes of workers constrained."[14] The economics of cap-and-trade are not a mystery, and they are validated in the numbers projected for Lieberman-Warner.

The Congressional Budget Office (CBO) has recently released a report detailing the effect the Lieberman-Warner bill would have on federal revenue and taxes. The CBO score stated that $1.2 trillion will be raised in federal revenue between 2009 and 2018, generating $1.2 trillion in new entitlement spending. CBO also said that the bill will cost $90 billion a year in

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[11] Neil O'Brien. "Open Europe's O'Brien calls E.U.'s CO2 program 'failure,' suggests different steps for U.S." Transcript from interview on E&E TV. http://www.eenews.net December 5, 2007.

[12] CRA International report "Economic Modeling of the Lieberman Warner Bill." January 31, 2008. This number relative to baseline projections of GDP.

[13] EPA Analysis of the Lieberman Warner Climate Security Act of 2008. March 14, 2008.

[14] Greenspan, Alan. *The Age of Turbulence*: Adventures in a New World. Penguin Press, New York. 2007. 454

unfunded private sector mandates. Underscoring the report from CBO is that their estimates show that most of the cost of the bill would ultimately be passed on to consumers.

Jobs

Under this legislation, America stands to lose millions of jobs. Greenspan forecasts such a problem, announcing that "cap-and-trade systems or carbon taxes are likely to be popular only until real people lose real jobs as their consequence."[15] Within only seven years of enactment, up to 1.2 million net jobs will be lost.[16] Many of these will be going offshore, where restrictions on emissions are nonexistent, to countries such as China. Worse, by 2020 up to 3.4 million net jobs may be lost.[17] Thousands more workers in Northeast Ohio, Pennsylvania, and Michigan could become jobless in an area already subjected to heavy layoffs. The Energy Information Administration (EIA) found that manufacturing output would drop by as much as 9.5% by 2030 under Lieberman-Warner.[18]

The problem Europe currently faces in losing jobs overseas is one that will become even more real in America, which has already lost 2.5 million manufacturing jobs since 2001.[19] The U.S. Chamber of Commerce has stated that "the chemical industry has already moved significant operations overseas because it cannot compete in the world market while complying with domestic energy constraints and emissions controls."[20] The problem will be compounded if the United States adds more costs to manufacturing within its borders because of emission caps. This is a fact that even a lead author from the United Nations Intergovernmental Panel on Climate Change has noted. William Pizer, an economist at Resources for the Future and a lead author on the most recent report from the UN IPCC, recently stated at a symposium in Washington, "As an economist, I am skeptical that [dealing with climate change] is going to make money. You'll have new industries, but they'll be doing what old industries did but at a higher net cost.... You'll be depleting other industries."

This truth has already been realized in planning for many businesses across the country. Alcoa, the world's leading producer of aluminum, has shown no interest of opening up more plants or new jobs within America, even though their businesses keep expanding. Alcoa's projected global growth map shows plans for opening over two dozen refineries, smelters and mines around the world. It plans to open in China, Brazil, Saudi Arabia, and Vietnam, among others, but none in America.[21]

Many of the 3.4 million jobs predicted to be lost will be exported as new jobs in China, India, and Brazil. All three of these nations are classified as developing countries and have been allowed to emit greenhouse gasses without international criticism. Currently, these countries

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[15] ibid

[16] CRA International. "Economic Modeling of the Lieberman Warner Bill." January 31, 2008.

[17] ibid

[18] Energy Information Administration. Energy Market and Economic Impacts of S.2191, the Lieberman-Warner Climate Security Act of 2007. April 2008.

[19] AFL-CIO, http://www.aflcio.org/issues/jobseconomy/exportingamerica/outsourcing_problems.cfm

[20] Chamber of Commerce of the United States of America. Letter to Senators Lieberman and Warner. October 31, 2007.

[21] Alcoa growth map, Public Record Senate Committee on Environment and Public Works Hearing. October, 24 2007.

are a breeding ground for carbon-intensive manufacturing and will thrive if Lieberman-Warner is adopted. According to estimates, China is currently opening a new coal-fired power plant each week, and has no imminent plans to curb greenhouse gas emissions.

Families

Added on top of nationwide job losses, families will be hurt further at home with heating and electricity bills. EPA modeling of Lieberman-Warner shows that electric prices will rise 44% by 2030 over baseline predictions for that time period.[22] These price increase models concur with what Anne Smith of CRA International stated during her testimony to the Senate Committee on Environment and Public Works in November of 2007; "Changes in emissions from generation will not be cheap, and they will drive up the wholesale price of electricity." Smith also refutes the claim that efficiency improvements will neutralize upward pressure on prices. She notes that home electricity prices will continue to increase by 58% by 2050 "despite extensive technological advancements and efficiency enhancements."[23] Every family in America is dependent on the needs of electricity, and many homes across the country have felt the effects of rising utility rates in the past few years. In addition, there have been recent increase announcements reflecting the rising cost of natural gas, coal, and other fuels used to produce electricity.[24] Large shocks of 44% to electricity prices under Lieberman-Warner would only add to this pain.

The cost per household will rise variedly across the country, largely because of the rising cost of home heating and electricity. CRA International suggests that the average cost per household will be $1,740 per year by 2020 and will continue to increase to $3,456 per year by 2050 in 2007 dollars. This number varies by region as well, with Oklahoma and Texas families spending $3,298 more and the Midwest spending $2,021 more by 2020. The costs of Lieberman-Warner cover the nation as a whole, and spares no family.[25] Additionally, CRA International projects that the overall standard of living would be reduced by 1.7% nationally during the 2010-2050 timeframe. With such a drop in standard of living, US average economic welfare drops by the same margin and disposable income falls by more than $1,000 within three years of the bill's implementation.

EPA also suggests this legislation would have a significant impact on the American family. They state that household annual consumption is $1,375 lower in 2030. EPA suggests that gasoline prices will rise $.53 per gallon on top of the baseline rise in gasoline prices. Additionally, EIA found that gasoline prices could rise anywhere from 41 cents to over a dollar by 2030.

Poorest Bear the Biggest Costs of Lieberman-Warner

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[22] EPA Analysis of Lieberman Warner Climate Security Act. March 2008.

[23] Smith, Anne. Written Testimony to the Senate Committee on Environment and Public Works. November 8, 2007.

[24] BGE announced that its bills are to jump 8% this summer, reflecting the rising cost of natural gas, coal, and other fuels used to produce electricity. Dominion Virginia Power announced May 6th that it is seeking the approval of the State Corporation Commission to increase customer rates, effective July 1.

[25] CRA International report "Economic Modeling of the Lieberman Warner Bill." January 31, 2008. This number relative to baseline projections of GDP

Kevin Book, an energy research analyst for FBR Capital Market Corporation testified to the Environment and Public Works Committee that not only will consumers be hurt, but the poorest of those will be hurt the worst. Book stated in reference to S.2191 that "any effort to trigger conservation or environmental stewardship, even if price hikes are mediated through larger enterprises before they reach consumers, will affect the poorest Americans first."[26] Those who are struggling now to pay their heating bills will suffer under this legislation. The Congressional Budget Office (CBO) released a report last year stating that American households would bear the biggest costs of a cap-and-trade bill.

> "Regardless of how the allowances were distributed, most of the cost of meeting a cap on CO_2 emissions would be borne by consumers, who would face persistently higher prices such as electricity and gasoline. Those price increases would be regressive in that poorer households would bear a larger burden relative to their income than wealthier households would."[27]

The poor already face much higher energy costs as a percentage of their income than wealthier Americans. While most Americans spend about four percent of their monthly budget on heating their homes or other energy needs, the poorest fifth of Americans spend 19 percent of their budget on energy.[28] Lieberman-Warner fails to sufficiently protect the poor who depend on cheap energy, and does little to ensure their economic safety. As seen above, EPA models show that electricity prices will be 44% higher in 2030, numbers that are hard to accept by any family, much less the economically disadvantaged. While the bill has provisions to distribute allowances to load serving entities (LSE) to defray costs to the poor, the very design ensures that many lower income families will get little, if any, relief.

Dramatic Expansion in Size and Scope of Government

Another aspect of this debate is the fact that the Lieberman-Warner bill is more than just a cap-and-trade system. It creates a larger federal bureaucracy to tax the American people and spend trillions of dollars on other government programs. The legislation bypasses the appropriations process and commits revenues from the auctioning of allowances to various different programs potentially predetermining winners and losers in the marketplace. In fact, some in the energy industry support the bill because the costs, according to the CBO, are passed on almost entirely to energy consumers, while the benefits, in the form of free allowances, accrue largely to energy companies and their shareholders, as well as a wide variety of politically-favored special interests.

