

Hearing on
Climate Change Technology and Policy Options
before the
U.S. SENATE COMMITTEE ON
Commerce, Science, and Transportation

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My name is David Hawkins, and I am the Director of the Climate Center at the Natural Resources Defense Council. I appreciate the opportunity to appear before you today on the issues of policies to combat the threat posed by climate change or global warming. The Natural Resources Defense Council is a national, non-profit organization of scientists, lawyers, and environmental specialists, dedicated to protecting public health and the environment. Founded in 1970, NRDC serves more than 500,000 members from offices in New York, Washington, Los Angeles, and San Francisco.

My message today is a simple one: the United States should no longer delay the adoption of effective policies to limit emissions of carbon dioxide and other greenhouse gas pollution. Nearly a decade ago, the U.S. and more than 100 other countries ratified a global climate change treaty that should have spurred adoption of serious policies to combat global warming. Instead, we have had a decade of delay, during which U.S. greenhouse emissions have increased by about 14%. Rather than adopt meaningful policies that would have sent an effective signal to the private sector that constraining carbon emissions was a sound course for business planning, we have relied on voluntary pledge programs that have been effective only in communicating to business leaders that the government is not yet serious about limiting global warming pollution.

Mr. Chairman, the first rule for getting out of a hole is to stop digging. Every year that we delay adoption of real global warming policies, we dig ourselves deeper and make our ultimate response programs more costly, disruptive, and risky. The United States is better positioned than any other country in the world to lead the way in showing that economic progress can go hand in hand with controlling global warming pollution. The time for us to exercise that leadership is now.

Global warming is a problem that becomes more difficult to manage the longer we wait to start. Let's review some basic information. Starting about 300 million years ago, for a period spanning about 75 million years, our planet transferred, through geologic processes, vast amounts of carbon from the atmosphere and living organisms to immense underground reserves, producing what we call fossil fuels. Estimates are that some 5 trillion tonnes of carbon were stored in this way. Imagine a 75 million year video documenting the removal of 5 trillion tonnes of material from our global living room and its storage in a remote subterranean repository. Now, imagine running this video in reverse and at hyper speed. That is what we have been doing for the past 150 years.

Since the Industrial Revolution, we have been putting these immense underground carbon stores back into the atmosphere by burning these fuels and we are doing so at ever increasing speed. At current consumption rates, we put back in the air each year about 100,000 years of stored carbon. In the last 150 years we have put about 290 billion tonnes (gigatonnes or Gt) into the air. Amidst the claimed uncertainties about the climate change phenomenon, there is no dispute that these emissions have caused significant increases in atmospheric concentrations of CO₂.

Today's CO₂ levels are about 370 parts per million (ppm), about 30% higher than the pre-industrial level of 280 ppm.

Nor is there any dispute that continued emissions of CO₂ from fossil burning will cause concentrations to go still higher. The latest forecasts for global carbon emissions in the 21st century are sobering. The IPCC's most recent report estimates emissions of between 1000 and 2100 Gt of carbon in the next 100 years—or about 3 to 7 times more than we released in the last 150 years. With cumulative emissions in these ranges, atmospheric CO₂ would build up to between 540 and 970 ppm by the year 2100 and continue to increase unless emissions were cut. Several of the plausible emission scenarios would lead to doubled CO₂ concentrations before a child born today would be eligible for social security.

A final undisputed fact is that once a certain atmospheric concentration is reached, it cannot be significantly reduced for hundreds of years, no matter how drastic a “response program” policymakers decide to put in place. Unfortunately, carbon dioxide's lifetime in the atmosphere is a long one: of each 1000 tons we emit today, 400 of those tons will still be in the air 100 years from now and 150 tons will remain 1000 years from now. So the bed we are making is a procrustean one that we and generations to come must lie on.

