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Final Report**

**S.309: Global Warming Pollution Reduction
Act**



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Abstract

Senate Bill 309 (S.309) proposes to amend the Clean Air Act of 1970 to include CO₂ emissions as a regulated pollutant in the U.S. It establishes a regulatory framework to nationally regulate CO₂ emissions through a set of programs, regulations and market-based incentives. The Environmental Protection Agency is the agency directed to implement and enforce the provisions of the bill.

Bernie Sanders (Rep-VT) and Barbara Boxer (Rep-CA) proposed S. 309 in January 2007. This bill aims to reduce incrementally U.S. CO₂ emissions from the highest polluting sectors, transportation and electric generation. Its goal is to reduce emissions to 80% of 1990 levels by 2050. In this report we discuss global warming and provide an analysis of how S.309 could be implemented if it were passed by Congress. The analysis focuses on the programs required to successfully implement this bill in the first year, from setting caps on emissions by industry through to designing a budget and staffing plan and implementation.

Table of Contents

Executive Summary	3
Section 1. What Is Global Warming?	4
1.1. The greenhouse effect	4
1.2. Why is global warming a problem for the U.S.?	4
Section 2. S.309: The Proposed Solution	6
2.1. U.S. emissions contribution	6
2.2. Reduction targets and programs	6
2.3. Political support and opposition	7
2.4. Development of U.S. climate change legislation	8
2.5. Policy objectives of the bill	8
2.6. Parties to the bill	8
Section 3. Program Design Options	9
3.1. First-year program design summary	9
3.2. Program design options and feasibility analysis	10
3.2.1. Vehicle emissions	10
3.2.2. Standards for electric generation units	11
3.2.3. Renewable energy portfolio	13
3.2.4. Market-based programs	15
3.2.5. Carbon sequestration	16
Section 4. Organizational, Contracting and Staffing Plan	17
4.1. Existing organization	17
4.2. Reorganization and additional units	19
4.3. Impact on the current organization	21
Section 5. Budget Plan	22
5.1. Overview and cost categories	22
5.2. Budget breakdowns	24
Section 6. Performance Management System	25
6.1. Overview	25
6.2 Internal processes	25
6.3 Regulations to draft first	26
6.4 Program design option performance metrics	26
Section 7. Conclusion	32
Appendix 1: Master Calendar (Vehicle Emissions Standards)	33
Appendix 2: References	34

Executive Summary

Anthropogenic (human-caused) global climate change is increasingly acknowledged as *the* environmental issue of our generation. Scientific evidence of the phenomena continues to mount, generating wider consensus in the scientific, policy and business communities. Major changes occurring world-wide including accelerated glacial melts, rising sea levels, and severe weather patterns, continue to remind humans that we can't continue to deposit harmful greenhouse gasses (GhGs), namely carbon dioxide, into the atmosphere without significantly altering Earth's fragile climate system. In its latest report, the Intergovernmental Panel on Climate Change (IPCC) stated,

"Most of the observed increase in globally-averaged temperatures since the mid-20th century is very likely due to the observed increase in anthropogenic GHG concentrations. It is likely there has been significant anthropogenic warming over the past 50 years..."

Observations like these from the world's most renowned climate scientists warrant serious attention. Decisive action must be taken, and globally.

The United States comprises 5% of the world's population, but emits more greenhouse gas pollution than any other country in the world. Eighty-four percent of all anthropogenic carbon dioxide emissions come from the United States (Borger, 2006). However, the U.S. has failed to take action on global climate change, despite a majority of other nations (174) that have ratified the Kyoto Protocol (as of November 2007), thereby recognizing the effects of human-caused global warming, and pledging to reduce their GhG emissions. As the pressure mounts for the world's largest contributor to act, sharply rising GhGs levels continue to assault Earth's climate system.

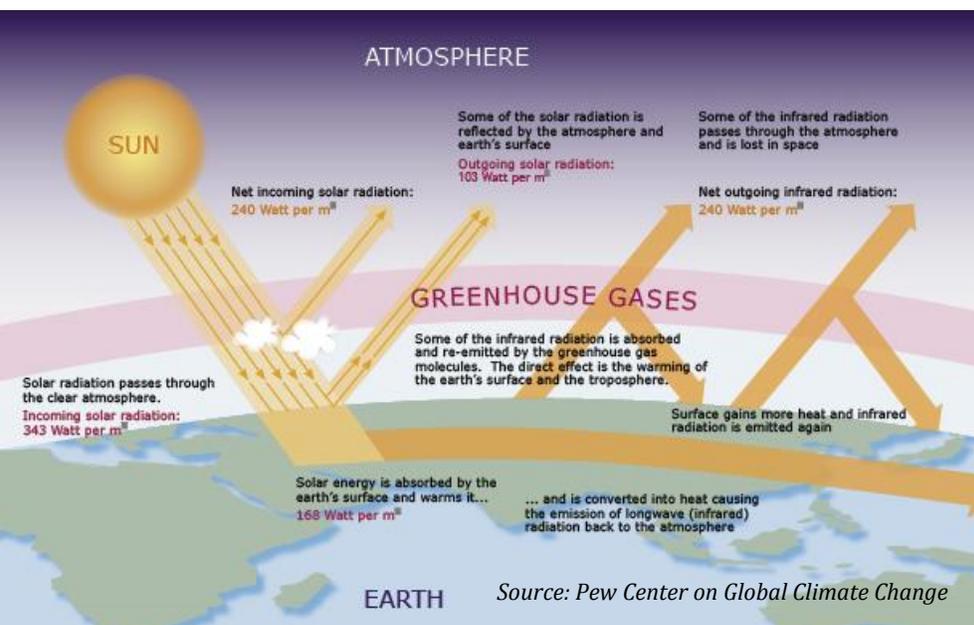
Though the U.S. has not ratified the Kyoto Protocol, the U.S. Congress has taken action in preparation for change. Senators Bernie Sanders (D, Vermont) and Barbara Boxer (D, California) proposed Senate Bill 309 (S.309) in January 2007. This bill, which is one of several aimed at addressing climate change in Congress, aims to incrementally reduce U.S. CO₂ emissions to 80% of 1990 levels by 2050, targets which are aligned with those target levels in the Kyoto Protocol. S.309 would amend the Clean Air Act of 1970 to include CO₂ emissions as a regulated pollutant in the U.S. It proposes to use a combination of programs, regulations and market-based incentives to regulate the greenhouse gas. Considering 68% of emissions in the U.S. come from the transportation and electric generation sectors, S.309 specifically aims to regulate these industries.

This report begins with an overview of global climate change, and then proceeds to provide a roadmap of how S.309 could be implemented if it were passed by Congress. The analysis focuses on steps required to successfully implement this bill in the first year. A section was dedicated to program design options which identifies and analyzes necessary elements to be implemented in the first year, 2008. An analysis was performed by applying a multi-dimensional framework in which political, technological and economic criteria were applied to identify the feasibility of each option. Based on the options, an organization, contracting and staffing plan was developed which identified the staffing needs of implementing S.309 in the first year. We then developed a budget plan to fund the work in 2008, and designed a performance management system to measure the progress of achieving our selected program design. The analyses consider the organizational and political conditions of the EPA, which is the agency tasked with implementing S.309.

Sec. 1: What Is Global Warming?

1.1 The greenhouse effect. The greenhouse effect is a natural process in which shortwave solar radiation enters the earth's atmosphere and is reflected back as long-wave radiation. A portion of this reflected long-wave radiation is absorbed by natural heat trapping gases called greenhouse gases (GhGs), while the balance is emitted back into space. This process maintains livable temperatures on Earth by creating a sort of "blanket" over Earth's surface—without it, Earth could not sustain life. The greenhouse effect keeps Earth's average temperature around 59°F. Without these natural GhGs, Earth's surface temperature would be around 0°F.

Figure 1: The Greenhouse Effect



However, this natural process does not regulate increasing emissions from anthropogenic sources. Since the Industrial Revolution, concentrations of atmospheric CO₂ have increased exponentially. This leads to an enhancement of the greenhouse effect, wherein the increased concentration of greenhouse gasses in the atmosphere traps long-wave solar radiation that would otherwise escape, forcing the global average temperatures to warm, and altering the global climate.

While water vapor contributes most to the natural greenhouse effect, the enhanced greenhouse effect is driven predominately by CO₂, methane, nitrous oxide, hydrofluorocarbon (HFC), and sulfur hexafluoride (SF₆). All greenhouse gasses are different, with varying absorption efficiencies (known as absorptivity) depending on its wavelength: while CO₂ accounts for 80% of total greenhouse gas emissions. Methane, for example, has 21 times the absorptivity of CO₂.¹ Carbon dioxide is emitted primarily from the burning of fossil fuels (oil, natural gas and coal), deforestation and land use changes.

1.2 Why is global warming a problem for the U.S.? The global implications of a global temperature increase are vast, and beyond the scope of this analysis. However, global warming presents several direct threats to American national interests, described here:

¹ S.309 enumerates various "carbon dioxide equivalents," such as methane.

