

Testimony of Michael Goo
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Before The Subcommittee on Energy and Air Quality
Committee on Energy and Commerce
United States House of Representatives
Hearing On
Legislative Proposals to Reduce Greenhouse Gas Emissions: An Overview

June 19, 2008

Thank you for the opportunity to testify today regarding global warming legislation.

My name is Michael Goo. I am the Climate Legislative Director of the Natural Resources Defense Council (NRDC). NRDC is a national, nonprofit organization of scientists, lawyers and environmental specialists dedicated to protecting public health and the environment. Founded in 1970, NRDC has more than 1.2 million members and online activists nationwide, served from offices in New York, Washington, Los Angeles and San Francisco, Chicago and Beijing.

Chairman Boucher and Ranking Member Upton, thank you for holding this hearing on legislative proposals to reduce greenhouse gas emissions. We look forward to working with the Energy and Air Quality Subcommittee and the full Energy and Commerce Committee, including Chairman Dingell and ranking member Barton, to enact comprehensive global warming legislation as soon as possible.

The time for action on global warming has already been delayed too long. Every day we learn more about the ways in which global warming is already affecting our planet. Recent satellite pictures show that summertime arctic ice has declined by 40 percent since 1979 (Figure 1). The UN Intergovernmental Panel on Climate Change (IPCC) found that 11 of the past 12 years are among the 12 hottest years on record. The Greenland and West Antarctic ice sheets are losing mass at accelerating rates. Rising sea surface temperatures correlate strongly with increases in the number of Category 4 and 5 hurricanes. Increases in wildfires, floods and droughts are predicted to occur as global warming continues unabated. Our oceans are warming and becoming more acidic. Everywhere one looks, the impacts of a disrupted climate are confronting us.

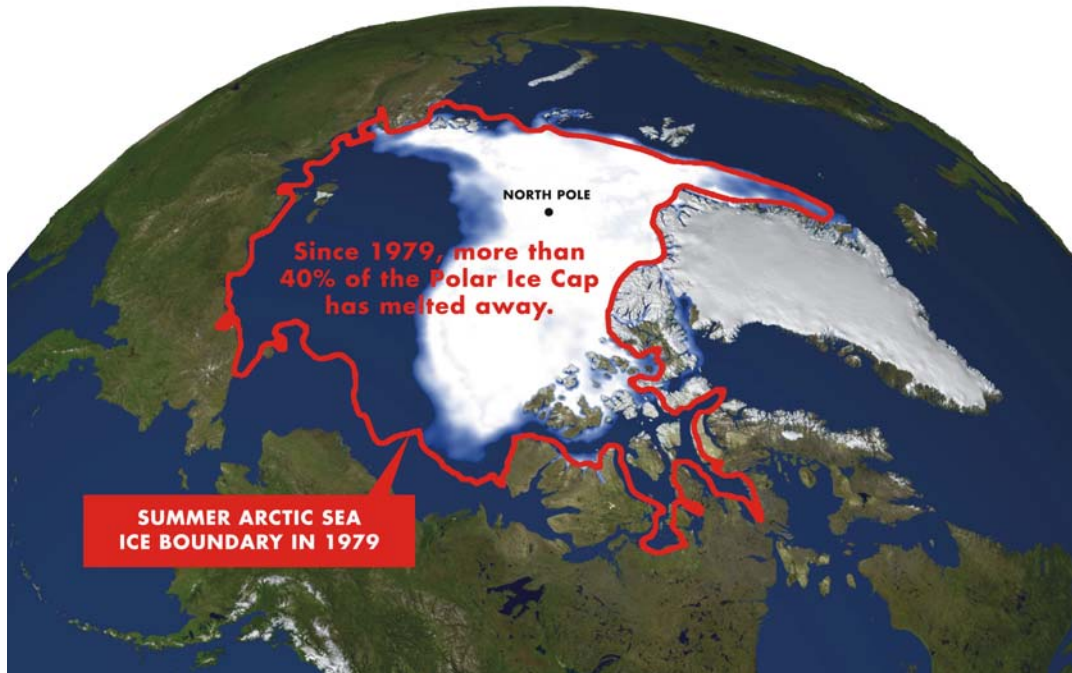


Figure 1: ARCTIC MELTDOWN - Arctic summer sea ice extent in 1979 and 2007.
Source: NASA.

Climate scientists warn us that we must act now to begin making serious emission reductions if we are to avoid truly dangerous global warming pollution concentrations. Because carbon dioxide and some other global warming pollutants can remain in the atmosphere for many decades, centuries, or even longer, the climate change impacts from pollution released today will continue throughout the 21st century and beyond. Failure to pursue significant reductions in global warming pollution now will make the job much harder in the future—both the job of stabilizing atmospheric pollution concentrations and the job of avoiding the worst impacts of a climate gone haywire.

Since the start of the industrial revolution, carbon dioxide concentrations have risen from about 280 parts per million (ppm) to more than 380 ppm today, and global average temperatures have risen by more than one degree Fahrenheit over the last century. A growing body of scientific opinion has formed that we face extreme dangers if global average temperatures are allowed to increase by more than 2 degrees Fahrenheit from today's levels. We may be able to stay within this envelope if atmospheric concentrations of CO₂ and other global warming gases are kept from exceeding 450 ppm CO₂-equivalent and then rapidly reduced. However, this will require us to halt U.S. emissions growth within the next few years and then cut emissions by approximately 80 percent over the next 50 years.

This goal is ambitious, but achievable. It can be done through an annual rate of emissions reductions that ramps up to about a 4 percent reduction per year (see Figure 2). But if we delay and emissions continue to grow at or near the business-as-usual trajectory for another 10 years, the job will become much harder. In such a case, the annual emission reduction rate needed to stay on the 450 ppm path would double to 8 percent per year. In short, a slow start means a crash finish, with steeper and more disruptive cuts in emissions required for each year of delay.

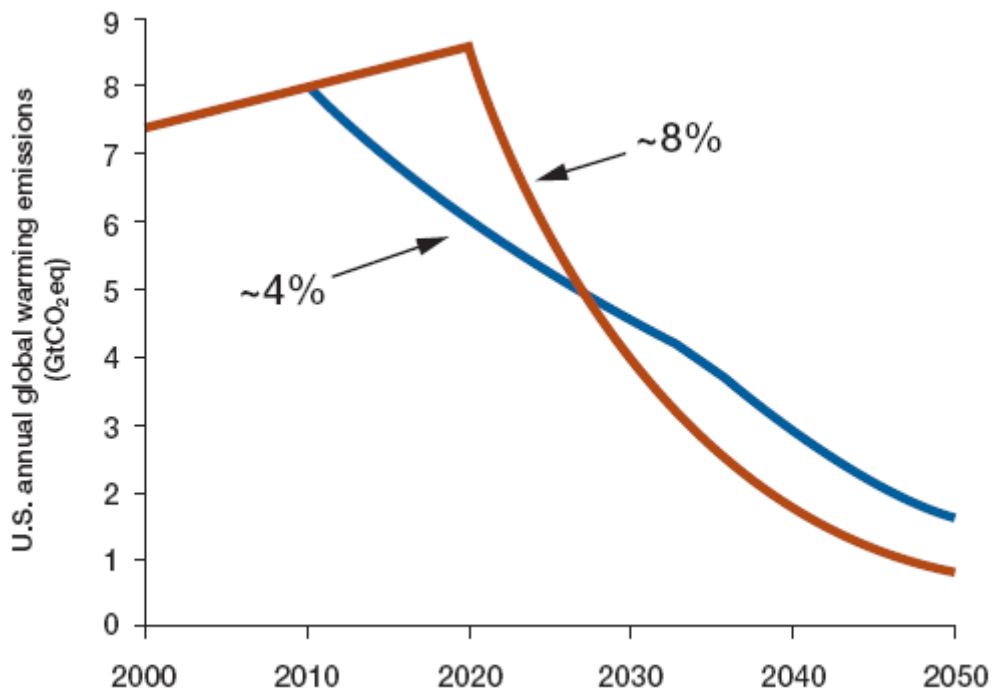


Figure 2: SLOW START... CRASH (OR BURN) FINISH

Source: Union of Concerned Scientists.

It is critical to recognize that continued investments in old technology will “lock in” high carbon emissions for many decades to come. This is particularly so for the next generation of coal-fired power plants. Power plant investments are large and long-lasting. A single plant costs around \$2 billion and will operate for 60 years or more. If we decide to do it, the United States and other nations could build and operate new coal plants that return their Carbon dioxide to the ground instead of polluting the atmosphere. With every month of delay we lose a piece of that opportunity and commit ourselves to 60 years of emissions. The International Energy Agency (IEA) forecasts that more than 20 trillion dollars will be spent globally on new energy technologies between now and 2030. How this money is invested over the next decade, and whether we will have the proper policies in place to drive investment into cleaner technologies, which can produce energy from zero and low carbon sources, or that can capture and dispose of carbon emissions, will determine whether we can realistically avoid the worst effects of global warming.

In short, we have the solutions – cleaner energy sources, new vehicle technologies and industrial processes and enhanced energy efficiency. We just lack the policy framework to push business investments in the right direction and to get these solutions in the hands of consumers.

Costs of Inaction

The claim that climate protection is “too expensive” treats it like a discretionary expense – perhaps like a luxury car or exotic vacation that is beyond this year’s budget. No harm is done by walking away from a high-end purchase that you can’t quite afford.

But if we walk away from climate protection, we will be walking into danger. Unless we act now, the climate disruption will continue to worsen, with health, economic, and environmental costs far

greater than the price of protection. Scholars and economists have only begun a serious assessment of the costs of inaction but it is clear from their work that it is climate disruption, *not* climate protection programs, which will wreck the economy.

The Stern Review, sponsored by the British government and directed by Sir Nicholas Stern, formerly the chief economist at the World Bank, estimated that 5 percent of world economic output would be lost, given a narrowly defined estimate of economic damages. Add in an estimate for environmental damage and for the increased chance of an abrupt climate change catastrophe, and Stern’s estimates of losses from climate disruption climb to 11 percent or more of world economic output.