American citizens, who would bear the brunt of the costs under this bill through higher energy rates, should see some of the billions of dollars in new federal revenue returned. Instead, that money is spent through a process that enlarges the federal government bureaucracy that is already too bloated. A Federal Reserve-like board to oversee the price of carbon emissions is also created through Lieberman-Warner. Named the Carbon Marked

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[26] Kevin Book. Testimony to Senate Committee on Environment and Public Works, November 15, 2007.
[27] CBO Economic and Budget Issue Brief. "Trade-Offs in Allocating Allowances for CO2 Emissions." April 25, 2007.
[28] http://www.hud.gov/offices/cpd/library/energy/homelessness.cfm

Efficiency Board, it would be part of the now larger federal bureaucracy that is much less certain to contain the rising costs of carbon than a true safety valve that prevents the cost of carbon from reaching a particular value.

International Action NOT Addressed

Engaging the developing world is one of the most critical components of the climate debate, however Lieberman-Warner punts on this issue, and largely leaves the United States alone to reduce its emissions, while those countries responsible for close to half of the worlds greenhouse gas emissions are not held to the same standards. Currently, the bill gives China and other developing countries an eight year exemption from reducing emissions while our domestic manufacturing would be at a competitive disadvantage. Up until this time, China will be able to export more items to America at a cheaper cost with no environmental benefit. Millions of American jobs would already be lost by 2015, while the bill does nothing about international action until at least 2019.

In addition, even if the compliance dates are moved up, the current proposal to "force" international action to reduce emissions contained in Lieberman-Warner has raised serious trade concerns. U.S. Trade Representative Susan Schwab recently stated that the international proposals contained in Lieberman-Warner could be viewed as "a blunt and imprecise instrument of fear – rather than one of persuasion – that will take us down a dangerous path and adversely affect U.S. manufacturers, farmers and consumers." She further added, "It is no accident that trade ministers in Bali unanimously agreed that trade restrictions run the risk for tit-for-tat retaliation and even an all-out trade war where no one wins and everyone loses."

Without international participation, global concentrations of greenhouse gases will continue to increase, even if America were to nearly eliminate its emissions. According to the International Energy Agency, global energy demand will grow by more than half over the next quarter of a century, with coal use rising most in absolute terms. China and India will contribute more than 40% of the increase in global energy demand to 2030 based on current trends and around 60% of the global emissions. For instance, in 2015 car sales in China will overtake the U.S. as car ownership jumps to 140 per 1000 people from 20 today. China oil imports will reach 13mb/d in 2030. From an emissions standpoint, capacity additions (largely from coal fired power stations) in the next decade will lock in technology and largely determine emissions through 2050 and beyond.

Laffer and Winegarden speak to this issue, stating that "the failure to achieve universality in a global warming policy will greatly reduce its effectiveness and yet will not significantly reduce its costs."[29] Passing Lieberman-Warner, without international accompaniment or restrictions set by the United States, will only be an act of symbolism. Recent studies have revealed that unilateral American action on climate change will do nothing to reduce global CO_2 concentrations. A chart issued by the EPA on three previous cap-and-trade bills of the 110th Congress have showed that without international action to curb greenhouse gas

[29] Laffer and Winegarden, p. 16

emissions, the Senate bills would do little to nothing in changing world concentrations (see figure 1).

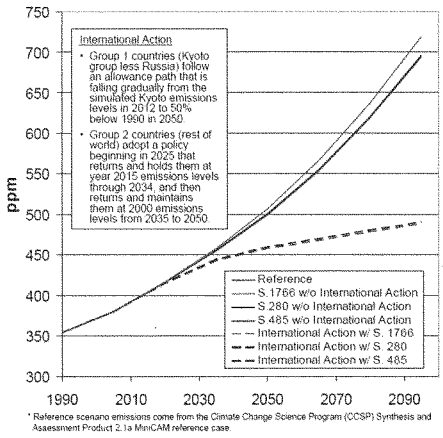

Figure 1: EPA graph of global CO_2 concentrations with and without international action[30]

Energy Security Threatened

With rising costs of coal, natural gas, and other fuels, American energy security has been seriously threatened. Wall Street has made adjustments to its investments in utilities because of the threat of emissions caps. Three of the biggest investments banks, Citigroup Inc., J.P. Morgan Chase & Co., and Morgan Stanley have decided to require that utilities, seeking financing for its plants, return the investment under strict government regulated emissions caps. An article from The Wall Street Journal cited that both Environmental Defense and the Natural Resources Defense Council worked with the banks to develop the standards.[31]

With the reduction of domestic coal use, utilities' initial reactions will be to turn to less carbon intensive natural gas as the preferred fuel. The shift to natural gas will increase demand over current use and drive up prices, as well as necessitate the need for more domestic production which the bill does not address. CRA International estimates that natural gas prices will rise 15%-20% by 2015 alone. Since the natural gas crisis started in late 2000, America has lost 18.5% of all manufacturing jobs, or 3.2 million jobs. High natural gas costs played a significant role in those job losses. Higher energy prices mean job losses will continue because natural gas prices are cheaper in other countries.

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[30] EPA Analysis of Bingaman-Specter Request on Global CO2 Concentrations, October 1, 2007. *U.S. Environmental Protection Agency, Office of Atmospheric Programs.*

[31] Ball, Jeffrey. "Wall Street Shows Skepticism Over Coal" *The Wall Street Journal*. February 4, 2008.

Unfortunately, natural gas is not the only low emission energy source that is burdened with restrictions rather than harnessed to help lower the costs of climate change legislation to consumers.

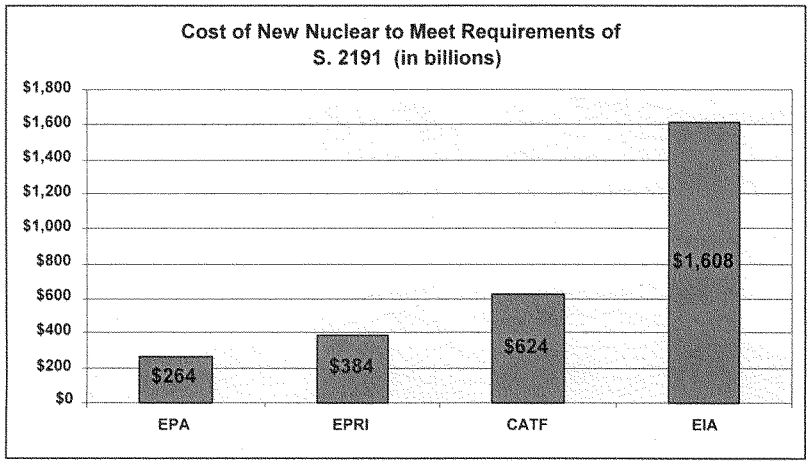
Nuclear power is the world's largest source of non-emitting energy by far. Nuclear energy provides 74% of our nation's non-emitting electricity and prevents the emission of 700 million metric tons of carbon each year. And that's only here in the U.S. Worldwide, nuclear energy prevents the emissions of more than 2 billion metric tons of carbon dioxide each year. Even the Progressive Policy Institute acknowledged this fact: "Lawmakers should acknowledge nuclear power's potential not only to reduce undue reliance on natural gas, but also help combat climate change and clean up the air."[32] Clearly, any serious effort to address climate change must encourage the expanded use of nuclear energy, yet this bill fails to do so.

Of the several analyses that have been conducted on S. 2191, one result is increasingly certain: reductions in carbon are contingent on the construction of extensive numbers of new nuclear plants. Each of these analyses may vary in their assumptions, but the results of each analysis show that significant new nuclear development is necessary to achieve the emissions reductions mandated by S. 2191. The table below shows this common result as the number of nuclear plants (1000 megawatts each) required by 2030 to meet the carbon reduction mandates in the bill:

Figure 2:
EPA: Environmental Protection Agency
EPRI: Electric Power Research Institute
CATF: Clean Air Task Force
EIA: Energy Information Administration

[32] Mazurek, Jan "A New Clean Air Strategy" *Progressive Policy Institute*, Policy Report, December 2005.

EIA's analysis further showed that merely limiting the construction of new nuclear plants dramatically increased allowance costs and electricity costs, while decreasing reductions in carbon emissions. This clearly indicates that nuclear energy is the key to reducing carbon emissions and mitigating the costs of any such effort. However, the investment necessary to fund such dramatic construction is staggering. According to the Nuclear Energy Institute, building the 268 plants indicated by EIA's analysis would likely cost $1.6 trillion (including financing costs). The Electric Power Research Institute's projection of 64 new plants by 2030, which is considered an extremely optimistic goal by industry experts, would require the industry to finance approximately $384 billion. Companies looking to build just one or two plants may need financing equal to half of their total market capitalization. CEO's will not gamble the health of their companies if the financial risks are too high or if political support is shaky. Loan guarantees will be critical to providing a stable financing platform to support this level of investment.



