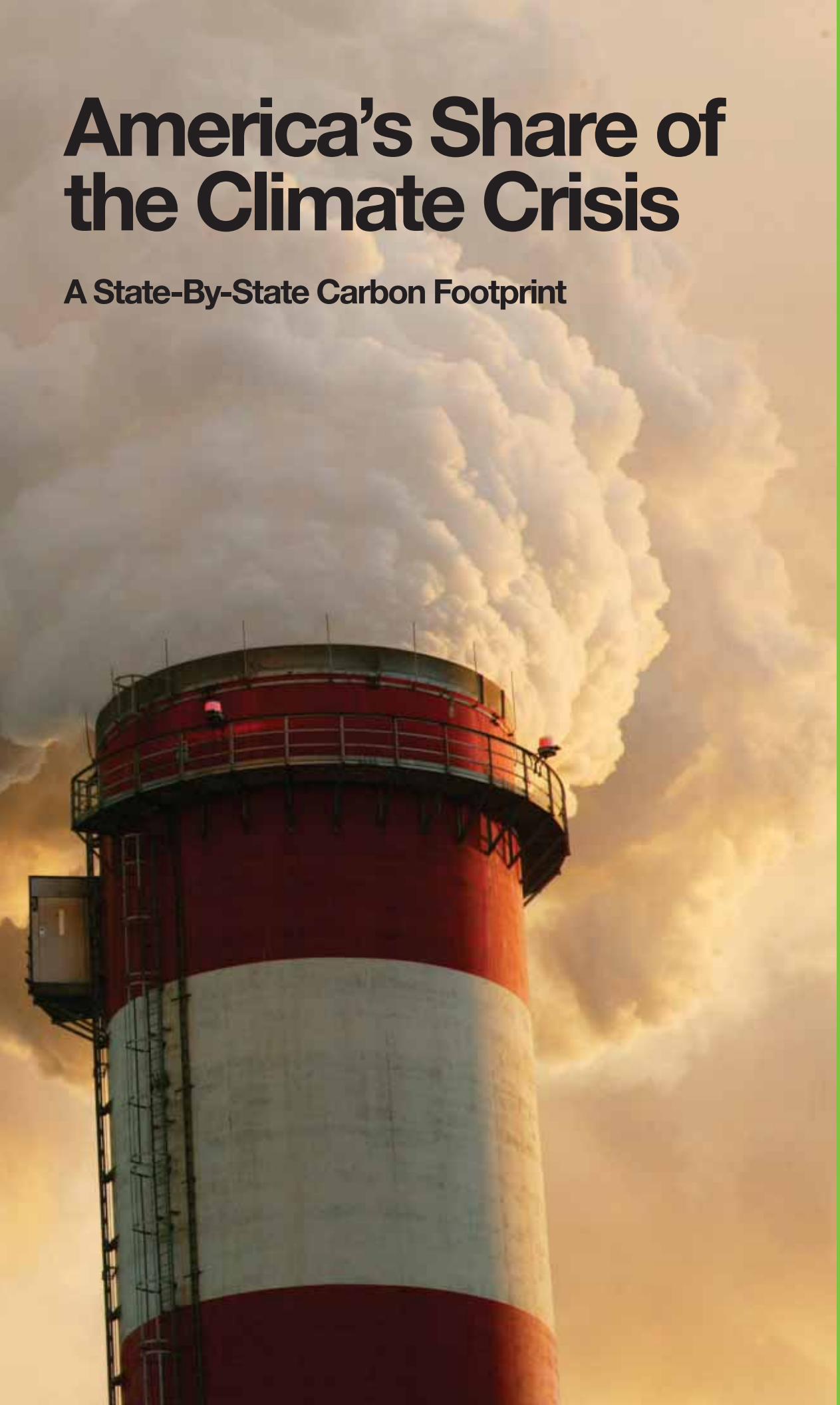
America's Share of the Climate Crisis

A State-By-State Carbon Footprint



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Chapter 1: Introduction

Global warming is an urgent crisis that demands immediate action to prevent climate catastrophe. The consequences of inaction are far too great, and the time remaining to reduce those consequences is running out.

The nations of the world will meet this December in Copenhagen to negotiate a new international climate treaty to improve upon the 1997 Kyoto Protocol. Central to the negotiation will be national targets, and ultimately a global target, for greenhouse gas pollution reductions.

Simply put, the world must decide how much total greenhouse gas pollution will be allowed into the atmosphere and then decide each country's share of that total.

Dangerous global warming—by the numbers

Setting a limit on global emissions is the easy part, relatively speaking. To prevent catastrophic global warming, worldwide average temperatures must remain as far as possible below 1.5–2.0 degrees Celsius above pre-industrial levels.[1,2] To have an approximately 50 percent chance of keeping warming below 2 degrees, atmospheric greenhouse gas concentrations must stabilize below 450 parts per million.[3] To stabilize the concentration of greenhouse gases in the atmosphere at 450 ppm, the global "budget" or maximum pollution we can allow between now and 2050 is approximately 1,700 gigatons (Gt) carbon dioxide-equivalent (CO2eq).[4] A Gigaton = one billion metric tons = over 2 trillion pounds.

A more precautionary approach to minimize the risk of catastrophic impacts would require that emissions be limited still further, and certainly a debate will go on about what degree of climate risk is acceptable to impose on future generations. Still, establishing an overall limit on total global emissions is mostly a question of hard science, not much more complicated than the basic points summarized above.

How these total pollution emissions, the rights to pollute, are divided up among nations is a political question, not a scientific one, and therefore it is a much more difficult question to answer in a way that is satisfactory to all parties.

The challenge for world leaders is to agree on national limits on global warming pollution that are both fair and feasible. If countries are asked to limit emissions to levels that seem arbitrary or unfair, then it is unlikely that politicians will abide by those limits. If countries are asked to achieve reductions that are claimed technically impossible or would limit growth in energy consumption below a country's planned or perceived needs, then that too is unlikely to succeed. Most nations act first in their own selfish interest, which is part of what has stalled international action to combat climate change.

Among the primary moral considerations one must account for in setting national emissions targets is each country's historical responsibility for creating the problem in the first place. Global warming is not a problem that emerged overnight. The accumulation of heat-trapping gases in the atmosphere has taken decades to reach the crisis point we face today.