A recent report released by researchers at Tufts University, commissioned by NRDC, builds on the Stern Review and presents two ways of estimating the costs of inaction to the United States, both leading to staggering bottom lines¹. A comprehensive estimate, based on state-of-the-art computer modeling, finds that doing nothing on global warming will cost the United States economy more than 3.6 percent of GDP - or \$3.8 trillion annually (in today’s dollars) - by 2100.

In addition, a detailed, bottom-up analysis finds that just four categories of global warming impacts -- hurricane damage, real estate losses, increased energy costs and water costs -- will add up to a price tag of 1.8 percent of U.S. GDP, or almost \$1.9 trillion annually (in today’s dollars) by 2100.

Costs and damages for the four detailed categories cited in the report if global warming continues include:

- Hurricane damages: \$422 billion
- Real estate losses: \$360 billion
- Increased energy costs: \$141 billion
- Water costs: \$950 billion





The Global Warming Price Tag in Four Impact Areas, 2025 through 2100					
	Cost in billions of 2006 dollars				U.S. Regions Most at Risk
	2025	2050	2075	2100	
 Hurricane Damages	\$10	\$43	\$142	\$422	Atlantic & Gulf Coast states
 Real Estate Losses	\$34	\$80	\$173	\$360	Atlantic & Gulf Coast states
 Energy-Sector Costs	\$28	\$47	\$82	\$141	Southeast & Southwest
 Water Costs	\$200	\$336	\$565	\$950	Western states
	\$271	\$506	\$961	\$1,873	

Figure 3: Cost of Inaction

Source: NRDC, available at <http://www.nrdc.org/globalWarming/cost/contents.asp>

Authors: Frank Ackerman and Elizabeth A. Stanton, *Tufts University*

¹ See Ackerman, Frank A., and Elizabeth A. Stanton, *Climate Change and the U.S. Economy: The Costs of Inaction*, March 2009 <http://www.nrdc.org/globalwarming/cost/contents.asp>.

Global warming is already melting sea ice and glaciers that will contribute significantly to sea level rise. Sea level is expected to rise 23 inches in 2050 and 45 inches by 2100, with grave impacts expected for the Southeastern U.S. By 2100, an estimated \$360 billion per year will be spent on damaged or destroyed residential real estate in the United States as a result of the rising sea levels inundating low-lying coastal properties. The effects of climate change will also be felt in the form of more severe heat waves, hurricanes, droughts, fires, and other erratic weather events—and in their impact on our economy's bottom line.

Inaction on climate change also increases the chance of an abrupt, irreversible catastrophe, which would be much worse than the predictable costs of inaction discussed above. This point is emphasized in the Stern Review, and the economic analysis behind it is supported by recent research by Harvard University economist Martin Weitzman². The collapse and complete melting of either the Greenland or West Antarctic ice sheets would cause sea levels to rise by 20 feet or more, causing devastation of coastal cities and regions where a large fraction of the American population lives. No one can say for certain at what temperature this will occur, but it becomes more likely as the world warms. We are taking a gamble, where the stakes are unbelievably high and the odds get worse the longer we stay on our current course.

In the future, global warming will cause drastic changes to the planet's climate, with average likely temperature increases of as much as 13 degrees Fahrenheit in most of the United States and 18 degrees Fahrenheit in Alaska over the next 100 years. This will change the nature of where Americans live. By 2100, New York City will feel like Las Vegas does today and San Francisco will have a climate comparable to that in New Orleans. In 2100, Boston will have average temperatures similar to those in Memphis, Tennessee today.

No sensible person bets his or her home on a spin of the roulette wheel. But inaction on climate change is betting the only home humanity has. Who knows, we might get lucky and win the bet; a few scientists still doubt that hurricanes are getting worse. But the consequences of a bad bet are enormous. Without arguing that Katrina was "caused" by global warming, the misery it caused the people of Louisiana and Mississippi and the continuing economic turmoil it produced are wake-up calls that show how much harm a disrupted climate can produce.

A catastrophe, such as 20 feet or more of sea level rise, is not certain to occur; we don't know enough today to say how quickly we may lock in these catastrophic events with current emission paths. But homeowners buy fire insurance, although they are not likely to have a fire next year; healthy young parents buy life insurance to protect their children, although they are not likely to die next year. The most catastrophic dangers from climate change are so immense that even if we believe

² See, e.g., "On Modeling and Interpreting the Economics of Catastrophic Climate Change," (November 2007), where Weitzman argues that conventional cost-benefit analyses of climate change are misleading because they ignore nontrivial risks of genuine disaster. "Standard conventional cost-benefit analysis (CBA) of climate change does not even come remotely close to grappling seriously with this kind of potential for disasters. When CBA is done correctly, by including reasonable probabilities of (and reasonable damages from) catastrophic climate change, the policy implications can be radically different from the conventional advice coming out of a standard economic analysis that (essentially) ignores this kind of potential for disasters." <http://www.economics.harvard.edu/faculty/Weitzman/papers/Modeling.pdf>

the chance of catastrophe is small, it is irresponsible to ignore them. Taking action against climate change is life insurance for our home planet, needed to protect everyone's children.

Costs and Benefits of Action

The debate on global warming in Washington has turned decisively from "Is it a problem?" to "What are we going to do about it and how much is it going to cost?" In fact, we can't afford *not* to solve global warming. Economic analyses of the cost of reducing global warming pollution do not attempt to tally the benefits of preventing global warming. As the studies just discussed make clear, the costs of inaction are likely to swamp the costs of reducing emissions.

Even considering only the direct economic implications, it is clear that action to reduce global warming pollution presents opportunities as well as costs, as recognized by the business and environmental leaders that have formed the US Climate Action Partnership. We need only look to California as a prime example of how aggressive implementation of climate friendly energy efficiency measures has been accompanied by strong economic growth.

Due to these measures, California's per capita electricity consumption has been level over the last 30 years while that of the US as a whole has steadily increased. Per capita electricity consumption in California is now more than 40 percent lower than in the rest of the country. Meanwhile, from 1990 to 2005 the California economy grew by more than 50 percent in real terms, an average annual growth rate of 2.9 percent³. And from 2003-2006 California has had an average annual real growth rate of 4 percent, while nationally the growth rate was 3.1 percent per year⁴.

The results of recent economic studies analyzing the costs of global warming cap and trade bills have shown that we can cut our global warming pollution substantially in a manner that is affordable for consumers and the US economy as a whole⁵. A number of agencies and organizations have made forecasts of the economic impacts of the Lieberman-Warner Climate Security Act (CSA), which was reported from the Environment and Public Works Committee on December 5, 2007 and considered on the floor of the Senate during the week of June 2, 2008.

The most important result from these studies of that particular bill is that, regardless of whether the study is a peer-reviewed academic or government analysis, or a non-peer reviewed industry-backed forecast, one prediction is the same: per capita household income (as measured by per capita gross domestic product, or GDP) will not decrease from today's levels. In fact, *all of the projections forecast robust economic growth and increasing household incomes*, despite the limits on global warming pollution contained in the CSA⁶. The most pessimistic GDP projection, from the Energy Information Administration (EIA), predicts GDP increasing by about 73.5 to 74.4 percent between

³ California Department of Finance, http://www.dof.ca.gov/html/FS_DATA/STAT-ABS/TABLES/d1.xls

⁴ Bureau of Economic Analysis, U.S Department of Commerce <http://www.bea.gov/national/xls/gdplev.xls>.

⁵ See NRDC Fact Sheet "Forecasts Of the Economic Effects of Climate Change Legislation: What Can We Conclude?" Available at http://www.nrdc.org/legislation/factsheets/leg_08060201A.pdf

⁶ See "Cutting Global Warming at Low Cost with the Lieberman-Warner Climate Security Act" http://www.nrdc.org/legislation/factsheets/leg_08051401A.pdf; and "New Department of Energy Study Shows Limit on Global Warming Pollution Compatible With Robust Economic Growth," <http://www.nrdc.org/media/2008/080430.asp>.

2007 and 2030. The business-as-usual projection (i.e. growth without climate policy) for this study is growth of 74.9 percent.⁷

Thus, macroeconomic cost analyses of the Lieberman-Warner bill suggest that climate change regulation can be enacted at little cost. Even the most pessimistic studies predict only modest decreases in GDP *growth* (as opposed to decreases in current GDP levels), and all the studies exclude the costs of inaction, which will likely greatly exceed these costs. Further, when provisions in recently enacted energy legislation (EISA) and proposed climate legislation are included in cost analyses, reductions in GDP growth are almost imperceptible.

All of the cost analyses predict continued economic growth, and ignore benefits, but it is still important to examine what drives the smaller versus larger estimates. Some of the ways in which the higher cost estimates differ from more realistic estimates include:

- **Higher cost forecasts do not model critical provisions in the Energy Independence and Security Act of 2007 (EISA) and in the Climate Security Act and make arguments that contradict more than 30 years of experience with environmental regulations.**

In contrast, the lowest cost estimates have the most extensive accounting for EISA and CSA provisions, and make assumptions that are consistent with the historical record. In reviewing the cost estimates predicted from regulating sulfur dioxide (SO₂) under the Clean Air Act, the Congressional Research Service (CRS) noted that *all* estimates (by government and industry alike) were significantly higher than the program's actual costs, and were "essentially the product of models' failure both to fully incorporate the flexibility that a cap-and-trade program provided participants and to employ sufficient imagination to explore the potential for technological breakthroughs and enhancements." In this regard, the high-end cost estimates for CO₂ regulation are *worse* than those made for SO₂: they fail to account for numerous provisions in EISA and CSA that augment technological innovation, a feature that did not accompany SO₂ regulation. More precisely,

- **High-cost studies assume low-carbon alternative energy sources will not advance**, such as carbon capture and sequestration (CCS), renewables, or energy efficiency, despite dramatic increases in research and development (R&D) spending, more stringent fuel economy standards (CAFE) for passenger cars and light trucks, higher efficiency standards for appliances and lighting, higher efficiency requirements for government buildings, requirements for reduced carbon content of fuels, increased funding for energy efficiency programs, and expanded rebates and incentives to consumers for purchasing low-carbon sources of energy and more efficient appliances.