Furthermore, the timeframe necessary to accomplish such a massive construction effort is highly unrealistic. For example, the analysis done by the Clean Air Task Force (CATF) –a study often cited by proponents of Lieberman-Warner – assumes that 104 gigawatts of new nuclear generation must be in operation by 2030 just to make the bill's objectives feasible.[33] CATF characterizes this expansion as "entirely plausible" even though the industry hasn't licensed or begun construction of a new plant since the 1970s. The CATF assumption means the industry would have to build 6.9 gigawatts per year when construction rates in the 1980s and early 1990s averaged 3.3 gigawatts per year. Even the EPA's more modest

[33] Clean Air Task Force, The Lieberman-Warner Climate Security Act—S. 2191 A Summary of Modeling Results from the National Energy Modeling System. February 2008.

modeling indicates a need for 44 gigawatts of new nuclear by 2025, suggesting a construction rate of 4.4 gigawatts per year, 33% higher than relevant history.

Since September of last year, nine applications have been filed with the NRC for 15 new reactors, the first of which may begin operating in 2016 at the earliest. Up to nine more applications are expected to be filed within a year. If all of these projects were licensed and built, the total generating capacity would be approximately 33 gigawatts: far short of even EPA's modest projection.

Conclusion

The Lieberman-Warner bill is set to be one of the most costly pieces of legislation ever. Senator Joseph Lieberman has even acknowledged that his bill will put a strain on the nation's economy. The Senator conceded that the Lieberman-Warner global warming cap-and-trade bill would cost "hundreds of billions of dollars" to the electrical and industrial sectors of the economy. The environmental community has acknowledged this fact as well. Speaking at a hearing on Lieberman-Warner, Dr. Jonathan C. Pershing of the World Resources Institute conceded that "The cap-and-trade system will create uneven costs across the economy."

This legislation will cripple the national economy while destroying jobs and raising electricity, heating, and gas costs to every single family in the country. Lieberman-Warner will leave the country more dependent than ever on importing energy and will place the nation at a competitive disadvantage to developing countries. There is a path to cleaner air, energy security, and American prosperity. That path involves investment incentives to energy efficiency, well-funded research and development, and an open mind about all sources of electric generation including nuclear and the further exploration of natural gas. Unfortunately, this bill provides none of these provisions and takes America down the wrong path.

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CHANGES IN EXISTING LAW

In compliance with section 12 of rule XXVI of the Standing Rules of the Senate, changes in existing law made by the bill as reported are shown as follows: Existing law proposed to be omitted is enclosed in [black brackets], new matter is printed in italic, existing law in which no change is proposed is shown in roman:

* * * * * * *

ENERGY POLICY AND CONSERVATION ACT

* * * * * * *

SEC. 325. (a) PURPOSES.—The purposes of this section are to—

(1) provide Federal energy conservation standards applicable to covered products; and

(2) authorize the Secretary to prescribe amended or new energy conservation standards for each type (or class) of covered product.

(b) * * *

* * * * * * *

(f) STANDARDS FOR FURNACES *AND BOILERS*.—(1) Furnaces (other than furnaces designed solely for installation in mobile homes) manufactured on or after January 1, 1992, shall have an annual fuel utilization efficiency of not less than 78 percent, [except that—

(A) boilers (other than gas steam boilers) shall have an annual fuel utilization efficiency of not less than 80 percent and gas steam boilers shall have an annual fuel utilization efficiency of not less than 75 percent; and] *except that*

[(B) the Secretary] *the Secretary* shall prescribe a final rule not later than January 1, 1989, establishing an energy conservation standard—

[(i)]*(A)* which is for furnaces (other than furnaces designed solely for installation in mobile homes) having an input of less than 45,000 Btu per hour and manufactured on or after January 1, 1992;

[(ii)]*(B)* which provides that the annual fuel utilization efficiency of such furnaces shall be a specific percent which is not less than 71 percent and not more than 78 percent; and

[(iii)]*(C)* which the Secretary determines is not likely to result in a significant shift from gas heating to electric resistance heating with respect to either residential construction or furnace replacement.

(2) Furnaces which are designed solely for installation in mobile homes and which are manufactured on or after September 1, 1990, shall have an annual fuel utilization efficiency of not less than 75 percent.

(3) BOILERS.—

(A) IN GENERAL.—*Subject to subparagraphs (B) and (C), boilers manufactured on or after September 1, 2012, shall meet the following requirements:*

Boiler Type Requirements	Minimum Annual Fuel Utilization Efficiency	Design
Gas hot water	82 percent	No constant burning pilot, automatic means for adjusting water temperature
Gas steam	80 percent	No constant burning pilot
Oil hot water	84 percent	Automatic means for adjusting temperature
Oil steam	82 percent	None
Electric hot water	None	Automatic means for adjusting temperature
Electric steam	None	None

(B) AUTOMATIC MEANS FOR ADJUSTING WATER TEMPERATURE.—

(i) IN GENERAL.—The manufacturer shall equip each gas, oil, and electric hot water boiler (other than a boiler equipped with tankless domestic water heating coils) with an automatic means for adjusting the temperature of the water supplied by the boiler to ensure that an incremental change in inferred heat load produces a corresponding incremental change in the temperature of water supplied.

(ii) CERTAIN BOILERS.—For a boiler that fires at 1 input rate, the requirements of this subparagraph may be satisfied by providing an automatic means that allows the burner or heating element to fire only when the means has determined that the inferred heat load cannot be met by the residual heat of the water in the system.

(iii) NO INFERRED HEAT LOAD.—When there is no inferred heat load with respect to a hot water boiler, the automatic means described in clauses (i) and (ii) shall limit the temperature of the water in the boiler to not more than 140 degrees Fahrenheit.

(iv) OPERATION.—A boiler described in clause (i) or (ii) shall be operable only when the automatic means described in clauses (i), (ii), and (iii) is installed.

(C) EXCEPTION.—A boiler that is manufactured to operate without any need for electricity, any electric connection, any electric gauges, electric pumps, electric wires, or electric devices of any sort, shall not be required to meet the requirements of this subsection.

[(3)**]***(4)*(A) The Secretary shall publish a final rule no later than January 1, 1992, to determine whether the standards established by paragraph (2) for mobile home furnaces should be amended. Such rule shall provide that any amendment shall apply to products manufactured on or after January 1, 1994.

(B) The Secretary shall publish a final rule no later than January 1, 1994, to determine whether the standards established by this subsection for furnaces (including mobile home furnaces) should be amended. Such rule shall provide that any amendment shall apply to products manufactured on or after January 1, 2002.

(C) After January 1, 1997, and before January 1, 2007, the Secretary shall publish a final rule to determine whether standards in effect for such products should be amended. Such rule shall contain

such amendment, if any, and provide that any amendment shall apply to products manufactured on or after January 1, 2012.

(D) Notwithstanding any other provision of this Act, if the requirements of subsection (o) are met, the Secretary may consider and prescribe energy conservation standards or energy use standards for electricity used for purposes of circulating air through duct work.

* * * * * * *

SEC. 327. (a) PREEMPTION OF TESTING AND LABELING REQUIREMENTS.—(1) Effective on the date of enactment of the National Appliance Energy Conservation Act of 1987, this part supersedes any State regulation insofar as such State regulation provides at any time for the disclosure of information with respect to any measure of energy consumption or water use of any covered product if—

(A) * * *

* * * * * * *

(b) GENERAL RULE OF PREEMPTION FOR ENERGY CONSERVATION STANDARDS BEFORE FEDERAL STANDARD BECOMES EFFECTIVE FOR A PRODUCT.—Effective on the date of enactment of the National Appliance Energy Conservation Act of 1987 and ending on the effective date of an energy conservation standard established under section 325 for any covered product, no State regulation, or revision thereof, concerning the energy efficiency, energy use, or water use of the covered product shall be effective with respect to such covered product, unless the State regulation or revision—

(1) was prescribed or enacted before January 8, 1987, and is applicable to products before January 3, 1988, or in the case of any portion of any regulation which establishes requirements for fluorescent lamp ballasts, was prescribed or enacted before the date of the enactment of the National Appliance Energy Conservation Amendments of 1988, or in the case of any portion of any regulation which establishes requirements for fluorescent or incandescent lamps, flow rate requirements for showerheads or faucets, or water use requirements for water closets or urinals, was prescribed or enacted before the date of the enactment of the Energy Policy Act of 1992;

(2) is a State procurement regulation described in ⟦subsection (e)⟧ *subsection (f)*;

(3) is a regulation described in ⟦subsection (f)(1)⟧ *subsection (g)(1)* or is prescribed or enacted in a building code for new construction described in ⟦subsection (f)(2)⟧ *subsection (g)(2)*;

(4) * * *

* * * * * * *

(c) GENERAL RULE OF PREEMPTION FOR ENERGY CONSERVATION STANDARDS WHEN FEDERAL STANDARD BECOMES EFFECTIVE FOR A PRODUCT.—* * *

* * * * * * *

(3) is in a building code for new construction described in ⟦subsection (f)(3)⟧ *subsection (g)(3)*;

(4) * * *

* * * * * * *

(d) WAIVER OF FEDERAL PREEMPTION.—(1)(A) Any State or river basin commission with a State regulation which provides for any energy conservation standard or other requirement with respect to energy use, energy efficiency, or water use for any type (or class) of covered product for which there is a Federal energy conservation standard under section 325 may file a petition with the Secretary requesting a rule that such State regulation become effective with respect to such covered product.