Historically, no nation has emitted more global warming pollution than the United States. Over the past 150 years, the U.S. has emitted 328,264 million metric tons of carbon dioxide (MtCO2), the primary greenhouse gas, 29% of total global emissions.[5] No other country in the world emitted more than 8% of global emissions. China, the second-leading global warming emitter in the world, trails far behind with just 92,950 MtCO2 of emissions over the same time frame. This legacy of pollution by industrialized countries is the reason that they are obliged to cut emissions before developing countries under the UN global warming treaty (the Framework Convention on Climate Change.)

Per capita emissions in the U.S. have historically been far above most countries in the world as well. In 2005, the United States emitted 23.5 tons of global warming pollution for every man, woman and child in the country. Only Australia (26.9), the tiny principality of Luxembourg (27.5), and small, oil-producing nations Qatar (55.5), U.A.E. (38.8), Kuwait (35.0) and Bahrain (25.4) had greater emissions per capita than the United States.[6]

While much attention has been paid to the rising emissions of developing nations like China and India, the per capita emissions in the U.S. and across the developed world still far exceed those nations'. U.S. per capita emissions in 2005 were more than four times greater than China's (5.5 tons per person), and almost 14 times India's (1.7).

Introduction

Key Findings

This study aims to shed light on the United States' responsibility for taking the lead to solve global warming as a result of its outsized role in causing the problem in the first place. Using data from the Carbon Analysis Indicators Tool maintained by the World Resources Institute, the analysis examines state-by-state carbon dioxide emissions from fossil fuel combustion from 1960-2005 and compares those emissions to 184 other countries of the world.

Key findings include:

- Historically, no nation has emitted more global warming pollution than the United States. From 1960-2005, the U.S. emitted 213,608 MtCO2 (Mt = Megatons or millions of tons of carbon dioxide), 26% of total global emissions. The next biggest polluter, China, emitted 88,643 MtCO2 over the same time frame, 10.7% of global emissions.
- The U.S. also exceeded almost every other nation in per capita emissions. Per capita, the U.S. emitted 720 tons of CO2 per person per year from 1960-2005. This is more than ten times China's per capita emissions (68 tons of CO2) during the same period, and ninety times the per capita emissions of Kenya (7.7 tCO2).

Pictured below:
Exxon refinery in New York Harbor
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- Even considered individually, the 50 U.S. states are among the nations that are the largest emitters of carbon dioxide on earth.
- The average U.S. state emitted 4,449 MtCO2 from 1960-2005, which would rank 30th among the nations of the world.
- The top state in total emissions from 1960-2005 was Texas (25,191 MtCO2).
- If Texas were its own country, it would rank sixth out of 184 countries in the world in total emissions, trailing just China, Russia, Germany, Japan, and the United Kingdom.
- Texas alone emitted more CO2 than the 122 lowest-emitting countries in the world combined.
- The combined historic emissions of just seven states—Texas, California, Illinois, New York, Indiana, Pennsylvania, and Ohio—totalled 96,517 MtCO2, more than any other country in the world, including China (92,950).
- Vermont, the U.S. state with the lowest emissions since 1960, still accounted for more carbon dioxide emissions than 87 nations.
- Only two countries had higher cumulative per capita emissions since 1960 than the U.S.: Estonia (728) and Luxembourg (1,251) which is known in Europe for its cheap petrol and diesel fuel, leading to inflated consumption per capita.
- The state with the highest cumulative per capita emissions from 1960-2005 was Wyoming, which emitted 3,868 tCO2 per person due to its heavy coal mining industry in the Powder River Basin.
- The state with the lowest cumulative per capita emissions from 1960-2005, Vermont, emitted 420 tCO2 per person, more than the per capita emissions of 167 individual nations.

Chapter 2: Global Warming—Damage Today, Catastrophe Tomorrow

The Scientific Evidence of Human-Caused Global Warming

In 2007, the Nobel Prize-winning Intergovernmental Panel on Climate Change, the scientific body charged by the United Nations with summarizing the best climate science, concluded that evidence of the warming of our climate is "unequivocal," finding that eleven of the preceding twelve years (1995–2006) ranked among the twelve warmest years on record.[7]

Among the consequences of global warming detectable today, according to IPCC, are more frequent heat waves, heavy precipitation events, and increasing average sea levels. The areas affected by drought have increased, while the incidence of extreme cold weather days has decreased. Mountain glaciers and snow cover have declined in both the northern and southern hemispheres, and both the extent and volume of Arctic sea ice are declining dramatically, putting both wildlife and human communities at risk throughout the Arctic.

Most of the observed warming over the last 50 years, IPCC further stated, is "very likely" due to human activity, specifically the emission of heat-trapping greenhouse gases. By far the largest single source of greenhouse gases is the combustion of fossil fuels like coal and oil for energy, which emits carbon dioxide. In 2004, carbon dioxide emissions from fossil fuel use accounted for nearly 57% of all global greenhouse gas emissions. The second greatest source, carbon dioxide emissions from deforestation, amounted to nearly 20%.

If we do not act quickly to reduce our global warming emissions, IPCC projects devastating consequences within the next few decades: up to 30% of plant and animal species extinct by mid-century; hundreds of millions of people worldwide facing floods, more intense storms, and severe water shortages. Former World Bank chief economist Sir Nicholas Stern estimated that global warming could reduce worldwide GDP by 20 percent.[8] Indeed, a recent report by World Bank economists concluded that just the impacts of increased storm surges caused by global warming could reduce the GDP's of developing coastal nations by $122 billion.[9]

More recent findings since the publication of the 2007 IPCC Forth Assessment report suggest that even more urgent action may be needed. In 2008, for example, the U.S. National Snow and Ice Data Center announced that summer Arctic sea ice had reached the second-lowest level ever recorded.[10] This observed rapid arctic melting is already far outpacing IPCC worst-case scenario predictions: two years ago, IPCC projected Arctic sea ice could disappear almost entirely by the later part of this century.[11] Now, some scientists including NASA's Jay Zwally predict Arctic summers could be nearly ice-free within the next five years.[12] The speed of this loss is particularly troubling because, as sea ice vanishes, the Arctic Ocean will absorb more energy from the sun, leading to even more rapid sea ice loss, glacial melt and sea level rise. This is only one of several potential feedback loops that could cause runaway global warming that humans can no longer mitigate.