To give just one illustration of the importance of these provisions, during its first 10 years of implementation, the Climate Security Act would invest \$13 billion to help domestic vehicle

⁷ These figures are for 2007 to 2030, whereas the figures given in NRDC's Fact "Forecasts of the Economic Effects of Climate Change Legislation: What Can We Conclude?" are from 2011 to 2030.

manufacturers retool their facilities to build advanced technology vehicles⁸. In comparison, the Department of Energy currently spends between \$200 and \$400 million dollars per year on advanced vehicle and hydrogen fuel R&D.

With regard to employment, high cost studies forecast dire consequences. Again, unrealistic assumptions are needed to reach these results:

- **High-cost studies ignore the jobs that will be retained and created in producing and installing low-carbon technologies**, despite the provisions in EISA and CSA discussed above. Again, history serves as a guide: prior to SO₂ regulation, millions of lost jobs were forecasted by industry that never materialized.

High cost studies also predict dire consequences for household energy costs. To arrive at this result,

- **high-cost studies assume energy efficiency measures that are currently cost-competitive with fossil fuels will not be increasingly adopted.** This assumption is based on the premise that consumers, firms, and the government are currently using all available cost-effective energy efficiency measures, i.e., there is no waste in energy consumption patterns. But experts in energy efficiency find significant opportunities for energy efficiency improvements that are not now widely used due to various market barriers. A recent report by McKinsey & Company, supported by several major energy companies and others, found that almost 40 percent of the abatement required by 2030 could be achieved at “‘negative’ marginal cost.” These costs are shown in Figure 4 below. All of the reduction strategies that are below the line represent strategies like energy efficiency that actually save money.

⁸ For a more complete description of the technology provisions in the CSA see “The Climate Security Act is an Investment in America’s Clean and Independent Energy Future,” http://www.nrdc.org/legislation/factsheets/leg_08052701A.pdf.

firms moving to developing countries for their weaker environmental regulations. The explanation is simple: labor cost differences overwhelm any potential regulatory cost differences for nearly all firms. For example, labor accounts for roughly 70 percent of production costs in the United States, sometimes dwarfing wages in China by a factor of 20 to 1.

With the recent run up in oil and gasoline prices, there have been suggestions that global warming legislation will lead to increased household transportation fuel costs. NRDC's analysis suggests otherwise⁹. Under the Lieberman-Warner bill, household transportation fuel bills in 2020 and 2030 are likely to be lower than today's bills even as oil companies are required to purchase emission allowances. Total transportation fuel bills are what matters to household budgets, not the price per gallon of gasoline.

NRDC estimates that under the Lieberman-Warner bill, the average household will pay 7 percent to 16 percent less for transportation fuels in 2020 than they did in 2007, depending on the future price of oil¹⁰. As a result, the average household's total transportation fuel bill will be \$230 to \$530 lower in 2020 than it was in 2007. Total fuel costs drop due to more fuel efficient vehicles and (in the higher savings case) the decrease in oil prices forecast by the U.S. Energy Information Administration (EIA). For a sensitivity case, we estimated the savings if oil prices did not drop from 2007 average levels although the current AEO2008 predicts a drop. The average household still pays about 7 percent less in total transportation fuel bills in 2020, or a decrease of \$230.

For 2030, we use EIA's world oil price forecasts and estimate that the average household will pay 18 percent to 25 percent less for transportation fuels under the CSA than they did in 2007, depending on the price of emission allowances. As a result, the average household's total transportation fuel bill will be \$590 to \$805 lower in 2030 than it was in 2007¹¹.

Even if base gasoline prices do not fall from 2007 levels (which AEO2008 forecasts), households will still see their fuel bills drop significantly. If base gasoline prices do not drop from 2007 levels, the reduction in gasoline consumption due to a more energy efficient vehicle fleet and greater use of electricity is more than sufficient to outweigh the increase in fuel costs due to addition of the carbon allowance on the base price.

To demonstrate this, we ran a sensitivity analysis of household bills assuming that the base gasoline price without the carbon allowance price addition stays at the 2007 average level of \$2.77 per gallon. The average household still pays about 12 percent to 19 percent less in total fuel bills in 2030, or a decrease of \$390 to \$600¹².

Increases in household energy bills have also been a concern. However, even under the most extreme assumptions, EIA forecasts show that *relative to annual household income*, households will experience *relief* from today's home energy bills. The reason for this is that annual household

⁹ See NRDC Fact sheet: "Household Transportation Fuel Bills and the Climate Security Act" available at http://www.nrdc.org/legislation/factsheets/leg/_08061201A.pdf

¹⁰ Id.

¹¹ Id.

¹² Id.

incomes are projected to increase by more than 70 percent by 2030, which is far greater than any increases in energy bills.

In EIA's core case, energy bills are actually expected to be *lower* than today's bills. And while it is true that under extreme assumptions they will be higher, under any set of assumptions *the percentage of a households' income devoted towards energy bills declines*. Figure 5 shows that under the core EIA policy case, the percentage of a households' income devoted toward home energy bills declines 34 percent by 2020 (from 3.1 percent today to 2 percent in 2020), and 45 percent by 2030 (from 3.1 percent today to 1.7 percent by 2030). ***But for even the most unlikely scenario, the burden is still reduced:*** the percentage of a households' income spent on energy is 23 percent less in 2020 and 27 percent less in 2030.

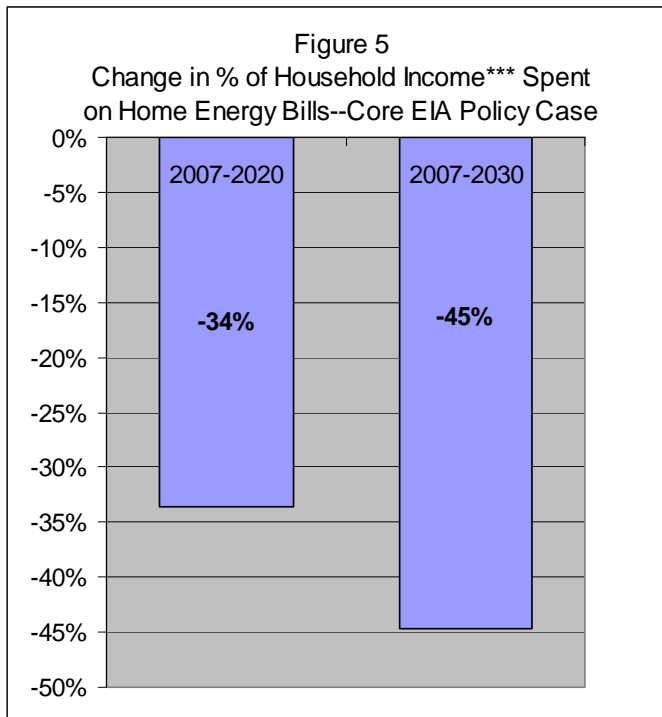


Figure 5: Annual household income was estimated by taking current average annual household income and growing it at the rate of GDP growth projected in EIA's Core CSA Case

Source: NRDC analysis using EIA data.

We should also note the assumptions required for the extreme case are unrealistic: 1) in contrast to proposed legislation, no international offsets are allowed to meet compliance standards; 2) Carbon capture and storage (CCS) technology is not available by 2030, despite generous proposed subsidies for its development and deployment; and 3) biomass power plant additions are limited to AEO2008 Reference Case level, despite significant proposed increases in subsidies for biofuel research and development. Because these assumptions are contrary to actual policies that would accompany emissions reduction requirements, NRDC finds the extreme case implausible.

The above projections are anything but the cataclysmic claims made by some opponents of climate legislation. But the picture might be even more positive, if one assumes an optimistic technological path.

An analysis of the proposed Lieberman-Warner legislation prepared for NRDC shows that the global warming pollution reduction targets established by the bill can be achieved without a significant increase in the country's total energy costs¹³. The overall economic impact is small because increased investment in new, more efficient appliances and equipment and low-carbon technologies is offset by savings from decreased expenditures on fuel and electricity. The analysis also shows that there are opportunities in the major transition to new technologies needed to achieve these reductions.

The analysis was performed using an improved and extended version of the US national MARKAL model (US-NM50), which was originally developed by the Environmental Protection Agency's Office of Research and Development. The reference point for the analysis is a business-as-usual (BAU) scenario calibrated to the Department of Energy's 2008 Annual Energy Outlook (AEO2008).

The effect of the Lieberman-Warner bill on energy investments and total energy system costs is illustrated with two different cases. Case A illustrates a future where substantial reductions in renewable energy costs occur as experience with these technologies accumulates, causing those resources to achieve a large market share after 2030. Case B illustrates a future with major continued investments in coal generation, with more substantial reliance on carbon capture and geologic sequestration (CCS).

The main findings of this analysis, presented by topic, include:

The Lieberman-Warner emission limits could be achieved with contributions to global warming pollution reductions from the following sources (Case A):

- Electric demand reduction - 19 percent
- Renewable energy - 24 percent
- Carbon sequestration - 8 percent
- Domestic offsets - 13 percent
- International credits - 18 percent
- Nuclear power - 0 percent

Emission reductions in both cases come mostly from the electric sector through a combination of efficiency improvements reducing electricity and direct fuel consumption, renewable energy use, CCS, and reduced energy service demands. In Case B, CCS contributes 19 percent of the reductions and other measures contribute somewhat less than in Case A. Direct emissions from major consuming sectors are roughly flat in both scenarios – with efficiency improvements offsetting economic growth.

Renewables will grow to between 50 percent and 60 percent of total electricity supply. In this model, renewables are a mix of biomass, geothermal, concentrating solar power, solar photovoltaics and wind technologies. The two main contributors to renewable electric output are large, remote wind farms and concentrating solar power.