As a result of fossil fuel combustion, we already have increased atmospheric CO₂ to levels greater than “at any time during the past 400,000 years,” notes the recent National Academy of Sciences report to President Bush. And we are on a path to dramatically higher concentrations in the coming decades. The policy questions this Committee and this Congress must address are whether and when to act to reduce the buildup of CO₂ concentrations in the atmosphere. In NRDC's view the answers are, yes we must act and we should start now.

Yet for more than a decade, fossil-fuel dependent industries have vehemently opposed policies to limit global warming pollution and governments, including the U.S. government, have declined to adopt such policies. One can explain the position of the industrial opponents as driven by the narrow interests of their current business plans but what explains the compliant position of governments, which should show at least some signs of support for the broader public interest. One explanation is the influence of money on politics and enactment of the McCain-Feingold legislation would be a salutary development. A second explanation is that legislators and executive branch officials believe that we can wait until the emergence of greater consensus on the detailed nature of the threats we face from global warming and that acting later will reduce the costs of a response program compared to acting now. NRDC believes this basic assumption—that later is cheaper—is simply wrong.

The basic fact is that further delay in adopting effective policies forecloses options for us and for our children. Further delay will increase the costs of achieving stable atmospheric concentrations at levels less than double or even triple the concentrations under which human societies have evolved. How important is it for us to preserve the option to stabilize greenhouse gas concentrations at these lower levels? The policy dilemma is that we may not know the

answers in a manner convincing to all for decades to come. Yet if we delay policy action until we have amassed a more comprehensive and detailed body of evidence of the full range of damages that a changed climate will bring, the planet's growing emissions will have made stabilizing concentrations at levels anywhere near today's levels very much more expensive, if not impossible.

Each year of delay in developing an effective global response program brings us closer to the point of no-return when we lose the ability to limit the increase in greenhouse gas concentrations to lower levels. By failing to act, we are passing these points of no-return without even understanding what we are giving up for ourselves and our descendants. As I mentioned, pre-industrialization levels of CO₂ did not exceed 280 ppm and we are now at 370 ppm, the highest level in 400,000 years. Because the way CO₂ builds up in the atmosphere is well understood, we can determine the cumulative emissions during the next century that allow us to stabilize the atmosphere at various levels, such as 350, 450, 550, 650, or even 750 ppm and experts have done these calculations. The most recent IPCC report summarizes these 21st century emission budgets as follows:

Stabilization target (ppm)	350	450	550	650	750
Cumulative emissions in 21 st century (GtC)	280	630	960	1150	1300

The same report forecasts cumulative global emissions during this period, in the absence of effective global warming policies, to range from 1000 to 2100 Gt of carbon. While many members of Congress don't fancy themselves expert in global warming, most have a good understanding of budget fundamentals. In budget terms we are spending at a rate that far exceeds what we can afford if we learn we need to stabilize CO₂ concentrations in the 350 to 550 ppm range. At first glance, these numbers may suggest we still have lots of time to study this issue but consider that to keep the next hundred years' emissions under 300 Gt we would need to cut today's global emissions *immediately* by more than 60% and keep them there while the world grows in population and affluence. Or we might pursue the cut more gradually but then we must achieve even deeper cuts later to stay within the same budget. While this example is for the 350 ppm option, the same dynamic exists for each of the higher stabilization targets: the longer we delay adoption of policies that limit business as usual growth in emissions, the deeper the cuts the planet must achieve to hit any stabilization target. And if we delay too long, each successive stabilization target becomes impossible to achieve.