Picuted above:
Oil refinery in New Sarpy, Louisiana
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Action Needed to Prevent Catastrophic Warming

Numerous studies have concluded that, to minimize the risk of catastrophic global warming, worldwide average temperatures should be kept as far as possible below 1.5-2.0 degrees Celsius above pre-industrial levels.[13,14] Further research shows that to have an approximately 50 percent chance of keeping warming below 2 degrees Celsius, atmospheric greenhouse gas concentrations must stabilize below 450 parts per million (ppm). For the chances of keeping warming below these levels to be considered "likely," total greenhouse gases must stabilize at 350-400 ppm or lower.

To stabilize atmospheric greenhouse gas concentrations in the 445–490 ppm range, IPCC estimated that worldwide global warming emissions must fall by 50–85% by 2050 with global emissions peaking no later than 2015. With prudent assumptions about projected emissions in the developing world, IPCC projected that to keep greenhouse gas concentrations below 450 ppm, developed countries as a whole would need to reduce emissions by 25–40 percent below 1990 levels by 2020 and by 80–95 percent by 2050. Again, to ensure the lowest possible degree of risk of catastrophic global warming, cuts would need to be even faster and deeper.

Historically, the largest source of global warming pollution has been carbon dioxide from fossil fuels. In 2004, CO2 emissions from fossil fuel combustion were responsible for 57% of global greenhouse gas emissions.[15] Carbon dioxide lasts in the atmosphere for 50-200 years. Prior to the industrial revolution, concentrations were fairly stable at 280ppm. Today, they are around 388 ppm, an increase of nearly 40%.[16] Average global carbon dioxide levels have been measured from the top of Mauna Loa volcano at the Earth System Research Laboratory in Hawaii since 1959 when levels of around 315 ppm were measured.

Besides fossil fuels, other major global warming pollution sources include CO2 from deforestation (17%), methane (14%), nitrous oxides (8%) and fluorocarbons (1%).

Because of the large share of global greenhouse gas pollution that comes from fossil fuel combustion, it is essential that any serious effort to combat global warming begin with a rapid transition to a clean energy economy powered by clean, renewable energy sources like wind and solar.

According to Energy [R]evolution, a recent study by Greenpeace and the European Renewable Energy Council based on modeling commissioned from the German Aerospace Center, currently available technologies enable us to meet the energy needs of a growing global economy while cutting global emissions by 57% from current levels by 2050 and phasing out nuclear power.

Here in the U.S., the report shows that we can cut emissions even faster, eliminating 83% of carbon dioxide emissions by 2050.[17] The U.S. scenario shows that it is not only possible to cut emissions by these levels, but that the transition to a clean energy economy would pay for itself in saved fuel costs two times over by 2030 and create more than twice as many jobs.

Chapter 3: Global Warming Pollution in the U.S.

Sources of Carbon Dioxide Pollution

The overwhelming majority of global warming pollution in the U.S. comes from burning fossil fuels for energy. In 2007, CO2 emissions from combustion of coal, oil and natural gas accounted for 80% of total U.S. global warming pollution, with total CO2 emissions accounting for over 85% of U.S. global warming pollution.

Power plants are the nation's largest source of carbon dioxide emissions from energy consumption, contributing 42% of carbon dioxide emissions from fossil fuel combustion and 34% of global warming emissions overall.

The transportation sector is the next largest source of carbon dioxide, contributing 33% of carbon dioxide emissions from fossil fuel combustion and 26% of global warming emissions overall.

The remaining 25% of U.S. carbon dioxide emissions from energy sources comes from the direct consumption of fossil fuels in the commercial, industrial, and residential sectors.[18]

Other Global Warming Pollutants

Other global warming pollutants include methane, nitrous oxide (N2O), hydrofluorocarbons (HFCs), perfluorocarbons (PFCs), and sulfur hexafluoride (SF6). Of these, methane and nitrous oxide are the biggest sources of U.S. global warming pollution, accounting for 8% and 4% respectively in 2007. HFCs, PFCs, and SF6 together accounted for 3% in the U.S. These percentages include only those gases being regulated by the Kyoto Protocol international treaty and its successor to be determined in Copenhagen in December 2009.

In addition, there are many millions of pounds of potent CFC and HCFC refrigerant gases and foam-blowing agents that leak from air conditioning and refrigeration equipment and from foam insulation. 'Freon' was one trade name for these gases. CFCs came into heavy use in the 1950s and 60s and are now banned from being produced. HCFCs and HFCs were sanctioned as replacements to CFCs to help the ozone layer, but are now heavy contributors to global warming. HFCs were included in the Kyoto Protocol because they are were not being regulated under the Montreal Protocol ozone layer treaty.

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Chapter 4: Report Findings

This report examines the cumulative global warming pollution emitted by the United States and more than 180 other countries of the world since 1960 in order to more accurately understand each country's relative degree of responsibility for the global warming problem.

Much recent public attention, especially in the U.S., has been paid to the rising levels of pollution in developing nations. For instance, China's total emissions today now meet or exceed those of the U.S. However, because carbon dioxide lasts in the atmosphere for 50-200 years, we must look back at historical emissions over time to gain a more accurate understanding of the causes of the problem.

While carbon dioxide is not the only global warming pollutant, it is the most important historic global warming pollutant, and is therefore a critical point of comparison among nations.

U.S. Far Exceeds All Other Nations in Cumulative Emissions since 1960

Figure 1 shows the cumulative CO2 emissions from the 20 biggest emitting nations between 1960 and 2005. The figure clearly shows that since 1960, the U.S. has far exceeded every other nation in the world in cumulative carbon dioxide emissions from fossil fuel combustion.

From 1960–2005, the U.S. emitted 213,608 MtCO2, nearly 26% of global emissions as indicated in Figure 2. The next biggest polluter, China, emitted 88,643 MtCO2 over the same time frame, 10.7% of global emissions.

While China currently emits slightly more CO2 per year than the U.S. (China in 2005 emitted 7,219 MtCO2, compared to 6,963 in the U.S.), it would take almost 500 years for China to catch up to the U.S. in terms of total emissions since 1960, assuming current rates of pollution.

The average U.S. state emitted 4,449 MtCO2 from 1960-2005, which would rank 30th among the nations of the world.

The top state in total emissions from 1960-2005 was Texas (25,191 MtCO2) (Figure 3). If Texas were its own country, it would have ranked sixth out of 184 countries in the world in total emissions, trailing just China, Russia, Germany, Japan, and the United Kingdom. Texas's emissions were greater than the combined emissions of the 122 lowest-emission countries in the world.