¹³ See US Technology Choices, Costs and Opportunities under the Lieberman-Warner Climate Security Act: Assessing Compliance Pathways Pat DeLaquil, Gary Goldstein and Evelyn Wright International Resources Group Available at http://docs.nrdc.org/globalwarming/glo_08051401A.pdf

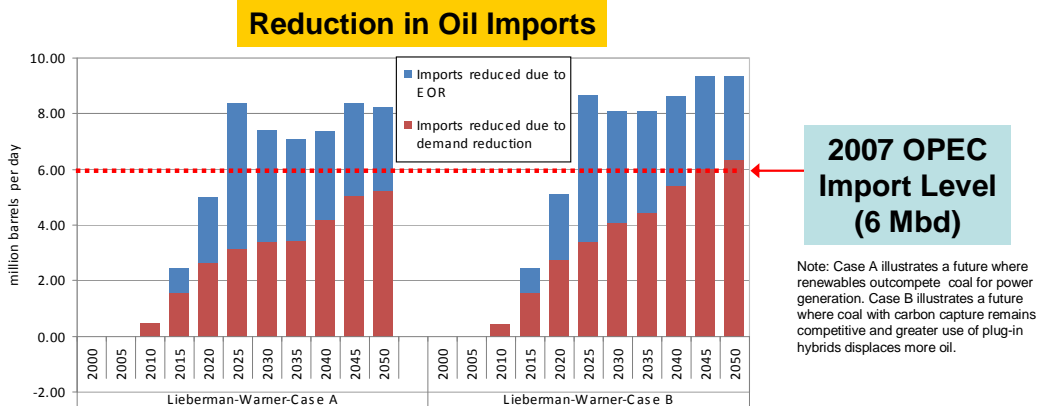
Achieving the Lieberman-Warner CO₂ emission reductions targets results in about a 0.45 percent increase in the total discounted energy system cost in Case A relative to the BAU case over the 2000 to 2050 period. Achieving the Lieberman-Warner CO₂ emission reductions targets results in about a 0.65 percent increase in the total discounted energy system cost in Case B relative to the BAU case over the 2000 to 2050 period. The impact is modest because increased investments in energy efficient end-use devices and renewable energy technologies are offset over the long-term by reduced expenditures on fuel and electricity.

One important and interesting finding is that oil imports drop to 35 percent of total oil supply in the middle years of the period under study due to both lower demand and the use of CCS for Enhanced Oil Recovery (EOR) that greatly expands domestic production from existing fields. Oil imports rise again between 2035 and 2050 as the EOR resource (estimated at 50 billion barrels) begins to deplete, although they remain under 60 percent of total oil supply, as compared to more than 80 percent by 2050 in the BAU case.

CSA Cuts Imports by up to 9 Million Barrels per Day (Mbd)



- Reductions range from 7.1 to 9.3 Mbd during the 2025 to 2050 timeframe due to:
 - Reduction in overall oil demand
 - Increased domestic oil production due to increased use of Enhanced Oil Recovery (EOR) being used for carbon sequestration from power plants



Source: MARKAL analysis by International Resources Group for NRDC (IRG, "US Technology Choices, Costs and Opportunities under the Lieberman-Warner Climate Security Act: Assessing Compliance Pathways", PowerPoint, May 2008). For more information please visit <http://www.nrdc.org/media/2008/080513.asp>

Slide 3

Figure 6: Reduction in Oil Imports

Source: MARKAL Analysis by International Resources Group for NRDC

Energy prices for coal and natural gas (not including allowance costs) are between 15 and 30 percent lower relative to the BAU case because of decreased demand. The marginal cost of generating electricity for summer days decreases relative to the BAU case due to the lower demand, while summer night costs increase as the use of plug-in hybrids grows.

The analysis also shows that use of domestic offsets and international credits within the limits in the Lieberman-Warner legislation would significantly reduce compliance costs, while expanded access to offsets would be of little additional benefit in terms of reducing costs.

This analysis demonstrates that the impact of strong global warming legislation on energy costs is relatively modest and manageable, particularly if some of the value of emission allowances is invested to spur deployment of increased energy efficiency, renewable energy and CCS technology.

Finally, refuting industry claims that major fuel switching would occur with enactment of climate protection legislation a recent report by M.J. Bradley & Associates shows that the emission reductions required by the Climate Security Act can be achieved in the electric power sector without fuel switching from coal to natural gas. The study outlines a realistic scenario where increased reliance on efficiency, renewable resources like wind, solar, and biomass, and carbon dioxide capture from coal power plants can achieve the near and mid-term reduction goals of the Climate Security Act without significant changes in reliance on coal, natural gas or nuclear energy to meet U.S. power needs. The analysis assumes:

- efficiency measures that reduce electricity demand by 10 percent below business-as-usual in 2025,
- renewable sources are deployed at approximately twice the current rates, and
- 65GW of coal with carbon capture and sequestration (CCS) is built by 2025, or about 6 GW a year from 2015-2025.¹⁴

A cap combined with focused incentives for these three activities would ensure that the Climate Security Act's emission reduction requirements can be met with no switching from coal to natural gas.

LEGISLATIVE PRINCIPLES

Before turning to specific provisions of particular bills, it may be instructive to discuss some basic legislative principles that NRDC believes should apply to all global warming legislation. These principles help provide a framework by which the members can gauge the merits of current and future legislative proposals.

On September 14, 2007, 16 major environmental organizations wrote to members of the U.S. Senate and announced principles for global warming legislation. For the environmental groups who signed this letter, these principles remain fundamental for any federal legislation and we urge this committee to consider them as it drafts legislation. As noted in the letter, these organizations will judge any climate legislation on how well it reflects these principles. The principles are as follows:

Preventing dangerous global warming is paramount.

Permits to emit carbon must be used for public benefit, not private windfalls.

Promoting a clean energy future is key.

¹⁴M.J. Bradley & Associates, "Coal and Natural Gas Use in the Electric Power Sector under the Climate Security Act," June 2008. http://docs.nrdc.org/globalwarming/glo_08060401A.pdf

Ensuring a just transition is critical.

Assisting adaptation to an altered climate is an essential goal.

Managing costs must be done without breaking the cap

Energy policy reform is an essential companion of any cap.

For a fuller discussion of the content of these principles see Attachment A: Letter from 16 Environmental Groups to U.S. Senators, April 22, 2008.

On April 22, 2008, three members of the Committee on Energy and Commerce, Congressman Waxman, Congressman Markey and Congressman Inslee circulated a set of global warming legislative principles for signature in the House of Representatives. We understand the Waxman/Markey/Inslee principles have already garnered more than 80 signatures to date with continuing interest from additional members. NRDC and many other members of the environmental community endorse these principles and encourage members of the Subcommittee and full Committee, as well as other members of the House to sign on to these principles.

The first and most important principle is that global warming legislation must reduce emissions of greenhouse gases so as to avoid dangerous global warming. Scientists are telling us that we will need to reduce total us emissions 15-20 percent below 1990 levels by 2020 and 80 percent below 1990 levels by 2050. In case, even these numbers turn out to be insufficient to avoid catastrophic global warming, legislation must include a mechanism for periodic scientific review and adjustment of targets. Because global warming is a worldwide problem, in addition to leading through domestic action, the U.S. must continue to seek international commitments and actions to reduce emissions, so that the worldwide targets described by the Intergovernmental Panel on Climate change can be met.

The legislation must ensure that emissions limits are certain and enforceable. For this reason, as discussed more fully below, NRDC does not support the so called “safety valve” cost containment mechanism which allows the unlimited purchase of permits to emit greenhouse gases, once the market price for allowances reaches a set price. Such a mechanism allows the release of greenhouse gases in excess of the emissions cap, in exchange for payment of a set dollar figure. As various analyses of legislation that includes a safety valve have demonstrated, in cases in which the safety valve is invoked, emissions can actually increase, rather than decline under such an approach. Figure 6 below illustrates this point with regard to the Bingaman/Specter bill, as seen in the cross hatched area in green, which represents additional emissions allowed through the safety valve mechanism.

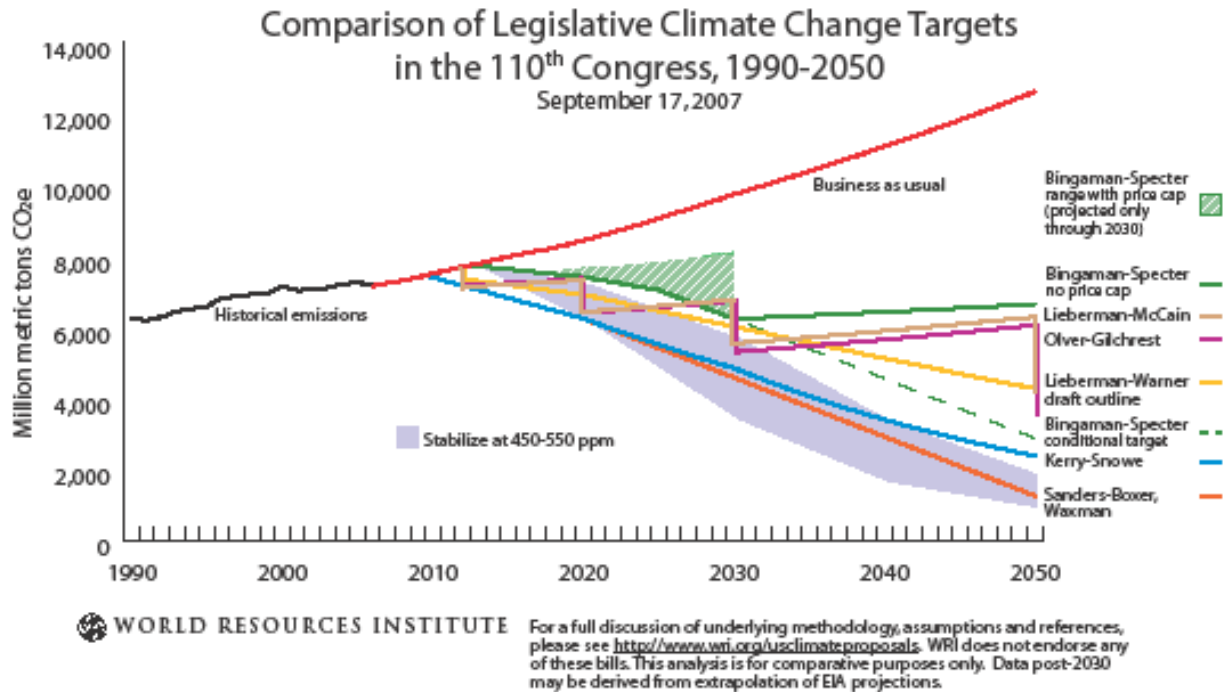


Figure 6: Comparison of Legislative Climate Change Targets
 Source: World Resources Institute

As the chart shows, the fundamental problem with the safety valve is that it breaks the cap without ever making up for the excess emissions. Simply put, the cap doesn't decline as needed or, worse, keeps growing. "Safety valve" is actually a misleading name. In boiler design, the role of a safety valve is to allow pressures to build within the vessel to working levels, well above atmospheric pressure. A safety valve's function is to open on the rare occasion when the boiler is pressured beyond its safe operating range, to keep it from exploding. In the life of a well-run boiler, the safety valve may never open.