(B) * * *

* * * * * * *

(e) REGIONAL STANDARDS FOR SPACE HEATING AND AIR CONDITIONING PRODUCTS.—

(1) STANDARDS.—

(A) IN GENERAL.—*The Secretary may establish regional standards for space heating and air conditioning products, other than window-unit air-conditioners and portable space heaters.*

(B) NATIONAL MINIMUM AND REGIONAL STANDARDS.—*For each space heating and air conditioning product, the Secretary may establish—*

(i) a national minimum standard; and

(ii) 2 more stringent regional standards for regions determined to have significantly differing climatic conditions.

(C) MAXIMUM SAVINGS.—*Any standards established for a region under subparagraph (B)(ii) shall achieve the maximum level of energy savings that are technically feasible and economically justified within that region.*

(D) ECONOMIC JUSTIFIABILITY STUDY.—

(i) IN GENERAL.—*As a preliminary step in determining the economic justifiability of establishing a regional standard under subparagraph (B)(ii), the Secretary shall conduct a study involving stakeholders, including—*

(I) a representative from the National Institute of Standards and Technology;

(II) representatives of nongovernmental advocacy organizations;

(III) representatives of product manufacturers, distributors, and installers;

(IV) representatives of the gas and electric utility industries; and

(V) such other individuals as the Secretary may designate.

(ii) REQUIREMENTS.—The study under this subparagraph—

(I) shall determine the potential benefits and consequences of prescribing regional standards for heating and cooling products; and

(II) may, if favorable to the standards, constitute the evidence of economic justifiability required under this Act.

(E) REGIONAL BOUNDARIES.—Regional boundaries used in establishing regional standards under subparagraph (B)(ii) shall—

(i) conform to State borders; and

(ii) include only contiguous States (other than Alaska and Hawaii), except that on the request of a State, the Secretary may divide the State to include a part of the State in each of 2 regions.

(2) NONCOMPLYING PRODUCTS.—*If the Secretary establishes standards for a region, it shall be unlawful under section 332 to offer for sale at retail, sell at retail, or install within the region products that do not comply with the applicable standards.*

(3) DISTRIBUTION IN COMMERCE.—

(A) IN GENERAL.—*Except as provided in subparagraph (B), no product manufactured in a manner that complies with a regional standard established under paragraph (1) shall be distributed in commerce without a prominent label affixed to the product that includes—*

(i) at the top of the label, in print of not less than 14-point type, the following statement: "It is a violation of Federal law for this product to be installed in any State outside the region shaded on the map printed on this label.";

(ii) below the notice described in clause (i), an image of a map of the United States with clearly defined State boundaries and names, and with all States in which the product meets or exceeds the standard established pursuant to paragraph (1) shaded in a color or a manner as to be easily visible without obscuring the State boundaries and names; and

(iii) below the image of the map required under clause (ii), the following statement: "It is a violation of Federal law for this label to be removed, except by the owner and legal resident of any single-family home in which this product is installed."

(B) ENERGY-EFFICIENCY RATING.—*A product manufactured that meets or exceeds all regional standards established under this paragraph shall bear a prominent label affixed to the product that includes at the top of the label, in print of not less than 14-point type, the following statement: "This product has achieved an energy-efficiency rating under Federal law allowing its installation in any State."*

(4) RECORDKEEPING.—*A manufacturer of space heating or air conditioning equipment subject to regional standards established under this subsection shall—*

(A) obtain and retain records on the intended installation locations of the equipment sold; and

(B) make such records available to the Secretary on request.

[(e)**]** *(f)* EXCEPTION FOR CERTAIN STATE PROCUREMENT STANDARDS.—Any State regulation which sets forth procurement standards for a State (or political subdivision thereof) shall not be superseded by the provisions of this part if such standards are more

stringent than the corresponding Federal energy conservation standards.

[(f)] *(g)* EXCEPTION FOR CERTAIN BUILDING CODE REQUIREMENTS.—(1) A regulation or other requirement enacted or prescribed before January 8, 1987, that is contained in a State or local building code for new construction concerning the energy efficiency or energy use of a covered product is not superseded by this part until the effective date of the energy conservation standard established in or prescribed under section 325 for such covered product.

(2) * * *

* * * * * * *

[(g)] *(h)* NO WARRANTY.—Any disclosure with respect to energy use, energy efficiency, or estimated annual operating cost which is required to be made under the provisions of this part shall not create an express or implied warranty under State or Federal law that such energy efficiency will be achieved or that such energy use or estimated annual operating cost will not be exceeded under conditions of actual use.

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ENERGY CONSERVATION AND PRODUCTION ACT

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SEC. 101. This title may be cited as the "Federal Energy Administration Act Amendments of 1976".

* * * * * * *

DEFINITIONS

SEC. 303. As used in this title:

(1) The term "Administrator" means the Administrator of the Federal Energy Administration; except that after such Administration ceases to exist, such term means any officer of the United States designated by the President for purposes of this title.

(2) * * *

* * * * * * *

(16) The term "ASHRAE" means the American Society of Heating, Refrigerating, and Air-Conditioning Engineers.

(17) IECC.—*The term "IECC" means the International Energy Conservation Code.*

[SEC. 304. UPDATING STATE BUILDING ENERGY EFFICIENCY CODES.

[(a) CONSIDERATION AND DETERMINATION RESPECTING RESIDENTIAL BUILDING ENERGY CODES.—[(1) Not later than 2 years after the date of the enactment of the Energy Policy Act of 1992, each State shall certify to the Secretary that it has reviewed the provisions of its residential building code regarding energy efficiency and made a determination as to whether it is appropriate for such State to revise such residential building code provisions to meet or exceed CABO Model Energy Code, 1992.

[(2) The determination referred to in paragraph (1) shall be—

[(A) made after public notice and hearing;

[(B) in writing;

[(C) based upon findings included in such determination and upon the evidence presented at the hearing; and

[(D) available to the public.

[(3) Each State may, to the extent consistent with otherwise applicable State law, revise the provisions of its residential building code regarding energy efficiency to meet or exceed CABO Model Energy Code, 1992, or may decline to make such revisions.

[(4) If a State makes a determination under paragraph (1) that it is not appropriate for such State to revise its residential building code, such State shall submit to the Secretary, in writing, the reasons for such determination, and such statement shall be available to the public.

[(5)(A) Whenever CABO Model Energy Code, 1992, (or any successor of such code) is revised, the Secretary shall, not later than 12 months after such revision, determine whether such revision would improve energy efficiency in residential buildings. The Secretary shall publish notice of such determination in the Federal Register.

[(B) If the Secretary makes an affirmative determination under subparagraph (A), each State shall, not later than 2 years after the date of the publication of such determination, certify that it has reviewed the provisions of its residential building code regarding energy efficiency and made a determination as to whether it is appropriate for such State to revise such residential building code provisions to meet or exceed the revised code for which the Secretary made such determination.

[(C) Paragraphs (2), (3), and (4) shall apply to any determination made under subparagraph (B).

[(b) CERTIFICATION OF COMMERCIAL BUILDING ENERGY CODE UPDATES.—(1) Not later than 2 years after the date of the enactment of the Energy Policy Act of 1992, each State shall certify to the Secretary that it has reviewed and updated the provisions of its commercial building code regarding energy efficiency. Such certification shall include a demonstration that such State's code provisions meet or exceed the requirements of ASHRAE Standard 90.1–1989.

[(2)(A) Whenever the provisions of ASHRAE Standard 90.1–1989 (or any successor standard) regarding energy efficiency in commercial buildings are revised, the Secretary shall, not later than 12 months after the date of such revision, determine whether such revision will improve energy efficiency in commercial buildings. The Secretary shall publish a notice of such determination in the Federal Register.