The combined cumulative emissions of just seven US states—Texas, California, Illinois, New York, Indiana, Pennsylvania, and Ohio—totalled 96,517 MtCO2, more than any other country in the world, including China (92,950).

Vermont, the U.S. state with the lowest emissions since 1960, still accounted for more carbon dioxide emissions than 87 nations (Figure 4).

Figure 1: Top 20 Nations

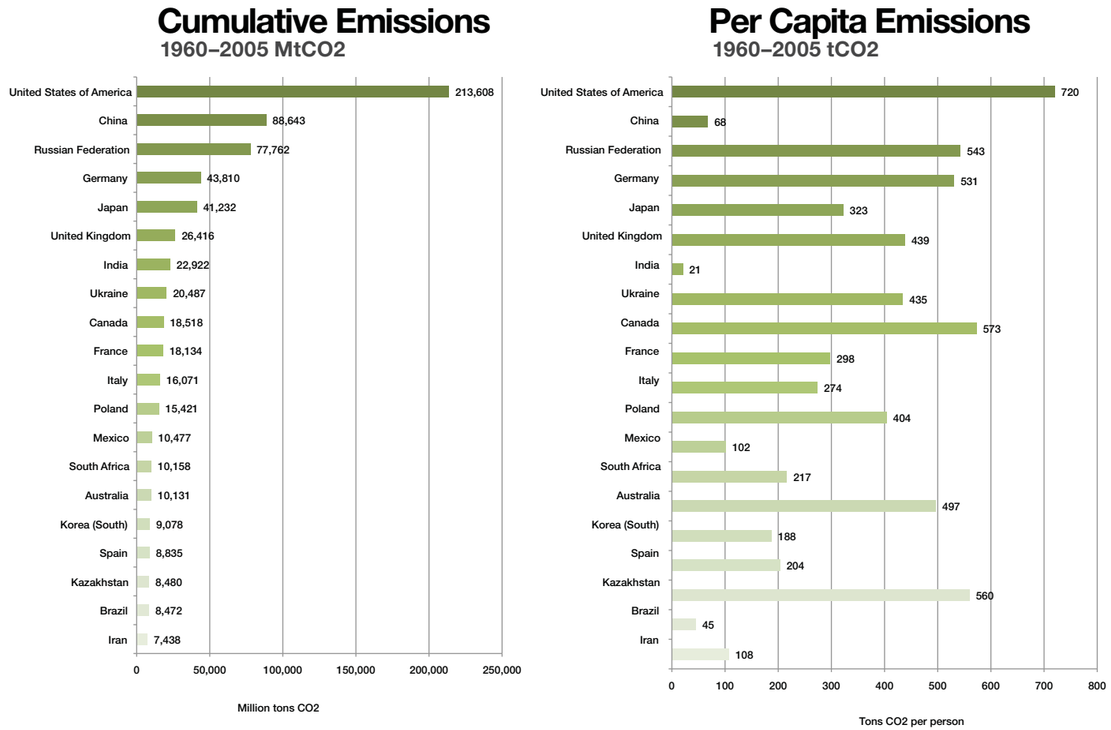
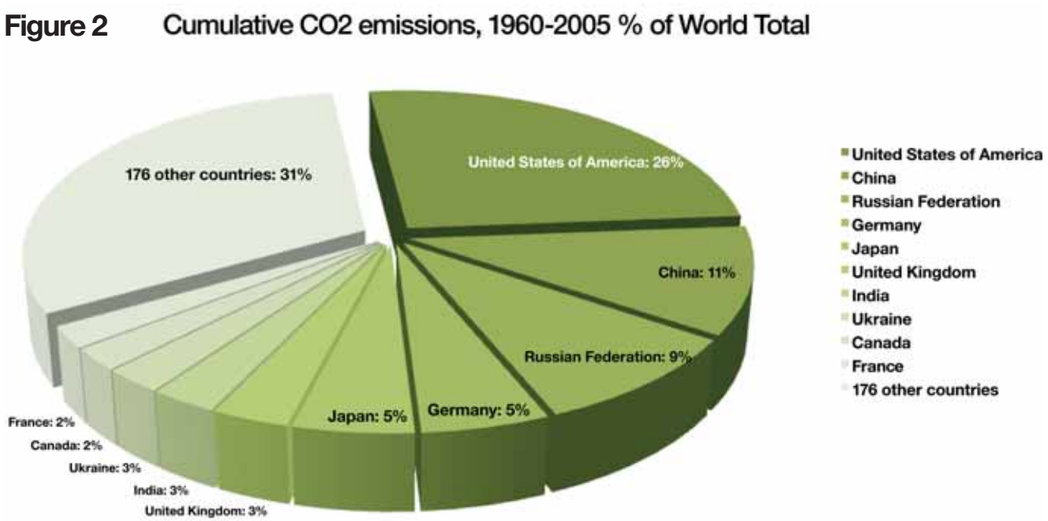


Figure 2 Cumulative CO2 emissions, 1960-2005 % of World Total



Report Findings

Figure 3

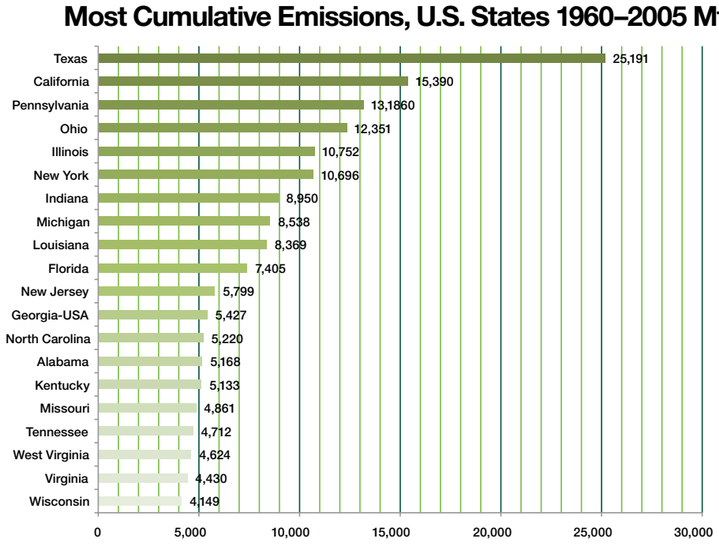
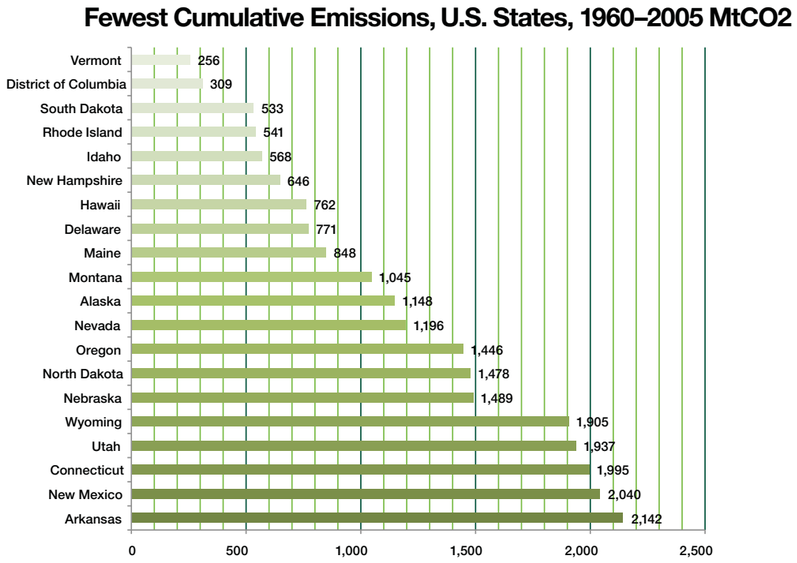