National security. Global warming could increase instability in vulnerable parts of the developing world. Climate change can exacerbate drought conditions, declining food production, disease, water shortages, and problems attendant to displacement of mass numbers of populations, referred to as climate refugees. These disastrous situations can be beyond the capacity of weak and fragile governments and lead to extremist politics. The resulting geopolitical destabilization makes the world less safe and could harm U.S. national security interests.

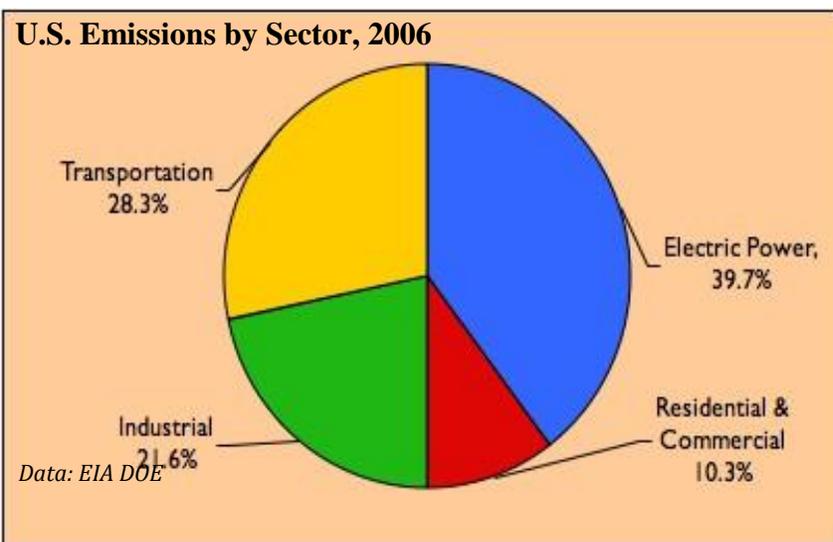
Economy. Global warming could have negative impacts on the United States economy. Significantly affected sectors will include transportation, agriculture, energy, and manufacturing. Severe weather such as hurricanes, flooding, and drought can impose significant costs as the recent experience with Katrina demonstrates. This displacement of large masses of people could mean the overcrowding of inland cities and higher unemployment rates as those displaced seek new locations. Loss of productivity in critical economic sectors could lead to supply shortages, increased unemployment, and decreases in national GDP.

Public health and welfare. Scientists have speculated that increased surface temperature may increase heat wave mortality (particularly in the summer months), especially in more vulnerable populations such as infants and the elderly. More hot days may cause elevated smog levels, leading to increased respiratory problems and incidence of asthma, especially in urban areas. Climate change can also increase levels of pollutants and pollens in the air affecting those with allergies. Higher temperatures lead to more severe storms, such as hurricanes, and to more flooding. More deaths, injuries, and population relocation, particularly along the coastal areas, would be expected. Flooding and drought would also be expected in other regions, such as the western U.S. Higher temperatures could also bring more tropical diseases by expanding the range in which insects can survive to spread infection.

Biological environment. Global warming affects all of the Earth's natural systems, with the potential for catastrophic results. Some effects are already apparent today. Rising ocean levels could displace coastal communities, introduce saltwater into freshwater, and disrupt estuarine ecosystems that filter wastes and provide other benefits. The melting of the polar ice caps and thawing of permafrost and sub-polar and mountain glacier regions are already evident and will contribute to the rise in sea levels, which in turn will enhance global warming. For example, in the United States scientists estimate that the current rate of global warming will leave no glaciers in Glacier National Park by 2030 (Hall et al., 2003). The ice-covered regions reflect incoming sunlight. If they are melted, the oceans absorb more heat. Sensitive ecosystems are already feeling effects of global warming. Increased temperatures in the oceans have damaged coral reefs. Diminished ice in the arctic region has damaged polar bear habitats. Global warming will contribute to a loss of species that are sensitive to temperature and are forced to relocate to a different habitat.

Sec. 2: S.309: The Proposed Solution

2.1 U.S. emissions contribution. The U.S. represents approximately 5% of the world's population yet emits 84% of the world's CO₂ (Borger, 2006). A significant portion of these emissions are associated with high level of GDP and industrial success of the United States. Of all CO₂ emissions in the U.S., 68% comes from the transportation and electric generation sectors (Energy Information Administration, 2005). Hence, any proposed solution by the U.S. to the problem of global warming must address these two sectors, specifically. S.309 is designed to address CO₂ emission from these two sectors.



2.2 Reduction targets and programs. The bill aims to ensure that the average global temperature increase does not exceed 3.6°F (2°C), and that the concentration of global warming pollutants does not exceed 450 parts per million in CO₂ equivalents. To achieve this, the bill sets out aggressive emissions reduction targets as follows:

- 1/3 of 80% of the aggregate net level of 1990 emissions by 2030
- 2/3 of 80% of the aggregate net level of 1990 emissions by 2040
- 80% of the aggregate net level of 1990 emissions by 2050

The bill outlines a number of provisions to reduce CO₂ emissions via a series of programs, regulations and market-based incentives. These programs include the following:

Vehicle emissions standards. The bill directs the EPA Administrator to establish emission standards which U.S. motor vehicle manufacturers must comply with by 2016. The principal requirements are that vehicle emissions standards shall not exceed certain CO₂ equivalents per grams per mile (g/m) depending on the vehicle weight (205 g/m and 332 g/m for automobiles and 405 g/m for vehicles over 8,501 pounds). The approach has worked in the past with other emissions standards regulations, and thus can be effective in reducing CO₂ emissions.

Emissions standards for electric generation units. The U.S. derives 52% of its energy from coal, a fossil fuel comprising one of the largest sources of CO₂ emissions. The act outlines an approach for standards compliance that phases out the use of coal and other polluting fuels. Electric generation units must meet emission standards for new combined cycle natural gas generating units by 2030.

Low carbon generation requirement. Low carbon generation requires specified electricity generators to produce a certain amount of low-carbon energy. Generators with a rated capacity of 25 megawatts and annual energy inputs of 50% or more from coal, petroleum coke, lignite or any combination of these fuels, must produce for sale 5% low carbon electricity by 2020. To achieve emission reduction targets, the EPA is given the right to increase the requirement by up to 2% each year from 2021-2025 and 3% each year from 2026-2030. Compliance with low-carbon requirements can be achieved in one of two ways: 1) generating or purchasing low-carbon electric energy, or 2) purchasing credits pursuant to the Low-Carbon Generation Credit Trading Program. This trading program utilizes market efficiency to reduce emissions.

Renewable portfolio standard. In 2008, all electricity suppliers must provide a percentage of electricity (determined by the EPA) from renewable sources (i.e., solar, wind, biomass, landfill gas, ocean--including tidal, wave, current, and thermal, geothermal, municipal solid waste, or new hydroelectric generation). In addition, to subsidize renewable energy, the EPA will be mandated to establish a renewable energy credit program one year after the enactment of the bill. A key benefit in this approach is development of renewable energy technology and a market force for clean energy generation.

Research and development. The bill will establish a global climate change standards and processes research competitive grant program with the following federal agencies: National Oceanic and Atmospheric Administration (NOAA), National Aeronautics and Space Administration (NASA) and the Department of Energy (DOE). The objective of this program is to: 1) develop enhanced ways to monitor global warming pollution; 2) establish a baseline reference point for future global warming pollutants; and 3) begin an international exchange of information in an effort to develop mutually-recognized measurements. Furthermore, a program aimed at researching abrupt climate change is a priority under this bill. Research and development is a key component of the bill, as it will increase the current state of knowledge technology of clean energy programs.

Carbon sequestration. Carbon sequestration involves the capture and long-term storage of CO₂ in geologic repositories and the terrestrial biosphere. CO₂ generated by point sources such as power plants is separated from other byproducts of energy production, captured and pressurized, and then pumped into geologic formations such as oil and gas reservoirs, coal beds, saline reservoirs, and basalt formations. While there is evidence that carbon sequestration is effective, the impact of a potential leak would have disastrous consequences. Also, sequestration cannot remove existing CO₂ from the atmosphere, as some people believe.

2.3 Political support and opposition. The supporters of this legislation are in favor of it because of the overwhelming scientific consensus, supportive public opinion, and awareness of the potential public health and ecological impacts. Also, many private entities are increasing their support either as an attempt to appeal to public opinion or to plan for the environmental and economic shifts that may occur (McCright and Dunlap 2003).

The opponents of such legislation oppose it because they question the science and believe that carbon dioxide regulation will impair the economy by inhibiting economic

growth. In the past, the argument of economic impact on industry has been used to oppose environmental legislation. However, many businesses are moving to recognize global warming and create adaptive strategies.