[(B)(i) If the Secretary makes an affirmative determination under subparagraph (A), each State shall, not later than 2 years after the date of the publication of such determination, certify that it has reviewed and updated the provisions of its commercial building code regarding energy efficiency in accordance with the revised standard for which such determination was made. Such certification shall include a demonstration that the provisions of such State's commercial building code regarding energy efficiency meet or exceed such revised standard.

[(ii) If the Secretary makes a determination under subparagraph (A) that such revised standard will not improve energy efficiency in commercial buildings, State commercial building code provisions

regarding energy efficiency shall meet or exceed ASHRAE Standard 90.1–1989, or if such standard has been revised, the last revised standard for which the Secretary has made an affirmative determination under subparagraph (A).

[(c) EXTENSIONS.—The Secretary shall permit extensions of the deadlines for the certification requirements under subsections (a) and (b) if a State can demonstrate that it has made a good faith effort to comply with such requirements and that it has made significant progress in doing so.

[(d) TECHNICAL ASSISTANCE.—The Secretary shall provide technical assistance to States to implement the requirements of this section, and to improve and implement State residential and commercial building energy efficiency codes or to otherwise promote the design and construction of energy efficient buildings.

[(e) AVAILABILITY OF INCENTIVE FUNDING.—(1) The Secretary shall provide incentive funding to States to implement the requirements of this section, and to improve and implement State residential and commercial building energy efficiency codes, including increasing and verifying compliance with such codes. In determining whether, and in what amount, to provide incentive funding under this subsection, the Secretary shall consider the actions proposed by the State to implement the requirements of this section, to improve and implement residential and commercial building energy efficiency codes, and to promote building energy efficiency through the use of such codes.

[(2) Additional funding shall be provided under this subsection for implementation of a plan to achieve and document at least a 90 percent rate of compliance with residential and commercial building energy efficiency codes, based on energy performance—

[(A) to a State that has adopted and is implementing, on a statewide basis—

[(i) a residential building energy efficiency code that meets or exceeds the requirements of the 2004 International Energy Conservation Code, or any succeeding version of that code that has received an affirmative determination from the Secretary under subsection (a)(5)(A); and

[(ii) a commercial building energy efficiency code that meets or exceeds the requirements of the ASHRAE Standard 90.1–2004, or any succeeding version of that standard that has received an affirmative determination from the Secretary under subsection (b)(2)(A); or

[(B) in a State in which there is no statewide energy code either for residential buildings or for commercial buildings, to a local government that has adopted and is implementing residential and commercial building energy efficiency codes, as described in subparagraph (A).

[(3) Of the amounts made available under this subsection, the Secretary may use $500,000 for each fiscal year to train State and local officials to implement codes described in paragraph (2).

[(4)(A) There are authorized to be appropriated to carry out this subsection—

[(i) $25,000,000 for each of fiscal years 2006 through 2010; and

[(ii) such sums as are necessary for fiscal year 2011 and each fiscal year thereafter.

[(B) Funding provided to States under paragraph (2) for each fiscal year shall not exceed one-half of the excess of funding under this subsection over $5,000,000 for the fiscal year.]

SEC. 304. UPDATING STATE BUILDING ENERGY EFFICIENCY CODES.

(a) UPDATES.—

(1) IN GENERAL.—*The Secretary shall support updating the national model building energy codes and standards not later than 3 years after the date of enactment of the America's Climate Security Act of 2007, and not less frequently every 3 years thereafter, to achieve overall energy savings, as compared to the IECC (2006) for residential buildings and ASHRAE Standard 90.1 (2004) for commercial buildings, of at least—*

(A) 30 percent by 2010;

(B) 50 percent by 2020; and

(C) goals to be established by the Secretary in intermediate and subsequent years, at the maximum level of energy efficiency that is technologically feasible and lifecycle cost effective.

(2) REVISIONS TO IECC AND ASHRAE.—

(A) IN GENERAL.—*If the IECC or ASHRAE Standard 90.1 regarding building energy use is revised, not later than 180 days after the date of the revision, the Secretary shall determine whether the revision will—*

(i) improve energy efficiency in buildings; and

(ii) meet the energy savings goals described in paragraph (1).

(B) MODIFICATIONS.—

(i) IN GENERAL.—*If the Secretary makes a determination under subparagraph (A)(ii) that a code or standard does not meet the energy savings goals established under paragraph (1) or if a national model code or standard is not updated for more than 3 years, not later than 1 year after the determination or the expiration of the 3-year period, the Secretary shall propose a modified code or standard that meets the energy savings goals.*

(ii) REQUIREMENTS.—

(I) ENERGY SAVINGS.—*A modification to a code or standard under clause (i) shall—*

(aa) achieve the maximum level of energy savings that is technically feasible and economically justified; and

(bb) incorporate available appliances, technologies, and construction practices.

(II) TREATMENT AS BASELINE.—*A modification to a code or standard under clause (i) shall serve as the baseline for the next applicable determination of the Secretary under subparagraph (A)(i).*

(C) PUBLIC PARTICIPATION.—*The Secretary shall—*

(i) publish in the Federal Register a notice relating to each goal, determination, and modification under this paragraph; and

(ii) provide an opportunity for public comment regarding the goals, determinations, and modifications.

(b) STATE CERTIFICATION OF BUILDING ENERGY CODE UPDATES.—

(1) GENERAL CERTIFICATION.—

(A) IN GENERAL.—*Not later than 2 years after the date of enactment of the America's Climate Security Act of 2007, each State shall certify to the Secretary that the State has reviewed and updated the provisions of the residential and commercial building codes of the State regarding energy efficiency.*

(B) ENERGY SAVINGS.—*A certification under subparagraph (A) shall include a demonstration that the applicable provisions of the State code meet or exceed, as applicable—*

(i)(I) the IECC (2006) for residential buildings; or

(II) the ASHRAE Standard 90.1 (2004) for commercial buildings; or

(ii) the quantity of energy savings represented by the provisions referred to in clause (i).

(2) REVISION OF CODES AND STANDARDS.—

(A) IN GENERAL.—*If the Secretary makes an affirmative determination under subsection (a)(2)(A)(i) or proposes a modified code or standard under subsection (a)(2)(B), not later than 2 years after the determination or proposal, each State shall certify that the State has reviewed and updated the provisions of the residential and commercial building codes of the State regarding energy efficiency.*

(B) ENERGY SAVINGS.—*A certification under subparagraph (A) shall include a demonstration that the applicable provisions of the State code meet or exceed—*

(i) the modified code or standard; or

(ii) the quantity of energy savings represented by the modified code or standard.

(C) FAILURE TO DETERMINE.—If the Secretary fails to make a determination under subsection (a)(2)(A)(i) by the date specified in subsection (a)(2), or if the Secretary makes a negative determination, not later than 2 years after the specified date or the date of the determination, each State shall certify that the State has—

(i) reviewed the revised code or standard; and

(ii) updated the provisions of the residential and commercial building codes of the State as necessary to meet or exceed, as applicable—

(I) any provisions of a national code or standard determined to improve energy efficiency in buildings; or

(II) energy savings achieved by those provisions through other means.

(c) ACHIEVEMENT OF COMPLIANCE BY STATES.

(1) IN GENERAL.—*Not later than 3 years after the date on which a State makes a certification under subsection (b), the State shall certify to the Secretary that the State has achieved compliance with the national building energy code that is the subject of the certification.*

(2) RATE OF COMPLIANCE.—*The certification shall include documentation of the rate of compliance based on independent inspections of a random sample of the new and renovated buildings covered by the State code during the preceding calendar year.*

(3) COMPLIANCE.—*A State shall be considered to achieve compliance for purposes of paragraph (1) if—*

(A) at least 90 percent of new and renovated buildings covered by the State code during the preceding calendar year substantially meet all the requirements of the code; or

(B) the estimated excess energy use of new and renovated buildings that did not meet the requirements of the State code during the preceding calendar year, as compared to a baseline of comparable buildings that meet the requirements of the code, is not more than 10 percent of the estimated energy use of all new and renovated buildings covered by the State code during the preceding calendar year.

(d) FAILURE TO CERTIFY.—

(1) EXTENSION OF DEADLINES.—*The Secretary shall extend a deadline for certification by a State under subsection (b) or (c) for not more than 1 additional year, if the State demonstrates to the satisfaction of the Secretary that the State has made—*

(A) a good faith effort to comply with the certification requirement; and

(B) significant progress with respect to the compliance.