Figure 4



U.S. Far Exceeds Most Other Countries in Per Capita Emissions

The U.S. not only far exceeded every other country in the world in total cumulative carbon dioxide emissions since 1960, but also exceeded almost every other nation in per capita emissions as well.[19]

Per capita, the U.S. emitted 720 tons CO2 from 1960-2005. This is more than ten times China's per capita emissions (68 tCO2) (See Figure 1) during the same time period, and ninety times the per capita emissions of Kenya (7.7 tCO2).

Only two countries, Estonia (728) and the tiny principality of Luxembourg (1,250) emitted more greenhouse gases per capita than the U.S. (Figure 5).

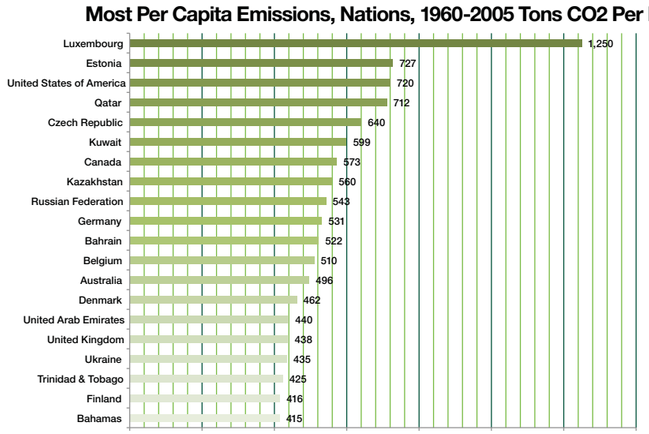


Figure 5

Of the 185 countries studied, 160 nations, about 87% of the world's population, emitted less than half the per capita emissions of the U.S. One hundred twenty-nine nations, 78% of the world's population, emitted less than a quarter as much carbon dioxide per capita as the U.S.

Thirty-eight countries emitted less than 10 tons CO2 per capita over the period studied (Figure 6).

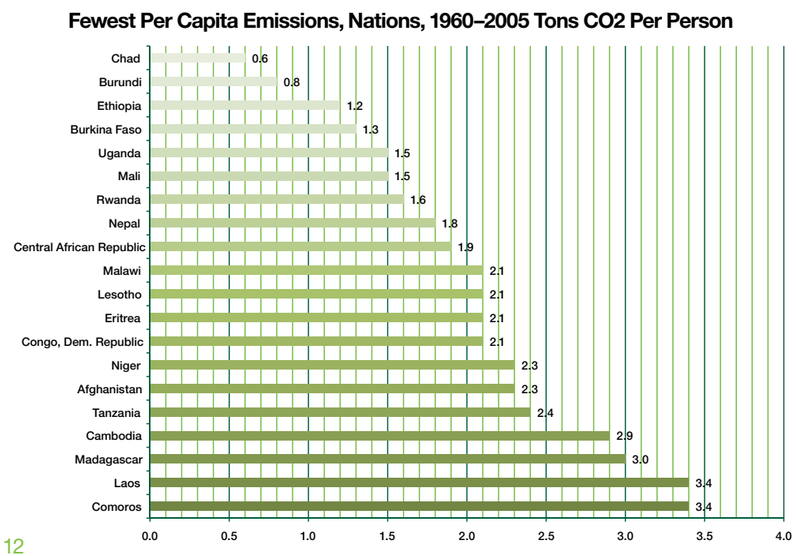


Figure 6

The total emissions of these nations, with combined population of over 800 million, were 2,855 MtCO2. This is less than 27 individual U.S. states.

The top five states in per capita emissions were Wyoming (3858 tCO2), West Virginia (2558 tCO2), North Dakota (2302 tCO2), Louisiana (1873 tCO2), and Alaska (1831 tCO2) (Figure 7).[20]

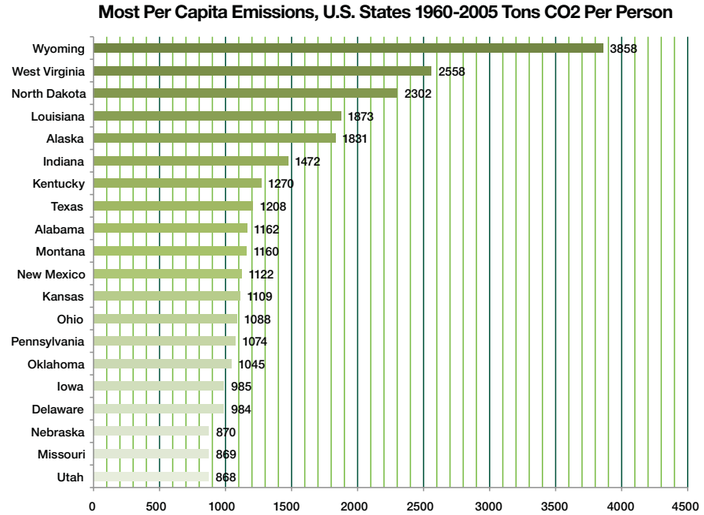


Figure 7

The state with the highest per capita emissions was Wyoming, which emitted 3858 tCO2 per person, more than three times the highest per capita nation in the world, Luxembourg. Seven states have higher per capita emissions than any other country in the world: Wyoming, West Virginia, North Dakota, Louisiana, Alaska, Indiana, and Kentucky.