2.4 Development of U.S. climate change legislation. S. 309 is an amendment to the Clean Air Act. CO₂, the primary global warming pollutant, was not listed as a pollutant under the Clean Air Act when it was first enacted in 1970. However, on April 2, 2007 the Supreme Court ruled in a 5 to 4 decision that CO₂ is a pollutant that can and in fact, must be regulated by the EPA, in the case *Massachusetts v. Environmental Protection Agency* (2007). This piece of legislation is important in promoting the regulation of CO₂; S. 309 gives authority to the EPA Administrator to reduce CO₂ through incremental reductions.

2.5 Policy objectives. Global warming is a serious problem that must be addressed. Because the U.S. is the largest emitter of CO₂, the U.S. must act to reduce the harmful effects of global warming. This is why the U.S. needs a comprehensive national program to reduce global warming pollution. This policy is incremental in its approach because it is clear it will take a significant amount of time and resources to change the behavior of the U.S. This bill could serve as an approach to global warming pollution for other countries.

2.6 Parties to the bill. S.309 presents an attempt to federally require States to reduce net U.S. greenhouse gas emissions via regulation and research on new technologies. The EPA is the agency responsible for setting standards to reach the emissions targets, and the EPA's Administrator acts to enforce all provisions of the bill. The EPA has a contract with the National Academy of Sciences (NAS), which will study the potential contribution of the non-highway portion of transportation sector emissions. Plans for a carbon sequestration program are to be established by the Secretary of Agriculture. Furthermore, the Securities and Exchange Commission (SEC) is charged with requiring securities issuers to inform investors of the risks associated with global warming. While the EPA Administrator retains most control associated with this bill's implementation, a number of other agencies are incorporated into its implementation including the Department of Energy and individual state governments.

Sec. 3: Program Design Options

The EPA Administrator is required to implement specific provisions of the bill, but is also given considerable discretion in certain areas, e.g. setting timetables for emissions standards. The scope of this analysis is planning for the implementation of the bill in the first year, 2008. Therefore, this section outlines those program design options which we propose to be implemented in the first year only. It does not address the longer term issues delineated in the bill. Of the several items appointed the EPA Administrator, capping of emissions is the only discretionary item covered in the first year.

3.1 First-year program design summary. To reiterate, transportation and electric power generation sectors constitute 68% of all U.S. GhG emissions (EIA, 2005). The bill expressly addresses these sectors, and thus our team developed the program design options around these sectors. In deciding which options to choose, we applied a rigorous analysis of each option using a multi-dimensional framework focused on the technological, political and economic feasibility of each program element. A summary of our analysis follows:

Feasibility Analysis of Design Options During the First Year					
<i>Program Element</i>	<i>Design Option</i>	<i>Technological</i>	<i>Political</i>	<i>Economic</i>	<i>Recommend?</i>
Vehicle Emission	Fuel Efficiency	High	Moderate	High	✓
	Carbon Capture	Low	Low	Low	X
Electric Generation	Renewable Energy	Moderate	High	High	✓
	Cap & Trade Program	High	High	High	✓
Research & Development	Renewable Energy	N/A	High	High	✓
	Sequestration	N/A	High	High	✓

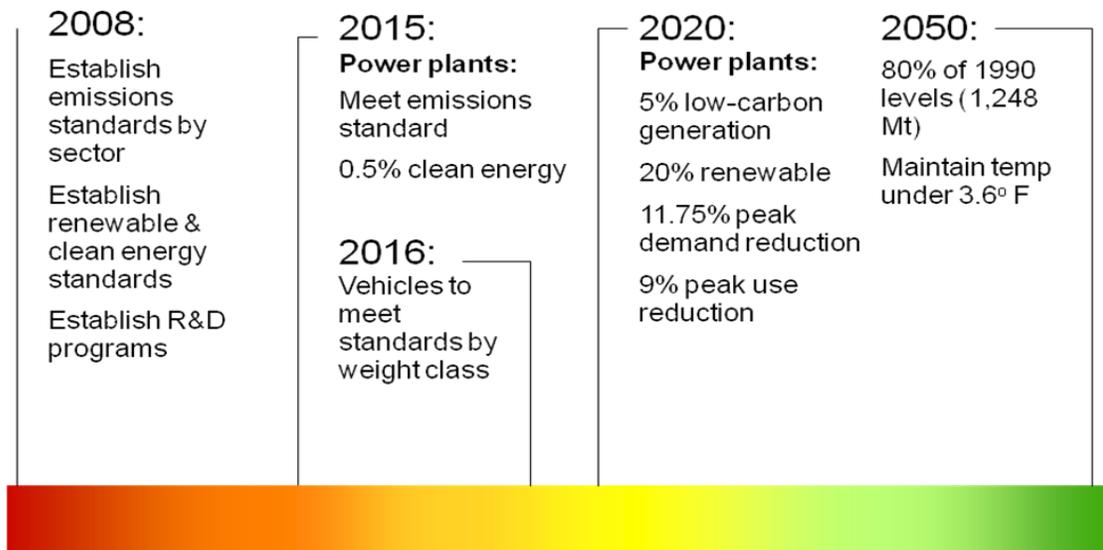
Our first-year recommended design options include:

- ◆ Establishing greenhouse gas emission caps for the automotive and electric generation unit sectors
- ◆ Designing and implementing a national CO₂ cap and trade framework for the electric generation sector and implement the required renewable energy percentage use for electricity generation
- ◆ Allocating the research and development budget between renewable energy and sequestration

First-year implementation of these design options (as mandated by S.309) will involve:

- ◆ Entering into a contract with the NAS for studies regarding lowering vehicle emissions
- ◆ Meeting the following electric generation requirements:
 - 5% electricity sold in the U.S. shall be generated using renewable energy
 - U.S. electricity use shall decrease by 0.25%
- ◆ Establishing 5 grant programs for sequestration study within the first 180 days.

Overall timeframe for implementation



3.2 Program design options and feasibility analysis. The following is a detailed discussion of each program’s design options and feasibility analyses:

3.2.1 Vehicle emissions

Option 1: mandated fuel-efficiency standards: The national government could impose a mandate that all U.S. manufacturers only sell fuel-efficient vehicles per a standard that they would establish by a specified date. Furthermore, the national government could impose a mandate where all new vehicles commissioned or sponsored by a government entity must either be a low emission, fuel-efficient vehicle, using renewable fuels and other kinds of clean technologies.

Feasibility: In general, requiring auto manufacturers to produce more fuel efficient vehicles is politically problematic, due to the reluctance of U.S. auto companies to increase fuel economy standards.

Option 2: national incentive program: In order to assist and support the auto manufacturers in their obligation to produce more fuel efficient vehicles, the national government could set up an incentive program, where consumers have an incentive to purchase more fuel efficient vehicles, including hybrids. The incentive can come in the form of a tax rebate, for example. Automakers will benefit from this because consumers will be more inclined to buy the newer, more fuel efficient vehicles. This incentive program will also help to end backlash from auto manufacturers who may object to having to produce more fuel efficient vehicles. Consumers, too, will benefit from this program by receiving the tax rebate or something similar for purchasing the more fuel efficient vehicles. The national government will also benefit from this program, because the target regulations will stand a better chance of being met.

3.2.2 Standards for Electric Generation Units.

Option 1: electric generation unit emissions cap: The electric power industry is defined in terms of load serving entities (LSE) rather than power plants. An LSE is an organization that is responsible for obtaining and distributing electric power to customers. Examples of LSEs are Con Edison in New York City and Southern California Edison in southern California. LSEs are investor owned utilities, municipal utilities, or private electric service providers. Each LSE would be required to hold emission allowances that cover the emissions associated with the power they deliver to their customers. To comply with its emission limit or cap, each LSE would be required to track/calculate emissions associated with all the electricity it delivers.

Technological feasibility: To implement this option, the electric power sector must track/calculate emissions associated with all power generation through the market to its eventual delivery. No such tracking/calculating system currently exists. Methodologies for tracking/calculating these emissions would need to be developed.

Political feasibility: The government currently has regulatory authority, via various state public utility commissions, over investor-owned utilities and municipal utilities. With its existing authority, the various state public utility commissions could require all investor-owned utilities and municipal utilities to limit their total GhG emissions associated with the power they deliver to their customers. New regulatory authority would need to be obtained so that the government could also have authority over private electric service providers; this would give the government regulatory authority for CO₂ emissions over all LSEs nationwide and allow the government to require all LSEs to comply with the emissions cap program.

Economic feasibility: To implement this option, the electric power sector must operate under a total GhG emissions cap. Therefore, all electric utilities nationwide could buy and sell emissions credits from each other in an attempt to meet the overall emission cap. An

outside consultant would be hired in the first year to develop an economic impact analysis based on different cap scenarios. Refer to Cap and Trade in this report.

Option 2: energy-efficient building codes: Energy-efficient building codes and product standards mandating maximum allowable levels of energy consumption could be required for all new federal, state, and local government projects and all projects even partially funded by these governments. Therefore, this could include all universities, schools, libraries, etc. that received any funding from the government. The building codes could require development and redevelopment utilizing only products and technologies that would result in a *LEED* certified development. See www.usgbc.org for more information on *LEED*.