Imagine, however, a boiler designed with a valve set to open just slightly above normal atmospheric pressure. The valve would always be open, and the boiler would never accomplish any useful work. That is the problem with the safety valve design in some of the current legislative proposals. The valve is set at such a low level that it is likely to be open virtually all the time.

In addition to breaking the U.S. cap, a safety valve also would prevent U.S. participation in international trading systems. If trading were allowed between the U.S. and other capped nations, a major distortion would occur. Firms in other countries (acting directly or through brokers) would seek to purchase U.S. lower-priced allowances. Their demand would almost immediately drive the U.S. allowance price to the safety valve level, triggering the "printing" of more American allowances. Foreign demand for newly-minted U.S. safety valve allowances would continue until the world price dropped to the same level. The net result would be to flood the world market with far more allowances – and far less emission reduction – than anticipated.

Although NRDC believes that the primary and most effective cost containment device in any mandatory legislation will be the cap and trade system itself, NRDC also supports other means of

providing flexibility. Banking has long been a feature of cap and trade systems. We also support allowing firms to borrow a limited number of allowances with appropriate interest and payback guarantees.

A common feature of all of the bills being examined by the Subcommittee today is that they are implemented largely through a cap and trade system that achieve emission reductions through a market based allowance trading system. NRDC agrees that – combined with complementary policies – cap and trade is the most effective and efficient approach to curbing global warming pollution. A cap and trade system requires attention to how the emissions allowances are allocated, and for what purposes. It is important to distinguish between the abatement cost of a cap and trade system and its distributional implications. The abatement cost will be significant, but far less than the cost of inaction. At the same time, the value of the pollution allowances created by the law will be much higher: some estimates place their value between \$50 and \$300 billion per year.

NRDC believes these pollution allowances are a public trust. They represent permission to use the atmosphere, which belongs to all of us, to dispose of global warming pollution. As such, they are not a private resource owned by historical emitters and such emitters do not have a permanent right to free allowances. The value of the allowances should be used for public purposes including promoting clean energy solutions, protecting the poor and other consumers, ensuring a just transition for workers in affected industries, and preventing human and ecosystem impacts both here and abroad, especially where they can lead to conflicts and threats to security.

The Waxman/Markey/Inslee Principles make the same points. They indicate that acceptable legislation must:

- **“Use public assets for public benefit in a fair and transparent way.** Emissions allowances should be auctioned with the revenues going to benefit the public, and any free allocations should produce public benefits. If any allocations are given to polluters, they must be provided only to existing facilities for a brief transition period and the quantity must be limited to avoid windfall profits.
- **Return revenues to consumers.** Revenues from auctioned allowances should be returned to low- and moderate-income households at a level sufficient to offset higher energy costs.
- **Return revenues to workers and communities.** Workers and communities most affected by the transition to a clean energy economy should receive a portion of the revenues to ease the transition and build a trained workforce so that all can participate in the new energy economy.
- **Protect against global trade disadvantages to U.S. industry.** In addition to providing incentives for developing countries to reduce emissions, the legislation should provide for an effective response to any countries that refuse to contribute to the international effort. These elements will protect energy-intensive U.S. enterprises against competitive disadvantage.
- **Assist states, localities and tribes to respond and adapt to the effects of global warming.** A portion of auction revenues should be provided to states, localities, and tribes to respond to harm from global warming and adapt their infrastructure to its effects, such as more severe

wildfires, intensified droughts, increased water scarcity, sea level rise, floods, hurricanes, melting permafrost, and agricultural and public health impacts.

- **Assist developing countries to respond and adapt to the effects of global warming.** A portion of auction revenues should be provided to help the developing countries most vulnerable to harm from global warming and defuse the national security threats posed by the conflicts over water, famines, and mass migrations that could be triggered by global warming. Vulnerable countries include least developed countries, where millions of people are already living on the brink, and small island states, which face massive loss of land.
- **Assist wildlife and ecosystems threatened by global warming.** A portion of auction revenues should be provided to federal, state, and tribal natural resource protection agencies to manage wildlife and ecosystems to maximize the survival of wildlife populations, imperiled species, and ecosystems, using science-based adaptation strategies.”

See Letter From Reps. Henry Waxman, Edward Markey and Jay Inslee, April 22, 2008. Attachment B.

As discussed more fully below in the context of the specifics of particular legislative vehicles, NRDC agrees with these principles as the basis for a sound and effective distribution of the revenues from a cap and trade program.

LEGISLATION

The Committee invite letter asks that I present the views of NRDC regarding five legislative vehicles under consideration this Congress:

H.R. 1590: the Safe Climate Act, (introduced by Representative Henry Waxman),

S. 1799, The Low Carbon Economy Act, (introduced by Senators Bingman and Specter

S. 2191, America’s Climate Security Act of 2007 (as reported out of the Senate Committee on Environment and Public Works and introduced by Senators Lieberman and Warner)

S. 3036 (the Lieberman-Warner Climate Security Act of 2008 --Senator Boxer’s Substitute)

H.R. 6186 (the Investing in Climate Action and Protection Act (Congressman Markey).

The massive size and scope of these bills make a full summary and comparison of them beyond the scope of this testimony. Several of the bills run to nearly 500 pages and the combined page total for all the bills reaches nearly 2000 pages. In addition, some of these bills have not yet had the same level of analysis, especially outside economic analysis, as some of the earlier bills such as the Bingaman/Specter and Lieberman/Warner bills. Nevertheless, because each of these bills makes important contributions to the legislative debate over climate change, I will highlight a few of the key provisions in each that merit close attention.

The Safe Climate Act, H.R. 1590 (introduced by Representative Henry Waxman)

The Safe Climate Act was the first bill in Congress to point to the need for a long term reduction target for 2050. That same approach was followed in the Sanders/Boxer bill, S. 309. Using a cap and trade system, the Safe Climate Act requires annual reductions of approximately 2 percent per year, reaching 1990 levels until 2020 and approximately 5 percent per year thereafter, ultimately resulting in a 80 percent reduction from 1990 levels by 2050. The Safe Climate Act reduction targets are based on 100 of U.S. emissions, unlike other bills which only guarantee reductions from a subset of covered sources. It would be implemented by EPA and DOE. Because of its stringent reduction path, the Safe Climate Act would be consistent with limiting global CO₂ emission concentrations to 450 parts per million and thus meets the requirement for a scientifically based emissions reduction goal sufficient to avert dangerous global warming.

The Safe Climate Act was also the first bill to include the concept of a scientific review provision. The bill directs the National Academy of Sciences and the National Research Council to review, every five years, progress toward avoiding dangerous climate change. If the National Academies find that dangerous global warming is likely, they must identify the reductions needed and recommend additional national and international actions to achieve the reductions.

Under the Safe Climate Act, allowances are distributed according to a plan developed by the President, with an opportunity for Congress to ratify or modify the plan. Proceeds from auctioning allowances are deposited in the Climate Reinvestment Fund. Revenues in the fund are dedicated to maximizing the public benefit and promoting economic growth, including supporting technology research and development, compensating consumers for any energy cost increases, providing transition assistance for affected workers and regions, and protecting against harm from climate change, such as safeguarding water supplies, protecting against hurricanes, and mitigating harm to fish and wildlife habitat

In addition to the cap and trade program under the bill, a number of complementary policies are included:

- The bill directs EPA to set standards for reducing greenhouse gas emissions from motor vehicles that are at least as stringent as the current California standards. EPA must tighten these standards in 2014 and periodically thereafter.
- The bill directs the Department of Energy to establish national standards requiring an increasing proportion of electricity to be generated from renewable energy sources, reaching 20 percent of retail electricity sold in 2020.
- The bill directs the Department of Energy to establish national standards requiring utilities to obtain, each year, 1 percent of their energy supplies through energy efficiency improvements at customer facilities. These savings would accumulate each year through 2020.

More than 150 members of the House of Representatives have cosponsored the Safe Climate Act, which is the largest number of co sponsors on any global warming bill in Congress to date. NRDC supported the Safe Climate Act upon its introduction and continues to commend Congressman Waxman and the many other members of the House of Representatives for their groundbreaking leadership in pushing this important piece of legislation forward.

The Low Carbon Economy Act, S. 1799 (introduced by Senators Bingaman and Specter)

S 1799, the Low Carbon Economy Act, also creates a cap and trade system for reducing greenhouse gas emissions. The current version of the bill is based on previous efforts by Senator Bingaman and other senators, and builds off the work of the National Commission on Energy Policy. Many key concepts in other bills, such as the Lieberman-Warner Bill, the Boxer Substitute and the Markey bill first appeared as part of the Low Carbon Economy Act and its predecessor versions. These include concepts such as the bonus allowance provision for carbon capture and sequestration, the initial version of a carbon border adjustment provision, a detailed technology investment fund, a fund for energy intensive industries and the decision to flesh out a detailed and dedicated allocation system with substantial revenues going directly to states. Senator Bingaman and the National Commission on Energy Policy are to be commended for being among the first to bring forth such ideas.