The state with the lowest per capita emissions, Vermont, emitted 420 tCO2 per person, more than the per capita emissions of 167 individual nations (Figure 8).

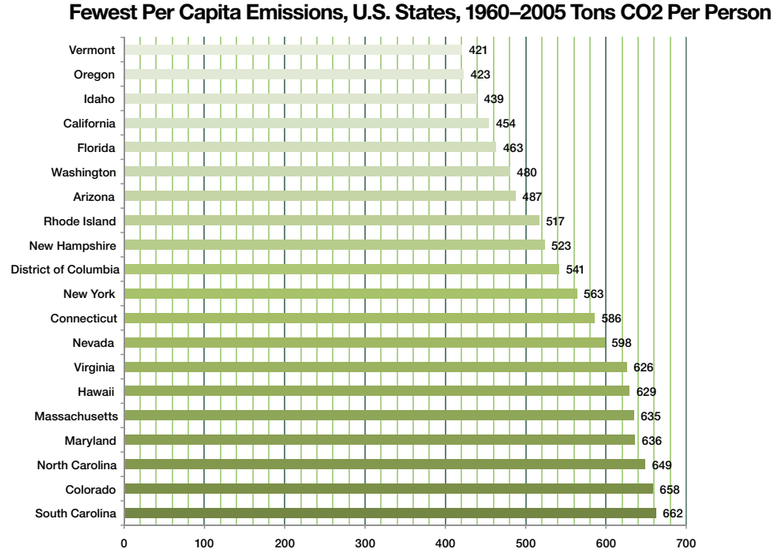


Figure 8

Chapter 5: U.S. Climate Policy Has Fallen Far Short

1908 to 2008—A Century Wasted

Unfortunately, the United States' policy response to global warming since 1960 has been neither as consistent nor as rapid as the growth in its pollution emissions during the same period. Despite the overwhelming scientific evidence demanding swift action to halt global warming pollution, the U.S. Congress and previous administrations have largely failed to rise to the challenge of global warming. To date, global warming pollution remains unregulated at the federal level in the United States and the U.S. continues to lag far behind other industrialized countries (and many developing countries) in responding seriously to the threat.

The first widely read scientific work suggesting a link between global warming and human activity was published more than 100 years ago, in 1908. Following half a century of slowly emerging evidence that the burning of fossil fuels was causing the planet to heat up—accompanied by the simultaneous and massive growth of fossil fuel burning in this country—the federal government first began funding serious research into global warming in the early 1950s. By 1961, the start of the period covered by this report, this research had produced reliable scientific evidence that global levels of carbon dioxide were, in fact, increasing due to human activity. By 1967, calculations based on these measurements suggested that global average temperatures could rise significantly over the next century if global warming emissions were not curtailed. A decade later, in 1977, the National Academy of Sciences, the most prestigious and respected scientific body in the country, published a report conclusively linking energy production and climate change.

In 1981, eight decades after scientists first illuminated the problem, two decades after government research began in earnest, and four years after the NAS report, a young Congressman named Al Gore organized the first Congressional hearing on the issue. Nine years later, Congress adopted the Clean Air Act amendments of 1990, giving the President the power to regulate carbon dioxide and other greenhouse gases for the first time. Despite nearly two decades of increasingly compelling scientific data on the seriousness and urgency of climate change, this power has never been used.

By the end of the decade, the threat of global warming had become a matter of international concern. The first real step in response to this threat came in 1989, when the member countries of the United Nations created a global body of eminent climate scientists, the Intergovernmental Panel on Climate Change (IPCC), to resolve outstanding scientific questions regarding global warming. The IPCC has now issued four assessment reports on the state of climate science, its current and projected impacts, adaptation to those impacts and mitigation of emissions. In each successive report, the scientific consensus has grown stronger with respect both to the profound risks of climate change and the need for urgent global action to curtail those risks.

In 1992, the international community adopted the first treaty to deal specifically with the threat of global warming, the United Nations Framework Convention on Climate Change (UNFCCC). This voluntary treaty failed to decrease greenhouse gas emission. Six years later, the parties to this treaty, including the United States under President Clinton, signed the Kyoto Protocol to the UNFCCC, making their first specific commitments to begin reducing their global warming emissions. The U.S. signed the Kyoto Protocol despite a pre-emptive strike in the Senate led by a coal-state Democrat and a western Republican who pushed a resolution to block its ratification.

Although many of the Senators involved in that measure later expressed regret for their decision, the Byrd-Hagel resolution stymied real action on climate change for the remainder of the Clinton Administration. Two years later, President George W. Bush entered the White House. Despite a campaign promise to tackle global warming emissions, the Bush administration quickly reversed course after coming to power. Immediately after taking office, on the advice of industry lobbyists, Bush withdrew the United States from the Kyoto Protocol, bringing international progress on the issue to a standstill. For the ensuing eight years, his administration staunchly rejected mandatory limits on global warming emissions, actively worked to undermine global climate negotiations and opposed domestic policies to promote the development of clean energy, instead pushing energy policy built on increasing production and consumption of oil and coal.

U.S. Climate Policy Has Fallen Far Short

2009 and Beyond—Time to Act

In 2007, following years of litigation by twelve U.S. states, along with several cities and environmental groups, the Supreme Court ruled that the Environmental Protection Agency has unambiguous authority to regulate global warming emissions under the Clean Air Act. Despite this mandate, the Bush administration refused to implement the law.

Although political momentum to act has increased in recent years in Congress, the certainty of a Presidential veto made meaningful measures impossible under Bush. Weak global warming bills were introduced in the Senate in 2003, 2005 and 2007, only to be defeated or withdrawn. Like the Senate, the House of Representatives failed to take concrete action during this period. This said, the House side saw encouraging progress in 2008 when 152 representatives endorsed principles, authored by environmental champion Representative Henry Waxman, calling for strong climate legislation under the next President.

Ultimately, however, 2008 ended without meaningful action being taken by either Congress or the President to stop global warming. In real world terms, U.S. action to address the threat of climate change has made little progress since that threat was first identified more than 100 years ago.