Dr. James E. Edmonds of the Department of Energy's Pacific Northwest National Laboratory and colleagues have estimated least-abatement cost schedules for reducing emissions to meet these stabilization targets. He points out that these schedules require global emissions to drop below business as usual paths in the very near future. Here is a

summary of this information as he presented it to the Senate Energy Committee on June 28, 2001:

CO₂ Concentration (ppmv)	350	450	550	650	750
Maximum Global CO ₂ Emissions (billions of tonnes carbon per year)	8.5	9.5	11.2	12.9	14.0
Year in which Global Emissions Must Break from Present Trends	Today	2007	2013	2018	2023

As can be seen, for the lower targets, the dates for achieving significant global emission reductions are upon us now and the dates for preserving even the higher targets are very close. To appreciate that these dates do not allow time for further delay in adopting policies, consider the sequence of events that must occur to actually succeed in reducing global emissions. Clear public policies must be debated and adopted, not just in the U.S. but in other countries too. The private sector must develop strategies for response to those policies. The strategies must be translated into specific investment decisions needed to carry out the strategies, most likely involving additional development work for certain technologies. The investment decisions must be followed with detailed engineering and planning work. And this work must be followed by deployment of lower-carbon technologies in the field on a sufficient scale to actually reduce global emissions below current forecasted increases. Thus, to reduce global emissions by dates like 2007-2020, we must start today with adoption of effective policies.

Stated another way, further delay in adopting policies to limit global warming pollution means we are discarding the options of stabilizing concentrations at levels closer to the lower end of the range of targets. I cannot prove today that stabilizing CO₂ at 350 ppm is essential for our well-being. But I think it is self-evident that it is not responsible to eliminate this option without any assurance that we can live well with the resulting future. As the National Academy of Sciences panel noted in its report to President Bush, “risk increases with increases in both the rate and the magnitude of climate change.” By committing ourselves to ever-higher CO₂ concentrations, we are committing to higher rates and magnitudes of climate change for our descendants and ourselves.

Fortunately, there are no technical or economic impediments to adopting policies today that will restore U.S. leadership on fighting global warming and send important signals to the private sector and to other countries that the time for effective action has arrived. Congress has before it a number of major legislative initiatives that will address the principal sources of global warming pollution in the U.S. in a way that will stimulate the new technology that is essential to meeting the challenges of limiting these emissions during the remainder of this century.

Near-term domestic policies to address global warming

A. Comprehensive power plant clean-up legislation

NRDC supports comprehensive legislation to reduce all four major pollutants from electric generation—sulfur oxides, nitrogen oxides, mercury and carbon dioxide. Electric generation is responsible for 40% of total U.S. CO₂ emissions. We have the technology to make significant reductions in CO₂ from this sector through a combination of efficiency measures on the supply and the demand side, and through increased reliance on cleaner fuels. Enactment of a cap and trade program for CO₂ from the electric sector would produce the needed market signal to all the players in the electric production and consumption sectors that there is value in reducing carbon emissions. The bipartisan bill, S. 556, the “Clean Power Act,” sponsored by Senators Kerry, Lieberman, Collins, Jeffords and Snowe would accomplish this objective and NRDC strongly supports it.

Complementary policies to reduce emissions from electric generation include renewable portfolio standards proposed in the last Congress in S. 1369, to facilitate the deployment of renewable energy resources, a public benefits fund as proposed in last year’s S. 1369 and this year’s S. 597, to promote continued investments in demand side management programs and net metering provisions (as found in both bills), to promote clean and efficient distributed generation.

B. Policies to Reduce Petroleum Dependence and Protect the Environment and Public Health

1. Close the Light Truck Loophole and Raise Fuel Economy Standards to 40 Miles per Gallon

Incentives for advanced technology vehicles will be most effective if enacted in combination with updated fuel economy standards. This can be accomplished in two steps. First, congress should quickly eliminate the light truck loophole in the current fuel economy standards. The share of new vehicles that are classified as light trucks (SUVs, minivans, and pickups) has increased dramatically from 20 percent of sales when the CAFE law was first enacted in 1975 to nearly 50 percent of the market today. Yet the vast majority of vehicles currently regulated as light trucks are in fact used in exactly the same way as passenger cars. EPA recognized the need to eliminate the light truck loophole in its Tier II tailpipe standards beginning in 2004. Congress should follow this lead and eliminate the light truck loophole in fuel economy regulations in the same time frame. Congress should raise the overall fuel economy standard for the entire light vehicle fleet over a longer time period. A recent report by the Union of Concerned Scientists shows that the fleet average efficiency could be increased to 40 miles per gallon (mpg) by 2012 and 55 miles per gallon by 2020. The 40 mpg standard could be achieved through incremental