(2) NONCOMPLIANCE BY STATE.—

(A) IN GENERAL.—*A State that fails to submit a certification required under subsection (b) or (c), and to which an extension is not provided under paragraph (1), shall be considered to be out of compliance with this section.*

(B) EFFECT ON LOCAL GOVERNMENTS.—*A local government of a State that is out of compliance with this section may be considered to be in compliance with this section if the local government meets each applicable certification requirement of this section.*

(e) TECHNICAL ASSISTANCE.—

(1) IN GENERAL.—The Secretary shall provide technical assistance (including building energy analysis and design tools, building demonstrations, and design assistance and training) to ensure that national model building energy codes and standards meet the goals described in subsection (a)(1).

(2) ASSISTANCE TO STATES.—*The Secretary shall provide technical assistance to States—*

(A) to implement this section, including procedures for States to demonstrate that the codes of the States achieve equivalent or greater energy savings than the national model codes and standards;

(B) to improve and implement State residential and commercial building energy efficiency codes; and

(C) to otherwise promote the design and construction of energy-efficient buildings.

(f) INCENTIVE FUNDING.—

(1) IN GENERAL.—*The Secretary shall provide incentive funding to States—*

(A) to implement this section; and

(B) to improve and implement State residential and commercial building energy efficiency codes, including increasing and verifying compliance with the codes.

(2) AMOUNT.—*In determining whether, and in what amount, to provide incentive funding under this subsection, the Secretary shall take into consideration actions proposed by the State—*

(A) to implement this section;

(B) to implement and improve residential and commercial building energy efficiency codes; and

(C) to promote building energy efficiency through use of the codes.

(3) ADDITIONAL FUNDING.—*The Secretary shall provide additional funding under this subsection for implementation of a plan to demonstrate a rate of compliance with applicable residential and commercial building energy efficiency codes at a rate of not less than 90 percent, based on energy performance—*

(A) to a State that has adopted and is implementing, on a statewide basis—

(i) a residential building energy efficiency code that meets or exceeds the requirements of the IECC (2006) (or a successor code that is the subject of an affirmative determination by the Secretary under subsection (a)(2)(A)(i)); and

(ii) a commercial building energy efficiency code that meets or exceeds the requirements of the ASHRAE Standard 90.1 (2004) (or a successor standard that is the subject of an affirmative determination by the Secretary under subsection (a)(2)(A)(i)); or

(B) in the case of a State in which no statewide energy code exists for residential buildings or commercial buildings, or in which the State code fails to comply with subparagraph (A), to a local government that has adopted and is implementing residential and commercial building energy efficiency codes, as described in subparagraph (A).

(4) TRAINING.—*Of the amounts made available to carry out this subsection, the Secretary may use not more than $500,000 for each State to train State and local officials to implement State or local energy codes in accordance with a plan described in paragraph (3).".*

* * * * * * *

TITLE XIV OF THE PUBLIC HEALTH SERVICE ACT (THE SAFE DRINKING WATER ACT)

* * * * * * *

SEC. 1400. This title may be cited as the "Safe Drinking Water Act".

PART A—* * *

* * * * * * *

SEC. 1421. (a)(1) * * *

* * * * * * *

(b)(1) Regulations under subsection (a) for State underground injection programs shall contain minimum requirements for effective programs to prevent underground injection which endangers drinking water sources within the meaning of [subsection (d)(2)] *subsection (e)(2).* Such regulations shall require that a State program, in order to be approved under section 1422—

(A) * * *

* * * * * * *

(c)(1) The Administrator may, upon application of the Governor of a State which authorizes underground injection by means of permits, authorize such State to issue (without regard to subsection (b)(1)(B)(i)) temporary permits for underground injection which may be effective until the expiration of four years after the date of enactment of this title, if—

(A) * * *

* * * * * * *

(d) CARBON DIOXIDE.—

(1) REGULATIONS.—*Not later than 1 year after the date of enactment of the America's Climate Security Act of 2007, the Administrator shall promulgate regulations for permitting commercial-scale underground injection of carbon dioxide for purposes of geological sequestration to address climate change, including provisions—*

(A) for monitoring and controlling the long-term storage of carbon dioxide and avoiding, to the maximum extent practicable, any release of carbon dioxide into the atmosphere, and for ensuring protection of underground sources of drinking water, human health, and the environment; and

(B) relating to long-term liability associated with commercial-scale geological sequestration.

(2) SUBSEQUENT REPORTS.—*Not later than 5 years after the date on which regulations are promulgated pursuant to paragraph (1), and not less frequently than once every 5 years thereafter, the Administrator shall submit to Congress a report that contains an evaluation of the effectiveness of the regulations, based on current knowledge and experience, with particular emphasis on any new information on potential impacts of commercial-scale geological sequestration on drinking water, human health, and the environment.*

(3) REVISION.—*If the Administrator determines, based on a report under paragraph (2), that regulations promulgated pursuant to paragraph (1) require revision, the Administrator shall promulgate revised regulations not later than 1 year after the date on which the applicable report is submitted to Congress under paragraph (2).*

[(d)] *(e)* For purposes of this part:

(1) * * *

* * * * * * *

SEC. 1447. (a) IN GENERAL.—Each department, agency, and instrumentality of the executive, legislative, and judicial branches of the Federal Government—

(1) owning or operating any facility in a wellhead protection area;

(2) engaged in any activity at such facility resulting, or which may result, in the contamination of water supplies in any such area;

(3) owning or operating any public water system; or

(4) engaged in any activity resulting, or which may result in, underground injection which endangers drinking water (within the meaning of [section 1421(d)(2)] *section 1421(e)(2),*

* * * * * * *

CLEAN AIR ACT

* * * * * * *

SEC. 101. (a) The Congress finds—

(1) * * *

* * * * * * *

SEC. 608. NATIONAL RECYCLING AND EMISSION REDUCTION PROGRAM.

(a) DEFINITION OF HYDROFLUOROCARBON SUBSTITUTE.—*In this section, the term "hydrofluorocarbon substitute" means a hydrofluorocarbon—*

(1) with a global warming potential of more than 150; and

(2) that is used in or for types of equipment, appliances, or processes that previously relied on class I or class II substances.

[(a)] *(b)* IN GENERAL.—(1) The Administrator shall, by not later than January 1, 1992, promulgate regulations establishing standards and requirements regarding the use and disposal of class I substances during the service, repair, or disposal of appliances and industrial process refrigeration. Such standards and requirements shall become effective not later than July 1, 1992.

(2) The Administrator shall, within 4 years after the enactment of the Clean Air Act Amendments of 1990, promulgate regulations establishing standards and requirements regarding use and disposal of class I and II substances not covered by paragraph (1), including the use and disposal of class II substances during service, repair, or disposal of appliances and industrial process refrigeration. Such standards and requirements shall become effective not later than 12 months after promulgation of the regulations.

(3)(A) Not later than 1 year after the date of enactment of the Lieberman-Warner Climate Security Act of 2007, the Administrator shall promulgate regulations establishing standards and requirements regarding the sale or distribution, or offer for sale and distribution in interstate commerce, use, and disposal of hydrofluorocarbon substitutes for class I and class II substances not covered by paragraph (1), including the use, recycling, and disposal of those hydrofluorocarbon substitutes during the maintenance, service, repair, or disposal of appliances and industrial process refrigeration equipment.

(B) The standards and requirements established under subparagraph (A) shall take effect not later than 1 year after the date of promulgation of the regulations.

[(3)] *(4)* The regulations under this subsection shall include requirements that—

(A) reduce the use and emission of such substances to the lowest achievable level, and

(B) maximize the recapture and recycling of such substances.

[Such regulations] *(5) The regulations* may include requirements to use alternative substances (including substances which are not class I or class II substances) or to minimize use of class I or class II substances, or to promote the use of safe alternatives pursuant to section 612 or any combination of the foregoing.

[(b)] *(c)* [SAFE DISPOSAL.—The regulations under subsection (a) shall establish standards and requirements for the safe disposal of class I and II substances. Such regulations shall include each of the following—]

(c) SAFE DISPOSAL.—*The regulations under subsection (b) shall—*

(1) establish standards and requirements for the safe disposal of class I and II substances and hydrofluorocarbon substitutes for those substances; and

(2) include each of the following:

[(1)] *(A)* Requirements that class I or class II substances *(or hydrofluorocarbon substitutes for those substances)* contained in bulk in appliances, machines or other goods shall be removed from each such appliance, machine or other good prior to the disposal of such items or their delivery for recycling.

[(2)] *(B)* Requirements that any appliance, machine or other good containing a class I or class II substance *(or a hydrofluorocarbon substitutes for such a substance)* in bulk shall not be manufactured, sold, or distributed in interstate commerce or offered for sale or distribution in interstate commerce unless it is equipped with a servicing aperture or an equally effective design feature which will facilitate the recapture of such substance during service and repair or disposal of such item.