Pictured:
Coal plant that powers the US Capitol
© Pete Muller/Greenpeace

The elections of November 2008 brought a sea change in the political landscape in Washington, creating profound new opportunities to respond seriously to global warming for the first time. Unfortunately, decades of relative inaction by the United States—decades in which U.S. greenhouse emissions continued to rise rapidly even as the evidence of global warming impacts became ever more urgent—mean that both the President and Congress must now take quick and dramatic action to reduce emissions and transform our economy in order to avoid climate catastrophe.

Only five months into the new Administration, it is too early to judge whether our new government will meet the test of climate change. It is a regrettable reality, however, that success or failure in responding to climate change can no longer be measured in years—it must be measured in months. Considered it in its international context, in fact, it will be measured in days.

As its name implies, global warming is a global problem that demands a global solution. No country can solve the climate crisis by acting alone. For more than a decade, however, international efforts to solve that crisis together have been stymied by the United States' refusal to cooperate in the international climate negotiations of the Kyoto Protocol. This delay is becoming even more critical because the initial round of pollution reduction commitments under the Kyoto Protocol will soon expire, and the world must now negotiate a new agreement. Because of our long delay and growing emissions elsewhere, this new agreement must include much steeper reductions than required by Kyoto. The international community has a deadline for reaching that agreement—the UN climate talks in Copenhagen, Denmark this December. As this report is being finalized in May, there are fewer than 200 days remaining before the start of those talks.

As the country responsible for more than a quarter of historic greenhouse gas emissions, U.S. participation—and leadership—is critical to the Copenhagen process. Unless and until the U.S. demonstrates its readiness to make dramatic and rapid reductions in its CO2 emissions, few other countries will be willing or able to make commitments needed to make the Copenhagen talks a success. For this reason, the world is watching carefully every step the U.S. takes—or doesn't take—with respect to climate change.

2009 and Beyond—Time to Act

There have been some positive signs of progress. In his inaugural address, and in many speeches thereafter, President Obama has made a clear commitment to return to the international climate negotiations and to lead both the country and the world in the urgent fight against climate change. In some important respects, he has moved quickly to deliver on this promise. The President's economic stimulus plan invested more than $80 billion in measures to spur development of clean, renewable energy sources such as wind and solar, and to make that energy go farther by modernizing the country's energy transmission system and improving energy efficiency.

The President has called on Congress to bring him strong climate legislation to sign, and, more importantly, has demonstrated that he is ready and able to use existing authority to regulate greenhouse gases if necessary. In April, for example, the Obama EPA made a formal finding that carbon dioxide emissions pose a danger to human health and welfare, and began a process to regulate those emissions under the Clean Air Act—nearly two decades after Congress gave it the authority to do so in 1990.

Similarly, the U.S. under Obama has reengaged the international community to seek a way forward on climate policy. In addition to returning the US to the UN climate talks themselves, President Obama has brought together the world's biggest polluting countries in an effort to accelerate those talks. The U.S. has also reached out separately to China to find ways these two critical countries can work together to solve the crisis. As the largest historic emitter and the largest current emitter, respectively, and as leaders of the world's most powerful economies, the U.S. and China are together considered the lynchpin to a successful outcome at Copenhagen.

Unfortunately, these measures and words still fall short of the concrete pollution reduction commitments that must be taken to reach agreement at Copenhagen and avert imminent climate catastrophe. In order to avoid the worst impacts of global warming, the IPCC says that the US and other industrialized countries must reduce their overall emissions of greenhouse gases by 25-40% below 1990 levels by 2020. These countries must also invest the financial and technical resources necessary to help end the tropical deforestation that accounts for nearly one-fifth of global warming emissions, and to help the countries of the developing world leap-frog fossil fuels and grow their economies with safer energies that won't endanger the planet. The necessary actions are described in more detail in Chapter 6.

In all of these respects, the Obama Administration has far still to go. While President Obama has pledged to reduce our CO2 emissions, his target would only return the US to 1990 levels by 2020. While no doubt substantial, this target remains far less ambitious than both science and the international community demand. As discussed elsewhere in this report, it is also far less than is already achievable with existing technology.

The story in Congress is similar. Under the leadership of representatives Henry Waxman and Ed Markey, a key House committee has brought forward the first ever climate bill with a reasonable chance of passing. Despite Waxman and Markey's own commitment to strong climate leadership, however, their bill has been attacked and undermined by industry lobbyists—and by powerful members of Congress beholden to those industries. As of this writing, the Waxman-Markey bill had been so weakened that, even were it to pass, it would lead to no real emission reductions between now and 2020 and would provide massive subsidies to fund a whole new generation of dirty coal-fired power plants. This fact has caused even greater concern within the global community that the U.S. will not be ready to make meaningful commitments in time for the Copenhagen talks.

While it is tempting to see this as a simple political problem, the reality is more stark and more troubling. The impacts of global warming are now all around us. The best available science shows that those impacts are far more severe, and are accelerating far more rapidly, than we ever predicted, and that we will soon reach a tipping point beyond which global warming will become uncontrollable and irreversible. It is this reality—the physical reality of global climate science—against which the actions of our government will truly be measured. If they don't adhere to and respect this reality, compromises that seem politically savvy today will prove irrational and irresponsible in the very near future. For both the President and Congress—and for other leaders in countries around the world—the true test of their leadership will be whether they base their actions on political convenience or on scientific facts.

U.S. Climate Policy Has Fallen Far Short

States Take Action to Cut Global Warming Pollution

As the federal government has largely dragged its feet over the last eight years, states in the U.S. have been leading the way to advance renewable and energy efficiency. Only a handful of states do not have any policies to promote renewable energy or energy efficiency in some way.

In combination with federal tax credits, state renewable energy standards (RES) are among the most important factors driving the growth of renewable energy in the United States. RES laws require a specific share of electricity to come from renewable sources or that a specific amount of renewable energy capacity is installed by a given date. By late 2008, there were mandatory RES laws in 28 U.S. states plus Washington, DC, and 5 additional states had adopted voluntary goals. When fully implemented, state RES laws will affect more than 46 percent of national retail electricity sales and together will require more than 10 percent of electricity in the U.S. come from clean, renewable sources by 2020.

A number of states are also considering Renewable Energy Payments (REPs, also known as feed-in tariffs) to assist in meeting state-mandated renewable energy targets. By late 2008, REP legislation had been introduced in six states and under consideration in at least six more. In 2006, for example, California created a renewable energy payment program to support more than 250 megawatts (MW) of renewable energy development. It has since expanded its REP program to include all customer types and increased the cap to 480 MW. (See below for more on California's ground-breaking energy policies.)