The Low Carbon Economy Act would reduce U.S. emissions to 2006 levels by 2020 and would reduce U.S. emissions to 1990 levels by 2030. The bill also includes a “safety valve” provision, called the “Technology Accelerator Payment” or “TAP”. This “Technology Accelerator Payment” (TAP) price starts at \$12 per metric ton of CO₂-equivalent in the first year of the program and rises steadily each year thereafter at 5 percent above the rate of inflation. The proceeds from the TAP are to be used for investment hastening the pace of technological development, in the event the safety valve price is reached and TAP payments are actually collected.

Although NRDC commends the bi-partisan leadership of Senators Bingaman and Specter, the reduction targets in the Low Carbon Economy Act are not in line with the scientific evidence and are not stringent enough to prevent dangerous global warming. In order to meet those requirements, U.S. emissions must be reduced by 15-20 percent below current levels by 2020. The Low Carbon Economy Act would, putting aside the safety valve, result in about a 4 percent reduction from 2005 levels by 2020 and a 20 percent reduction from 2005 levels in 2030. Thus, the needed cuts in emissions would come about a decade too late under the Bingaman-Specter bill.

Equally important, with the safety valve, emissions could actually increase. NRDC estimates that if the safety valve provision were invoked emissions could actually increase by 6 percent above 2005 levels by 2020 and by 11 percent above 2005 levels by 2030. Because of the weak reduction targets and the potential effect of the safety valve provision on emissions, NRDC and many other environmental groups do not support the Bingaman-Specter legislation.

America’s Climate Security Act of 2007, S. 2191 (as reported out of the Senate Committee on Environment and Public Works and introduced by Senators Lieberman and Warner)

The Lieberman-Warner bill, America’s Climate Security Act (S. 2191) as reported from the Environment and Public Works Committee represents a major step towards putting our country on an emissions pathway consistent with avoiding extremely dangerous global warming. This bill represents the most detailed and comprehensive attempt to date to combat global warming. On December 5, 2007, the Climate Security Act was approved by an 11-8 vote in the United States Senate Environment and Public Works Committee. This was the first comprehensive global warming bill ever to be reported from that Committee and consideration of its substitute version (discussed more fully below) was the subject of a historic debate and vote in the Senate on June 6, 2008. Forty eight Senators voted for cloture on the bill and another 6 who were absent indicated that they too, would have voted for cloture. With that vote, it is accurate to conclude that a majority of the United

Senate (54 members) supports moving forward to consider strong global warming legislation consistent with scientifically based limits. We urge the House to move as soon as possible to have a similar vote, both in this Committee and on the floor of the full House of Representatives.

The Climate Security Act, as reported, caps and cuts emissions of three sectors – electricity, transportation, and industry – that together account for about 84 percent of U.S. greenhouse gas emissions. It calls for about a 19 percent reduction in covered emissions by 2020 and for a 70 percent reduction in covered emissions by 2050. The bill also includes features to reduce emissions from the uncovered sectors, principally a set of energy efficiency measures for buildings and key energy-using activities, and a “set-aside” of allowances from within the cap to encourage emission reductions and sequestration in the agriculture and forestry sectors. Our calculations indicate that this combination will result in reducing *total* U.S. emissions by approximately 18-25 percent by 2020 and approximately 62-66 percent by 2050.

S. 2191 embraces the principle that pollution allowances should be used for public purposes and contains a detailed allocation system that eliminates free allocations to emitters in 2031. However, as reported, S. 2191 still gives away more allowances to the biggest emitting firms than is needed to fully compensate such firms for the effects of their compliance obligations on the firms’ economic values.

S. 2191 also allows the owner or operator of a covered facility to satisfy up to 15 percent of a given year’s compliance obligation using “offsets” generated within the United States. These offsets would come from emission reduction activities that are not covered by the emissions cap. The 15 percent limitation is essential to ensure the overall integrity of the emissions cap in the bill and to spur technology innovation. Analysis of S.2191 by the Energy Information Administration shows that allowing greater use of offsets would have only a small impact on compliance costs, but would delay needed investments in low-emission technologies, such as CCS. NRDC has and will consistently oppose efforts to allow unlimited use of offsets for compliance purposes.

The Lieberman/Warner legislation includes “cost containment” provisions that protect the integrity of the emissions cap and preserve incentives for technology innovation. The bill includes a further provision, nicknamed the Carbon Fed, based upon a proposal developed by Senators Warner, Graham, Lincoln and Landrieu. The board created under this provision is charged with monitoring the carbon market and is authorized to change the terms of allowance borrowing, including the interest rate and the time period for repayment. Crucially, however, the Carbon Fed would not have the authority to change the cumulative emissions cap, thereby protecting the environment while minimizing cost volatility. NRDC supports this and other provisions of the bill that help to contain costs without compromising environmental performance.

The bill includes a provision under which the National Academy of Sciences would assess the extent to which emissions reductions required under the Act are being achieved, and would determine whether such reductions are sufficient to avoid dangerous global warming.

The bill also includes several incentive provisions to reward developers who incorporate carbon capture and geologic disposal systems for new coal plants, including an updated version of the bonus allowance provision for carbon capture and sequestration, transition assistance for electricity generation, funding for zero and low carbon technologies, and an advanced coal and sequestration technology fund. As the bill was reported from Committee, NRDC continued to conclude that the bill contained excessive funding for coal based technologies that would be wasteful and result in

windfall profits for emitters. As discussed more fully below, the bills sponsors substantially revised the technology funding provisions in the Boxer substitute version.

Finally, the bill includes a provision to encourage other nations to join in action to reduce greenhouse gas emissions, and to protect American businesses and workers from unfair competition if specific nations decline to cooperate. Under this provision, the United States would seek to negotiate for “comparable emissions reductions” from other emitting countries within 8 years of enactment. Countries failing to make such commitments would be required to submit greenhouse gas allowances for certain carbon intensive products. NRDC supports this provision, while bearing in mind that the U.S., as the world’s greatest contributor to the burden of global warming pollution already in the atmosphere, needs to show leadership in meeting the global warming challenge.

S. 3036 (the Lieberman-Warner Climate Security Act of 2008 --Senator Boxer’s Substitute)

S. 3036 represents changes made to the Climate Security Act between the time the bill was reported from the Committee on Environment and Public Works in December of 2007 and consideration of the bill by the full Senate. The primary notable changes included incorporation of a new fund designed to help the bill conform to pay-as-you go budget rules, inclusion of a new cost containment mechanism, changes to natural gas coverage, substantial changes to the allocation provisions (including a reduction of the amount of funding for coal related emissions and technologies) and changes to the offset provisions.

S. 3036 represents changes made to the Climate Security Act between the time the bill was reported from the Committee on Environment and Public Works in December of 2007 and consideration of the bill by the full Senate. The primary notable changes included incorporation of a new fund designed to help the bill conform to pay-as-you go budget rules, inclusion of a new cost containment mechanism, changes to natural gas coverage, substantial changes to the allocation provisions (including a reduction of the amount of funding for low-carbon technologies) and changes to the offset provisions.

S. 3036 contained a new cost containment mechanism designed to help dampen volatility in the carbon market price. Under S. 3036 a new cost containment auction was created. A pool of allowances totaling 6 billion tons, borrowed from the years 2030 to 2050 provides the basis for an auction, with a price to be set between \$22-30 dollars per ton as determined by the President. The initial price chosen escalates annually at 5 percent above the rate of inflation. In the first year 450 million tons may be auctioned and each year the total number of allowances available for auction declines by 1%. 70 percent of the revenues (if any) from the cost-containment auction are to be used to create additional reductions. This cost containment mechanism helps to limit allowance market volatility, but preserves the integrity of the emissions cap. Although NRDC does not endorse the specific trigger price and auction pool size in the Boxer substitute, NRDC believes the structure of this cost-containment mechanism provides an acceptable alternative to a classic safety valve that breaches the emission cap.

S. 3036 also adjusted the offset provisions in the Lieberman/ Warner bill that allow firms to comply with emission reductions from sources that are not covered by the cap. Under S. 3036, the firm-wide offsets limit contained in S. 2191 was converted to a percentage limit of total allowances. Offsets from domestic agriculture and forestry may total up to 15 percent of the cap under S. 3036. Another 15 percent may come from international actions, including 10 percent from national-level programs to reduce tropical deforestation. Carry over provisions are included to allow unused

tonnage to be used in future years. These changes help improve flexibility in the use of offsets without jeopardizing the overall cap integrity.

Unfortunately under S. 3036, a provision that would have required EPA to regulate emissions from unprocessed natural gas was altered to a study provision. Future versions of this legislation should be strengthened to increase the coverage of natural gas and hence increase the amount of overall reductions.

Finally, S. 3036 adjusted the allowance allocation framework in significant fashion. Although these changes are too numerous to detail here, some of the more significant ones include an increase in the amount of allowances to carbon intensive manufacturers, accompanied by a matching decrease in the amount of transition assistance to electricity producers, reallocating 1/3 of the state general fund to assist state economies that rely heavily on coal and elimination of the fund for advanced coal and carbon sequestration, but creation of a new “kick start” program for carbon capture and sequestration. In general these changes represented improvements in the legislation as the portion of allowances going to energy efficiency and other public purposes was increased. In addition, because of the new deficit reduction fund created in order to comply with budget rules, the overall amount of the allowance pool for other purposes was significantly reduced. A chart summarizing the revised allocation scheme is included below:

Allowance Allocation Beneficiaries	Cumulative % Allowances, 2012-2050
Consumers, states, and tribes	49%
Free allocations to industry	9%
Low-carbon technology development and deployment	
■ Energy efficiency, renewable and zero emission sources (6 percent)	
■ Advanced coal with carbon capture and storage (2 percent)	
■ Advanced biofuels and vehicles (1.5 percent)	9.5%
Domestic agricultural and forestry activities	4.5%
Worker training for green jobs	3%
International mitigation and adaptation	6%
Domestic wildlife adaptation and ecosystem protection	4%
Pay-as-you-go budget offset and other program costs	15%

Figure 7: Allowance Allocation Beneficiaries

Source: NRDC, http://www.nrdc.org/legislation/factsheets/leg_07121101A.pdf

The Investing in Climate Action and Protection Act, H.R. 6186 (Congressman Markey).