Technological feasibility: To implement this option, the construction of or redevelopment of all government and government-funded buildings would be required to incorporate *LEED* standards. This *LEED* system currently exists and has been implemented already as policy in local government jurisdictions and universities that receive state government money (i.e., City of Santa Monica and the University of California system).

Political feasibility: The government currently has regulatory authority over its own projects and projects it funds. With its existing authority, the various government jurisdictions could require all developers of their projects to limit utilize *LEED* building standards. No new regulatory authority would need to be obtained to require all new government-related development to comply with the *LEED* building regulation.

Economic feasibility: To implement this option, government-related buildings must be constructed using *LEED* building standards. *LEED* building materials and standards currently cost more than non-*LEED* equivalents. However, on such development projects, government jurisdictions typically partner or are sponsored in whole financially by a private developer who is a proponent of the project. Thus, the higher costs of green building could often be passed onto private developers seeking land use and zoning approvals for their developments in the associated government jurisdiction.

Research & development. In order to more effectively and efficiently reduce global warming pollutant emissions from electric generation units, further research and development is required with regard to:

- tracking/calculating of emissions associated with electricity distribution
- best use of renewable energy and in what combination to produce electricity

Feasibility Potential for Electric Generation Unit Emission Options		
	Option 1: Electric Generation Unit Emissions Cap	Option 2: Energy-Efficient Building Codes
Technological Feasibility	Moderate	High
Political Feasibility	Moderate	High
Economic Feasibility	High	Moderate

3.2.3 Renewable Energy Portfolio

Option 1: foster generation of solar energy in public buildings: Following the procedural guidelines of Sec. 204 of the Energy Policy Act of 2005, a photovoltaic energy commercialization program for the procurement and installation of photovoltaic solar electric systems in public buildings could be established. This program would include federal, state and local government buildings, as well as any buildings funded by these governments.

**In the case of private buildings, the Department of Energy shall establish program providing rebates for consumers for expenditures made for the installation of a renewable energy system in connection with dwelling unit or small business (Energy Policy Act, 2005).*

Technological feasibility: Solar energy technology is available in the form of photovoltaic cells, which have a 25-year warranty, but should be fully functional after 30-40 years. Cells require protection from the environment, but they can operate with little maintenance after initial setup. Total peak power of photovoltaic cells is expected to continue to increase, meaning that they may generate more megawatts (MW) than they currently do. It is important to take into account that solar electricity is not available at night and may be unavailable due to weather conditions, so complementary power systems would be required until better energy storage capacity is developed.

Political feasibility: By establishing a photovoltaic energy commercialization program for the procurement and installation of photovoltaic solar electric systems in public buildings, the government would lead by example the promotion of solar energy use. The promotion of this program may be supported by the DOE, through the Office of Energy Efficiency and Renewable Energy.

Economic Feasibility: Selling prices of photovoltaic cells are too high to compete with fossil-fuel generation, so in order to implement this option the cost of solar energy needs to decrease. However, declining manufacturing costs in the last decade and the possibility of

setting private-public partnerships with manufacturers expand the possibilities of successfully implementing this option.

Option 2: enhance the wind energy program actions: The main goal of the Wind Energy Program, one element of the U.S. DOE Wind and Hydropower Technology Program (WHTP) under the Office of Energy Efficiency and Renewable Energy (EERE), is to produce almost 1,000 billion kilowatt hours (KWh) per year by 2050, representing approximately 50% of all new electric generation resulting from the different generation technologies in the EERE portfolio. This would result in 75 million metric tons carbon equivalent savings annually, of 15% of the expected carbon reductions for all EERE programs (Wind Energy Multi-Year Program Plan, U.S. Dept. of Energy). The program actions include improving the efficiency and lowering the costs of conventional wind turbine technologies and developing new small-scale wind technologies for use in low-speed wind environments.

Technological feasibility: Wind energy is mainly used to provide energy to rural residences or grid-isolated locations. Transmission infrastructure limitations hinder the use of high-quality wind resources located far from demand centers. In order to implement this option, investments in the proper infrastructure need to be made.

Political feasibility: Unclear regulatory approval processes at the federal, state and local levels complicate and raise the costs for the development of wind projects. Another limitation is the perceived impact of wind turbines on avian and bat populations at some sites, concerning some environmental groups. In order to implement this option, regulations on wind energy need to be reviewed and information sessions with opposition groups should take place.

Economic feasibility: Although wind energy can be installed at a good site for prices lower than conventional technology, generally, new technology must be available at a cost significantly lower for the market to openly accept it because of the perceived higher risk of new technology. Although the cost of energy from wind is comparable to new conventional technologies, the rising costs associated with wind energy development require further reductions of between 10% and 20% of the total system cost to allow wind to develop to its full potential. Depending on budget availability, important investments in wind energy generation would be required in order to implement this option.

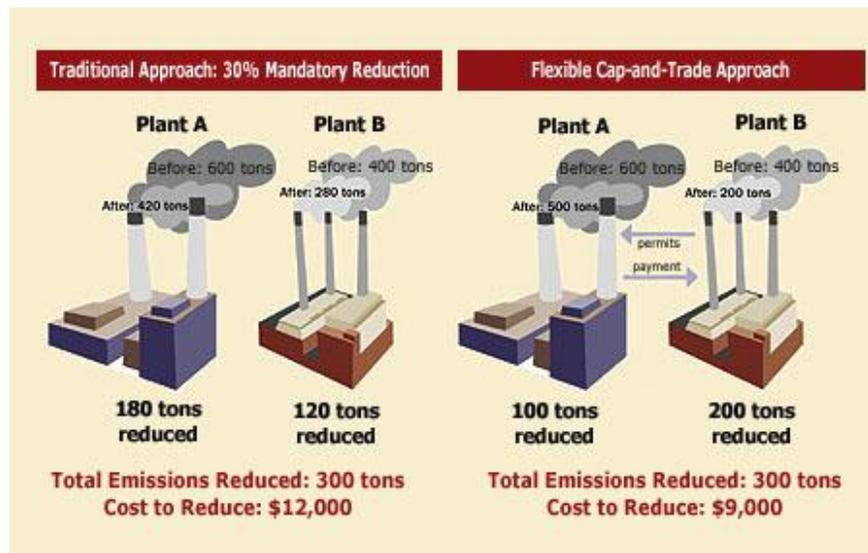
Research and development Many corporations and institutions are currently developing ways to increase the practicality of solar power. Much of the research and development on solar energy is being conducted by private companies, while colleges, universities and institutes also work on solar-powered devices. Nonetheless, in order to achieve this goal, more funding has to be directed to research.

Feasibility Potential for Renewable Energy Portfolio Options		
	Option 1: Solar Energy Generation in Public Buildings	Option 2: Enhance Wind Energy Program Actions
Technological Feasibility	High	High
Political Feasibility	Moderate	Moderate
Economic Feasibility	Moderate	Moderate

3.2.4 Market-Based Programs

Defined in section 704, market-based strategies are those that place absolute limits on the aggregate net global warming pollution emissions of one or more sectors of the economy, while allowing the transfer or sale of emission allowances. The limits on the amount of emissions allowed are called “caps,” and so this strategy is often referred to as “cap-and-trade.” Caps are set by a regulatory agency for a classification of sources such as electricity generating power plants. As permits to emit are distributed, restricting pollution allowed, rights to pollute take on a monetary value. Permits may be bought and sold between emission sources. Those regulated who can control emissions cheaply will sell their allowances to those who find reducing emissions more costly.

Drawing on power of the marketplace, cap and trade arrangements create financial incentive for emissions reductions. The EPA contends cap-and-trade programs can yield dramatic reductions in pollution, higher levels of compliance and accountability, flexibility for compliance, compatibility with state and local programs in place, efficient use of government resources, and significant environmental benefits (EPA 2007). Also, experts believe this is the cheapest route for all parties to emissions reductions.



Options: If pollution allowance permits are to be allocated and then traded, we need to determine the basis on which permits will be distributed. Permits can be auctioned off, grandfathered, or a combination of both. Furthermore, the number of permits issued via auction or otherwise will be critical to the success or failure of any national program—the

European Union's Emissions Trading Scheme ran into trouble when too many permits were distributed, causing the price of permits to fall and little to no reductions in pollution. Because the range of options is so vast, this report does not devise any potential schemes for distributing permits. This will be decided by the EPA if the bill is passed as it stands, but will most likely undergo congressional debate prior to being enacted. Such is the case with the pending Liberman-Warner Bill, which proposes similar measures to S.309. While economists generally argue for greater auctioning of permits, and utility companies would prefer grandfathered permits, the International Emissions Trading Association (IETA) is calling for greater use of offsets as opposed to auctioned permits (Feldman, 2007). They argue that the rigorous approval process provided by offsets will ensure greater environmental integrity than will auctioning. In all likelihood, any emissions trading program will have some combination of these methods so as to satisfy all the parties involved. In addition, others argue for a carbon tax, rather than a cap and trade system.