In addition, 16 states and Washington, DC have Public Benefit Funds (worth an estimated $6.8 billion by 2017) to advance renewables and energy efficiency (as well as low-income assistance). Funding is derived from a very small per kWh charge on electricity.

Many U.S. states have also enacted laws that require net-metering to allow customers who produce their own renewable electricity to feed their excess electricity into the grid. As of November 2008, net-metering was available in 44 states and Washington, DC.

A number of states have adopted renewable fuels standards (RFS) for biofuels. Although most are for ethanol, some require biodiesel blending. For example, Minnesota has enacted a 20 percent by 2015 biodiesel mandate; the legislation requires that 5 percent of the feedstock come from non-traditional state agricultural resources.

Several states have also begun taking steps to regulate global warming pollution directly. At least fourteen states and the District of Columbia have adopted tailpipe emissions standards for automobiles. The rule, known sometimes as the "California clean cars standard," will require automakers to reduce the average amount of global warming pollution from their cars, light trucks and SUVs. By 2015, new cars will be required to emit 34 percent and light trucks 25 percent less global warming pollution on average.

Finally, some states have enacted economy-wide caps on global warming pollution. In 2006, California Governor Arnold Schwarzenegger signed into law the Global Warming Solutions Act, the first-ever statewide cap on global warming pollution. The law will reduce annual global warming emissions in California by 25 percent by 2020 (equivalent to 1990 levels) and 80 percent below 1990 levels by 2050. Since then, Hawaii, Connecticut, Massachusetts, New Jersey, and Washington have followed suit, enacting similar statewide caps on emissions.

Several states have also entered into regional agreements to cut global warming emissions. For instance, ten states in the Northeast—Connecticut, Delaware, Maine, New Hampshire, New Jersey, New York, Vermont, Massachusetts, Rhode Island, and Maryland—have agreed to the Regional Greenhouse Gas Initiative (RGGI) to cap global warming emissions from the region's power plants at current levels and reduce them by 10 percent by 2019.

Similarly, in 2007, the governors of Arizona, California, New Mexico, Oregon, and Washington announced the Western Climate Action Initiative, which sets a regional global warming emissions reduction goal.

In addition, several states have adopted non-binding goals for reducing global warming emissions. For example:

- New Jersey in 2007 established a goal to cut global warming emissions to 1990 levels by 2020 and to 80 percent below 2006 levels by 2050.[21]
- Illinois in 2007 announced a statewide goal to reduce global warming emissions to 1990 levels by 2020 and to 60 percent below 1990 levels by 2050.[22]
- Washington state in 2007 established a statewide goal to reduce global warming emissions to 1990 levels by 2020, 25 percent below 1990 levels by 2035, and 50 percent below 1990 levels by 2050.[23]
- Arizona in 2006 established a statewide goal to reduce global warming emissions to 2000 levels by 2020 and to 50 percent below 2000 levels by 2040.[24]
- Oregon in 2005 established a statewide goal to reduce global warming emissions to 10 percent below 1990[25] levels by 2020 and 75 percent below 1990 levels by 2050.
- New Mexico in 2005 established a statewide goal to reduce global warming emissions to 2000 levels by 2012, 10 percent below 2000 levels by 2020, and 75 percent below 2000 levels by 2050.[26]

In order to minimize the risk of catastrophic climate change, the U.S. must move aggressively to cut our own domestic emissions by levels consistent with the best climate science. In addition, we must, along with the rest of the developed world, provide the leadership and resources necessary to curb emissions by science-based levels in the developing world while also helping communities adapt to the damage caused by global warming.

Specifically, any minimally adequate U.S. response to global warming climate policy must cut US emissions of greenhouse gases at least 25% below 1990 levels by 2020.

To get to this overall goal, the United States must take two types of action:

01 Reduce domestic emissions of greenhouse gases through a strong national cap.

02 Provide significant financial support for international action to reduce greenhouse gas emissions. This support must come in addition to—not instead of—reducing emissions here in the United States.

By moving aggressively on both fronts, we can do our part to achieve the goals scientists indicate the developed world must reach: cuts in greenhouse gas emissions of 25-40% below 1990 levels by 2020, and 80-95% below 1990 levels by 2050.

Methodology

Carbon dioxide emissions for U.S. states were calculated using fossil fuel combustion data from the U.S. Department of Energy's Energy Information Administration (EIA). EIA's State Energy Data System (http://www.eia.doe.gov/emeu/states/_seds.html) provides state-specific data for energy consumption by source from 1960 to 2006.

We then converted those data from British thermal units (Btu) to carbon dioxide emissions using the emissions coefficients used by EIA in their Voluntary Reporting of Greenhouse Gases Program (http://www.eia.doe.gov/oiaf/1605/coefficients.html). Those coefficients are as follows:

Emission Coefficients

Fuel	Pounds CO2 per	Unit Volume or Mass	Pounds CO2 per Million Btu
Petroleum Products			
Aviation Gasoline	18.355	Per gallon	152.717
Distillate Fuel	22.384	Per gallon	161.386
Jet Fuel	21.095	Per gallon	156.258
Kerosene	21.537	Per gallon	159.535
Liquified Petroleum Gases	12.805	Per gallon	139.039
Motor Gasoline	19.564	Per gallon	156.425
Residual Fuel	26.033	Per gallon	173.906
Natural Gas			
Natural Gas (Pipeline)	120.593	Per 1000 ft3	117.08
Coal			
Anthracite	5685	Per short ton	227.4
Bituminous	4931.3	Per short ton	205.3
Subbituminous	3715.9	Per short ton	212.7
Lignite	2791.6	Per short ton	215.4

Because the State Energy Data System database does not break down coal by rank, we assumed each state's coal mix is equal to the current national mix (approximately 7% anthracite, 50% bituminous, 44% subbituminous, and less than 1% lignite).

Because EIA's Voluntary Reporting of Greenhouse Gases Program does not provide emissions coefficients for asphalt and road oil or lubricants, we assumed 156 pounds carbon dioxide per million Btu. We assumed the same coefficient for the petroleum category labeled "other" in the State Energy Data System database.

For national emissions numbers, we used World Resources Institute's Climate Analysis Indicators Tool database (http://cait.wri.org/).

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