H.R. 6186, the Investing in Climate Action and Protection Act (iCAP) builds off the basic structure of S. 2191 and S. 3036. The bill includes many of the same features as the Lieberman-Warner bill, as reported, and the Boxer substitute bill, but also calls for steeper emission cuts and returns significantly smaller amounts of the allowance revenue to emitters. Other features of the Lieberman-Warner Bill and the Boxer substitute are also adjusted under iCAP as discussed below.

H.R. 6186 covers approximately 86 percent of U.S emissions and uses the same definition of “covered” entities as S. 2191 and S. 3036, however the point of regulation for natural gas is the local gas distribution companies. The iCAP bill also covers emissions from geological sequestration sites, which represents a different approach to dealing with any potential leakage from geological sequestration sites than the Lieberman-Warner bill.

H.R. 6186 requires covered sectors to reduce by 85 percent by 2050 from current levels of greenhouse gas emissions. Covered sectors must reduce emissions by 20 percent from current levels by 2020. In addition mandatory performance standards are included in the bill for coal mines, landfills, wastewater treatment operations, and large animal feeding operations. Together with voluntary incentives for agricultural and forest sequestration, these additional measures are estimated by the bills sponsors to achieve an additional 7 percent reduction from source that are not covered entities. The iCAP also establishes mandatory performance standards for any new coal-fired power plant, requiring all plants on which construction begins after January 1, 2009, to achieve capture and geological sequestration of 85 percent of their CO₂ emissions, by either 2016 or within 4 years of commencing operation. The bill also statutorily grants the California Wavier for greenhouse gas emission standards for motor vehicles, which EPA has denied.

The iCAP Act auctions 94 percent of allowances in 2012 and transitions to a 100 percent auction in 2020. The 6 percent of allowances that are not initially auctioned are distributed to U.S. industries that are energy-intensive and exposed to international trade competition (e.g., iron and steel, aluminum, cement, glass, and paper).

The iCAP Act allows banking, borrowing and trading of permits. Borrowed allowances must be repaid within five years with interest. Covered entities can meet up to 15 percent of their annual obligations with EPA-approved domestic offset credits and up to an additional 15 percent with EPA-approved international emission allowances or offset credits. However, domestic and international offset credits are subject to rigorous standards to ensure reductions in emissions or increases in sequestration are real, verifiable, additional, permanent, and enforceable. Only 4 categories of domestic offsets are allowed as follows:

- Reductions in (outside-the-cap) fugitive greenhouse gas emissions from oil and gas systems;
- Reductions in greenhouse gas emissions from livestock operations that are not covered by performance standards,
- Reductions in greenhouse gas emissions from abandoned coal mines; and
- Increases in biological carbon sequestration through afforestation and reforestation.

The iCAP Act directs the Federal Energy Regulatory Commission to oversee the carbon market to prevent fraud and market manipulation.

Among the most prominent features of the iCAP act is the creation of a fund for low and middle income households under which more than half of auction proceeds would be returned to low- and middle-income households through rebates and tax credits. The fund is designed to compensate all increased energy costs due to climate legislation for all households earning under \$70,000 (66 percent of U.S. households), and will provide benefits to all households earning up to \$110,000 (over 80 percent of U.S. households).

Under iCAP the remaining auction proceeds are invested in a number of programs aimed at further reducing the costs of reductions, spurring technology development and mitigating unavoidable impacts of climate change. Funds are included for:

- Clean energy technology research, development, demonstration and deployment
- Energy efficiency policies
- Incentives to U.S. farmers and foresters

- Carbon storage in agricultural soils and forests
- Green jobs training and assistance
- Reduction of deforestation and deployment of clean technologies in developing countries
- Programs to increase resilience to domestic and foreign climate change impacts
- Climate change education

The iCAP Act includes provisions to address international competition and engagement in fighting climate change. Under the iCAP Act, developing countries that take comparable action to reduce global warming pollution will have access to funding from the International Clean Technology Fund and will be allowed to sell “offset credits” into the U.S. market. Developing countries that carry out programs to reduce emissions from deforestation will be eligible for assistance from an International Forest Protection Fund. For countries failing to take comparable action by 2020, importers of energy-intensive primary goods (e.g., iron and steel, aluminum, cement, glass, and paper) from that country will have to purchase special reserve allowances to account for pollution generated in the production of such goods. Also, until 2020, U.S. manufacturers of competing primary goods will be given free allowances to prevent loss of jobs or “leakage” of emissions due to international competition.

The iCAP bill provides a strong basis for global warming legislation with emissions reductions that fall within the range of reductions science tells us are needed to avoid dangerous climate change. NRDC supports the decision to provide a very small amount of free allowances to emitters and to use a substantial amount of the proceeds from the auction for rebates and tax credits for low and middle income consumers. NRDC also supports the decision to limit offsets to 15%, subject such offsets to stringent criteria and to only allow domestic offsets from a well-defined set of sources. Similarly, NRDC supports the decision to use the set-aside approach, rather than an offset based approach for soil sequestration reductions from agriculture. NRDC believes the iCAP Act makes a very substantial contribution to further progress in the global warming debate and urges this committee to consider some or all of its provisions carefully as a basis for future action.

* * *

Chairman Boucher, allow me to once again thank you for holding this legislative hearing and for indicating your desire to consider moving forward on strong, bi-partisan global warming legislation this year. We have reached a key moment in history and you, along with Chairman Dingell, Ranking Members Barton and Upton, and the other distinguished members of the Committee, can be central in solving the greatest environmental problem that mankind has yet faced. The work that you and your staff are doing now will be critical in making progress toward enactment of strong, bipartisan global warming legislation. The bills now before you provide many excellent examples of ways in which global warming legislation can reduce emissions, consistent with scientifically based targets, while helping to limit costs, create jobs, grow our economy, increase our energy independence, and spur new energy technologies for export to the world at large. We urge you to act now to draft legislation as soon as possible and to seek to report such legislation to the full Committee on Energy and Commerce and to the full House of Representatives. We cannot afford to wait any longer. We look forward to further progress as your legislation moves through the Subcommittee and the full Committee, and we at NRDC stand ready to assist in any way possible.

**Clean Water Action • Defenders of Wildlife • Earthjustice • Greenpeace
League of Conservation Voters
National Audubon Society • National Environmental Trust
National Tribal Environmental Council • National Wildlife Federation
Natural Resources Defense Council
Oceana • Physicians for Social Responsibility • The Sierra Club
Union of Concerned Scientists • U.S. Public Interest Research Group
The Wilderness Society**

September 14, 2007

Dear Senator,

This fall, as the Congress completes its work on the energy bill and turns its attention toward enacting legislation to tackle global warming, there are some fundamental principles that we urge you to embrace. An approach that combines capping and cutting carbon emissions to science-based levels, market flexibility for cost-effective reductions, using carbon permits for public benefit, and reforming the energy sector is the key to meeting the challenge of global warming, improving our economy and enhancing fairness and justice. Our organizations will judge any climate legislation on how well it reflects these principles:

Preventing dangerous global warming is paramount. Science tells us we have little time left to take action. To prevent dangerous temperature increases and drastic climate impacts, it is essential to adopt mandatory and enforceable limits that start cutting global warming pollution by 2012, with mandated annual reductions in global warming emissions reaching at least 15 to 20 percent below current levels by 2020 and on the order of 80 percent by mid-century.

Permits to emit carbon must be used for public benefit, not private windfalls. Pollution allowances are a public trust. All allowances should be auctioned or otherwise used to benefit the public, not to generate windfall profits for polluting industries. Free allocations, if any, must be limited to a short transition period.

Promoting a clean energy future. Allowances should be used to accelerate deployment of clean technologies we have today and to develop the ones we need for tomorrow. Energy efficiency – more efficient vehicles, appliances, homes, and factories – is the fastest and cheapest way to cut emissions. Investing in efficiency and renewables creates new industries and good jobs here at home. We could be selling clean technology to the world instead of sending our dollars abroad for oil.

Ensuring a just transition. Allowances should be used to help finance a just transition, protecting low- and moderate-income citizens and creating new jobs and ensuring fair treatment for affected workers and their communities. We must also take care of communities that suffer the impacts of global warming we were too late to avoid.

Assisting adaptation to an altered climate. Allowances should be used to help facilitate adaptation of distressed and impoverished people, communities and regions at home and abroad. Allowances should also be used to help fish, wildlife and ecosystems adapt in the face of global warming's complex threats.

Managing costs without breaking the cap. Banking, limited borrowing, and other tools exist to help industry keep costs predictable and manageable. “Safety valves” and other devices that break the cap on emissions must not be allowed. Any offsets must be real, surplus, verifiable, permanent, and enforceable. Use of offsets must be limited in quantity to ensure the transformative investments in low-carbon technology needed to achieve the long-term emission reduction goals.

Energy policy reform is an essential companion of any cap. An economy-wide carbon cap, while essential, is not a sufficient strategy to combat global warming. Our national energy policies need to be restructured to encourage efficiency, innovation, competition and fairness. A comprehensive set of policies to fight global warming needs to include measures like the CAFE standards increase that has been included in the Senate energy bill and the renewable electricity standard included in its House counterpart.

We must act quickly. Carbon dioxide remains in the atmosphere for generations; the longer we wait, the more aggressive our actions will have to be. Delay will commit us either to making emission reductions on a much more costly crash basis later or to inflicting truly dangerous global warming impacts on our children and grandchildren.

Many existing technologies can be deployed now to achieve these goals, and the right policies will increase our national security, revitalize our industrial jobs base, and enhance our global competitiveness. These solutions will create jobs and improve our standard of living as we tackle this dangerous problem. We look forward to working with you to help design and enact global warming legislation that accelerates economic growth and creates new jobs while achieving the steady reductions in global warming pollution that are needed.