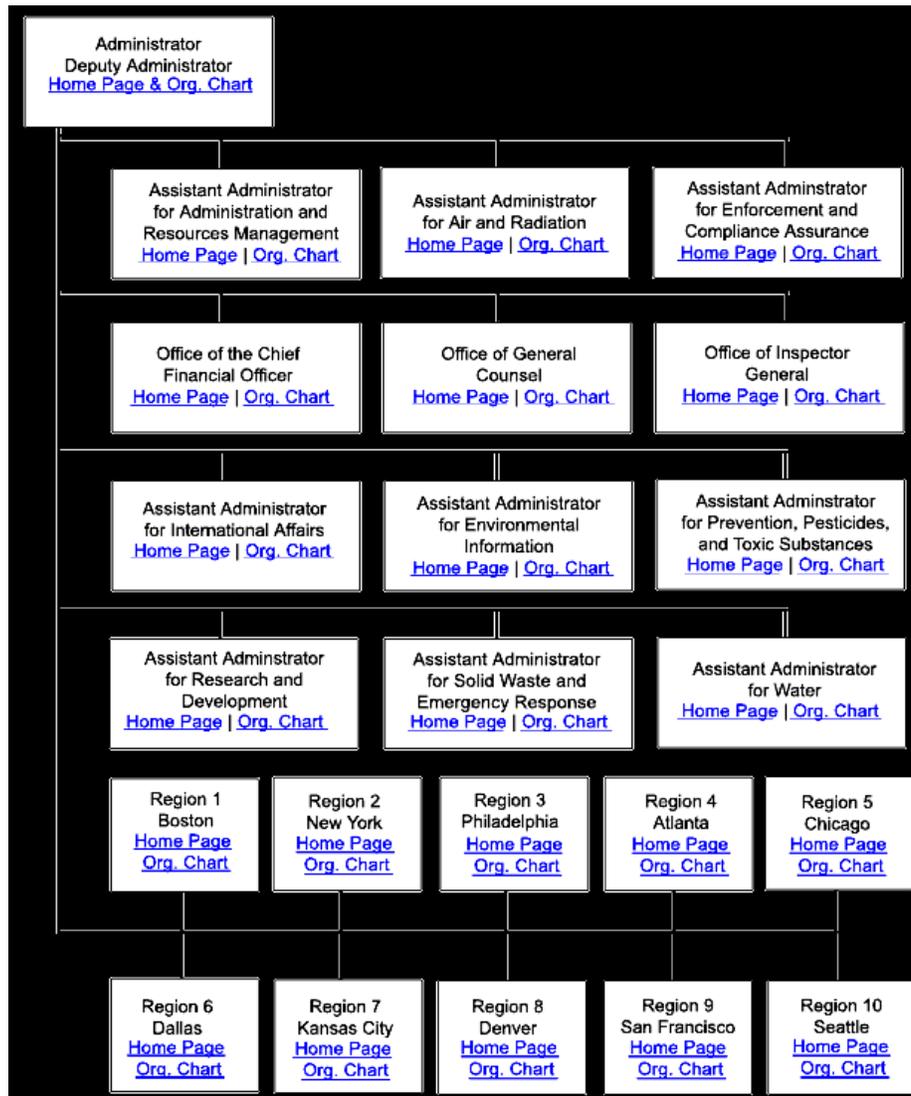
3.2.5 Carbon Sequestration

Geological carbon sequestration involves the capture of CO₂ from point sources to prevent its release into the atmosphere and storage of the captured CO₂ in some type of reservoir. Storage of CO₂ can include storage in underground aquifers, tanks, or oceans and ocean beds. The process involves capturing CO₂ at the source, transportation of the CO₂ via a pipeline into a storage unit, and injection of the CO₂ into an underground geological reservoir. In S. 309 sequestration is referred to as 'geological disposal of global warming pollutants' though it only addresses the global warming pollutant CO₂. For geological sequestration, S.309 proposes a program that would provide grants for different entities to plan and perform their own carbon sequestration projects. S.309 does not offer any other policy options in regards to geological sequestration that go beyond research and development for the first year, so we will simply encourage a research and development program. This analysis details that program, but does not provide any further program design options.

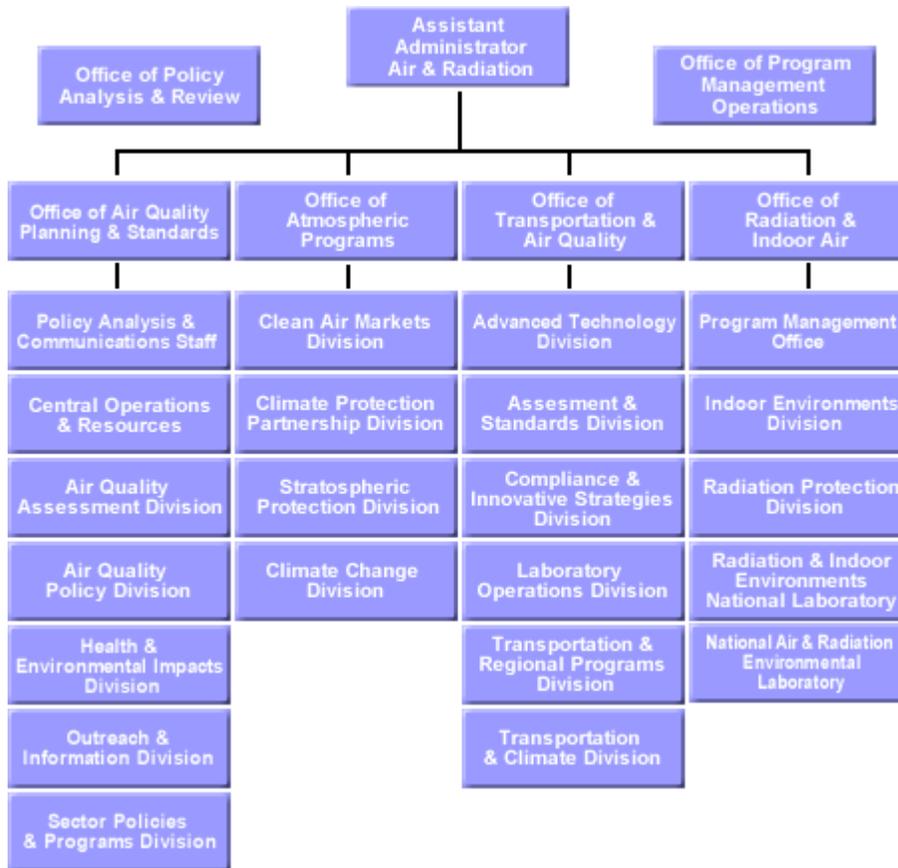
Research and development. Under S. 309 a competitive grant program will be established in which applicants will propose their own CO₂ capture and storage projects, of which 5 will be chosen as grant recipients. The purpose of this program is to better understand and further develop sequestration techniques through these capture and storage projects. It is also hoped that a better understanding of the technology will help reduce the costs associated with sequestration technology. Grant recipients will receive funds for a maximum of five years, and shall publish their findings.

Sec. 4: Organizational, Contracting and Staffing Plan

4.1 Existing organization. To create an organizational, contracting, and staffing plan for the selected design options, we first look at the existing organizational structure of the EPA:



The group carrying out implementation of S.309 will be located under the Assistant Administrator for Air and Radiation. The following chart represents the current organizational structure for the Office of Air and Radiation (OAR):



The current organizational structure of the EPA is hierarchical. The Administrator is the head of the EPA oversees all offices. There is also a Deputy Administrator who is second in command under the Administrator. Currently, there is a division within the Office of Atmospheric Program’s that current works on climate change issues in the U.S. The specific division within this office is the Climate Change Division. Below are descriptions of the functions of each unit:

Office of Atmospheric Programs (OAP): “Over the past decade, OAP has become a world leader for its work on market based programs such as the Acid Rain Program and public/private partnership programs such as ENERGY STAR. Our programs to protect the ozone layer, address climate change, and improve regional air quality have resulted in billions of dollars in health benefits annually, and thousands of lives saved.” (Air & Radiation website, U.S. EPA).

Climate Change Division of OAP: “U.S. EPA’s Climate Change Division works to assess and address global climate change and the associated risks to human health and the environment. We play a key role in U.S. and international efforts to address climate change by:

- Implementing successful voluntary programs to reduce non-CO₂ and CO₂ emissions,

- Analyzing rigorously CO₂ and non-CO₂ GhG emissions and economically efficient reduction, sequestration, and adaptation options,
- Communicating climate analyses and strategies to policy-makers, experts and U.S. climate negotiators,
- Building effective international capacity to analyze and reduce GHG emissions and associated air pollution, and
- Educating the public on climate change.” (Climate Change website, U.S. EPA)

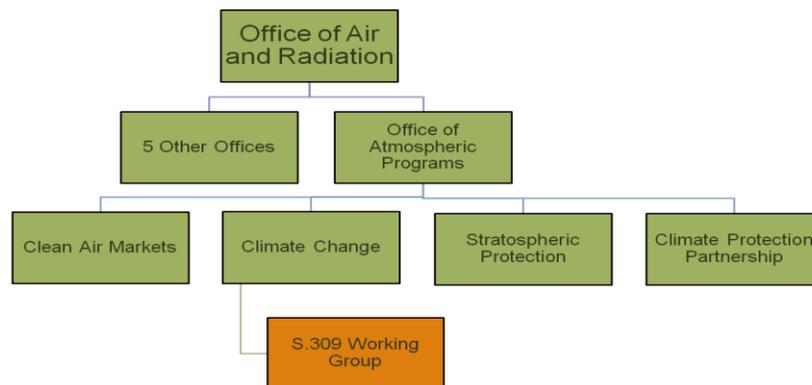
4.2 Reorganization and additional units. The implementation of S.309 requires adjustments in the current EPA organization to foster greater efficiency and align existing functions. Changes to existing organization arrangements is required in order to improve work flow and communication. Some departments will not expand in numbers but will expand it scope of work, according to the legislation. New staff members need to be incorporated quickly and cooperate with existing EPA employees to accomplish first year implementation goals.