improvements to vehicles with conventional drive trains, although hybrid and fuel cell vehicles would likely contribute to achieving this efficiency level. The 55 mpg standard could be most easily achieved by applying hybrid technology throughout the vehicle fleet.¹

Congress should also set standards for replacement tires. It is a little known fact that auto manufacturers use highly-efficient tires to comply with current CAFE requirements, but comparable tires are not available to the consumers as replacements. Congress should require replacement tires to meet the same specifications as those sold on new cars. This measure alone would save over 70% more oil than is likely to be found if drilling were permitted in the Arctic National Wildlife Refuge.

2. Pass the CLEAR Act: Tax Incentives for Advanced Technology Vehicles and Alternative Fuels

The CLEAR Act (S. 760) provides a comprehensive set of performance-based tax incentives to accelerate the commercialization of advanced technology vehicles and alternative fuels. This bill is a major advance over previous vehicle tax credit proposals because it is the first proposal to link publicly-funded incentives directly to the public benefits provided by the vehicles that get the incentive, in this case the amount of petroleum and carbon dioxide displaced. This is accomplished by linking the amount of the tax credit it offers in part to the actual fuel economy of the qualifying vehicles. The bill also includes important provisions to ensure that public support only goes to truly advanced vehicles that reduce local air pollution as well as global warming pollution and petroleum consumption.

The policy advances incorporated into CLEAR reflect the collective advice of a unique coalition of environmental advocates and automakers. Public interest organizations that have joined NRDC in endorsing the CLEAR Act include the Union of Concerned Scientists, Environmental Defense, the American Council for an Energy-Efficient Economy, the Ecology Center of Ann Arbor, Michigan and the Michigan Environmental Council.

3. Establish Incentives to Promote Smart Growth Development Patterns

Gasoline use also can be reduced by directing real estate development away from urban sprawl and toward “smart growth.” Smart-growth suburbs reduce the need to drive by 30 percent or more, cutting household expenditures on transportation.² An important incentive for smart growth is to establish mortgage qualification rules that recognize the increased affordability of homes that have low transportation costs because they are located in areas with good access to public transportation.

¹ Union of Concerned Scientists, *Drilling in Detroit: Tapping Automaker Ingenuity to Build Safe and Efficient Automobiles*. (June 2001). Available from <http://www.ucsusa.org/>

² David Goldstein, “Mortgages Can Remove the Incentive for Sprawl,” *Earthword: The Journal of Environmental and Social Responsibility*, Issue #4.

4. Modify the Ethanol Tax Credit to Make it Performance-Based

The largest incentive currently going to alternative fuels is the excise tax credit provided for ethanol. Unfortunately, the environmental benefits generated by this tax credit are limited because it does not currently incorporate performance criteria. Most ethanol is currently produced from corn and requires high levels of chemical and fossil fuel inputs that are almost as great as those for conventional gasoline over the full fuel cycle of production and use. The existing tax incentive for ethanol could be made much more effective by linking the amount of the credit to the net reduction in global warming pollution or fossil fuel consumption achieved by the ethanol producer. This would encourage ethanol producers to shift to less energy intensive feedstocks, such as agricultural wastes and perennial crops, and to improve the efficiency of their conversion processes.