Sincerely,

Frances Beinecke, President
Natural Resources Defense Council

Carl Pope, Executive Director
Sierra Club

Larry Schweiger, President
National Wildlife Federation

Kevin Knobloch, President
Union of Concerned Scientists

Gene Karpinski, President
League of Conservation Voters

Philip E. Clapp, President
National Environmental Trust

Margie Alt, Executive Director
U.S. Public Interest Research Group

John Flicker, President
National Audubon Society

Rodger Schlickeisen, President
Defenders of Wildlife

Andrew Sharpless, Chief Executive Officer
Oceana

William H. Meadows, President
The Wilderness Society

Jerry Pardilla, Executive Director
National Tribal Environmental Council

Vawter Parker, Executive Director
Earthjustice

Michael McCally, MD, Executive Director
Physicians for Social Responsibility

David Zwick, President
Clean Water Action

John Passacantando, Executive Director
Greenpeace

Congress of the United States
Washington, DC 20515

April 22, 2008

**Support Strong, Fair, Science-Based Legislation to
Fight Global Warming**

Dear Colleague:

Please join us in establishing principles for strong, fair, science-based legislation to fight global warming while creating jobs and building a clean energy economy. The attached letter to Speaker Pelosi salutes her leadership on this issue and recommends a set of principles to guide Congress as it produces a comprehensive global warming bill.

The American people, states and communities, environmental and public health advocates, multinational corporations, and small businesses all recognize that we need a comprehensive mandatory national program to reduce global warming pollution. This presents a great opportunity for America. We must have a clear vision of what we aim to accomplish, or we risk establishing a program that would be unfair, ineffective or have other unintended consequences. Now is the time to focus on what this legislation must achieve.

We believe there are four key goals for global warming legislation:

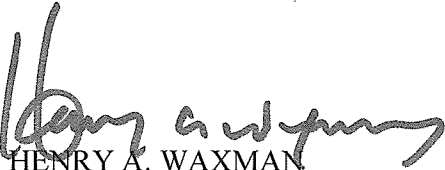
1. Reduce emissions to avoid dangerous global warming;
2. Transition America to a clean energy economy;
3. Recognize and minimize any economic impacts from global warming legislation; and
4. Aid communities and ecosystems vulnerable to harm from global warming.

The attached letter lays out these goals and identifies the key elements that are necessary for legislation to achieve these goals.

The principles include the following elements: strong science-based targets for near-term and long-term emissions reductions; auctioning emissions allowances rather than giving them to polluting industries; investing auction revenues in clean energy technologies; returning auction revenues to consumers, workers, and communities to offset any economic impacts; preserving state authorities; protecting against trade disadvantages to U.S. industry; and dedicating a portion of auction revenues to help address harm from the degree of global warming that is now unavoidable.

Please join us in supporting the development of strong, fair, and effective legislation to fight global warming. To sign on to the attached letter, please contact Melissa Bez (5-3976) (Rep. Waxman), Ana Unruh Cohen (5-4012) (Rep. Markey), or James Bradbury (5-6311) (Rep. Inslee).

Sincerely,


HENRY A. WAXMAN
Member of Congress


EDWARD J. MARKEY
Member of Congress


JAY INSLEE
Member of Congress

[Month] [Date], 2008

The Honorable Nancy Pelosi
Speaker
U.S. House of Representatives
Washington, DC 20515

Dear Madam Speaker,

We salute your leadership on one of the critical issues of our time: the effort to save the planet from calamitous global warming. You have listened to the scientists and recognized the scope and severity of the threat that global warming poses to our nation's security, economy, public health, and ecosystems. You have made enacting legislation to address global warming a top priority for Congress for the first time in our history. We stand ready to help develop this legislation and enact it into law.

As part of this effort, we have developed a set of principles to guide Congress as it produces legislation to establish an economy-wide mandatory program to address the threat of global warming. Acting in accordance with these principles is critical to achieving a fair and effective bill that will avoid the most dangerous global warming and assist those harmed by the warming that is unavoidable, while strengthening our economy.

The following are the principles we have developed to guide the creation of comprehensive global warming legislation.

Comprehensive legislation to address global warming must achieve four key goals:

1. Reduce emissions to avoid dangerous global warming;
2. Transition America to a clean energy economy;
3. Recognize and minimize any economic impacts from global warming legislation;
and
4. Aid communities and ecosystems vulnerable to harm from global warming.

To meet each of these goals, climate change legislation must include the following key elements.

Reduce Emissions to Avoid Dangerous Global Warming

The United States must do its part to keep global temperatures from rising more than 3.6 degrees Fahrenheit (2 degrees Celsius) above pre-industrial levels. The scientific

community warns that above this level, dangerous and irreversible changes to the Earth's climate are predicted to occur. To meet this goal, the legislation must:

- **Cap and cut global warming emissions to science-based levels with short and long-term targets.** Total U.S. emissions must be capped by a date certain, decline every year, be reduced to 15% to 20% below current levels in 2020, and fall to 80% below 1990 levels by 2050.
- **Review and respond to advancing climate science.** The effects of global warming are happening much faster than scientists predicted several years ago, and there may be tipping points at which irreversible effects occur at lower levels of greenhouse gas concentrations than previously predicted. A mechanism for periodic scientific review is necessary, and EPA, and other agencies as appropriate, must adjust the regulatory response if the latest science indicates that more reductions are needed.
- **Make emissions targets certain and enforceable.** Our strong existing environmental laws depend on enforceable requirements, rigorous monitoring and reporting of emissions, public input and transparent implementation, and government and citizen enforcement. All of these elements must be included in comprehensive global warming legislation. Cost-containment measures must not break the cap on global warming pollution. Any offsets must be real, additional, verifiable, permanent, and enforceable. The percentage of required emissions reductions that may be met with offsets should be strictly limited, and should be increased only to the extent that there is greater certainty that the offsets will not compromise the program's environmental integrity.
- **Require the United States to engage with other nations to reduce emissions through commitments and incentives.** The United States must reengage in the international negotiations to establish binding emissions reductions goals under the United Nations Framework Convention on Climate Change. The legislation must encourage developing countries to reduce emissions by assisting such countries to avoid deforestation and to adopt clean energy technologies. This is a cost-effective way for the United States and other developed nations to achieve combined emissions reductions of at least 25% below 1990 levels by 2020, as called for by the Intergovernmental Panel on Climate Change.

Transition America to a Clean Energy Economy

Global warming legislation provides an opportunity to create new jobs, while transforming the way we live and work through renewable energy, green buildings, clean vehicles, and advanced technologies. To realize this opportunity, the legislation must:

- **Invest in the best clean energy and efficiency technologies.** A significant portion of revenues from auctioning emissions allowances should be invested in clean energy and efficiency measures, targeted to technologies and practices that

are cleaner, cheaper, safer, and faster than conventional technologies, as determined through the application of clear standards set by Congress.

- **Include and encourage complementary policies.** Complementary policies can lower program costs by producing lower-cost emissions reductions from economic sectors and activities that are less sensitive to a price signal. Smart growth measures, green building policies, and electricity sector efficiency policies are important types of complementary policies. The legislation should include federal complementary policies and encourage state and local complementary policies in areas better addressed by states and localities.
- **Preserve states' authorities to protect their citizens.** Federal global warming requirements must be a floor, not a ceiling, on states' ability to protect their citizens' health and state resources. Throughout our history, states have pioneered policies that the nation has subsequently adopted. Addressing global warming requires state and local efforts, as well as national ones.

Recognize and Minimize Any Economic Impacts from Global Warming Legislation

Reducing global warming pollution will likely have some manageable costs, which would be far lower than the costs of inaction. To minimize any economic impacts, the legislation must:

- **Use public assets for public benefit in a fair and transparent way.** Emissions allowances should be auctioned with the revenues going to benefit the public, and any free allocations should produce public benefits. If any allocations are given to polluters, they must be provided only to existing facilities for a brief transition period and the quantity must be limited to avoid windfall profits.
- **Return revenues to consumers.** Revenues from auctioned allowances should be returned to low- and moderate-income households at a level sufficient to offset higher energy costs.
- **Return revenues to workers and communities.** Workers and communities most affected by the transition to a clean energy economy should receive a portion of the revenues to ease the transition and build a trained workforce so that all can participate in the new energy economy.
- **Protect against global trade disadvantages to U.S. industry.** In addition to providing incentives for developing countries to reduce emissions, the legislation should provide for an effective response to any countries that refuse to contribute their fair share to the international effort. These elements will protect energy-intensive U.S. enterprises against competitive disadvantage.

Aid Communities and Ecosystems Vulnerable to Harm from Global Warming

Global warming is already harming communities and ecosystems throughout the world, and even with immediate action to reduce emissions and avoid dangerous effects, these impacts will worsen over the coming decades. To ameliorate these harms, the legislation must:

- **Assist states, localities, and tribes to respond and adapt to the effects of global warming.** A portion of auction revenues should be provided to states, localities, and tribes to respond to harm from global warming and adapt their infrastructure to its effects, such as more severe wildfires, intensified droughts, increased water scarcity, sea level rise, floods, hurricanes, melting permafrost, and agricultural and public health impacts.
- **Assist developing countries to respond and adapt to the effects of global warming.** A portion of auction revenues should be provided to help the developing countries most vulnerable to harm from global warming and defuse the threats to national security and global stability posed by conflicts over water and other natural resources, famines, and mass migrations that could be triggered by global warming. Vulnerable countries include least developed countries, where millions of people are already living on the brink, and small island states, which face massive loss of land.
- **Assist wildlife and ecosystems threatened by global warming.** A portion of auction revenues should be provided to federal, state, and tribal natural resource protection agencies to manage wildlife and ecosystems to maximize the survival of wildlife populations, imperiled species, and ecosystems, using science-based adaptation strategies.

These principles, if adopted as part of comprehensive climate change legislation, will meet the United States' obligations to curb greenhouse gas emissions and also will provide a pathway to the international cooperation that is necessary to solve the global warming problem.

We commend these principles to you and hope that you find them helpful as we move forward together to develop and adopt global warming legislation.

Sincerely,