S.309 Working Group. This group will utilize the current organizational structure of the EPA by taking advantage of existing units that are aligned with the goals of S.309. This organizational approach reduces redundancy and fosters more efficient use of resources. The purposes of the group will be to implement the provisions of S. 309 within the first year, and guide the EPA through the initial objectives setting.

S.309 Interagency Board. Considering the complexity of the bill, a high level of coordination is required. The Interagency Board will meet twice a year to direct the work of the S.309 Working Group. It will ensure that all participating agencies know their roles, establishing accountability. The board will facilitate much needed partnership between the agencies involved in implementation.

Consultants. Outside consultants will be hired to perform the analyses needed to design the emissions caps. The consultants will perform the required economic impact and technical feasibility analyses and will make recommendations to the S.309 working group on how to establish sector emissions caps.

Proposed Organizational Chart

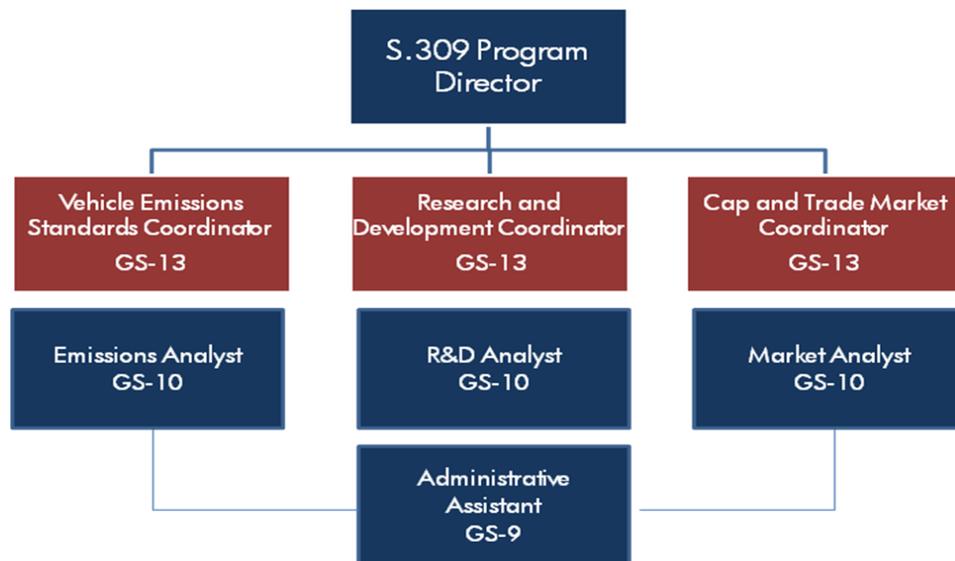


This diagram illustrates the addition of the S. 309 Working Group to the Climate Change Division of the OAP, within the OAR.

S.309 Working Group members

- Assistant Administrator for Air and Radiation Representative
- Clean Air Markets Division Representative
- Climate Protection Partnership Division Representative
- Stratospheric Protection Division Representative
- Climate Change Division Representative
- Four full-time employees: GS 15, 14, 13, 11.
- Each employee leads one sub-group: Vehicle emission standards, research and development, cap and trade
- 3 to 4 full-time managerial employees
- Employees are in charge of all managerial tasks for the Working Group

Proposed S.309 Working Group Organization



Structure of the S. 309 Working Group. Operating as an organizational unit within the CCD, the S. 309 working group will have eight employees. This includes a Program Director (GS-15), three Deputy Coordinators (GS-13's), three Analysts (GS-10's) and an Administrative Assistant (GS-9). All workers except for the Deputy Coordinators will be full time employees. Each Coordinator will be shared with one other office, making them half time employees.

The three Coordinators are to function as liaisons between the Program Director and the Analysts. They will be responsible for organizing, managing and channeling information

flow. Meanwhile, the Analysts will work closely with external consultants, reporting to their designated Coordinator. Each of the three pairs of Coordinators and corresponding Analysts will oversee one of the three primary program elements requiring action in the first year of the implementation. The Administrative Assistant shall aid the flow of pertinent information between the three Analysts.

The first Coordinator-Analyst pair will oversee the Vehicle Emissions Standards element of the program. They will evaluate options with respect to increasing fuel efficiency and potential methods of carbon capture. This pair must also oversee the establishment of GhG emission caps for the automotive and electric generation unit industries. The second Coordinator-Analyst pair will oversee the Research and Development element of the program. In their first year they are to allocate the research and development budget between renewable energy and sequestration. This pair is to facilitate the establishment of five grant programs for carbon sequestration study within the first 180 days of the legislation's passing. Finally, the third Coordinator-Analyst pair will oversee the Cap and Trade element. Working closely with consultants, the pair will develop and implement a cap and trade framework for the electric generation industry as well as implement required renewable energy percentage use within electricity generation.

S. 309 Interagency Board members

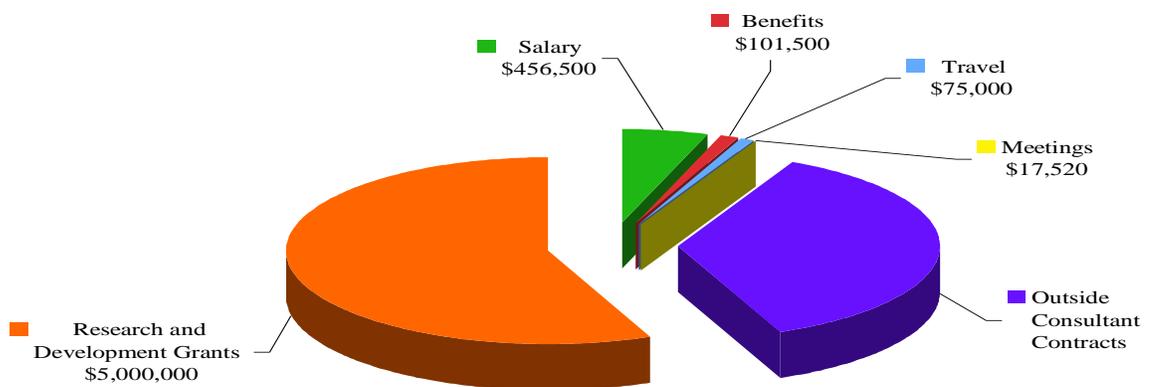
- EPA Administrator
- Science Advisory Board representative
- Assistant Administrator for Air and Radiation
- Department of Energy representative
- National Academy of Sciences representative
- NOAA representative
- NASA representative

4.3 Impact on the current organization. Staff members placed in the Working Group will work part-time only in the working group and will maintain current duties. There is the possibility for strain during this initial transition period. The added staff members (borrowed staff members) will add expert experience. There will be minimal structural impact, due to the similar staffing scheme. There will likely be a synergistic approach to S.309 implementation because of the coordinated effort between the Interagency Board and the Working Group. The one year contract with the consulting firm will bring constructive feedback to the group, in the form of a request for proposals (RFP) analysis and other analyses.

Sec. 5: Budget Plan

5.1 Overview and cost categories. The budget plan outlined herein delineates major objectives in the first year of the recommended program design and connects them with costs. The plan delineates budget allocations that are necessary in the program's inaugural fiscal year. These costs will likely vary in future years.

Total budget: \$8,850,520



Administrative costs. Administrative costs constitute a negligible part of the budget since the Working Group staff is to be housed within the office space of the Office of Air and Radiation Safety. The cost of finding office space is absorbed by EPA's General Allocation Budget. Information Technology such as computers and printers, as well as General Office Supplies including desks and chairs can also be absorbed by the General Allocation Budget.

Inter-Agency Board meeting. Two meetings will be held in the first year of S.309 Work Group. The initial meeting shall take place upon the inception of the Work Group in order to establish program direction, goals, and refine expectations for S.309 Work Group staff positions. The second meeting is required six months after the birth of the S. 309 Working Group to collaborate between the eight Federal Agencies in communicating research & development findings, summarize on the development of Vehicle Emissions standards and Cap & Trade standards, and disseminate information to all eight Federal agencies on the next steps of action for implementing the S. 309 legislation. Inter-Agency Board meetings will convene once a year thereafter.