C. Benefits of a Comprehensive Policies to Promote Advanced Technology Vehicles and Alternative Fuels

The economic and environmental benefits of enacting the comprehensive set of policies described here would be profound. EPA estimates that the average light truck on the road today produces 164 pounds of smog-forming pollution (hydrocarbons plus nitrogen oxides) and 8.0 tons of global warming pollution in traveling 14,000 miles each year. This does not include upstream emissions associated with producing the fuel, which would add about 11 pounds of smog-forming pollution and 2 tons of global warming pollution, bring the totals to 175 pounds of smog-forming pollution and 10 tons of global warming pollution. Conventional new vehicles are substantially cleaner than this average with respect to smog-forming pollution, but have roughly the same fuel economy and therefore the same global warming pollution emissions as the vehicle existing vehicle it is likely to replace. For example, a vehicle meeting the National Low Emission Vehicle standard would emit only 12 pounds of smog-forming pollution from its tailpipe, but upstream emissions would still add 11 pounds, bringing its total impact to 23 pounds of smog-forming pollution and 10 tons of global warming pollution. In contrast, a hybrid vehicle qualifying for a \$3000 tax credit under the CLEAR Act would emit less than 1 pound of smog-forming pollution from its tailpipe and would use only half as much fuel. As a result, its total impact would be only 6 pounds of smog-forming pollution and 5 tons of global warming pollution.

Aggregating from the vehicle level to the fleet level, the Union of Concerned Scientist (UCS) estimates that the combination of tax incentives and higher fuel economy standards advocated here would save 540 million barrels of oil in the year 2010, reduce upstream smog-forming pollution by 320 million pounds, and reduce global warming pollution by 273 million tons. By 2020 the savings would be even more dramatic: 1.8 billion barrels of oil, 1000 pounds of smog-forming pollution, and 890 million tons of global warming pollution. All of these benefits would be achieved while saving consumers billions of dollars: nearly \$10 billion in 2010 and \$28 billion in 2020 according to UCS.

D. Legislation to Provide Energy-Efficiency Incentives for the Buildings Sector

The performance based approach adopted in the CLEAR Act should also be applied to the design of tax incentives to promote efficiency in other energy using sectors of our economy. For example, “The Energy-efficient Buildings Incentives Act” (S. 207), introduced by Sens. Robert Smith (R-N.H.) and Diane Feinstein (D-Calif.), would provide tax breaks for building energy-efficient commercial buildings, schools, rental housing and new homes, cutting their energy needs by 30 percent to 50 percent. It also would provide tax incentives for the purchase of energy-efficient air conditioners, heating and cooling systems, and solar water heating and photovoltaic systems.

S. 207 provides tax incentives for energy efficiency in buildings. Buildings are an often-overlooked source of energy waste. They consume over a third of U.S. energy use and account for about a third of total air pollution in the United States. Energy use in buildings can be cut in half or better using cost-effective technologies that are available to those consumers that are willing to search them out.

But in practice most of those technologies simply are not options for energy users, whether consumers or businesses, because they are too hard to find. Economic incentives can cause the entire chain of production and consumption, from the manufacturer to the contractor or vendor to the consumer, to accept new technologies rapidly. In the few cases where utility programs have been consistent enough across the country and long-lasting enough, new products have been introduced that have become or will become the most common product in the marketplace, with reductions in energy use of 30%-60%.

Examples include:

- Refrigerators, where, new products that are available this year consume less than a quarter of the energy of their smaller and less feature-laden counterparts 30 years ago. The last step forward, saving 30%, resulted from a coordinated incentive program, the Super Efficient Refrigerator Program (SERP), which was sponsored by utilities with the advice of the U.S. Environmental Protection Agency.
- Clothes washers, where some 10% of the market now provides cleaner clothes at a reduction in energy use of 60% or more. This gain in efficiency resulted from a program organized by the Consortium for Energy Efficiency (CEE) and supported by Energy Star. New standards adopted by the Department of Energy – and supported by the manufacturers – will bring all of the market to this level by 2007.
- Fluorescent lighting systems, where new technologies that also will be required by manufacturer-supported federal standards will reduce lighting energy consumption by 30% compared to mid-70’s practice while improving the performance of the lighting system.