[(3)] *(C)* Requirements that any product in which a class I or class II substance *(or a hydrofluorocarbon substitutes for such a substance)* is incorporated so as to constitute an inherent element of such product shall be disposed of in a manner that reduces, to the maximum extent practicable, the release of such substance into the environment. If the Administrator determines that the application of this paragraph to any product would result in producing only insignificant environmental benefits, the Administrator shall include in such regulations an exception for such product.

[(c)] *(d)* PROHIBITIONS.—(1) Effective July 1, 1992, it shall be unlawful for any person, in the course of maintaining, servicing, repairing, or disposing of an appliance or industrial process refrigeration, to knowingly vent or otherwise knowingly release or dispose of any class I or class II substance used as a refrigerant in such appliance (or industrial process refrigeration) in a manner which permits such substance to enter the environment. De minimis releases associated with good faith attempts to recapture and recycle

or safely dispose of any such substance shall not be subject to the prohibition set forth in the preceding sentence.

(2) Effective 5 years after the enactment of the Clean Air Act Amendments of 1990, paragraph (1) shall also apply to the venting, release, or disposal of any substitute substance for a class I or class II substance by any person maintaining, servicing, repairing, or disposing of an appliance or industrial process refrigeration which contains and uses as a refrigerant any such substance, unless the Administrator determines that venting, releasing, or disposing of such substance does not pose a threat to the environment. For purposes of this paragraph, the term "appliance" includes any device which contains and uses as a refrigerant a substitute substance and which is used for household or commercial purposes, including any air conditioner, refrigerator, chiller, or freezer.

SEC. 609. SERVICING OF MOTOR VEHICLE AIR CONDITIONERS.

(a) REGULATIONS.—Within 1 year after the enactment of the Clean Air Act Amendments of 1990, the Administrator shall promulgate regulations in accordance with this section establishing standards and requirements regarding the servicing of motor vehicle air conditioners.

(b) DEFINITIONS.—As used in this section—

(1) * * *

* * * * * * *

(5) The term "hydrofluorocarbon substitute" means a hydrofluorocarbon—

(A) with a global warming potential of more than 150; and

(B) that is used in or for types of equipment, appliances, or processes that previously relied on class I or class II substances.

* * * * * * *

[(e) SMALL CONTAINERS OF CLASS I OR CLASS II SUBSTANCES.—Effective]

(e) SMALL CONTAINERS OF CLASS I OR CLASS II SUBSTANCES AND HYDROFLUOROCARBON SUBSTITUTES.—

(1) CLASS I OR CLASS II SUBSTANCES.—*Effective beginning* 2 years after the date of the enactment of the Clean Air Act Amendments of 1990, it shall be unlawful for any person to sell or distribute, or offer for sale or distribution, in interstate commerce to any person (other than a person performing service for consideration on motor vehicle air-conditioning systems in compliance with this section) any class I or class II substance that is suitable for use as a refrigerant in a motor vehicle air-conditioning system and that is in a container which contains less than 20 pounds of such refrigerant.

(2) HYDROFLUOROCARBON SUBSTITUTES.—*Effective beginning January 1, 2010, it shall be unlawful for any person to sell or distribute, or offer for sale or distribution, in interstate commerce to any person (other than a person performing service for consideration on motor vehicle air-conditioning systems in compliance with this section) any hydrofluorocarbon substitute that is—*

(A) suitable for use in a motor vehicle air-conditioning system; and

(B) in a container that contains less than 20 pounds of the hydrofluorocarbon substitute.

* * * * * * *

SEC. 202. (a) * * *

* * * * * * *

REGULATION OF FUELS

SEC. 211. (a) * * *

* * * * * * *

(c)(1) The Administrator may, from time to time on the basis of information obtained under subsection (b) of this section or other information available to him, by regulation, control or prohibit the manufacture, introduction into commerce, offering for sale, or sale of any fuel or fuel additive for use in a motor vehicle, motor vehicle engine, or [nonroad engine or nonroad vehicle (A) if in the judgment of the Administrator] *nonroad vehicle-(A) if, in the judgment of the Administrator, any fuel or fuel additive or* any emission product of such fuel or fuel additive causes, or contributes, to [air pollution which] *air pollution which or water pollution (including any degradation in the quality of groundwater) that* may reasonably be anticipated to endanger the public health or welfare[, or (B) if]; *or (B) if* emission products of such fuel or fuel additive will impair to a significant degree the performance of any emission control device or system which is in general use, or which the Administrator finds has been developed to a point where in a reasonable time it would be in general use were such regulation to be promulgated.

* * * * * * *

(o) RENEWABLE FUEL PROGRAM.—

(1) DEFINITIONS.—In this section:

(A) CELLULOSIC BIOMASS ETHANOL.—The term "cellulosic biomass ethanol" means ethanol derived from any lignocellulosic or hemicellulosic matter that is available on a renewable or recurring basis, including—

(i) dedicated energy crops and trees;

(ii) wood and wood residues;

(iii) plants;

(iv) grasses;

(v) agricultural residues;

(vi) fibers;

(vii) animal wastes and other waste materials; and

(viii) municipal solid waste.

The term also includes any ethanol produced in facilities where animal wastes or other waste materials are digested or otherwise used to displace 90 percent or more of the fossil fuel normally used in the production of ethanol.

(B) CULTIVATED NOXIOUS PLANT.—*The term "cultivated noxious plant" means a plant that is included on—*

(i) the Federal noxious weed list maintained by the Animal and Plant Health Inspection Service; or

(ii) any equivalent State list.

(C) FUEL EMISSION BASELINE.—*The term "fuel emission baseline" means the average lifecycle greenhouse gas emissions per unit of energy of conventional transportation fuels in commerce in the United States in calendar year 2008, as determined by the Administrator under paragraph (11).*

(D) FUEL PROVIDER.—

(i) IN GENERAL.—*The term "fuel provider" means an obligated party (as described in section 80.1106 of title 40, Code of Federal Regulations (or a successor regulation)).*

(ii) INCLUSIONS.—*The term "fuel provider" includes, as the Administrator determines to be appropriate, an individual or entity that produces, blends, or imports gasoline or any other transportation fuel in commerce in, or into, the United States.*

(E) GREENHOUSE GAS.—*The term "greenhouse gas" means any of—*

(i) carbon dioxide;

(ii) methane;

(iii) nitrous oxide;

(iv) hydrofluorocarbons;

(u) perfluorocarbons;

(vi) sulfur hexafluoride; and

(vii) any other emission or effect (such as particulate matter or a change in albedo) that the Administrator determines to be a significant factor in global warming as a result of the use of transportation fuel.

(F) LIFECYCLE GREENHOUSE GAS EMISSIONS.—

(i) IN GENERAL.—*The term "lifecycle greenhouse gas emissions" means, with respect to a transportation fuel, the aggregate quantity of greenhouse gases emitted per British thermal unit of fuel, as determined by the Administrator, from production through use of the fuel, as calculated to ensure that any nonrecurring emission is not amortized over a period of more than 20 years to ensure that required improvements in greenhouse gas emissions occur within that period.*

(ii) INCLUSIONS.—*The term "lifecycle greenhouse gas emissions" includes emissions associated with—*

(I) feedstock production (including direct and indirect land-use changes) or extraction;

(II) feedstock refining;

(III) distribution of a fuel; and

(IV) use of a fuel.

[*(C)***]** *(G)* RENEWABLE FUEL.—

(i) IN GENERAL.—The term "renewable fuel" means motor vehicle fuel that—

(I)(aa) is produced from grain, starch, oilseeds, vegetable, animal, or fish materials including fats, greases, and oils, sugarcane, sugar beets, sugar components, tobacco, potatoes, or other biomass; or

(bb) is natural gas produced from a biogas source, including a landfill, sewage waste treat-

ment plant, feedlot, or other place where decaying organic material is found; and

(II) is used to replace or reduce the quantity of fossil fuel present in a fuel mixture used to operate a motor vehicle.

(ii) INCLUSION.—The term "renewable fuel" includes—

(I) cellulosic biomass ethanol and "waste derived ethanol"; and

(II) biodiesel (as defined in section 312(f) of the Energy Policy Act of 1992 (42 U.S.C. 13220(f))) and any blending components derived from renewable fuel (provided that only the renewable fuel portion of any such blending component shall be considered part of the applicable volume under the renewable fuel program established by this subsection).

[(D)] *(H)* SMALL REFINERY.—The term "small refinery" means a refinery for which the average aggregate daily crude oil throughput for a calendar year (as determined by dividing the aggregate throughput for the calendar year by the number of days in the calendar year) does not exceed 75,000 barrels.