The entire Working Group staff is expected to attend the two-day conference which includes rental of conference space, meals, travel, and hotel accommodations for Board Members if necessary. Including conference space rentals, food and additional expenses, **both Inter-Agency Board Meetings are budgeted at \$17,520.**

Salaries and compensation. The following five new full-time employee (FTE) positions are created: Program Director, Vehicle Emissions Analyst, Research & Development Analyst, Cap & Trade Market Analyst, and Administrative Assistant. The yearly salaries are based on their pay grade from G9 - G15. Benefits, which include medical insurance and fringe benefits, are calculated by taking 22% of the base salary. Yearly Salary + Benefits = Total Compensation or total cost of each position.

There will also be three part-time positions, Vehicle Emissions Coordinator, Research & Development Coordinator, and Cap & Trade Market Coordinator. Persons who assume these part-time positions are shared from the OAR staff already in other Coordinator positions. Each of these yearly salaries will be half of G13 + 22% of salary.

Travel between Regional EPA Offices, and for additional training. Working Group staff members are allotted monies to travel to EPA regional offices to maintain communication amongst programs and maintain contact with contractors. Travel monies can also be used to receive additional training, attend meetings, or improve personal development skills. This includes airfare, lodging, food, etc.

Contractual agreements (consulting firm). A substantial amount of development and research will be conducted by an outside firm contracted by EPA to perform a variety of duties in the formation of S.309 policy and structure. Drafting of regulations, policy and impact analyses, development of compliance monitoring systems, and development of a national renewable energy market program will all be tasked to the outside contract firm. Expenses from such a contract will be substantial, and difficult to predict from the outset of the program. For the first calendar year, **S.309 has budgeted \$3.2 million for contractual work**, with the realization that this number may change dramatically in subsequent years.

Research and development. S.309 states that the EPA shall develop and distribute requests for proposals for new research and development projects to be conducted by outside agencies in the first year after implementation of the bill. Five projects will be approved by the S.309 Work Group, in consultation with an outside strategic contractor, with each award being for the amount of \$1 million. As such, **R&D budget for calendar year 2008 is in the amount of \$5 million.**

5.2 Budget breakdowns

Salary and Compensation

Position	Salary	Benefits	Total Compensation
Program Director	\$118,000	\$26,000	\$144,000
Vehicle Emissions Coordinator	\$85,000 x 0.5= \$42,500	\$9,500	\$52,000
Research & Development Coordinator	\$85,000 x 0.5= \$42,500	\$9,500	\$52,000
Cap & Trade Market Coordinator	\$85,000 x 0.5= \$42,500	\$9,500	\$52,000
Vehicle Emissions Analyst	\$54,000	\$12,000	\$66,000
Research & Development Analyst	\$54,000	\$12,000	\$66,000
Cap & Trade Market Analyst	\$54,000	\$12,000	\$66,000
Administrative Assistant	\$49,000	\$11,000	\$60,000
Totals	\$456,500	\$101,500	\$558,000

Travel breakdown

<u>Position</u>	<u>Travel days</u>	<u>Budget allotted</u>
Program Director	50	\$25,000
Program Coordinators	(3) 20	\$30,000
Analysts (3)	10	\$15,000
Administrative Assistant	10	\$5,000
Travel Total:		\$75,000

Sec. 6: Performance Management System

6.1 Overview. A performance management system is a management tool to guide the EPA so that S. 309 and its program design options are being carried out. The performance management system focuses on answering: 1) how do we know how well we are doing? and 2) how can we do better? The performance management system is designed measure progress. The performance management system involves four components which interact in a constant cycle. This cycle is applied to both internal and external work processes. The four components include:

1. *Goal Setting and Action Planning* to identify goals and targets, establish standards and regulations, and identify indicators of success for program design option to show whether the program is being effective.

2. *Measurement* helps define inputs, refine indicators, and develop a data base system to keep track of indicator status and share information.

3. *Collection and Reporting Progress* develops a regular reporting cycle and provides information back to managers, staff, and policy makers.

4. *Feedback Quality Improvement* details if the process is working or not and identifies how often and who information is reported to while also using data to improve policies, programs, and outcomes.

6.2 Internal processes. In order to for the S. 309 Working Group to apply the performance management system internal processes need to be established to facilitate reporting and communication. The following detail four major processes including their goal, method to reach the goals and indicators of success. These components will help track the progress implementation of the program design options:

S. 309 Working Group Meetings

Goal: Ensure progress is being made for all goals and targets

Method: Weekly Meetings with Project Coordinators and every 2 weeks with Director

Indicators of Success: Meeting minutes and a weekly Progress Report sent to Director

Intergovernmental Board Meetings

Goal: Strategy, Reporting and Advising

Method: Biannual meeting with Intergovernmental Board

Indicators of Success: Internal Communication and feed back to S. 309 Working Group

S. 309 Knowledge Track Database

Goal: Compile industry standards, regulations, new technologies, contact information and best practices from around the country for access by S. 309 Working Group staff

Method: Compiled by analysts and managed by administrative assistant

Indicator of Success: Monthly report; Yearly evaluation

Employee Evaluation System

Goal: Link employee performance to overall objectives and goals

Method: Meetings with superior

Indicator of Success: Quarterly performance reports; Yearly evaluation

6.3 Regulations to draft first. Before many of the program design options can take action, regulations and standards must be established. These official targets are part of the first step of the performance management system of setting goals and targets. Regulations are needed before making measurements of progress. Regulations should be drafted for three main areas:

1. Electric generation unit regulation for a cap and trade program
2. Vehicle emission and auto mileage regulations
3. Renewable energy standards

Tracking the progress of new regulations is an important element of overall performance management. The process involves analyzing the options, proposing solutions, drafting regulations, reviewing, revising, and finally publishing a proposed rule in the Federal Register, accept comments and then issue a final rule (Developing regulations website, U.S. EPA). This process can take months to years to complete. The review, revise and propose components will occur several times within the EPA before being proposed externally to the Federal Register or going to the Executive Office of the President. For example, a drafted regulation may be sent multiple times to the Office of General Counsel within the EPA and sent back for more revisions before being sent to the White House.

6.4 Program design option performance metrics. The performance management system can apply to each of the program design options: 1) Vehicle emissions – Fuel Efficiency 2) Electric Generation Units – Cap and Trade Program and Renewable Portfolio 3) Research and Development – CO₂ Sequestration. Since each of these programs is unique and works with multiple government departments beyond the EPA, tracking their progress is especially important. The following section will cover each of the program design options focusing on measurement, collection, reporting and feedback that help track their progress and measure their success.

Vehicle emission-fuel efficiency. S.309 proposes to employ vehicle emission standards to achieve global warming pollution emission reductions. With regards to vehicle emission standards, S. 309 Section 707 of the bill establishes regulations be promulgated by the Administrator for each fleet of automobiles sold by a manufacturer in the United States beginning in model year 2016 to meet emissions standards.

MEASUREMENT	COLLECTING	REPORTING	FEEDBACK
% Hybrid vehicles	Consultant will collect from EIA quarterly	Project Coordinator	Encourage subsidies
Auto Mileage Regulation proposed	Consultants will draft standards, and revise in first year	S. 309 Director	Consult with Transportation and Air Quality and DOT
Auto emissions	EIA monthly reports	Project Coordinator	Non-compliance will be enforced with regulations
Manufacturer design and safety reports	Consultant will collect and monitor industry compliance monthly	S. 309 Director	Keep on track for 2016 compliance

Electric Generation Units – cap and trade and renewable portfolio. Based on the generation and consumption by fuel type the EPA, jointly with the EIA, will be able to measure the percentage of renewable energy generated and sold to consumers. The US government, through different departments and agencies, will foster the use of renewable energy generation and consumption such as solar and wind energy. This is in order to achieve 5% of energy sold to consumer originating from renewable sources in the first year, especially within the electric sector.

According to the EPA, fossil fuels are the dominant source of energy in the United States, and CO₂ is emitted as a product from their combustion. Useful energy, however, is generated in the United States from many other sources that do not emit CO₂ in the energy conversion process, such as renewable and nuclear sources. Energy-related CO₂ emissions can be reduced by not only lowering total energy consumption (e.g., through conservation measures) but also by lowering the carbon intensity of the energy sources employed and increasing the percentage of renewable energy.

The overall carbon intensity of the U.S. economy is dependent upon the quantity and combination of fuels and other energy sources employed to meet demand of all sectors. In order to estimate CO₂ emissions the EPA, supported by the EIA, allocates them based the following methods:

1. CO₂ emissions from fossil fuel consumption: CO₂ emissions depend on the source of energy and its carbon intensity. The amount of carbon in fuels varies significantly by fuel type.
2. End-use sector consumer: This method allocates emissions associated with electricity generation to the sectors in which it is used. Four end-use sectors were defined: industrial, transportation, residential, and commercial. This method of distributing emissions assumes that each sector consumes electricity generated from an equally

carbon-intensive mix of fuels and other energy sources. After the end-use sectors are discussed, emissions from electricity generation are addressed separately.