The policies embodied in S. 207 are built on success stories like these.

Manufacturers have pointed out that in order to introduce new technologies that cost more and that are perceived to be risky, they need the assurance that the same product can be sold throughout the country and that the financial incentives will be available for enough time to make it worth investing in production. S. 207 does this by providing nationally uniform performance targets for buildings and equipment that will be eligible for tax incentives for 6 full years.

It's worth mentioning that S. 207 and other policies improving efficiency of electricity and natural gas use have immediate benefits for consumers and the economy. Let's start with the problem of electric reliability. Not only in California and the West, but in other parts of the country, we are facing the risk of electrical blackouts and/or excessively high electricity prices this summer and next. Regions that are confronting these problems are trying to move forward aggressively both on energy efficiency programs and on power plant construction. But the lead times for most actions on the supply side are far too long to provide a solution. And demand-side approaches attempted on a state-by-state level are much less effective than coordinated national activities.

Here, S. 207 could be a critical piece of a national solution. Air conditioners, for example, represent about 30% of summertime peak electric loads. Air conditioners that use a third less power can be purchased today, but they are not produced in large enough quantities to make a difference to peak load. If incentives are made available, manufacturers could begin to mass-produce these products in a matter of months, not years. Mass production and increased competition for tax incentives will drive prices sharply lower, so the incentives will be self-sustaining in the long-term. And with 5 million air conditioners being sold every year, a sudden increase in energy efficiency could have a significant effect in balancing electricity supply and demand even after less than a year.

Another peak power efficiency measure with a very short lead time is installing energy-efficient lighting systems – either new or retrofit – in commercial buildings. Some 15% of electrical peak power results from lighting in commercial buildings. Efficient installations, such as those NRDC designed and installed in our own four offices, can cut peak power demand by over two-thirds while improving lighting quality. Lighting systems are designed and installed with a lead time of months, so incentives for efficient lightings as provided in S. 207 could begin to mitigate electric reliability problems as soon as next summer.

The second major new problem is the skyrocketing cost of natural gas, which caused heating bills throughout the country to increase last winter. Improved energy efficiency can cut gas use for the major uses – heating and water heating – by 30%-50%. Much of this potential could be achieved in the short term, because water heaters need replacement about every ten years, and are the second largest user of natural gas in a typical household (and largest gas user in households living in efficient homes or in warm areas).

These types of quick-acting incentives help consumers in two different ways: first, they provide new choices that are not now available in practice for families and businesses that want to cut their own energy costs while obtaining tax relief. But they also help the non-participants, because reduced demand cuts prices for everyone.

E. Benefits of Integrated Policies to Promote Efficiency, Renewable Energy and Limit Carbon Emissions

The beneficial impacts of policies like those described above are magnified when assembled into an integrated program that combines incentives for energy efficiency and renewable energy and explicit measures to limit carbon emissions. An example of such an integrated program can be found in the November 2000, Department of Energy Report, "Scenarios for a Clean Energy Future." The policies described in the Clean Energy Future report include greatly expanded research and development funding for energy efficiency and renewable energy breakthroughs, a renewable energy portfolio standard, incentives for renewable energy production and suites of performance standards and incentives for the vehicles, buildings, and industrial sectors. DOE's report forecasts that together, these policies would avoid the need for construction of over 60 percent of the nation's base-case predicted need for new electric power plants over the next 20 years. The policies also would lower Americans' electric bills by over \$120 billion per year, cut CO₂ pollution by one-third, and slash emissions of other pollutants in half. These policies are not the imaginings of wild-eyed dreamers. In many cases they amount to expanding programs that have proven to work well already: cap and trade emissions programs; tax incentives; appliance standards; targeted research and development programs; and well-structured voluntary performance commitment programs. Adoption of such programs now is feasible and we urge members of the Committee to lend their support to early enactment of each of these measures.