(I) TRANSPORTATION FUEL.—*The term "transportation fuel" means fuel used to power motor vehicles, nonroad engines, or aircraft.*

[*(B)*] *(J)* WASTE DERIVED ETHANOL.—The term "waste derived ethanol" means ethanol derived from—

(i) animal wastes, including poultry fats and poultry wastes, and other waste materials; or

(ii) municipal solid waste.

* * * * * * *

(10) ETHANOL MARKET CONCENTRATION ANALYSIS.—

(A) ANALYSIS.—

(i) IN GENERAL.—Not later than 180 days after the date of enactment of this paragraph, and annually thereafter, the Federal Trade Commission shall perform a market concentration analysis of the ethanol production industry using the Herfindahl-Hirschman Index to determine whether there is sufficient competition among industry participants to avoid price-setting and other anticompetitive behavior.

(ii) SCORING.—For the purpose of scoring under clause (i) using the Herfindahl-Hirschman Index, all marketing arrangements among industry participants shall be considered.

(B) REPORT.—Not later than December 1, 2005, and annually thereafter, the Federal Trade Commission shall submit to Congress and the Administrator a report on the results of the market concentration analysis performed under subparagraph (A)(i).

(11) ADVANCED CLEAN FUEL PERFORMANCE STANDARD.—

(A) STANDARD.—

(i) IN GENERAL.—*Not later than January 1, 2010, the Administrator shall, by regulation—*

(I) establish a methodology for use in determining the lifecycle greenhouse gas emissions of all transportation fuels in commerce;

(II) determine the fuel emission baseline;

(III) establish a transportation fuel certification and marketing process to determine the lifecycle greenhouse gas emissions of conventional transportation fuels and renewable fuels being sold or introduced into commerce in the United States that allows—

(aa) for a simple certification using default values; and

(bb) fuel providers to opt in to the use of a standardized certification tool that would provide verifiable and auditable greenhouse gas ratings for fuels of the providers through the use of additional, certified data;

(IV) in accordance with clause (ii), establish a requirement applicable to each fuel provider to reduce the average lifecycle greenhouse gas emissions per unit of energy of the aggregate quantity of transportation fuel produced, blended, or imported by the fuel provider to a level that is, to the maximum extent practicable—

(aa) by not later than calendar year 2011, at least equal to or less than the fuel emission baseline;

(bb) by not later than calendar year 2015, 5 percent less than the fuel emission baseline; and

(cc) by not later than calendar year 2020, 10 percent less than the fuel emission baseline; and

(V) permit alternative reliable estimation methods to be used for the purpose of this clause during the first 5 years that the requirement described in subclause (IV) is in effect.

(ii) AIR QUALITY IMPACTS.—For the purpose of this subparagraph, in the case of any air quality-related adverse lifecycle impact resulting from emissions from motor vehicles using renewable fuel, the Administrator shall ensure, by regulation promulgated under this title, that gasoline containing renewable fuel does not result in—

(I) average per-gallon motor vehicle emissions (measured on a mass basis) of air pollutants in excess of those emissions attributable to gasoline sold or introduced into commerce in the United States in calendar year 2007; or

(II) a violation of any motor vehicle emission or fuel content limitation under any other provision of this Act.

(iii) CALENDAR YEAR 2025 AND THEREAFTER.—*For calendar year 2025, and each fifth calendar year thereafter, the Administrator, in consultation with the Secretary of Agriculture and the Secretary of Energy, shall revise the applicable performance standard to require that each fuel provider shall additionally reduce, to the maximum extent practicable, the average lifecycle greenhouse gas emissions per unit of energy of the aggregate quantity of transportation fuel introduced by the fuel provider into commerce in the United States.*

(iv) REVISION OF REGULATIONS.—*In accordance with the purposes of the Lieberman-Warner Climate Security Act of 2007, the Administrator may, as appropriate, revise the regulations promulgated under clause (i) as necessary to reflect or respond to changes in the transportation fuel market or other relevant circumstances.*

(v) METHOD OF CALCULATION.—*In calculating the lifecycle greenhouse gas emissions of hydrogen or electricity (when used as a transportation fuel) pursuant to clause (i)(I), the Administrator shall—*

(I) include emissions resulting from the production of the hydrogen or electricity; and

(II) consider to be equivalent to the energy delivered by 1 gallon of ethanol the energy delivered by—

(aa) 6.4 kilowatt-hours of electricity;

(bb) 132 standard cubic feet of hydrogen; or

(cc) 1.25 gallons of liquid hydrogen.

(vi) BEST AVAILABLE SCIENCE.—*In carrying out this paragraph, the Administrator shall use the best available scientific and technical information to determine the lifecycle greenhouse gas emissions of transportation fuels derived from—*

(I) planted crops and crop residue produced and harvested from agricultural land that—

(aa) has been cleared and, if the land was previously wetland, drained before the date of enactment of this paragraph, and that is actively managed or fallow and nonforested; and

(bb) is in compliance with a conservation plan that meets the standards, guidelines, and restrictions under subtitles B and C of chapter 1 of subtitle D of title XII of the Food Security Act of 1985 (16 U.S.C. 3831 et seq.);

(II) planted trees and tree residue from actively-managed tree plantations on non-Federal land that has been cleared and, if the land was previously wetland, drained before the date of enactment of this paragraph;

(III) animal waste material, and animal by-products;

(IV) slash and pre-commercial thinnings from non-Federal forestland other than—

(aa) old-growth forest or late successional forest; and

(bb) ecological communities with a global or State ranking of critically imperiled, imperiled, or rare pursuant to a State natural heritage program;

(V) biomass obtained from the immediate vicinity of buildings and other areas regularly occupied by individuals, or of public infrastructure, that is at risk from wildfire;

(VI) algae;

(VII) separated food waste or yard waste;

(VIII) electricity, including the entire lifecycle of the fuel;

(IX) 1 or more fossil fuels, including the entire lifecycle of the fuels; and

(X) hydrogen, including the entire lifecycle of the fuel.

(vii) EQUIVALENT EMISSIONS.—In carrying out this paragraph, the Administrator shall consider transportation fuel derived from cultivated noxious plants, and transportation fuel derived from biomass sources other than those sources described in clause (vi), to have emissions equivalent to the greater of—

(I) the lifecycle greenhouse gas emissions; or

(II) the fuel emission baseline.

(B) ELECTION TO PARTICIPATE.—An electricity provider may elect to participate in the program under this section if the electricity provider provides and separately tracks electricity for transportation through a meter that—

(i) measures the electricity used for transportation separately from electricity used for other purposes; and

(ii) allows for load management and time-of-use rates.

(C) CREDITS.—

(i) IN GENERAL.—The regulations promulgated to carry out this paragraph shall permit fuel providers to receive credits for achieving, during a calendar year, greater reductions in lifecycle greenhouse gas emissions of the fuel provided, blended, or imported by the fuel provider than are required under subparagraph (A)(i)(IV).

(ii) METHOD OF CALCULATION.—*The number of credits received by a fuel provider as described clause (i) for a calendar year shall be calculated by multiplying—*

(I) the aggregate quantity of fuel produced, distributed, or imported by the fuel provider in the calendar year; and

(II) the difference between—

(aa) the lifecycle greenhouse gas emissions of that quantity of fuel; and

(bb) the maximum lifecycle greenhouse gas emissions of that quantity of fuel permitted for

the calendar year under subparagraph (A)(i)(IV).

(D) COMPLIANCE.—

(i) IN GENERAL.—*Each fuel provider subject to this paragraph shall demonstrate compliance with this paragraph, including, as necessary, through the use of credits banked or purchased.*

(ii) NO LIMITATION ON TRADING OR BANKING.—*There shall be no limit on the ability of any fuel provider to trade or bank credits pursuant to this subparagraph.*

(iii) USE OF BANKED CREDITS.—*A fuel provider may use banked credits under this subparagraph with no discount or other adjustment to the credits.*

(iv) BORROWING.—*A fuel provider may not borrow credits from future years for use under this subparagraph.*

(v) TYPES OF CREDITS.—*To encourage innovation in transportation fuels—*

(I) only credits created in the production of transportation fuels may be used for the purpose of compliance described in clause (i); and

(II) credits created by or in other sectors, such as manufacturing, may not be used for that purpose.

(E) NO EFFECT ON STATE AUTHORITY OR MORE STRINGENT REQUIREMENTS.—*Nothing in this subsection—*

(i) affects the authority of a State to establish, or to maintain in effect, any transportation fuel performance standard or other similar standard that is more stringent than a standard established under this paragraph; or

(ii) supercedes or otherwise affects any more stringent requirement under any other provision of this Act.

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