3. Transportation end-use sector: Using this allocation method, the transportation end-use sector accounted for approximately 33 percent of total CO₂ emissions from fossil fuel combustion, the largest share of any end-use economic sector. Almost all of the energy consumed in the transportation sector was petroleum-based, including motor gasoline, diesel fuel, jet fuel, and residual oil.

Cap and trade. In order to achieve the provisions outlined in S.309, the Work Group will establish market caps on emissions in order to incrementally decrease global warming pollution emissions from utilities providers over the next 40 years. The Cap and Trade Analyst will pair with government contractors in order to identify and develop realistic targets for achieving emissions reductions industry-wide. After emissions targets have been identified, credits will be issued across the utilities industry. Generators will be required to hold an equivalent number of credits equal to their pollution production. Those who emit more than their allocated credits are required to buy additional credits from the market. Generators that emit less than their allocated credit limit can sell their credits on the market for profit. The amount of credits issued by the S.309 Working Group will decline over time in order to reduce overall emissions in compliance with S.309.

MEASUREMENT	COLLECTING	REPORTING	FEEDBACK
Price performance offset credits	Analyst will monitor price of emissions credits daily, and will report monthly	Analyst will report quarterly to the Project Deputy	Price is an excellent indicator of market performance- high price=not enough credits, low price=too many
Compliance of emissions generators	Consultant will monitor industry compliance monthly based on Emission collection	Consultant will report to Program Director on a quarterly basis	Non-compliance will be addressed with strict fines
Emissions reduction	Consultant will establish cap level in order to achieve emissions reduction goals in regulations	Consultant will report to Program Director on a quarterly basis	Cap level will be set annually, with credits removed from the market in order to meet emission targets

Renewable portfolio. S. 309 proposes to meet incremental minimal annual percentages of generated renewable energy, starting with a 5% of all electricity sold to consumers in the U.S. in 2008-2009 and reaching a 20% by 2020.

Likewise, S.309 establishes that not later than one year after the date of enactment of this title, the Administrator shall establish a Renewable Credit Program to issue, establish the value of, monitor the sale or exchange of, and track renewable energy credits; and penalties for any retail electric supplier that does not comply with this section.

MEASUREMENT	COLLECTION	REPORTING	FEEDBACK
KW/h produced from renewable sources	Power plants monthly reports of renewable energy produced	Program Coordinator of Working Group	Encourage tax credits for production of renewable energy
Total number of power plants producing renewable energy	DOE, through the Energy Information Administration, annual report		
New renewable energy power plants	DOE annual record of power plants		Penalties for producers who do not achieve required percentage of renewable energy (5% in the first year)
Solar panels installed in homes	DOE, through the Office of Energy Efficiency and Renewable Energy, annual report; and solar cells industry annual sales reports		

Research and development – CO₂ sequestration. First-year implementation will include establishing five grant programs for sequestration study and allocating the research and development budget between renewable energy and sequestration.

Program goals and program design

Inputs: effort by Working Group, NAS Advisor and Scientific Advisor to create application criteria for grant program; Peer Committee effort to review applications; establishment of mechanism to ensure data are published; establishment of standards (site selection, permitting processes, monitoring requirements, public participation); Materials and supplies: Meeting space and materials for advisors and committee, computers and other communication equipment, data on geology and sequestration, website for applicants and government, database for PMS

Outputs: application criteria, dissemination of grant applications (RFPs), selection of peer review committee, publishing mechanisms, standards established, meetings of review committee, meetings of Working Group and scientific advisors, program website

Outcomes: applications received, peer review committee recommends top 5 projects, top 5 applications meeting all criteria are selected, data are published, standards codified and adhered to, projects are funded for 5 years,

Impact: geosequestration technology and safety are improved

Performance indicators:

- Number of meetings of scientific advisors

- Selection criteria approved by scientific advisors
- Number of grant applications received
- Number of premier institutions/researchers submitting applications
- Level of agreement of peer review committee in selection of top 5 projects
- Number of publications resulting from funded projects
- Number of publications citing data/articles from funded projects
- Level of project adherence to codified standards
- Temporal progression of selected projects
- Number of safety infractions or hazardous events
- Amount of CO2 sequestered
- Efficiency (economic and energy) of sequestration per ton CO2

Data collection system for research and development

Sources of data:

- EPA Working Group
- Scientific Advisors
- Grant Applications
- Peer Review Committee comments and selection ranking
- Progress reports submitted by funded projects
- Staff research of journal citations
- Random Audits for standard adherence
- Emergency response actions and reported safety infractions
- Metering of tons of CO2 sequestered at project sites
- Metering of energy usage and cost per ton of CO2 sequestered

Compile and analyze data:

- Working Group Staff collects and manages data
- Checklist for progress reports
- Input and analysis of all relevant data in PMS Database

Reporting method

Frequency: scientific advisors report once initially and ad-hoc as needed, peer review committee reports once, progress reports from funded projects every 4 months, twice per year & random site visits and reports by EPA staff, Emergency response teams report on any events, CO2 meters feed data directly and continuously into PMS database

Recipient of reports: All reports received by EPA Working Group Staff

MEASUREMENT	COLLECTION	REPORTING	FEEDBACK
Application criteria for grant program	Created by NAS and Scientific Advisors	To S.309 R & D Staff	NAS approval unmet, criteria revised by scientific committee
Dissemination of grant applications (RFPs)	R & D S. 309 Staff	S. 309 Director and R&D Coordinator	Applications not disseminated within 180 days, priority status assigned
Number of applications received	R & D S. 309 Staff	R&D Coordinator	Very low numbers, resend RFPs to wider group, extend application deadline
Level of agreement of peer review committee in selection of top 5 projects	Peer review committee and R & D S. 309 Staff	S. 309 Director and R&D Coordinator	Low level of agreement, bring committee together to report on ranking
Amount of CO2 Sequestered	Funded projects	S. 309 Director	Standards in grant guidelines unmet, funding not extended
Energy and economic efficiency of sequestration per ton CO2	Funded projects	S. 309 Director	Minimum standards from guidelines unmet, funding not extended

Sec. 7: Conclusion

Government action is needed to reduce the U.S. contribution of greenhouse gas emissions. The current Clean Air Act is not sufficient to reduce emissions, as there has not been any evident decrease in emissions over the last decade. Emissions continue to increase, which will further increase the Earth's surface temperature.

The economic marketplace, including consumer conduct and industry performance, is not producing sufficiently aggressive steps to reduce CO₂ emissions. Although many individuals and businesses have made voluntary efforts, the majority of them have not. While some entities have implemented programs since 1992 to respond to the UN Framework Convention on Climate Change, they have yet to show any success in reducing or even stabilizing total U.S. emissions. Technologies have improved. However, the need for greater efficiency has been outpaced by higher demand caused by population growth, economic expansion and changing consumer preferences. Government action is needed to stimulate the broad engagement that will be necessary to achieve the level of emissions reductions that will ultimately be required. The government has the capacity to regulate industry generally to reduce CO₂ emissions and to set standards reaching all sectors.

The government has a duty to protect its citizens' public health and welfare. Global warming is having a negative impact on all sectors of society, and action is necessary to prevent more extreme threats from happening. The United States contributes more emissions than any other country to the world's global warming problem. For the common good of our Earth, the U.S. government needs to take the lead in fighting this global environmental problem. The United States alone cannot solve this problem but is central to any long-term strategy which will require international agreements and "sustained global action and investment over many decades" (Pew Center on Global Climate Change, 2006).

Upon the enactment of S. 309, Global Warming Pollution Reduction Act, a concrete plan to reduce U.S. greenhouse emissions is imminent and feasible. As the details of this report indicates, first year implementation is very possible and practical.

Appendix 1: Master Calendar

Below is an example of a master calendar for the vehicle emissions group. Similar schedules would be implemented for the various components of S.309.

Task	Responsible	J	F	M	A	M	J	J	A	S	O	N	D
		Vehicle Emissions Group											
Task 1: Contracting													
1.1 Compile list of Consultants/Analysts	Division Analyst				■								
1.2 Issue Rfps	Division Coordinator				■								
1.3 Receive and Review Rfps	Division Coordinator				■	■							
1.4 Issue invitations to chosen contractors	Division Coordinator						■						
Task 2: Analyses of Lowering Vehicle Emissions													
2.1 Meet with Contractors to Discuss Goals	Entire Division						■						
2.2 Work directly with Analysts to determine implications of lowering vehicle emissions	Division Analyst							■	■	■			
2.3 Meet with Industry Representatives	Contracted Analysts/Divisions Analyst									■			
2.4 Review and Report findings to Program Director/ Interagency Board	Division Coordinator										■		
Task 3: Draft Vehicle Emissions Regulations													
3.1 Draft Regulations Proposal	Division Coordinator										■	■	■
3.2 Submit Draft for Review	Division Coordinator												■

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